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NCERT

National Curriculum Framework for School Education

2023

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2023

National Steering Committee for National Curriculum Frameworks

Foreword

(To be added)

Acronyms

Acronym	Full Form
BITE	Block Institutes of Teachers Education
CG	Curricular Goals
CSR	Corporate Social Responsibility
DIET	District Institute for Education and Training
ICT	Computers and Information Technology
LO	Learning Outcomes
NAB	National Association for the Blind
NEP	National Education Policy
NIVH	National Institute for Visually Handicapped
NSQF	National Skill Qualification Framework
NTA	National Testing Agency
PHC	Primary Health Centers
PSSCIVE	Pandit Sunderlal Sharma Central Institute of Vocational Education
SCERT	State Council of Educational Research and Training
TLM	Teaching Learning Materials

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Introduction

The National Curriculum Framework for School Education (NCF) is developed based on the vision of the National Education Policy (NEP) 2020, and to enable its implementation.

The NCF addresses education for the age group 3 to 18 years, across the entire range of diverse institutions in India. This is across the four Stages in the 5+3+3+4 Curricular and Pedagogical restructuring of School Education as envisioned in NEP 2020.

NCF from the NEP

The NCF brings to life the aims and commitments of the NEP.

a. The **Aims of Education** are articulated in the NEP from which the curricular goals for the NCF are derived which then informs the rest of the elements.

b. This includes the full **range of human capacities, values and dispositions** that are aimed to be developed in school education. Pedagogy, practices, and culture must work in tandem to develop these, and move away from an overemphasis on memorization and content accumulation; in fact, content reduction is required to create space for such development.

c. The **5+3+3+4 Curricular and Pedagogical structure** of school education is reflected in the learning standards, the content, the pedagogy, and the assessment approaches

d. It is **integrative and holistic** with equal status to all subjects and learning domains from Math to Sports. It integrates vocational education in all schools, and there is integration across subjects while developing rigorous subject understanding and capacities.

e. It **confronts and address real challenges** facing our countries' education system. Notably that of literacy and numeracy, rote memorization, narrow goals, and inadequate resources.

f. It is **deeply rooted in India.** This is in content and learning of languages, in the pedagogical approaches including tools and resources, and most importantly in the philosophical basis – in the aims and in the epistemic approach.

Let us consider some of the directly relevant matters.

Curriculum

Curriculum refers to the entirety of the organized experience of students in any institutional setting towards educational aims and objectives.

The elements that constitute and bring to life a Curriculum are numerous, and include goals and objectives, syllabi, content to be taught and learnt, pedagogical practices and assessment, teaching-learning materials, school and classroom practices, learning environment and culture of the institution, and more.

There are other matters that directly affect a Curriculum and its practice or are integrally related while not being within the Curriculum. These include the Teachers and their capacities, the involvement of parents and communities, issues of access to institutions, resources available, administrative and support structures, and more.

Curriculum Framework

The Curricula across our country must be informed by and be fully responsive to the glorious unity and diversity of India. The imagination of NEP 2020, where institutions and educators are highly empowered - including to develop Curricula - is energized by this diversity and the nurturing of it. States have the Constitutional mandate to provide high-quality education to all children, and their own unique State contexts inform their own approaches to Curricula.

A Curriculum Framework must support exactly that - it is a framework to help develop all the diverse Curricula in the country, while enabling consonances and harmony across the country and providing a basis for quality and equity.

Thus, a Curriculum Framework provides the guiding principles, goals, structure, and elements for the development of Curricula, informed by which the syllabi, teaching-learning-materials including play materials, workbooks, and textbooks, and assessment methods will be developed by the relevant functionaries, including Teachers, in the States, Boards, and schools.

Objectives of this NCF

The overarching objective of this NCF is to help in positively transforming the school education system of India as envisioned in NEP 2020, through corresponding positive changes in the curriculum including pedagogy.

In particular, the NCF aims to help change practices in education and not just ideas; indeed, since the word 'curriculum' encapsulates the overall experiences that a student has in school, 'practices' do not just refer to curricular content and pedagogy, but also include school environment and culture. It is this holistic overall transformation of the curriculum that will enable us to positively transform overall learning experiences for students.

Structure and presentation of the NCF to enable its Objectives

While based on the most current knowledge based on research and experience, this NCF aims to be understandable and relatable to, and usable by, practitioners of education, including Teachers and other educators, school leaders, and functionaries of the education system such as project officers, cluster and block resource persons, block education officers, teacher educators, examination boards, and curriculum/syllabus/textbook development teams.

The NCF also aims to provide the interested reader a reasonable understanding of what education should look like in our new vision for schools and why, and what role individuals could play as parents, community members, and citizens of India, who all have a large stake in Indian education.

Nevertheless, this NCF is designed with the Teacher as the primary focus - the reason being that the Teacher is at the heart of the practice of education. It is the Teacher who is ultimately the torchbearer for the changes we seek. As such, it is the perspective of the Teacher that must be carried by all, including syllabus and content developers, textbook writers, administrators, and others.

This NCF thus aims to adopt a presentation style and structure that enables the above objectives of readability, accessibility, and relevance. While it aims to articulate the underlying philosophy and principles, it does not simply leave it at the level of abstraction but also brings it to practice.

To enable this, and to communicate ideas with greater clarity, this NCF contains different levels of detail and specificity at the level of practice, with clear real-life illustrations in a variety of contexts. The Teacher or curriculum developers are not bound by these illustrations, but it is envisaged that this level of detail will help to make this NCF graspable, relatable, and useable.

This NCF also aims to account for the reality of the current typical institution and Teacher, while being entirely in harmony with the imagination of the best-resourced institutions. Thus, this NCF aims to be deeply rooted in the reality of our context, yet aspirational.

Volume in hand and those to follow

The volume in your hand describes the NCF comprehensively.

To enable the objective of making the NCF as relatable to practitioners as possible, eight volumes will follow, of which seven would be on the specific Curricular Areas – Arts and Music, Languages, Math, Science, Social Science and Humanities, Sports, and Vocational Education, and one will be on School Culture and Processes. The volumes that are to follow will have greater details on the specific matters, to enable the implementation of the NCF, and its use by practitioners, from curriculum and textbook developers, to, teachers and assessors.

While the NCF-FS is included with this NCF, the NCF-FS document must be considered as another of the detailed volumes, making the set all together of ten volumes, including the volume in hand.

This integrated overview volume of the NCF is structured in five parts, which are further divided into chapters as follows:

Part A: Approach

Ch-1: Aims and Curricular Areas of Education

Ch-2: School Stages – Logic and Design

Ch-3: Approach to Leaning Standards, Pedagogy, Content, and Assessment across Stages

Part B: School Subjects/Areas

Ch-1: Foundational Stage

Ch-2: Language Education

Ch-3: Mathematics Education

Ch-4: Science Education

Ch-5: Social Science Education

Ch-6: Arts Education

Ch-7: Interdisciplinary Areas

Ch-8: Physical Education

Ch-9: Vocational Education

Ch-10: Secondary Stage, Grades 11 and 12

Part C: Cross-cutting Themes

Ch-1: Values

Ch-2: Inclusion

Ch-3: Information and Communications Technology

Ch-4: Guidance and Counselling

Ch-5: Environment

Ch-6: Rootedness In India

Part D: School Culture and Processes

Ch-1: School Culture

Ch-2: School Processes

Part E: Creating a Supportive Ecosystem

Ch-1: Ensuring an Appropriate Environment for Learning

Ch-2: Pupil Teacher Ratio

Ch-3: Enabling and Empowering Teachers

Ch-4: Role of Academic and Administrative Functionaries

Associated documents

While the NCF is sufficient for its purposes, nuances can be arrived at better, particularly in the context of the overall education system, when it is read in conjunction with the NEP 2020 and the draft NEP 2019. The Mandate Document for NCF (2022) was the bridge between the NEP and draft NEP, and the NCF.

The NCFTE that is under the process of development will be informed by the NCF, and thus must be read in conjunction. The NCFAE too will draw from the NCF.

Few key characteristics of this NCF to keep in mind as you read

a. **Goal directed:** The entire approach is driven by the curricular goals which are derived from the aims; these tie everything together and are center stage.

b. **Practice enabling:** It attempts to convert and distill mattes to practice which is where education happens or doesn't.

c. **Educationally valid:** It's based on sound research, experience, and accumulated knowledge in India and across the world.

d. **Engaging:** Education must be made interesting and exciting both to the children and teachers.

e. **Improvement driving:** Must be able to change things on-the-ground within practical constraints and limitations and keep moving forward.

f. **Diversity embracing:** India's diversity in all its forms must not only be addressed but should also become a resource for learning.

g. **Mutually reinforcing elements:** All dimensions mentioned above are mutually reinforcing; as are the curricular goals, content, pedagogy, school culture and practices, assessment and evaluation.

Part A:
Approach

Chapter 1

Aims and Curricular Areas of School Education

This chapter defines the Aims of School Education for this NCF and indicates the curricular arrangements that would assist in achieving these aims. These aims are derived from the purposes and goals articulated in NEP 2020, and their more elaborate articulation in DNEP 2019.

The chapter first reiterates the vision of the Indian society as envisaged by NEP 2020 and the purposes of education, and the characteristics of individuals that such an education would develop, who would contribute to this vision.

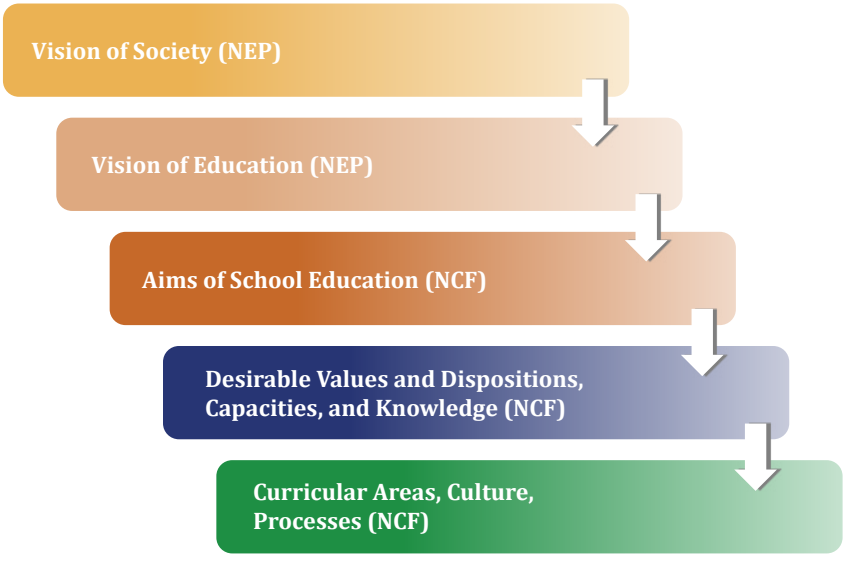
The chapter then organizes the vision provided in the NEP 2020, into specific Aims of School Education that give clear direction for developing the NCF.

These Aims are to be fulfilled by developing appropriate Knowledge, Capacities, and Values and Dispositions. The chapter articulates these.

School curriculum is a deliberate and organized set of arrangements intended to achieve these Aims. These arrangements include – subjects that are taught, the pedagogical practises, books and other teaching-learning-material, examinations and other forms of assessment, school culture and processes, and more. Then there are a range of matters that directly affect learning, such as the appointment of teachers and their professional development, admission of students and the composition of students, and physical infrastructure.

Among these many arrangements, school culture and processes and the subjects (curricular areas) to be taught along with their associated academic process such as pedagogy and assess-

Figure A-1-i



ment, have particular relevance in terms of achieving the Aims of School Education. The last section of the chapter gives a brief outline of these arrangements that are appropriate to achieving these Aims.

Section 1.1
Vision of Education drawn from NEP 2020

Education is, at its core, the achievement of valuable Knowledge, Capacities, and Values and Dispositions by an individual.

Which Knowledge, Capacities, and Values and Dispositions are 'valuable' enough to be developed by education is decided by the society, which in turn is informed by the vison that the society has for itself. Thus, it is by developing the individual that school education contributes to the realization of the vision of a society.

The overarching vision of India is articulated in the Constitution of India. Drawing from this vison of India, the vision and purpose of education is articulated by the NEP 2020 as below:

"This National Education Policy envisions an education system rooted in Indian ethos that contributes directly to transforming India, that is Bharat, sustainably into an equitable and vibrant knowledge society, by providing high-quality education to all, and thereby making India a global knowledge superpower." [NEP 2020, The Vision of this Policy]

The vision, thus, is developing an equitable and vibrant knowledge society. This social goal is to be achieved by developing desirable qualities in an individual through education. The purpose and aims of education have been detailed in NEP 2020: *"The purpose of the education system is to develop good human beings capable of rational thought and action, possessing compassion and empathy, courage and resilience, scientific temper and creative imagination, with sound ethical moorings and values. It aims at producing engaged, productive, and contributing citizens for building an equitable, inclusive, and plural society as envisaged by our Constitution." [NEP 2020, Principles of this Policy]*

The NEP 2020 further elaborates on the aim of education *"The aim of education will not only be cognitive development, but also building character and creating holistic and well-rounded individuals equipped with the key 21st century skills. Ultimately, knowledge is a deep-seated treasure and education helps in its manifestation as the perfection which is already within an individual. All aspects of curriculum and pedagogy will be reoriented and revamped to attain these critical goals." [NEP 2020, 4.4]*

The vision for education is thus to develop well-rounded individuals capable of rational thought and action equipped with sufficient knowledge and appropriate capacities and possessing desirable moral and democratic values.

Section 1.2
Aims of School Education

The vision of education articulated in the NEP 2020 would be achieved by school education by developing, in individuals, desirable values and dispositions, capacities, and knowledge. A curriculum, thus, is a systematic articulation of what these desirable values and dispositions, capacities, and knowledge are and how they are to be achieved through appropriate choice of content and pedagogy, and other relevant elements of the school, and presenting strategies for assessment to verify if they have been achieved.

1.2.1 Definitions

Before we elaborate on the Aims of School Education it is useful to clarify the meanings of the words – knowledge, capacities, values, and dispositions as used in this document. Here is a brief explanation of what is meant by these words in this NCF:

a. **Knowledge,** that we refer to in this document, is descriptive knowledge – 'knowing that'. For example, knowing that the earth revolves around the sun, or knowing that Mahatma Gandhi played the central role in India's independence movement. A very large part of the understanding of the world is through this form of knowledge. This form of knowledge is expressed through theories, concepts, and principles. In a way, this form of knowledge, reveals to us the truths about the world. While knowledge of this form might appear to be factual, the focus of education is not merely remembering these facts, but the ability to reason about why these facts are true. How can we know if the statement 'earth revolves around the sun' is true? What are the sources of evidence? What are the methods of justifications? School education needs to focus on these aspects too.

b. **Capacities,** that we refer to in this document, are procedural knowledge – 'knowing how'. For examples, knowing how to communicate effectively or think critically or how to play kho-kho. The abilities and skills acquired through this form of knowledge enable us to act based on our understanding. Usually, procedural knowledge is used in the context of embodied abilities, like the ability to drive a car, but problem-solving and reasoning are procedural knowledge too. We refer to such broad know-how like critical thinking, problem-solving, effective communication as capacities, and these capacities can be broken down into more narrower skills like addition, or decoding. Often acquiring descriptive knowledge requires capacities too, for instance in the science, the capacities and skills for observation and experimentation are central to building descriptive scientific knowledge. For e.g., without the skills of observation it is difficult to truly justify that the earth revolves around the sun. For a student to attain a capacity or a skill, the ability needs to be consistent and repeatable, and it also needs to be adaptable to different situations. For e.g., to be skilled in making pots or doing addition, the student should be able to exercise that ability successfully not just once, but many times consistently and accurately, and should be able to work with different materials or numbers.

c. Values and Dispositions. Effective action needs strong motivation in addition to knowledge and capacities. Our values and dispositions are the sources of that motivation. Values are beliefs about what is right and what is wrong, while dispositions are the attitudes and perceptions that form the basis for behaviour. Thus, in addition to developing knowledge and capacities, the school curriculum should deliberately choose values and dispositions that are aligned with the aims of education, and devise learning opportunities for students to acquire these values and dispositions.

Box A-1.2-i

Pramanas

Thinking about knowledge, on how does one know, and what are the true sources of knowledge has been a philosophical preoccupation for Ancient Indians. The following six pramanas were considered as valid means through which one can gain knowledge about the world:

1. *Pratyaksa:* This is usually interpreted as direct perception through the five senses. It can be further divided into anubhava (direct perception) or smriti (remembered perception).
2. *Anumana*: Using inferences to come to new conclusions from observations is one another way of coming to know.
3. *Upamana*: Knowing through analogy and comparison is upamana. Relating to existing knowledge and identifying the similarities and differences and thus coming to know new things or experiences is another valid way of knowing.
4. *Arthapatti*: Knowing through circumstantial implication is arthapatti.
5. *Anupalabdi*: Perception of non-existence is considered a valid form of knowledge. To observe that the well is empty of water is knowing something about the well. People have come to significant conclusions because "the dogs did not bark that night"!
6. *Sabda*: In some systems of knowledge the testimony of an expert is admissible as true knowledge. That an individual can only directly know a fraction of all reality through direct experience and inferences but must rely on other experts was acknowledged thousands of years ago!

These different *pramanas* were recognized as valid or invalid sources of knowledge by different philosophical systems of Ancient India. These ancient investigations of the nature of knowledge are still relevant for education. By having a deeper grasp of the nature of knowledge teachers are better equipped to select appropriate content, pedagogy, and assessments to achieve the aims of education.

1.2.2 Aims of School Education for this NCF

The purposes, vision, and the goals of education (as in earlier sections) have been organized into five Aims of School Education. These Aims give clear direction to the choice of knowledge, capacities, and values and dispositions that need to be included in the curriculum.

a. **Rational Thought and Autonomy**: Making choices based on rational analysis and a ground understanding of the world and acting on those choices is an exercise of autonomy. This indicates that the individual should have the capacity for rational reasoning and sufficient knowledge to understand the world around them. This understanding develops through knowledge in breadth and depth. Thus, achieving knowledge in depth and breadth, becomes one of the key goals in the NCF.

b. **Health and Well-being**: A healthy mind and a healthy body are the foundations for an individual to pursue a good life and contribute meaningfully to society. School education should be a wholesome experience for students, and they should acquire capacities and dispositions that keep their bodies and mind healthy.

c. **Democratic Participation**: The knowledge, capacities, and values and dispositions developed are to be oriented towards sustaining and improving the democratic functioning of Indian society. Democracy is not just a form of governance, but it is a "mode of associated living". The goals articulated in the NEP 2020 point to the development of an individual who can participate and contribute meaningfully to sustaining and improving the democratic vision of the Indian Constitution.

d. **Economic Participation**: In the current context of India, a healthy economy needs to go along with a healthy democracy. Effective participation in the economy has positive impacts on both the individual and the society. It provides material sustenance for the individual and also generates economic opportunities for others in society. The achievement of these aims makes individuals productive members of the economy. The exposure and preparation of vocational education in particular develops capacities and dispositions to enter the world of work.

e. **Cultural and Social Participation**: Along with democracy and the economy, culture and the society play an important role in the "mode of associated living". Cultures maintain continuity as well as change over time. The NEP 2020 expect students to have *'a rootedness and pride in India, and its rich, diverse, ancient and modern culture and knowledge systems and traditions'*. They should also acquire capacities and a disposition to contribute meaningfully to culture.

A society with individuals who are healthy, knowledgeable, and with capacities and values and dispositions to participate effectively and meaningfully in a democracy, economy, and culture would be a vibrant, pluralistic, and democratic knowledge society.

Section 1.3
Knowledge, Capacities, and Values and Dispositions

The central purpose of schools as formal educational institutions is the achievement of valuable knowledge, capacities, and values and dispositions by their students. What is desirable is guided by the Aims of School Education as articulated in the previous section. Thus, the knowledge, capacities, and values and dispositions that are to be proposed by the NCF should be towards achieving these Aims.

1.3.1 Values and Dispositions

India has been a great contributor to the discourse of values from the ancient times till today. The exploration of humanistic and pluralistic values is embedded in its traditions and its Constitution is a beacon for democratic values. The NEP 2020 derives its values from these traditional sources, the broad humanistic values, and the Constitution.

Autonomy, health and wellbeing, democratic/economic/cultural participation can be achieved through these broad categories of values:

a. **Ethical and moral values**. These values include among others: the *"values of seva, ahimsa, swacchata, satya, nishkam karma, tolerance, honest hard work, respect for women, respect for elders, respect for all people and their inherent capabilities regardless of background, respect for environment, etc. will be inculcated in students." [DNEP 2019, 4.6.8.2]* These values are virtues that students need to develop, and these are beneficial both to the individual, in terms of their health and well-being, as well as to society as a foundation for democratic values.

b. **Democratic values**. These values include *"democratic outlook and commitment to liberty and freedom; equality, justice, and fairness; embracing diversity, plurality, and inclusion; humaneness and fraternal spirit; social responsibility and the spirit of service; ... commitment to rational and public dialogue; peace; social action through Constitutional means; unity and integrity of the nation..." [DNEP 2019, 4.6.8.3]*

c. **Epistemic values.** These are values that we hold about knowledge. Developing a scientific temper is as much a value orientation towards the use of evidence and justification, as much as understanding current scientific theories and concepts. **"***Inculcate scientific temper and encourage evidence-based thinking throughout the curriculum" [DNEP 2019, 4.6.1.1]*

Along with the above values, the NCF would intend to develop the following dispositions in students:

d. **A positive work ethic.** Any form of achievement, if it needs to be achieved through just and equitable means, require honest and deliberate work. This includes learning achievements too. While hard work and perseverance contributes personally, being responsible and taking up and completing an honest share of work contributes to situations where work is

accomplished collectively. Respect towards various modes of work – with hands, with technology, household work or factory work is very desirable. Developing these dispositions in students become a very important goal for school education.

e. **Curiosity and wonder.** Curiosity and wonder are at the core of learning, and with this disposition students can become lifelong learners. The very young child comes with natural curiosity to engage with the social and practical world around them. This needs to be sustained, extended, and expanded. If knowledge needs to be active and alive and not passive and inert, students have to approach knowledge with curiosity and wonder. The world around us is a limitless source for developing this disposition.

f. **Pride and rootedness in India.** The Aim of cultural participation indicates that students should develop dispositions that make them rooted in the Indian context. Right in the vision of NEP 2020 it is stated that *"The vision of the Policy is to instill among the learners a deep-rooted pride in being Indian, not only in thought, but also in spirit, intellect, and deeds, as well as to develop knowledge, skills, values, and dispositions that support responsible commitment to human rights, sustainable development and living, and global well-being, thereby reflecting a truly global citizen."* The notion of Vasudhaiva Kutumbakam, the world as one family, emerges from this rootedness. With the varied and common shared interests to hold strongly within, Indians can aspire to have a free and fair interplay with the rest of world with assurance and confidence.

While the above values and dispositions are broad categories, more specific values and dispositions that are relevant to particular curricular areas have been articulated as part of the learning standards of those areas.

1.3.2 Capacities

While values and disposition are sources of motivation to act, acting skilfully requires students to have specific capacities. These capacities can be developed through deliberate and conscious engagement and practice. The Aims of Rational Thought and Autonomy, Health and Well-being, Democratic/Economic/Cultural Participation indicates the necessity of the following broad set of capacities.

a. **Inquiry.** To act rationally, we need an understanding of the world around us. This understanding needs abilities of observation, collection of evidence, analysis, and synthesis. Experimentation and innovation are the practical aspects of this capacity. Beyond these general capacities of inquiry, there are discipline-specific skills like laboratory skills or field techniques that assist in the process of inquiry. These capacities of inquiry are fundamental in building all the five Aims – Rational Thought and Autonomy, Health and Well-being, and Democratic/Economic/Cultural participation.

b. **Communication**. The abilities to listen, speak, read, and write in multiple languages are very valuable capacities. This includes the skilled use of digital media for effective and appropriate communications. The ability to use varied forms of communication in different contexts and that are appropriate for the intended audience is very valuable for all the Aims.

c. **Problem Solving and Logical Reasoning.** The ability to formulate problems, develop many alternative solutions, evaluate different solutions to choose the most optimal solution, and implement the solution is very valuable. Problems that require quantitative models require

the mastery of various mathematical procedures starting from simple arithmetic skills of addition and subtraction to more complex solving of algebraic equations. The use of computational models for solving problems would require computational skills. Skills for logical reasoning include constructing and evaluating arguments both formally and informally.
Skills of effective communication, problem-solving and logical reasoning promote democratic and economic participation.

d. **Aesthetic and Cultural Capacities.** The Aims emphasise creativity and aesthetic and artistic expression. Creating works of art require skills specific to different forms of art – visual arts, music, dance/movement, and theatre. Culturally relevant skills in art forms enable effective cultural participation. These skills enable students to effectively express emotions and thoughts through art, thus improving their sense of health and well-being.

e. **Capacities for Health, Sustenance, and Work.** Developing skills and practices that enable students to lead a healthy life is one of the important Aims. Developing strength, endurance, and perseverance is not just in terms of physical capacities but also related to capacities of the mind. Such capacities are foundational for not just well-being but also contribute positively towards autonomy and democratic participation. Vocational exposure and skills are given equal importance in NEP 2020 along with academic streams. These capacities along with the disposition of positive work ethic should enable students to participate in the economy meaningfully and significantly.

f. **Capacities for Social Engagement.** Empathy and compassion are not mere values or dispositions, these are capacities that are developed through deliberate practice. Cooperation, teamwork, and leadership are fundamental capacities for social engagement. Along with the capacities for logical reasoning and problem solving these capacities are crucial for democratic participation.

With the desirable values and dispositions and equipped with appropriate capacities it is expected that students will live healthy autonomous lives and participate actively in the democracy, economy, and culture. But these values and capacities do not operate in a vacuum, they are based on a clear understanding of the world. This understanding is gained through achievement of knowledge in breadth and depth.

1.3.3 Knowledge

The achievement of the values and capacities listed above intrinsically depends on knowledge. Knowledge about the self, about others, about the social world around us, and the natural world enables us in being "capable of rational thought and action".

This knowledge has been developed over history through specific modes of inquiry, within a community of inquirers. The theories and concepts within a mode of inquiry has emerged sometimes through systematic and incremental explorations of a whole community, and sometimes through dramatic insights of a few remarkable individuals. This accumulated knowledge is a human heritage, and it is the responsibility of schools to share this heritage with every new generation.

But this knowledge "is not one seamless robe, but a coat of many colours". It is a sum of many parts. Each part being a specific '**form of understanding**'. Each form of understanding has its own community of inquirers who have formed conventions on the scope of inquiry (what questions to explore), they have their own specific ways of giving meaning to concepts and specific methods of validating the truth of the claims being made. They have distinct methods of reasoning and justification, procedures and protocols, and what is to be admitted as evidence. In a way, each form of understanding has their own kind of 'critical thinking' and their own ways of being 'creative'. *Mathematics*, the *Sciences*, the *Social Sciences*, *Arts and Aesthetics*, and *Ethics* are some of these forms of understanding that have their own set of concepts and theories through which we make meaning of our experiences. These forms of understanding give clear direction as to what is the knowledge that all students in schools should acquire. They help, in part, in determining the different Curricular Areas of the NCF.

Through engagement with these forms of understanding, students develop *disciplinary knowledge*. While the capacity for problem solving depends heavily on such disciplinary knowledge, often real-life situations pose problems, solutions for which are informed by many disciplines that need to be integrated. For instance, the problems of sustainability and climate change are not merely informed by the Sciences, but also by our understanding of Social Sciences and Mathematics. Thus, along with these forms of understanding, engagement with *interdisciplinary knowledge* becomes an important goal for school education.

Section 1.4
Towards a Curriculum

Schools need to make arrangements to develop in students the desirable values and dispositions, capacities, and knowledge through which the aims of education are achieved. As mentioned before, these arrangements can range from selection and appointment of teachers to school culture, to the actual subjects that are taught in the school. The curriculum is one part of these arrangements that has a more direct engagement and impact on the learning of the students. While the curricular imagination for a school is usually restricted to the arrangements of classroom interactions, the school culture and ethos and school practices have a very important role both in enabling a positive learning environment, as well as promoting the desirable values and dispositions.

Thus, a curriculum is a deliberate and explicit set of choices of organizing the school experience for students that are related to direct teaching-learning experiences in different curricular areas as well as the overall school culture and ethos and school processes.

In this section we would explore the specific curricular arrangements schools have to organize so that students gain the desirable values and dispositions, capacities, and knowledge.

1.4.1 School Culture

To begin with, it has to be acknowledged that schools achieve aims not just through teaching within the confines of the classroom but also through socialization of the students into the extant culture and ethos of the school. Values and dispositions in particular are learnt by immersion in a school ethos and culture that deliberately and explicitly promotes these values. So, it is equally important for a curriculum framework to explicitly articulate the arrangements and organization of the school in terms of its culture and ethos that would promote the desirable values and disposition. This NCF has made specific recommendations for school culture and ethos in Chapter 15.

1.4.2 School Processes

In addition to school culture, more formal and well-defined school processes have a significant role to play in both ensuring smooth functioning of the school as well as enabling achievement of curricular goals. Processes for maintaining academic accountability towards achieving the aims, both from the teachers and students are important to be articulated, understood, and followed. From simple matters like maintaining cleanliness of the school premises, to more complex situations like responding to learning failures of students, needs thoughtfully designed school processes that are transparent, professional, and effective. The NCF makes specific recommendations related to school processes in Chapter 16.

1.4.3 Curricular Areas

எண்ணென்ப ஏனை எழுத்தென்ப இவ்விரண்டும்
கண்ணென்ப வாழும் உயிர்க்கு
– குறள் 392

The twain that lore of numbers and of letters give

Are eyes, the wise declare, to all on earth that live

– Translation, G.U. Pope

Ancient Indians had clear conceptions on what is valuable in education. As the above couplet from the ancient Tamil poet Tiruvalluvar indicates, language and mathematics were seen as two eyes through which we make sense of the world. It is not surprising then, that language and mathematics continue to be important and curricular areas even after two thousand years since this verse was written!

Based on the aims, and on the derived knowledge, capacities, and values and dispositions, the curriculum is divided into specific curricular areas. This division is not just a pragmatic necessity for organizing classrooms, timetables, and teachers. While pragmatic considerations are equally relevant, the division of the curricular areas have an internal logic.

1. **Languages:** Language is not just a medium of thinking, nor merely a tool for acquiring different forms of understanding. Language education makes effective communication possible and equally develops aesthetic expression and appreciation. Reasoning and critical thinking are very closely linked with language use, and these are valuable capacities to be developed. In the context of India, multilingualism and sensitivity to a diverse set of languages are desirable outcomes as articulated in the NEP 2020.

The form of understanding, as articulated in the previous section, implies that Mathematics, Sciences, Social Sciences, and Arts form their own distinct curricular areas.

2. **Mathematics**: Mathematics is a form of understanding the world through patterns, measurement, and quantities. Mathematics education also develops capacities for problem-solving and logical reasoning.
3. **Sciences:** Science is a form of understanding the natural world. It has its own specific methods of inquiry and reasoning, and theories and concepts. Beyond aiding in gaining understanding of the natural phenomena around us, science education helps developing rational thought and scientific temper.
4. **Social Sciences**: Social Science is a form of understanding the social (human) world. The methods of inquiry in Social Science are evidence based and through specific methods of reasoning. Like the Sciences, Social Science too promotes rational thought and scientific temper. Social Science also enables students in more effective democratic participation.
5. **Arts:** Arts is a form of understanding through which we make aesthetic sense of our experiences. Engagement with arts also builds our capacities for being creative and develops cultural sensibilities. A grounded learning of the arts allows to engage and participate meaningfully in our culture and develops capacities for maintaining good health and contributes to well-being.

While forms of understanding give disciplinary knowledge and depth, it has been argued earlier that interdisciplinary knowledge and thinking is an important goal.

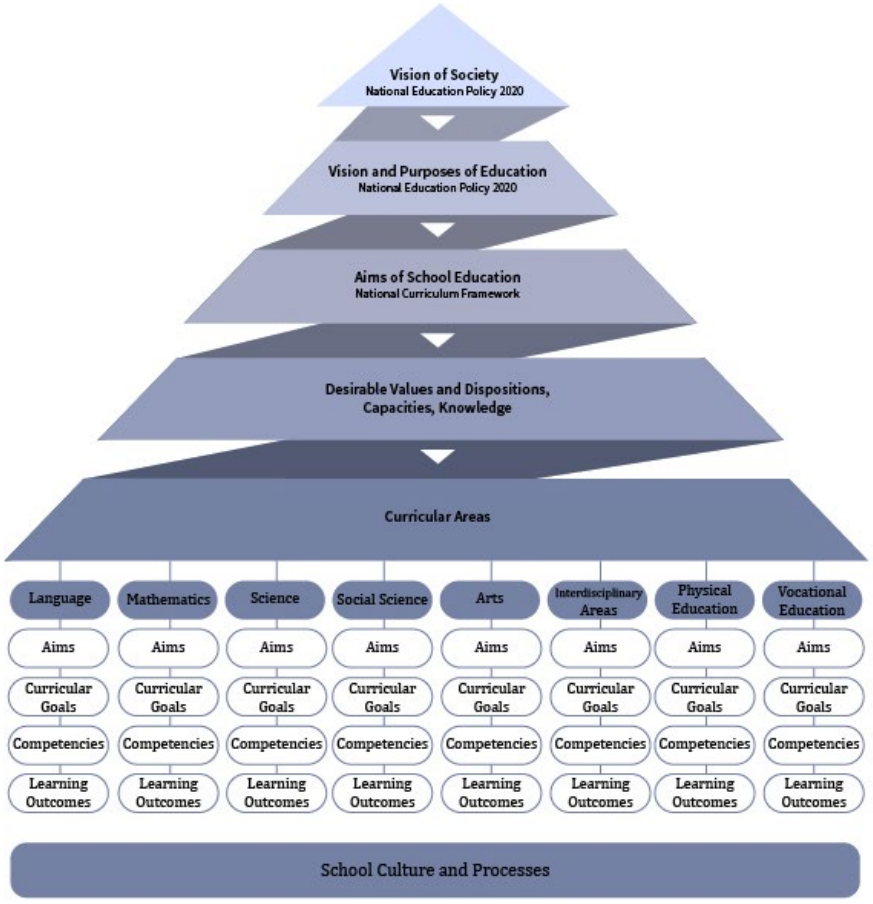
6. **Interdisciplinary Areas**: Engagement in interdisciplinary areas develops capacities for interdisciplinary thinking and problem solving. This curricular area complements the disciplinary thinking developed through engagement with specific forms of understanding.

Beyond these forms of understanding, physical education and vocational education are important Curricular Areas. These areas become important due the specific Curricular Aims of health and well-being and economic participation. The NEP 2020 has given specific directions for both physical and vocation education.

7. **Physical Education**: Physical Education is focused towards developing capacities for maintaining health and well-being. Through engagement in sports, important ethical and moral values and Constitutional and democratic values are developed.
8. **Vocational Education**: Vocational Education intends to develop capacities for sustenance and work and economic participation. It also develops values and sensibilities towards physical work and dignity of labour. The NEP 2020 has given a strong emphasis on giving vocational exposure and developing vocational skills from very early stages of school through to higher education.

These eight curricular areas have their own specific learning standards, and have specific recommendations for content selection, pedagogical approaches, and ways of assessments. These details have been outlined in Chapters 6 to 13.

Figure A-1.4-i



Box A-1.4.3-i

(For reference)

DNEP 2019, Curricular integration of essential subjects and skills

The DNEP 2019, recognizes the limitation of the current educational practice in the Indian context. It attempts to shift the focus of the vision of schooling from an excessive emphasis on remembering facts, to developing capacities and skills for thinking and acting. The following ten capacities and skills are highlighted as important goals of school education, which need to be paid adequate attention, along with other critical goals:

a. **Develop a scientific temper.** *"Inculcate scientific temper and encourage evidence-based thinking throughout the curriculum: Evidence-based reasoning and the scientific method will be incorporated throughout the school curriculum - in science as well as in traditionally "non-science" subjects - in order to encourage rational, analytical, logical, and quantitative thinking in all aspects of the curriculum." [DNEP 2019, 4.6.1.1]*

b. **Develop creativity and innovation through arts**. *"Any education emphasising creativity and innovation must include the arts." [DNEP 2019, 4.6.2] Art education in music, "theatre, poetry, painting, drawing, sculpture, and vocational arts such as carpentry, embroidery/sewing/clothes-making" [DNEP 2019, 4.6.2.1]* should develop aesthetic capacities and sensibilities.

c. **Develop excellent verbal and written communication capacities**. *The education system should develop "the ability to speak, listen, question, discuss, and write with clarity and conciseness – and with confidence, eloquence, friendliness, and open-mindedness…" [DNEP 2019, 4.6.3].*

d. **Develop appropriate practices and habits to maintain a healthy body and mind.** *"Physical education is important for both physical and mental health and development. It helps improve a child's muscular and cardiovascular strength, flexibility, endurance, motor skills, and mind-body connection and wellness." [DNEP 2019, 4.6.4]. In addition, a good sports programme "helps students develop the qualities of teamwork, cooperation, problem-solving, discipline, perseverance, and responsibility"* [ibid].

e. **Develop effective problem-solving and logical reasoning capacities**. *Developing positive dispositions of seeing challenges as problems to be solved and capacities to find solutions to those problems is an important aim of school education. "Just as exercising the body is important to keep it fit and healthy, so too is exercising the mind. Games of strategy, logic and word puzzles, and recreational mathematics are the best way to excite children about mathematics, and to develop the logical skills that are so critical throughout their school years and indeed throughout life" [DNEP 2019, 4.6.5]*

f. **Develop useful vocational skills and sensibilities.** *"Vocational education is extremely vital for our country to run efficiently and properly, and thus it is beneficial to increasingly incorporate elements of vocational education into the school curriculum to expose children to its utility and its value as art. Indeed, some exposure to practical vocational-style training is always fun for young students, and for many students it may offer a glimpse of future professions while for others it would at the very least help teach and reinforce the dignity of all labour." [DNEP 2019, 4.6.6].*

g. **Develop digital literacy and computational thinking**. *"The new curriculum will also integrate digital literacy for all learners at the basic level, with hands-on assessments and worksheets keeping in mind the available digital infrastructure on the ground. At a more advanced level, curricula will be developed for Computational thinking …and Programming… "[DNEP 2019, 4.6.7]*

h. **Develop capacities for moral reasoning and ethical action**. *"Introducing an "ethics" component to the curriculum early on and throughout the years of school is also considered extremely important in helping students to build character, grow up into moral and good human beings, lead productive and happy lives, and contribute positively to society." [DNEP 2019, 4.6.8].*

i. **Develop an in-depth understanding of Indian knowledge systems.** *"Indian contributions to knowledge and the contexts in which they were discovered must be incorporated into the school curriculum not just for reasons of historical accuracy (which is sufficient reason on its own), but also for the often more holistic nature of the traditional Indian approach which leads to a deeper understanding, as well as for reasons of increased relatability due to geographic location, national pride, inspiration, and self-esteem." [DNEP 2019, 4.6.9]*

j. **Develop capacities and dispositions to be engaged with current affairs**. *Keeping abreast with current affairs, linking the knowledge gained in the school with the realities outside, and participating in current issues and debates are important characteristics of a responsible citizen. Schools should have dynamic content that "involve talking about the current economic scenario, recent scientific inventions, advances in medicine, geopolitical power equations around the world, trends in art and music, gender issues, environmental concerns, etc. - all topics that would have a direct bearing in the future on students' lives and their livelihoods." [DNEP 2019, 4.6.10]*

Chapter 2

School Stages - Logic and Design

The previous chapter has articulated the Aims of School Education for this NCF, and the corresponding set of desirable values and dispositions, capacities, and knowledge required to achieve these aims. The chapter also has given justifications for the different Curricular Areas that are parts of the NCF. These aims are to be achieved in a 5+3+3+4 structure in school education covering ages 3-18.

The NEP 2020 recommends that schooling should be imagined in four stages in a new 5+3+3+4 design covering ages 3-18. *"The curricular and pedagogical structure and the curricular framework for school education will therefore be guided by a 5+3+3+4 design, consisting of the Foundational Stage (in two parts, that is, 3 years of Anganwadi/pre-school + 2 years in primary school in Grades 1-2; both together covering ages 3-8), Preparatory Stage (Grades 3-5, covering ages 8-11), Middle Stage (Grades 6-8, covering ages 11-14), and Secondary Stage (Grades 9-12 in two phases, i.e., 9 and 10 in the first and 11 and 12 in the second, covering ages 14-18)." [NEP 2020, 4.1]*

This chapter outlines the logic of these four stages of schooling, on how each of these stages has specific considerations for curricular structure, content, pedagogy, and assessments and their relevance for achieving the aims of school education.

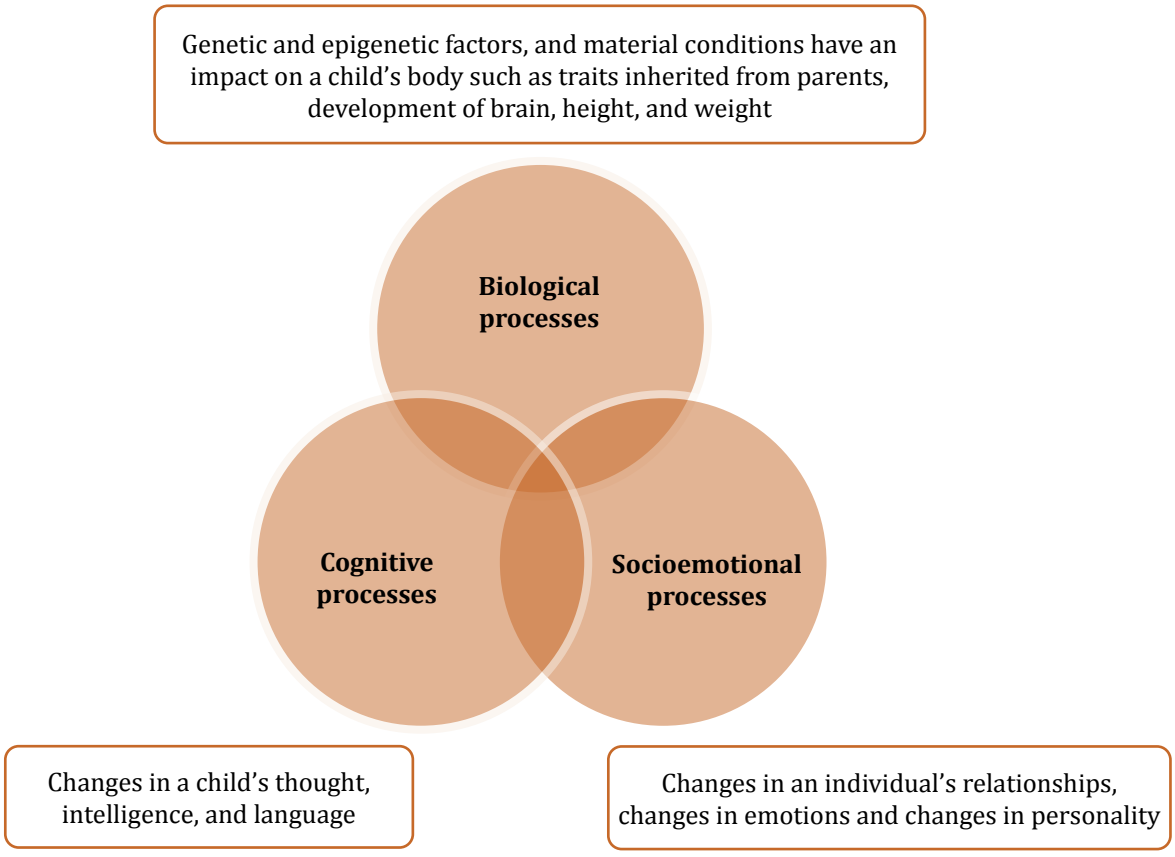
The central logic of dividing schooling into the four stages is based on our current understanding of child development and the growth of concepts in different curricular areas. The first two sections describe the process and stages of child development and concept development. The last section elaborates on the four-stage design of NCF.

Section 2.1
Child Development

Around the world, the experiences of children growing up are different, depending on various circumstances – social, cultural, and economic. But there are some common processes and stages too in the maturation and growth of the child. It is critically important to understand the development of a child to have realistic expectations at a particular age. In the field of education realising the significance of child development leads to the development of a quality curriculum with developmentally appropriate pedagogy and assessment.

Child development is influenced by the interplay of three different processes namely biological processes, cognitive processes, and socio-emotional processes. Biological, cognitive, and socio-emotional processes are intricately interwoven with each other. Each of these processes plays a role in the development of a child whose body and mind are interdependent.

Figure A-2.1-i



A child's development is usually described in terms of periods corresponding to approximate age ranges.

1. **Infancy**: This period ranges from birth to 24 months of age. A child in this period is highly dependent on adults. Children are beginning to learn about the things around them, learn to focus their vision and explore.
2. **Early childhood**: This period begins around 3 and usually extends up to 6-7 years of age. Children begin to become more self-sufficient and spend more time with peers. This is also a period of intense exploration through play.
3. **Middle to late childhood**: This developmental period is from 6-7 years to 10-11 years of age before they hit puberty. During this period children master the fundamental capacities and understanding for survival and growth. They grow physically, emotionally, and cognitively through exposure to the wider world around them and their culture.
4. **Adolescence:** This period is the transition period from childhood to early adulthood. A child enters adolescence at approximately the age of 12 years. Adolescence begins with rapid physical changes – gains in height and weight, changes in body contour and development of sexual characteristics. At this stage, the development of identity and the quest for independence is the central theme in children.

2.1.1 Development across domains

2.1.1.1 Physical Development

Height and weight increase rapidly during **infancy**. By their first birthday, they nearly triple their weight. As the child reaches **early childhood** the percentage of height and weight decreases with each additional year. Growth patterns vary individually where much of the variation is due to hereditary but also certain environmental factors can influence it to some extent such as nutrition. **Middle and late childhood** is the calm before the rapid growth spurt in adolescence. It involves slow and consistent growth in height and weight. There is improved muscle tone, and the strength capacity also doubles during these years. After slowing through childhood, **adolescence** experiences a growth surge during puberty. Puberty occurs approximately two years earlier for girls than boys. The features and proportions of the body changes as the individual become capable of reproduction. Among the most important factors that influence the onset and sequence of puberty are heredity, hormones, weight, and body fat.

Sensory and motor development: Infants and children develop rolling, sitting, standing and other motor skills in a particular sequence and within specific time frames. Infants are also born with certain reflexes which are built-in reactions to stimuli. Reflexes govern the new-born's movements, which are automatic and beyond the new-born's control. Reflexes are genetically carried survival mechanisms. They allow infants to respond adaptively to their environment before they have had an opportunity to learn. They include the sucking, rooting, and moro reflexes (when the baby gets started by an unexpected sound, light, or movement), all of which typically disappear after three to four months. Some reflexes, such as blinking and yawning, persist throughout life; components of other reflexes are incorporated into voluntary actions.

Gross motor skills involve large-muscle activities. Key skills developed during infancy include control of posture and walking. Mastering a motor skill requires the infant's active efforts to coordinate several components of the skill. Infants explore and select possible solutions to the demands of a new task; they assemble adaptive patterns by modifying their current movement patterns. Gross motor skills improve dramatically during the childhood years. Boys usually outperform girls in gross motor skills involving large-muscle activity.

Fine motor skills involve finely tuned movements. The onset of reaching and grasping is a significant accomplishment. Fine motor skills continue to develop throughout the childhood years and by 4 years of age are much more precise. Children can use their hands as tools by middle childhood, and at 10 to 12 years of age start to show fine motor skills similar to those of adults.

2.1.1.2 Cognitive Development

Children construct their own cognitive worlds, building mental structures to adapt to the world. They actively construct their meaning and understanding. The progression of cognitive development from infancy to adolescent can be seen as described below.

Infancy: The infant organizes and coordinates sensory experiences (such as seeing and hearing) with physical movements. They quickly learn and are able to understand that things they see continue to exist even though these things are no longer around them. They can scan patterns actively and display a growing capacity for remembering in ways that current neuroscience is still exploring.

Early Childhood: The child's mental life is becoming more expansive with experiences. They have pictures in their minds about various things in the world. Their capacity for new vocabulary and making mental pictures allows for more learning about the world and other people. They have begun to make sense of others, getting a sense of how people and things work. Their memories can hold much more than adults give them credit for!

Middle Childhood: By now, the child can think through reasons using language and ideas, understand well how people and things work around them, and give order to these things in terms of value and size. Their capacity to remember and use what they remember to do activities is growing in leaps and bounds. They even devise ways to remember better and are able to analyse, problem-solve, imagine alternatives.

Adolescence: The adolescent individual thinks in diverse and complex ways with a growing capacity for working with ideas and logical analysis. This enables them to plan, solve problems, and systematically test solutions. They are able to mentally look back at their own actions and evaluate, are forming a sense of themselves as different and similar to others, able to engage with ideas of right and wrong. They can be focused and flexible in their thinking and make decisions with reasoning.

2.1.1.3 Language Development

The development of language is a significant aspect of a child's development. The trajectory of this development across the age ranges is described below.

Infancy: Among the milestones in infant language development are crying (birth), cooing (1 to 2 months), babbling (6 months), using gestures (8 to 12 months), recognition of their name (as early as 5 months), first word spoken (10 to 15 months), vocabulary spurt (18 months), rapid expansion of understanding words (18 to 24 months), and two-word utterances (18 to 24 months).

Early Childhood: Young children increase their grasp of language's rule systems. In terms of phonology, most young children become more sensitive to the sounds of spoken language. Children learn and apply rules of syntax and of how words should be ordered. Vocabulary development increases dramatically during early childhood, conversational skills improve. They increase their sensitivity to the needs of others in conversation, and they learn to change their speech style to suit the situation.

Middle Childhood: Children gradually become more analytical and logical in their approach to words and grammar. They become increasingly able to use complex grammar and produce narratives that make sense. Improvements in metalinguistic awareness - knowledge about language - become evident as children start defining words, expand their knowledge of syntax, and understand better how to use language in culturally appropriate ways.

Adolescence: In adolescence, language changes include more effective use of words; improvements in the ability to understand metaphor, satire, and adult literary works; and improvements in writing. Young adolescents often speak a dialect with their peers, using jargon and slang.

2.1.1.4 Socio-emotional Development

A child's socioemotional development impacts the other domains of development. Physical, Cognitive and language development is highly influenced by how children feel about themselves and how they are able to express their ideas and emotions.

a. Emotional and Personality Development

Infancy: Emotions are the first language with which parents and infants communicate, and emotions play key roles in parent-child relationships. Infants display a number of emotions early in their development. Crying is the most important mechanism new-borns have for communicating with the people in their world.

Early Childhood: Advances in young children's emotional development involve expressing emotions, understanding emotions, and regulating emotions. Young children's range of emotions expands during early childhood as they increasingly experience self-conscious emotions such as pride, shame, and guilt. They also show a growing awareness of the need to manage emotions to meet social standards.

Middle Childhood: Self-understanding increasingly involves social and psychological characteristics, including social comparison. The development of self-regulation is an important as-

pect of this stage. Developmental changes in emotion include increased understanding of complex emotions such as pride and shame, improvements in the ability to suppress and conceal negative emotions, and the use of strategies to redirect feelings. Children use a greater variety of coping strategies.

Adolescence: Identity development is complex and takes place in bits and pieces. Some researchers have found that self-esteem declines in early adolescence for both boys and girls, but the drop for girls is greater. Self-esteem reflects perceptions that do not always match reality.

b. Role of Families

Infancy: In infancy, contact comfort and trust are important in the development of attachment. Infants show a strong interest in their social world and are motivated to understand it. Infants orient to the social world early in their development.

Early Childhood: Families play a significant role in the socio-emotional development of the child. The child takes emotional cues from the families and the socio-emotional state in the family interactions. The sense of emotional security and comfort in interactions largely depend on family environment.

Middle Childhood: Children begin to form strong bonds with peers, while families continue to play a significant role in their emotional development. The socio-emotional state of peer groups and social groups have a strong influence on the child's socio-emotional dispositions.

Adolescence: There is a significant shift in the influence of peers. Identity formation, rebelling against authority, conflict, aggression are some markers of this age. Families' influence is significantly lower on socio-emotional development, but the way conflicts are handled within the family has a significant impact.

c. Role of Peers

Early Childhood: Peers are powerful socialization agents. Peers provide a source of information and comparison about the world outside the family. In early childhood, children distinguish between friends and nonfriends, with a friend often described as someone to play with. Rough-and-tumble play is more likely to occur in peer relations, whereas in times of stress children often turn to parents rather than peers for support.

Middle Childhood: Children form stronger bonds with peers that goes beyond play. Friendships are formed and friend groups become an important source for emotional development. Children continue to seek confirmation from adults both at home and in school.

Adolescence: There is a significant shift in the influence of peers. Identity formation, rebelling against authority, conflict, aggression are some markers. Families' influence is significantly lower on socio-emotional development, but the way conflicts are handled within the family has a significant impact. Fitting in and receiving confirmation from peer groups is a high priority in this age.

2.1.1.5 Moral Development

Infancy: Their sense of right and wrong depends on their feelings and desires. Their sense of rightness depends on whether their needs are met or not.

Early Childhood: Children think of justice and rules as unchangeable properties of the world and beyond the control of people. They judge the rightness of behaviour by considering the consequences and not intentions of the individual.

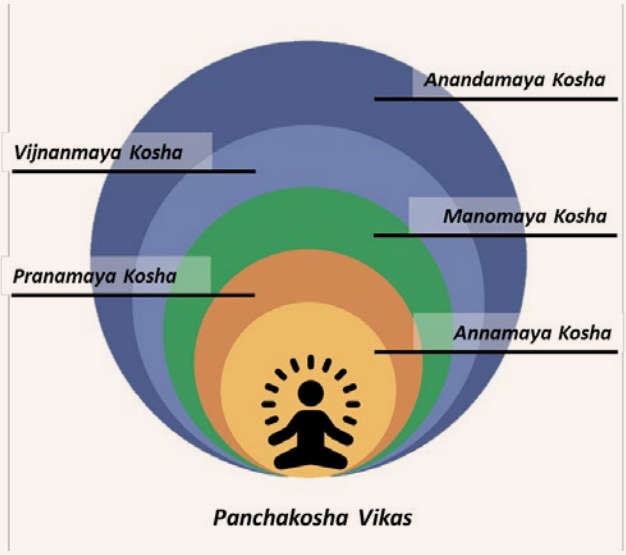
Middle Childhood: Children begin to express objective ideas on fairness. Children believe that equity can mean that people with special needs or merit need special treatment.

Adolescence: Closer to adulthood children begin to develop their own moral values while questioning and analysing the ones set by their parents or the society. They value rules but also negotiate. As they develop abstract reasoning abilities, they display interest in larger good for the society.

Box A-2.1-i

Panchakosha Vikas (Five-fold Development) - A keystone in Indian tradition

The child is a whole being with panchakoshas or five sheaths. The layers are annamaya kosha (physical layer), pranamaya kosha (life force energy layer), manomaya kosha (mind layer), vijnanamaya kosha (intellectual layer) and anandamaya kosha (inner self). Each layer exhibits certain distinct characteristics. The holistic development of a child takes into account the nurturing and nourishment of these five layers.



Panchakosha Vikas

Specific types of practices are designed to enable the development of each of these koshas. However, the practices are designed keeping in mind that the koshas are interconnected and so activities that focus primarily on one would also contribute to the development of the others.

For example, the physical dimensions are developed through a focus on a balanced diet, traditional games, and adequate exercise, as well as yoga asanas (at the appropriate ages), which build both gross and fine motor skills. Learning to breathe in a way that provides necessary oxygen for the entire body is important; it, trains the voice, and provides direction for increased self-awareness. A wide variety of stories, songs, lullabies, poems, prayer, enable children to not only develop a love for their cultural context but also provide value-based insights. This contributes to language development beginning with listening or shravana as

well as the ability to focus and concentrate. The senses, indriyas, are to be sharpened to be able to experience the world around in all its beauty and wonder. Seva integrated into everyday life enables the experience of joy of relationships along with being a part of and doing good for one's community.

The Panchakosha concept and imagination also maps into the different domains of development envisaged in ECCE which are the basis of the Curricular Goals as discussed in the next Chapter.

- *Physical Development (Sharirik Vikas): Age-specific balanced physical development, physical fitness, flexibility, strength, and endurance; development of senses; nutrition, hygiene, personal health, expansion of physical abilities; building body and habits keeping in mind one hundred years of healthy living in a human being.*
- *Development of Life Energy (Pranik Vikas): Balance and retention of energy, positive energy and enthusiasm, smooth functioning of all major systems (digestive, respiratory, circulatory, and nervous systems) by activation of the sympathetic and parasympathetic nervous system.*
- *Emotional/Mental Development (Manasik Vikas): Concentration, peace, will and will power, courage, handling negative emotions, developing virtues (maulyavardhan), the will to attach and detach from work, people and situations, happiness, visual and performing arts, culture, and literature.*
- *Intellectual Development (Bauddhik Vikas): Observation, experimentation, analytical ability, abstract and divergent thinking, synthesis, logical reasoning, linguistic skills, imagination, creativity, power of discrimination, generalization, and abstraction.*
- *Spiritual Development (Chaitsik Vikas): Happiness, love and compassion, spontaneity, freedom, aesthetic sense, the journey of 'turning the awareness inwards.'*

Panchakosha is an ancient explication of the importance of the body-mind complex in human experience and understanding. This non-dichotomous approach to human development gives clear pathways and direction towards a more holistic education.

Section 2.2
Concept Development

While child development describes the process of growth and maturation of children in different domains, the nature of knowledge and capacities also have some implications on the sequence in which concepts and skills are learnt. This section explores some of these sequences and their implication for the four stages of schooling.

2.2.1 Literacy Development

Reading and writing have become very central to education and schooling. Most of the learning materials whether in the form of textbooks or worksheets have printed text in them and the students are expected to read and comprehend them. So, it is important to consider the stages of reading development for the design of the School Stages. Reading develops in the following stages :

1. **Stage 0: Pre-reading**: Children develop oral language capacities and begin to recognize individual sounds in parts of speech. If they are from a literate home context, they have an emerging understanding of the uses of texts.
2. **Stage 1: Initial Reading**: Children start making connections between oral sounds and the visual symbolic form of the written system. This aspect of reading is termed as 'decoding' where the effort is focussed on establishing letter-sound relationships and using this understanding to read familiar and unfamiliar words.
3. **Stage 2: Fluency and Ungluing from Print**: Their decoding abilities become fluent and thus placing low cognitive demand on the process of converting the textual symbols to sounds. With the release of this burden their focus shifts to grasping the meaning in the text.
4. **Stage 3: Reading for Learning the New**: In this stage children are not just reading familiar texts and engaging with familiar ideas in a textual form. They are able to learn new ideas and concepts through the process of reading. They are not relying only on their concrete physical experience but are able to imagine possibilities based on what they read. Reaching this stage is especially important for students to become independent learners.
5. **Stage 4: Multiple Viewpoints**: In this stage a more critical understanding of the text being read becomes possible. The students can understand that the author of the text has a specific viewpoint and there are possible other viewpoints. They can bring in their own understanding and critically evaluate the piece of text.
6. **Stage 5: Constructions and Reconstruction**: The reader forms a worldview based on what they are reading. They consciously choose books to further deepen their worldview or to challenge the worldview they hold. They are able to identify the core thesis of the authors, identify their agreements and disagreements with that thesis and are able to synthesize and construct a new thesis through this process.

In this approach to stages of reading, by the end of the Preparatory Stage, students should be reaching Stage 2 and by end of the Middle Stage, they are at Stage 3 and in the Secondary Stage they achieve Stage 4 and are beginning in Stage 5.

2.2.2 Perceptual, Practical, and Theoretical Concepts

Perceptual concepts are concepts formed through our perception or senses. Very young children can start differentiating objects based on their colour, shape, texture, and perhaps even taste and smell. More complex concepts like, birds have feathers, and dogs have legs and bark are perceptual concepts too. They are formed through careful observation and the use of the senses. Children almost automatically form these concepts through their experiences. By giving names to objects and experiences language does play an important role in developing and expressing these concepts.

Practical concepts are concepts formed not just by the perceptions but the practical use that is embedded. For e.g., a table or a chair is not a mere perception of the colour or shape of the object but the practical use of the object. While the chair is an object on which people sit, a table is not usually used for sitting, but rather to put objects on it or use for work. To form practical concepts, children need to have some understanding of social life. To understand a practical concept, one must grasp what people do with an object, and what they use it for . Again, through engagement and exposure to exercises in practical life, children develop practical concepts.

Language development plays a very important role in the development of perceptual and practical concepts. Language enables us to check our experiences with others and to ensure we have a shared meaning emerging from these experiences. Thus, making sure that we grasp the socially accepted use of the practical concept or the socially accepted vocabulary that represents the perceptual concept.

Theoretical concepts on the other hand explore in highly systematic ways our ordinary 'common sense' experience. These concepts make sense only within a form of understanding. While a spherical shape or a rectangular shape can be perceived, the mathematical understanding of a sphere or a rectangle has a very precise meaning. A rupee coin might perceptually mean a shiny round object. The practical use of it can also be grasped. But to understand money as an economic concept needs an introduction to a whole lot of theories and conceptual structures in economics.

While perceptual and practical concepts require not much more than a normal intuitive mind, theoretical concepts often are counterintuitive. To grasp that the earth is rotating around the sun at 30 kilometres per second and we are standing on a spinning orb spinning at the speed of 460 meters per second we cannot rely on our perceptions, nor can ordinary practical experience be of any assistance. We need an understanding of physics and mathematics. There is often a discontinuity between our intuitions and ordinary practices and the nature of reality.

Thus, theoretical concepts cannot be acquired merely through experiences or learning by doing. They need a more deliberate attempt of the Teacher and the student to grasp the meaning behind the experience by connecting it to various conceptual structures and the methods of inquiry specific to a form of understanding.

This indicates that very young children can grasp and develop perceptual and practical concepts through experience and human interaction along with effective use of language. Theoretical concepts on the other hand make sense only through the introduction of a form of understanding

and perhaps can wait till the Middle Stage. In the Secondary Stage, students gain deeper disciplinary knowledge and methods. This should enable them to grasp the deeper meanings of the theoretical concepts, by placing the concept within the overall conceptual framework of the disciplines, explaining them using the current valid theories of the discipline, and also by linking these concepts to theoretical concepts in other disciplines.

Section 2.3
Modes of Inquiry

Beyond the nature of knowledge and growth in capacities for literacy, the modes of inquiry used by children to develop conceptual understanding play a very important role in the selection of content, pedagogy, and assessment. The progression of these modes of inquiry also has implications for the stages of schooling.

2.3.1.1 Play and Exploration

Young children learn various concepts, particularly perceptual and practical concepts, largely through play and open exploration. Their incredibly curious and absorbent minds are constantly exploring the natural and social world around them. They are intuitive problem solvers and grasp conventions of language use and social behaviour through observation and imitation. At this stage, a stimulating environment and the freedom to explore and play are the biggest and most effective sources of learning. The stimulation doesn't come only from the material environment but also from an attentive and active adult and peer group.

2.3.1.2 Capacities for Inquiry

From a broad and free exploration, children need to acquire more specific capacities that have an important role in further inquiry. In addition to the foundational capacities of literacy and numeracy, they acquire skills in observation, data collection, analysis, and more. Gross motor skills and fine motor skills relevant to physical education and arts, and vocational education are developed. Further, capacities for attention, perseverance, and memory are also developed. These capacities are utilized in informal methods of inquiry to make sense of the world around them and to respond to the practical necessities of life. These capacities can be developed by giving learning experiences that are practical and within the social context of the student. The opportunities for learning can be guided explorations with the specific intent to develop these capacities.

2.3.1.3 Methods for Inquiry

To gain a deeper understanding, particularly of theoretical concepts, students need to gain knowledge and capacities for specific methods of inquiry. These methods are particular to different forms of understanding. Mathematics, Science, and Social Science have their own methods of inquiry and logic of reasoning. They have specific theories, and a web of concepts, the understanding of which gives insight into a new way of thinking about the world. These methods, theories and concepts increase the depth of inquiry within a specific convention or tradition.

Similarly, Arts has its specific forms and traditions in visual arts, music, dance, and theatre. Understanding these forms and acquiring the relevant practices, enables the students for a deeper exploration of aesthetic experiences. Specific forms of sports and practices like yoga have their own methods.

By getting introduced to these methods, students gain capacities for systematic and rigorous methods of inquiry in specific forms of understanding.

Teaching, in this stage, is more formal and the emphasis is on understanding the conventions and the "rules of the game" of each form of understanding, and the necessary capacity to "play" within these "rules".

2.3.1.4 Disciplinary Exploration

In this stage, students gain disciplinary depth within each form of understanding. The mode of inquiry becomes exploratory again like in the first stage, but within a framework of a discipline or a form. For e.g., a student with sufficient capacities/skills for dancing and a grounded knowledge of *Bharatanatyam* as a form of dance can now use these capacities and knowledge for creative expressions through dance. Similarly, in after gaining sufficient capacities for scientific inquiry through experimentation and instrumentation in Biology, students can pursue interesting and challenging questions about life forms and attempt to answer these questions within the discipline of Biology. A more sophisticated form of exploration would be to utilize their knowledge in multiple disciplines and approach problems with interdisciplinary solutions.

Section 2.4
Stage Design

The curriculum for the four stages of schooling has been designed based on the vision of NEP and on the considerations of child development, conceptual development, and the appropriate modes of inquiry at each age range.

2.4.1 Foundational Stage

The Foundation Stage is for children of the age 3 to 8. Children start schooling in the Foundational Stage. The design is based on the principles of Early Childhood Care and Education (ECCE).

"ECCE ideally consists of flexible, multi-faceted, multi-level, play-based, activity-based, and inquiry-based learning, comprising of alphabets, languages, numbers, counting, colours, shapes, indoor and outdoor play, puzzles and logical thinking, problem-solving, drawing, painting and other visual art, craft, drama and puppetry, music and movement. It also includes a focus on developing social capacities, sensitivity, good behaviour, courtesy, ethics, personal and public cleanliness, teamwork, and cooperation. The overall aim of ECCE will be to attain optimal outcomes in the domains of: physical and motor development, cognitive development, socio-emotional-ethical development, cultural/artistic development, and the development of communication and early language, literacy, and numeracy." [NEP 2020, 1.2]

- Curricular Structure: The Foundational Stage curriculum of the NCF is divided into domains that are closely linked to the developmental domains of the child – physical development, socio-emotional-ethical development, cognitive development, language and literacy development, and aesthetic and cultural development. These domains of development are also informed by the Panchakosha imagination.
- Content: Textbooks are used only from Grade 1 and most of the content is concrete materials – toys, puzzles, and manipulatives. Along with these materials, learning experience organized through physical exploration of the classroom and outdoor space becomes the most appropriate content. In later years of this stage, worksheets can start playing a bigger role. Children's literature is a very important source of content for language and literacy development.
- Pedagogy: The pedagogical approach suggested is play based and emphasizes the nurturing caring relationships between the teacher and the children. The pedagogical design should allow for a balance between self-paced individual learning to a more social group-based learning. Development of foundational capacities in literacy and numeracy would require adequate time for the child to practice and repeat on their own. Whole class instruction should be balanced with work time for children where they work on their own either with materials or with worksheets.
- Assessments: Most assessments are observations made by teachers and not explicit testing the ability of students. Worksheets used by children can give information to teachers about the progress in learning.

- Classroom Arrangement: Children of this age group need to move freely and have adequate opportunities for engaging their natural curiosity and exploration. Classroom arrangements should reflect this need of the children and should not restrict the movement of children.
- Teachers: Since the relationship between children and the teacher is critical for this stage, the same teacher would engage in all the domains and there would not be any subject/ domain-specific teacher. The teacher-pupil ratio is also expected to be lower since individual attention and assessment through observation are necessary.

The Foundational Stage bridges the divide between the home environment of the child and the formal school environment. It develops capacities in Foundational Literacy and Numeracy that enables the student to learn all other subject areas. In addition to these capacities, it develops valuable dispositions for active learning and would enable the students to become engaged learners in formal school environments. Play and exploration are the natural modes through which children learn and the Foundational Stage utilizes these modes to promote the valuable capacities and dispositions.

2.4.2 Preparatory Stage

The Preparatory Stage is for three years and includes Grades 3,4, and 5.

"The Preparatory Stage will comprise three years of education, building on the play-, discovery-, and activity-based pedagogical and curricular style of the Foundational Stage, but also gradually beginning to incorporate textbooks as well as aspects of more formal classroom learning. There would mostly be generalist teachers during this stage, with the possible exception of some specialist language and art teachers (who may be shared across the school or school complex). The aim of this stage will be to lay the general groundwork across subjects, including reading, writing, speaking, physical education, art, languages, science, and mathematics, so that students are prepared to delve deeper into learning areas through specialised subjects and subject teachers in the stages that follow." [DNEP 4.1.1]

- **Curricular Structure**: The Preparatory Stage curriculum of the NCF is divided into the following curricular areas – languages, mathematics, arts, physical education, and the world around us. The world around us is an interdisciplinary area that encourages exploration and understanding of both the natural world and the social world. Aspects of work in vocational education are also incorporated into this curricular area. The preparation is largely focused on capacities and dispositions at this stage.
- **Content**: Textbooks start playing a bigger role in the areas of language and mathematics. A variety of children's literature should complement the language textbook to consolidate students' literacy capacities. Materials and manipulatives continue to play a role in mathematics, though emphasis shifts to symbolic representation in correspondence with concrete materials. The world around us should rely less on the textbook and more on experiential learning with physical exploration as the main source of content. The content needs to be within the familiar contexts of the student.
- **Pedagogy**: The pedagogy continues to be activity-based and discovery-based in this stage, gradually encouraging students to be active within a formal classroom arrangement. The

ability to concentrate and pay continuous attention to classroom lectures and discussions needs to be encouraged. Some proportion of the self-paced individual work should be part of the classroom activity, while some amount of homework can be included.

- **Assessments**: Assessments in this stage is a combination of observation of students' activity, correcting their worksheets and short formal written evaluations. Periodic summative assessments should supplement the more formative assessments.
- **Classroom Arrangement**: The classroom setting is a balance between a formal environment and an arrangement that encourages movement and exploration. Students sitting and working in groups should be encouraged.
- **Teachers**: Teachers continue to be generalists and teach across curricular areas. For arts and physical education, specialists from the school complexes can be invited for the development of specific capacities and skills, but the class teacher should continue to be present and mediate these interactions with the students.

The Preparatory Stage consolidates the capacities and dispositions that begin to develop in the Foundational Stage. Students are expected to develop fluency in literacy and numeracy and develop further capacities that are helpful in a systematic exploration of the natural and social worlds around them.

2.4.3 Middle Stage

The Middle Stage is for three years and includes Grades 6, 7, and 8.

"The Middle Stage will comprise three years of education, building on the pedagogical and curricular style of the Preparatory Stage, but with the introduction of subject teachers for learning and discussion of the more abstract concepts in each subject that students will be ready for at this stage across the sciences, mathematics, arts, social sciences, and humanities. Experiential learning within each subject, and explorations of relations among different subjects, will be encouraged and emphasized despite the introduction of more specialized subjects and subject teachers." [NEP 2020, 4.2]

- **Curricular Structure**: The Middle Stage expands the curricular areas to include the Sciences – the study of the natural world, and Social Sciences – the study of the human world, and students get exposure to Vocational Education. Based on the capacities and dispositions in the Preparatory Stage, students engage more formally with knowledge and values in the Middle Stage. Curricular Areas are dealt with as 'forms of understanding' with explicit engagement with paradigmatic theories and conceptual structures that frame each area. The more generic capacities (like observation and data collection) developed in the Preparatory Stage are now specialized into specific methods of inquiry that is appropriate for each form of understanding. For e.g., students gain an understanding of the scientific method of inquiry and also contrast it with methods of inquiry in history or in the arts. The conventions and protocols of each form of understanding are also introduced in the middle stage.

- **Content**: The content in the Middle Stage needs to reflect the engagement with theoretical concepts and the introduction of theories and conceptual frameworks specific to each form of understanding. There is a shift to more abstract ideas and the students are expected to engage with unfamiliar contexts and situations. The textbooks need to play a central role in mediating the content in the Middle Stage. Both the expansion of curricular areas and the engagement with abstract ideas and unfamiliar contexts could be challenging and bewildering for students. Well-designed textbooks with clear expectations and specific learning goals would support students in entering these forms of understanding in a structured and systematic manner.
- **Pedagogy**: Pedagogy is a judicious balance of direct instruction and opportunities for exploration and inquiry. As mentioned before, the expansion of content areas and the abstract nature of theories places a heavy cognitive demand on students. The focus on concept development indicates that the Teacher must pay attention to the prior concepts that students might already have and how to use those conceptions to bring about active learning. The emphasis is not on accumulating more facts but on becoming fluent in the methods of inquiry within each form of understanding.
- **Assessments**: Assessments can become more formal and explicit. The focus of assessments should be on the specific ways of reasoning within each form of understanding and not merely the recall of facts. Formal tests and examinations play a role with the expectation that students can process larger chunks of information together for analysis and synthesis.
- **Teachers**: Subject-specific teachers handle different curricular areas in this stage. Teachers need a profound understanding of the curricular area in terms of both vertical connections of concepts within the subject and horizontal connections with concepts in other areas. Students of this age benefit from engaging with a diverse set of adults who have their own personalities and interests. Arts, physical education, and vocational education can have visiting faculty who have specialized knowledge and skills.

The Middle Stage utilizes the capacities and dispositions developed during the Preparatory Stage and introduces the students to different forms of understanding. Students gain systematic knowledge through rational thought and enquiry. The capacities for critical thinking and problem-solving are consolidated in this stage and they acquire the desirable values and dispositions for democratic/economic/cultural participation.

2.4.4 Secondary Stage

The Secondary Stage is for four years and includes Grades 9, 10, 11 and 12.

"The Secondary Stage will comprise of four years of multidisciplinary study, building on the subject-oriented pedagogical and curricular style of the Middle Stage, but with greater depth, greater critical thinking, greater attention to life aspirations, and greater flexibility and student choice of subjects. In particular students would continue to have the option of exiting after Grade 10 and re-entering in the next phase to pursue vocational or any other courses available in Grades 11-12, including at a more specialized school, if so desired." [NEP 2020, 4.2]

"Students will be given increased flexibility and choice of subjects to study, particularly in secondary school - including subjects in physical education, the arts and crafts, and vocational skills – so that they can design their own paths of study and life plans. Holistic development and a wide choice of subjects and courses year to year will be the new distinguishing feature of secondary school education. There will be no hard separation among 'curricular', 'extracurricular', or 'co-curricular', among 'arts', 'humanities', and 'sciences', or between 'vocational' or 'academic' streams. Subjects such as physical education, the arts and crafts, and vocational skills, in addition to science, humanities, and mathematics, will be incorporated throughout the school curriculum, with a consideration for what is interesting and safe at each age." [NEP 2020, 4.9]

The implications of the above two policy directions for curriculum design of the Secondary Stage are the following:

a. It consists of four years of multidisciplinary study, during which students will be offered a range of courses including:
    i. Essential courses which all students must take
    ii. Choice-based courses which each student may select
    iii. Vocational education, arts and sports which will be an integral part of the curriculum
b. The current practice of streaming into science, arts/humanities, and commerce will be replaced by a design that enables both breadth through engagement with a variety of courses across streams and depth in areas chosen by students.
c. Greater breadth will be enabled by the essential courses that all students will take, while greater depth will be enabled through courses based on student choice.
d. Students will receive greater attention to their personal and career aspirations as they ready themselves for work or higher education.
e. The Secondary Stage will be divided into two phases:
    i. Broad Curricular Areas (e.g., Science, Social Science, Humanities) will be offered in Grade 9 and 10 to enable breadth. Learning Standards are defined for this phase, and it is expected that all students attain these learning standards.
    ii. Disciplines (e.g., History, Physics, Language) within each Curricular Area will be offered in Grade 11 and 12 to enable depth. The students have a choice in selecting specific areas and disciplines. They make these choices based on their interests and their future plans either in the world of work or in higher education after their school completion. There are no common learning standards for this phase, while each of the disciplines would have its specific competencies and learning outcomes defined.

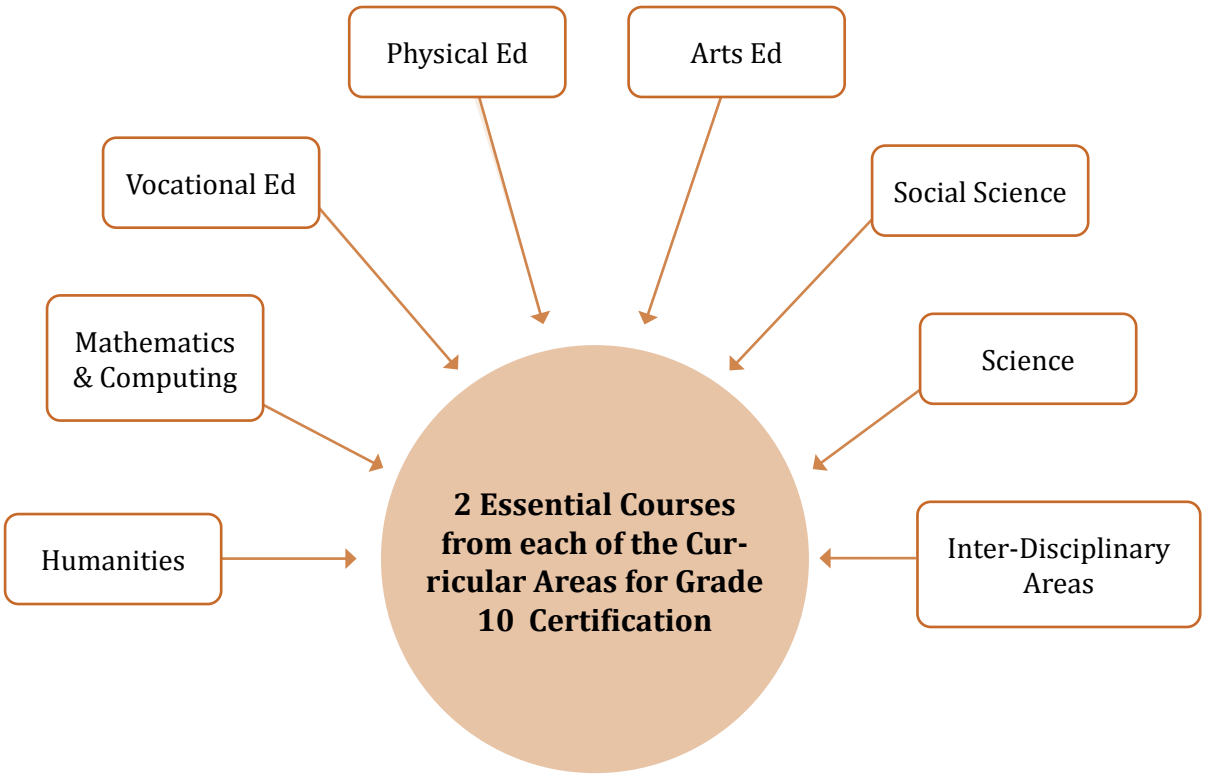
2.4.4.1 Design of Grades 9 and 10

To complete Grade 10, students will complete two Essential Courses from each of the eight Curricular Areas available i.e., a total of **16 Essential Courses** across two years of Grade 9 and 10. These either Curricular Areas – Humanities (that includes languages), Mathematics & Computing, Vocational Education, Physical Education, Arts, Social Science, Science, and Inter-disciplinary Areas gives the necessary breadth of understanding and capacities for the students.

Grades 9 and 10 will follow an annual structure (a semester structure in these classes is possible to construct but is unnecessary since all students will do all the essential courses).

Students must clear 8 Board examinations at end of Grade 10 - these assess each of the two Essential Courses in each Curricular Area learnt during Grades 9 and 10.

Figure A-2.4-i



The final certification will be based on the cumulative result of each of the examinations.

2.4.4.2 Design of Grades 11 and 12

The same set of eight Curricular Areas will continue to be on offer, but choice-based courses will be designed based on the Disciplines within the Curricular Areas to ensure deeper and more rigorous engagement. Choice-based courses and their content will be designed on the basis of the specific nature of disciplines.

This phase of the Secondary Stage would be divided into semesters and each choice-based course would be for a semester. **Students must complete 16 choice-based courses to complete Grade 12**.

To ensure that the students have adequate breadth, they have to choose Disciplines from at least three Curricular Areas. To ensure depth, when they choose a Discipline, they have to complete four choice-based courses in that Discipline.

In the case of academic disciplines, the intent of these four courses should be to give an introduction to give a good introduction to the discipline. By gaining knowledge of the key conceptual structures and theories of the discipline, and developing capacities of inquiry in that discipline, students can make informed decisions about the pursuit of this discipline in higher education.

In the case of vocational areas, these four courses should equip that student to enter the world of work in that particular vocation.

Table A-2.4-i

#	Curricular Areas	Disciplines (four courses within each discipline)
1	Humanities	Languages, Literature, Philosophy
2	Social Science	History, Geography, Political Science, Psychology, Economics, Sociology
3	Science	Physics, Chemistry, Biology
4	Mathematics & Computing	Mathematics, Computer Science, Business Mathematics
5	Arts	Music, Dance, Theatre, Sculpture, Painting, Film appreciation, Scriptwriting, Set design
6	Vocational education	Aligned to the National Skills Qualifications Framework (NSQF)
7	Sports	Courses on specific sports/games/yoga to include all aspects (e.g., coaching, financing)
8	Inter-disciplinary Areas	Commerce, Sustainability and Climate Change (Environmental Education), Health (Public, community health), Media and Journalism, Family and Community Sciences (the current form of home science), Knowledge of India/Indian Knowledge, Traditions and Practices/Indian Knowledge Systems, Legal studies. List may be enhanced continually.

As an illustration, if a student chooses Social Science (Curricular Area) and History (Discipline) within that, she must complete all four courses in History. She could then choose the Humanities as the second Curricular Area and do four courses in Philosophy. Mathematics could be the third Curricular Area with four courses in Computer Science. The fourth set of courses could be from one of the three Curricular Areas already chosen or from a completely different one.

Alternatively, if a student chooses Science (Curricular Area) and Physics (Discipline) within that, she must complete all four courses in Physics. She could then choose Arts as the second Curricular Area and do four courses in Music. Mathematics could be the third Curricular Area with four courses in Mathematics. The fourth set of courses could be from one of the three Curricular Areas already chosen or from a completely different one.

Modular Board Examinations will be offered as opposed to a single examination at the end of the year. The final certification will be based on the cumulative result of each of the examinations.

a. Design Considerations of Disciplinary Courses

The following are some of the key considerations for designing the Disciplinary Courses:

1. Each discipline has four courses through which a thorough introduction to the discipline is given to the students. Each course is semester-long in duration.
2. Since students have a wide choice Disciplines should not assume that students would choose the complementing Disciplines. For e.g., the Biology courses cannot assume that students are enrolled in Chemistry in their Grade 11 and 12.
3. The intention should be not to "cover" all the important concepts in that discipline. This would result in a very high content load. Instead, the design should focus on some key conceptual structures and theories in that discipline, along with an adequate emphasis on the methods of inquiry in that discipline.
4. The students should develop an understanding of how this discipline fits within the Curricular Area and what are currently the open questions that the discipline is engaging with.

2.4.4.3 Implications for Secondary Schools

All Secondary Schools will need to offer Essential Courses in all the Curricular Areas so that all students are able to complete Grade 10. The design and learning standards for the Essential Courses have been articulated in the NCF.

Since the Grade 11 and 12 of the Secondary Stage has a wide range of Disciplines, many schools might struggle to offer this entire range. This in effect limits the choice for the students. To ensure that students have a reasonable choice, Secondary Schools, to begin with, must offer **at least one Curricular Area from each of the following categories:**

a. Category 1: Humanities or Social Science or Science or Mathematics and Computing
b. Category 2: Inter-disciplinary Areas
c. Category 3: Arts or Sports or Vocational Education

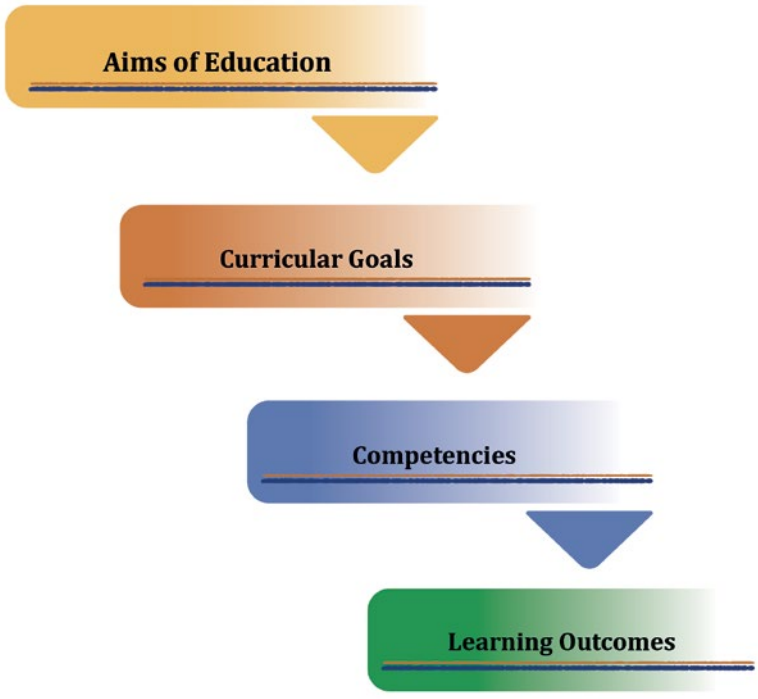
In the medium term, more and more schools must offer as many of the Curricular Areas as possible to truly enable student choice

Chapter 3

Approach to Learning Standards, Content, Pedagogy, Assessment across Stages

Chapter 1 has articulated the Aims of School Education. These aims have been derived from the vision and purposes of education outlined in NEP 2020. Chapter 2 detailed the four-stage design of schooling as recommended by NEP 2020. This Chapter draws out the approaches taken by the NCF towards defining Learning Standards, selection of Content, methods of teaching and assessments. It gives an outline of how the Aims of School Education are to be achieved.

Figure A-3-i



Section 3.1
Approach to Learning Standards

Education can be seen both as a process and an outcome. When we view education as an achievement we think about a student's achievement of the desirable knowledge, capacities, values and dispositions as derived from the Aims of School Education. To bring clarity to all stakeholders on what is it that is to be achieved by schools, this NCF has articulated the educational achievements as clear Learning Standards. Clarity on what is intended to be achieved is beneficial to teachers, students, educational functionaries, parents, and society as a whole. Clarity of purpose is one important step towards success and this NCF hopes that the Learning Standards provide that clarity of purpose. This section first defines a few terms used in this NCF in the context of Learning Standards and then gives an approach to arriving at the Learning Standards.

3.1.1 Definitions

a. **Aims of School Education:** Aims are educational vision statements that give broad direction to all deliberate efforts of educational systems – curriculum development, institutional arrangements, funding and financing, people's capacities and so on. Aims of School Education are usually directed by education policy documents. For example, NEP 2020 states that *"The purpose of the education system is to develop good human beings capable of rational thought and action, possessing compassion and empathy, courage and resilience, scientific temper, and creative imagination, with sound ethical moorings and values. It aims at producing engaged, productive, and contributing citizens for building an equitable, inclusive, and plural society as envisaged by our Constitution."* The NCF has derived the Aims of Education from NEP 2020, and the aims have been articulated in Chapter 2.

b. **Curricular Goals**: Curricular Goals are statements that give directions to curriculum development and implementation. They are derived from Aims and are specific to a Stage in education (e.g., the Foundational Stage). National Curriculum Frameworks which guide the development of all curricula state the Curricular Goals. For example, in this NCF *"Children develop effective communication skills for day-to-day interactions in two languages"* is a Curricular Goal for the Foundational Stage.

c. **Competencies:** Competencies are learning achievements that are observable and can be assessed systematically. These Competencies are derived from the Curricular Goals and are expected to be attained by the end of a Stage. Competencies are articulated in Curriculum Frameworks. However, curriculum developers can adapt and modify the competencies to address specific contexts for which the curriculum is being developed. The following are examples of some of the Competencies derived for the above Curricular Goal in this NCF - *"Converses fluently and can hold a meaningful conversation"* and *"Understands oral instructions for a complex task and gives clear oral instructions for the same to others."*

d. **Learning Outcomes:** Competencies are attained over a period of time. Therefore, interim markers of learning achievements are needed so that Teachers can observe and track learning and respond to the needs of learners continually. These interim markers are Learning Outcomes. Thus, Learning Outcomes are granular milestones of learning and usually progress in a sequence leading to attainment of a Competency. Learning Outcomes

enable Teachers to plan their content, pedagogy, and assessment towards achieving specific Competencies. Curriculum developers and Teachers should have the autonomy to define Learning Outcomes as appropriate to their classroom contexts, while maintaining the connection to the Competencies.

e. The following table is an example of Learning Outcomes derived for the Competency *"Converses fluently and can hold a meaningful conversation"* in the Foundational Stage:

Table A-3.1-i

	A	B	C	D	E
	Competency: Converses fluently and can hold a meaningful conversation				
	Ages 3 - 8				
1	Listens attentively and speaks in short conversations with familiar people around	Initiates conversations in daily life with peers and teachers in a variety of school settings	Engages in conversations based on events, stories, or their needs and asks questions	Engages in conversations, waits for their turn to speak, and allows others to speak	Maintains the thread of the conversation across multiple exchanges
2	Expresses their needs and feelings through short meaningful sentences	Narrates daily experiences in simple sentences and asks simple questions, using what/ when/ how/ whom, etc.	Narrates daily experiences in elaborate descriptions and asks why questions too	Engages with non-fictional content read aloud or discussed in class, is able to link knowledge from their own experiences, and talks about it	Engages in discussion about a topic and raises and responds to questions

3.1.2 From Aims to Learning Outcomes

This NCF strongly emphasises the importance of the clear flow-down that must be there from Aims of School Education to Curricular Goals to Competencies to Learning Outcomes. Each set must emanate from the immediately higher level, while ensuring full coverage of the objectives at the immediately higher level.

This is a process of 'breaking down and converting' relatively abstract and consolidated notions to more concrete components, in order to make them useable in the practice of education. This process, including other considerations that must be accounted for in this 'flow-down,' are described in this Chapter. It is only such coherence, coverage, and connection arising from a rigorous 'flow-down,' from Aims of Education to Learning Outcomes, that can align syllabus, content, pedagogical practices, institutional culture, and more to achieving what we want from education.

This is simply because in the everyday life of the Teacher and institutions, efforts are (or can be) made towards achieving very specific, observable, and short-period learning objectives which are marked as Learning Outcomes; and which when arising from the process of 'flow-down' described, guide the trajectory of educational efforts towards the attainment of Competencies, which in turn accumulate to Curricular Goals, and which taken together would fulfil the relevant Aims of Education.

NEP 2020 has articulated the vision and purpose of education. This NCF has drawn the Aims of School Education from this vision. The Curricular Goals are in turn derived from these Aims, with other relevant considerations. The Competencies then have been drawn from these Curricular Goals and the Learning Outcomes from those Competencies.

It must be noted that the Competencies and the Learning Outcomes are illustrative.

Curriculum developers should carefully consider the set of Competencies in the NCF and use these, after making relevant changes where and if required. Given the relative stability and cross-cutting relevance of Competencies across contexts (and time), there may be fewer requirements for changes in the Competencies articulated in the NCF; however, decisions on this matter should be carefully considered by curriculum developers.

The Learning Outcomes are far more contextual and will, therefore, require close attention and contextualisation, for the curriculum or syllabus being developed. The developers may use the sets articulated in the NCF, but this must be done after due consideration, and there must be no hesitation to use more relevant sets.

Thus, the States and their relevant institutions, and other institutions responsible for curriculum and syllabus development, would need to conduct a rigorous exercise of such a flow-down, to arrive at the full set of Learning Standards for their use.

3.1.3 From Aims to Curricular Goals

The Aims of School Education, as envisaged in Chapter 2 of this NCF, give direction to the intended educational achievements for the four school stages. Curricular Goals are stage specific as mentioned before.

In this NCF, Curricular Goals for the Foundation Stage are defined for the different domains of development. It is appropriate that at the Foundational Stage the curriculum is closely aligned with the domains of child development. From the Preparatory Stage onwards, the Curricular Goals are defined for specific Curricular Areas. These Curricular Areas have been defined in Chapter 2 along with the aims.

The aims are only one source for arriving at stage-specific Curricular Goals. These are some of the considerations that inform the articulation of Curricular Goals:

a. Aims of School Education, as articulated by the NCF
b. Nature of Knowledge that is relevant to the Curricular Area
c. Age appropriateness specific to the stage of schooling

The Aims of School Education as articulated in Chapter 2 are an important source for deriving the Curricular Goals. The Curricular Goals are to be arrived at from the desirable knowledge, capacities, and values and dispositions that are relevant to the Curricular Area which would contribute to achieving the aims.

3.1.4 From Curricular Goals to Competencies

The four main sources for arriving at the list of Competencies are:

a. Curricular Goals

b. Current research literature appropriate for the Stage and Curricular Area that informs

c. Experience of various educational efforts in the country

d. Our context, which includes resource availability, time availability, institutional, and Teacher capacities

Each stage has its own considerations regarding children's development and concept development (elaborated in Chapter 3) which have an impact on the choice of the Competencies within each Curricular Goal.

All stakeholders in school education should have clear visibility of the Competencies that are expected to be achieved. Keeping track of progress in the attainment of these Competencies for every child would allow school systems to ensure that all children receive appropriate learning opportunities towards reaching the Curricular Goals of the NCF.

3.1.5 From Competencies to Learning Outcomes

Learning Outcomes are interim markers of learning achievement towards the attainment of Competencies. They are defined based on the specifics of the socio-cultural contexts, the materials and resources available, and contingencies of the classroom. A set of illustrative Learning Outcomes have been defined in this NCF, based on the broad understanding of the context our education system.

These Learning Outcomes need to be seen as enabling guidelines for Teachers and school leaders and not as constraining demands on them. They have the autonomy to reimagine the Learning Outcomes based on their contexts.

Section 3.2
Approach to Content

"Curriculum content will be reduced in each subject to its core essentials, to make space for critical thinking and more holistic, inquiry-based, discovery-based, discussion-based, and analysis-based learning. The mandated content will focus on key concepts, ideas, applications, and problem solving." [NEP 2020, 4.5]

"The reduction in, and increased flexibility of, school curriculum content – and the renewed emphasis on constructivist rather than rote learning – must be accompanied by parallel changes in school textbooks. All textbooks shall aim to contain the essential core material (together with discussion, analysis, examples, and applications) deemed important on a national level, but at the same time contain any desired nuances and supplementary material in accordance with local contexts and needs." [NEP 2020, 4.31]

Content to be used in the teaching-learning process includes the learning environment, teaching learning materials and books. Developing books, including textbooks, must follow a rigorous process based on an appropriate syllabus. The arrangement and organization of the learning environment is important across all Stages but most especially for the Foundational and Preparatory Stages. Carefully selected Teaching Learning Materials play an essential role in all classrooms.

3.2.1 Core Essentials of the Curriculum

The Learning Standards (Curricular Goals, Competencies and Learning Outcomes) are the basis for what will be taught and learnt through school. As students progress through the Stages, they will move from learning perceptual concepts to practical concepts to theoretical concepts using play and exploration to methods of more rigorous inquiry.

As per the NEP 2020, all students must study the core essentials of each curricular area to make space and time to focus on developing capacities and values that are part of the aims of school education. Each curricular area will choose the core essentials based on the nature of knowledge of that area, the capacities it seeks to develop and the demands of each particular Stage of schooling.

3.2.2 Learning Environment, Learning Material

A safe, inclusive, and stimulating environment that supports every student's participation is critical for achieving the Learning Standards outlined in the NCF.

Classrooms that are clean, well-ventilated, and well-lit, adequate resources and material available and organized with appropriate access and safety provisions are important to facilitate learning. Classrooms should allow for both individual work and cooperative work. Classroom displays should be available for student work. Students with developmental delay or disability may need specific accommodations for both physical space and teaching learning materials to enable physical and curricular access.

For the Foundational and Preparatory Stages, classrooms may be organized into Learning Corners for specific domains of learning. Availability of a range of safe and stimulating material that encourages learning in different domains of development, literacy and numeracy would be necessary for all students.

Well-resourced libraries and laboratories would be necessary for the Middle and Secondary Stages. Art education, physical education and vocational education would require specific kinds of spaces and material available and organized in particular ways.

3.2.3 Broad Approach to Content Selection

Curricular Goals, Competencies and Learning Outcomes give clear direction as to what content is to be used for creating learning experiences for students

Concepts formed in the Foundational and Preparatory Stages are largely perceptive (e.g., colour as visually discriminated) and practical (e.g., spoon used as a lever to open a tin cover, money to buy things in a shop) but not theoretical (e.g., colour as a spectrum of light, lever as a simple machine, or money as a medium of exchange). Exploring the theories behind the perceptive and practical concepts is expected in the Middle and Secondary Stages of schooling. Choices of content for each Stage must be based on this.

Content in the Foundational and Preparatory Stages should be derived from children's life experiences and reflect the cultural, geographical, and social context in which the child is developing and growing. As students move through the Middle and Secondary Stages, content should move away from the familiar and include ideas and theories not necessarily represented in the immediate environment.

Content should be tied to capacities and values that students need to develop through Stages of schooling. Special care should be taken to avoid promotion of stereotypes.

3.2.4 Broad Principles of Textbook Design

a. **Curriculum Principle**: The textbook should be designed specifically to achieve the Competencies for the Stage and the Learning Outcomes for the Grade. Textbook developers and designers should not only be aware of the Competencies of the particular domain or curricular area for which the textbook is being developed, but also the Competencies for the whole Stage. This would allow them to bring in horizontal connections across the domains and curricular areas across the Stage.

b. **Discipline Principle:** Textbook developers should have sound knowledge of the discipline associated with the textbook being developed. The content and sequence included in the textbook should be careful not to contradict some of the core principles of these disciplines.

c. **Pedagogy Principle**: Textbook developers need to have a clear understanding of the pedagogy that is appropriate for the Competency and content (e.g., in language the balanced approach of including oral language, phonics and word solving instruction and meaning making needs to be incorporated all together for the Foundational Stage).

d. **Technology Principle**: Textbook developers should be aware of the current technology and audio-visual materials available for enhancing learning experiences of students. Activities that involve digital technology and references to external material should be embedded appropriately in the textbook.

e. **Context Principle:** The local context and environment is important in the Foundational and Preparatory Stages. important consideration for choice of content in the textbook. Moving from the familiar to unfamiliar is an important aspect of learning and the textbook should contain a balance of both familiar contexts that is a comfort for the children and unfamiliar contexts that should generate curiosity and challenge to their thoughts and preferences. For the Middle and Secondary Stages, this may not be a strong consideration in all curricular areas.

f. **Presentation Principle:** The textbooks should grab the attention of students. For the Foundational and Preparatory Stages, the balance between visual material and text should be tilted towards visual materials. The colour schemes and design themes should be attractive and consistent. The fonts and size of text material should be both visible and least confusing for young children to decode. For the Middle and Secondary Stages, the flow of concepts, clarity in articulation and well-designed illustration to show the same would be important.

g. **Diversity and Inclusion**: In the Indian context, it is important to maintain diversity and inclusion as an important principle in the choice of content for textbooks. Even within States there are regional variations and these need to find adequate representation in textbooks. Balanced gender and community representation must be ensured.

3.2.5 Process for Textbook Development

Applying the principles of textbook development, the process could be the following:

a. **Creation of a syllabus document** – Drawing from the Curricular Goals, Competencies and Learning Outcomes; nature, pedagogy, and assessment of a subject; the syllabus document could include the objectives of teaching the subject, approach to the content to be included (concept or theme), structure of the syllabus document (as questions, key concepts, suggested strategies or activities), choosing content that is cognitively and socio-culturally relevant. The syllabus document could also use literature from research studies, policy papers, Teacher experiences, subject matter expert opinions for deciding the extent and depth of the content.

b. **Panel of textbook writers, reviewers, and designers/illustrators** - The people involved in textbook development could be:

   i. **Textbook writers and reviewers** – Teachers must be part of this group – others could include subject experts, university faculty and research scholars.

   ii. **Designers/Illustrators** – People/organisations that have both design understanding and understanding of the local context, preferably local experts and should be involved from the start of the process.

iii. **Technical Expert –** A lot of content that complements the textbook can be made available through digital media. It is important for the technical expert to be part of the textbook development team from the start - media content should not be an afterthought.

The group should work together from the beginning to create a common understanding of the process and be open to feedback, suggestions, and multiple iterations of the textbook.

c. **Choice of content, pedagogy, and assessment** – The topics/themes chosen would need to include the context of the student (including previous experiences, language) and scope for further exploration. The content at each Grade should be a precursor to the next. It is essential to ensure an alignment of the pedagogy and assessment with the content and the Learning Outcomes.

d. **Structure of the textbook** – Considering that the textbook is an important point of connect between the Teacher and the student, it would need to be useful for both. Content in textbooks are largely directed towards students. It has been a practice to include notes for teachers in the textbook. This approach is limiting and this NCF recommends that each textbook released for students should be accompanied by a Teacher's version of the same textbook. (Please see the box below)

e. **Presentation and Design** – The presentation of a textbook relies on the font size, images, sketches, the colours used, and on the amalgamation of the three e.g., textual content in the early Grades may be limited with a large number of images, font size should be large, and the illustrations used should be sensitive and inclusive. The language used would need to be Grade-appropriate and relevant to the subject.

f. **Writing, review, and pilot run** – The writing of a textbook needs sufficient time, regular peer reviews and panel reviews. Regular sittings with the illustrators to define and reiterate the requirement of the content being worked on is necessary. This adds to the rigour of textbook creation and assists in avoiding repetitions in text, images, ideas across subjects as the illustrators work with all the writers.
The review provided would need to be constructive and encouraging. The feedback should include suggestions and alternative ideas. The writers should be open to multiple iterations and be cognizant of the principles of writing content. The review process must be done chapter wise and then for the textbook as a whole. Meticulous proof reading of the textbook is essential and contributes to their quality.
Selected schools must be identified for the pilot run of the textbooks. During the pilot run of the textbooks, the writers must visit schools and schedule classroom observations, conversations with Teachers, children, parents, and receive feedback about the textbook.

g. **Teacher orientation to the textbooks** - There must be provision for Teacher orientation on the genesis of the textbook, its rationale, the approach to pedagogy and assessment to ensure its appropriate use in the classroom. This orientation must be followed up through school visits, webinars, sharing of best practices and regular interactions with the Teachers to understand the challenges being faced in the use of the textbooks.

Box A-3.2-i

Teacher's Handbook

It has been a practice to include notes to Teachers in the textbook. This approach is limiting and not desirable. If notes are kept to their briefest minimum, it is not really useful for the Teacher. If they are elaborate and detailed, it unnecessarily increases the size of the textbook for the students and it perhaps would also be intimidating.

It is recommended that each textbook that is being published should be accompanied by a Teacher's version (textbook+) of the same textbook. The textbook+ should be organized in the same sequence of chapters as the students' textbook but can additional materials:

- Intended learning objectives of the chapter and how it is connected to the Learning Standards of the curriculum.
- Recommended pedagogical strategies relevant for that chapter.
- Alternative activities for students who are struggling to grasp the content.
- References (through QR-Codes) for digital materials, additional worksheets, formative assessments, pedagogical content knowledge packages etc. that provide both additional teaching aides and also develops a more profound understanding in the teacher of the topic under consideration.

Thus, the textbook+ would be valuable compendium for the teacher to go well beyond the textbook's content, without burdening or intimidating the students.

3.2.6 Teacher Support for Meaningful Use of Textbooks

A textbook must contain guidelines for the Teacher to indicate the broad approach to teaching-learning, as well as how to use the textbook optimally. It must indicate the Competencies students are to attain as a result of transacting a set of materials/activities suggested in the textbook, as well as expected Learning Outcomes for each chapter or unit or lesson.

The textbook must also provide the Teacher guidelines on processes like learning tasks, activities, projects, field trips, simple experiments as well as assessment. It must contain tables, figures, flow charts, cartoons, pictures that enable attainment of Learning Outcomes while also providing inputs to the Teacher on similar materials that can be sourced locally.

Notes to the Teacher explaining the rationale for content or activity as well as suggestions, and dedicated Teacher pages containing notes at strategic points in the textbook, as well pages providing practical suggestions which can extend to both the Teacher's classroom transaction in addition to the scope of the textbook are some devices that can be used within the textbook.

If practicable, a Teacher manual can be developed as a companion to the textbook, aligned to both its approach and content. While the Teacher manual is primarily intended for the Teacher, its use will benefit children as well. For example, the Teacher manual can include suggestions on accommodating diversity in the classroom, contextualizing content that may have been selected at the State level and linkages with other subjects. It can explain the developmental needs of children and how learning happens in the specific subject that will help the Teacher align pedagogy and assessment accordingly.

Section 3.3
Pedagogy

A good educational institution is one in which every student feels welcomed and cared for, where a safe and stimulating learning environment exists, where a wide range of learning experiences are offered, and where good physical infrastructure and appropriate resources conducive to learning are available to all students [NEP 2020, Principles]

Pedagogy is the method and practice of teaching used in classrooms by the Teacher to help students learn. Effective pedagogy is based on a good understanding of how children grow and learn and has clear focus on curricular goals, curricular competencies and learning outcomes to be achieved for students across Stages of School Education.

3.3.1 How do Children Grow and Learn?

Healthy physical development requires basic needs of adequate nutrition, and appropriate sensory and emotional stimulation. There are 'critical periods' in sensory development, e.g., normal visual experience is critical within the first few months of life. There are 'sensitive periods' in cognitive and emotional development e.g., early childhood and adolescence. Physiological changes have ramifications on the psychological and social aspects of a child's life.

From an evolutionary point of view, human beings are born to learn, so we come with a drive to understand the world, to explain what is around us. We constantly make our own theories and refine them based on our perceptions and experience.

Children are, therefore, natural learners. They are active, eager to learn, and respond with interest in new things. They have an innate sense of curiosity - they wonder, question, explore, try out, and discover to make sense of the world. By acting on their curiosity, they continue to discover and learn more.

Research from across the world has provided us with a set of ideas about how children learn that have practical implications for teaching, most importantly:

a. **The brain plays an important role in learning:** The brain is a complex organ made up of neurons, glial cells, blood vessels and many, many cells organized into specialized areas. The working of the brain is the ever-changing patterns of connections between millions of neurons. Learning is a physical process in which new knowledge is represented by new brain cell connections. The brain both shapes and is shaped by experience, including opportunities the child has for cognitive development and social interaction. The brain is designed to learn and remember new things through life, as long as it continues to be challenged and stimulated.

b. **Learning is based on the associations and connections children make:** Children are far from blank slates on which we can simply write pages and pages of information. They have knowledge and understandings based on their experience; they have intuitive theories about varied subjects. Nothing is ever recorded in a child's brain exactly as it is experienced.

It is their interpretation of what they experience that becomes new knowledge. Interpretation is always in the light of whatever knowledge they already possess. Children are continuously fitting new experiences into existing knowledge and adjusting existing knowledge to allow new experiences.

c. **Emotions are deeply connected to learning:** Emotions are inextricably intertwined with attention, motivation and cognition. Positive emotions like curiosity, wonder, joy and excitement aid attention, cognition and memory and, therefore, learning. Positive emotions are often best nurtured through positive relationships with Teachers and among students. When students feel they belong in a classroom and they can trust, they feel free to try out and explore and, therefore, learn better. As trust grows, the classroom becomes emotionally safer, and students have fewer obstacles to build their confidence and their learning.

d. **The learning environment matters:** The word environment refers to both the physical space and the 'atmosphere' or psychological environment in the classroom. The physical environment provides a structure that allows safe exploration, cognitive growth and challenge. The atmosphere or psychological environment is made up of all the relationships and social interactions that happen in the classroom. A safe, secure, comfortable, and happy classroom environment can help children to learn better and achieve more. For this, it is important that the necessary facilities such as learning materials, aids, equipment, and space for doing activities, working together, and playing so as to help each child learn better are made available. The classroom must be an inclusive, enabling learning environment that provides every child freedom, openness, acceptance, meaningfulness, belonging and challenge.

e. **Learning occurs in particular social and cultural environments:** Learning in school becomes meaningful when it connects to students' lives and experiences. Most children grow up with stories, songs, games, food, rituals, and festivals special to their families and community along with local ways of dressing or working or travelling or living that are an integral part of their everyday lives. The diverse experiences of children must find a place in the classroom. As children grow up, while there may often be a difference between the culture of a student's home and the culture of the classroom, it is important to continue to listen to student's voices and honour their cultural traditions in the classroom.

3.3.2 Effective Pedagogy for Achieving Aims of School Education

As stated in Chapter 1, Section 1.3, the central purpose of schools as formal educational institutions is the achievement of valuable knowledge, capacities, and values/dispositions by students. Based on how children learn, some key elements of pedagogy for achieving these aims are below.

a. **Knowledge (knowing that – concepts, theories, principles)**
Children form concepts and intuitive theories right from infancy. To learn a new theory or concept or principle, children fit this new experience into their existing knowledge and adjust their existing knowledge to allow new experiences in.
To help children do this well, teachers need to structure and sequence the teaching of concepts appropriately, connect new concepts to students' existing experience and understanding, pose questions that challenge their existing understanding and make clear demonstrations that push their thinking beyond their existing understanding. All this, while

ensuring their full participation in open discussions and hands-on activities. Teaching concepts, theories or principles in disconnected chunks or expecting students to reproduce them in the same way they were received makes true conceptual understanding impossible.

Box A-3.3-i

Importance of memory

*The ancient Indian emphasis on **Smriti (memory)** is critical to learning and development. It has often been misunderstood as an emphasis on rote learning, which in principle and when practised with fidelity, it was not.*

*Current cognitive science research indicates that **Smriti (memory)** - both working memory and long-term memory - plays an important role in cognition and comprehension. Insufficient emphasis on memory often results in inadequate outcomes in the classroom. When we use memory inappropriately, we are ignoring its powers and capacities.*

Using memory for learning in the classroom encompasses a variety of activities - deliberate and regular practice, deep processing, generating cues, making connections, and forming associations.

b. Capacities (knowing how - abilities and skills)

Abilities and skills are learnt best by doing and they improve with repeated exposure and practice. Good practice involves meaningful variety, must be done in appropriate quantity and is supplemented with continuous discussions on why certain procedures work and others do not.

Box A-3.3-ii

Importance of Practice

Learning is a time-consuming process. Organized, regular and steady practice yields steady and positive impact on learning. Practicing helps to internalize information; access more complex information stored in long-term memory and apply knowledge or skills automatically.

Across curricular areas, differences in students' performance are affected by how much they engage in deliberate practice. Deliberate practice is not the same as rote repetition. Rote repetition does not improve performance by itself. Deliberate practice involves attention, rehearsal and repetition and leads to new knowledge or skills that can later be developed into more complex knowledge and skills.

When a skill becomes automatic, attention and mental resources can be freed up for higher level thinking and reasoning.

Most Teachers are aware of two contradictory facts - drill can be boring, and yet practice is the only way for their students to master certain procedures. The problem with drill comes when we assume that it will substitute for understanding. Concepts and procedures are two different things, both of which students need to learn. Practice *alone* cannot lead to conceptual knowledge and understanding *alone* cannot lead to mastery of a procedure.

c. Values and Dispositions

'Telling' children about what values they should develop or uphold usually has very little effect. It either becomes 'boring' or seems like 'preaching.'

Development of values and dispositions in school education happens primarily in the following ways:

i. Through School and Classroom culture e.g., sensitivity and respect for others is encouraged when opportunities are provided for all students to participate in activities and select students do not end up participating in all activities.

ii. Through School and Classroom practices e.g., stories about particular values or regular bal sabhas and bal panchayats help to build notions of democracy, justice and equality.

iii. As part of learning through school subjects e.g., laboratory experiments and trials help build scientific thinking.

iv. As direct goals of some school subjects e.g., learning to win and lose with grace during sports and games helps build resilience.

Box A-3.3-iii

Importance of Questioning

We have a long and ancient tradition of questioning in India. Debate and discussion have always been held as a critical part of the Indian knowledge tradition.

The Upanishads were written in response to the questions of shishyas. The literal meaning of the word Upanishad is the sitting down (of the shishya) near (the guru). The usual method of argument utilized reason and went from simple to complex, from concrete to abstract, from known to unknown.

In the Katha Upanishad, is the powerful story of Nachiketa, a young boy, who dared to ask Yama, the lord of death, a very simple but fundamental question: 'Is there life after death, or is death the end?'

At different periods in time, India has produced exceptional scholars who were unconditional masters in their respective schools of thought. It was often the custom among learned men to debate the merits and demerits of these various systems of philosophy. The debates between Adi Shankara and Mandana Misra, for example, are legendary. Thousands of scholars gathered every day to watch and learn from them.

This debate between two luminaries throws light on the healthy competition that existed among followers of different philosophies. They had open minds and the immense courage to test their faith, to question their beliefs, and to change their philosophies, if reason demanded the change. Through this process, it was always important to remain accepting towards new concepts, experiments, or questionings.

Some values are developed better through particular processes, illustratively,

i. Regular dialogue and discussion with active listening as part of classroom culture and processes will help develop democratic values (e.g., pluralism, equality, justice, fraternity).

ii. Curricular areas like Arts and Physical Education will help build individual virtues (e.g., honesty, courage).

iii. Curricular areas like Science and Mathematics will help build epistemic values (e.g., scientific temper, mathematical reasoning).

iv. Marking important days through community service as part of school culture and practices will help build cultural values (e.g., seva, ahimsa, shanti).

v. Regular practices at the school assembly will help promote pride in India's cultural diversity.

3.3.3 Key Elements that Enable Effective Pedagogy in the Classroom

a. Ensuring respect and care

Our schools are committed to providing an environment where children feel secure, and relationships are governed by care, equity, and respect. Any form of discrimination based on religion, caste, gender, community, beliefs, disability, or any other factor, is unacceptable. Teachers must value and respect all students. Classrooms should be spaces that will offer all students equal access and equal opportunity to achieve learning outcomes. All children will participate in a variety of activities and school processes not just those with the best chances of success. Our schools will create an environment that enhances the potential and interests of each child.

Care is central to learning in schools. Care is an attitude of concern and responsibility for people and relationships. Empathy and respect are at the heart of caring.

b. Building positive Teacher-student relationships

A safe, positive relationship between Teacher and student is enriching both for cognitive and socio-emotional development.

Some important ways to build such a positive relationship are:

i. **Getting to know each student individually** - this helps to understand and plan learning experiences for each of them.

ii. **Listening carefully to students** - this conveys care and respect, builds trust, helps students gain confidence.

iii. **Observing students** - this helps to discover how each student thinks, reasons and responds to different situations, which is critical to planning for teaching and learning.

iv. **Encouraging student responses** - this helps to meaningfully build on children's naturally creative and resourceful selves.

v. **Encouraging questioning** - questions to and from the Teacher helps students think through a particular subject in depth while responding.

vi. **Recognizing and responding to the emotions and moods of students** - this helps them to settle and learn better, learn to regulate their own emotions, and to understand and respond to the emotions of others.

Box A-3.3-iv

Ways of the Guru

According to Shri Aurobindo, the three instruments of the Guru are teaching, example and influence.

Wise teachers do not seek to impose themselves or their opinions on the passive acceptance of receptive minds. They seek to awaken much more than to instruct, they aim at the growth of faculties and experience by a natural process and free expansion. They prescribe a method as an aid, as a utilizable device, not as imperative formula, or a fixed routine.

As the Taittiriya Upanishad tells us, the Teacher is the first letter, the student is the last letter, knowledge is the meeting place and instruction is the link.

c. Providing scaffolding

Students can easily learn new knowledge when systematic support from other experienced students or adults is provided. Learning new knowledge should be a challenge, but the challenge should be within the reach of students - something that relates to their existing knowledge and can be done with the support of an experienced person.

Scaffolding refers to providing support, structure, and guidance during instruction. Scaffolding differs, depending on the task, but occurs when the Teacher carefully students a learning task and provides support along the way until gradually fading as the student reaches expertise.

One way of scaffolding is through a 'Gradual Release of Responsibility' (GRR) where first, Teachers model or explain ideas or skills; after which students and Teachers work together on the same ideas and skills where the Teacher provides guided support; and finally, students practice individually and independently.

d. Using differentiated instruction

Teachers will need to plan classes in a way that engages students with varying interests and capabilities meaningfully and encourages better learning.

One way to think about this is differentiated instruction i.e., tailoring the teaching process according to the individual needs of students. Content, methods of learning, material, and assessment may be different for different children. It is often difficult to do this for individual children, especially in a large class. In that case, the Teacher could identify small groups of children who have similar needs and address them differently as a group.

Before planning for this, it is important for the Teacher to observe students carefully, analyse their work and gather as much information as possible about them. e.g., The Teacher could plan to use worksheets of varying levels, starting with simple worksheets and progress to more complex ones according to what different groups of students in the class are able to do.

e. Providing opportunities for independent and collaborative work

Classroom processes should provide opportunities for students to work individually and to work together. Teachers may ensure that children work in pairs, small and large groups as well as independently. Teachers must help students to listen, understand, appreciate, and reflect on their own thought process and other's experiences with empathy and critical understanding.

Working with others often increases involvement in learning. Sharing one's own ideas and responding to others' reactions improves thinking and deepens understanding. In carefully crafted collaborative learning situations, students require the contribution of each other to successfully complete a learning task because of which they need to learn to take on varied roles e.g., as observers, mediators, score manager, note-takers based on the objectives of the task.

f. Using varied resources

Using the textbook meaningfully is important for learning. In addition, other resources and materials must be used to engage students beyond the textbook. Classroom processes should incorporate use of resources made by students, teachers, and the local community as well as those available in the immediate environment. Digital resources must also be incorporated appropriately.

Classroom displays constitute an important part of the learning process which should not be limited to finished products alone - they could also include aspects of work in progress.

g. Helping students develop appropriate work habits and responsibility

Developing appropriate work habits and taking responsibility are critical to learning. These include aspects like students' organizing space and materials before and after use, organizing time, ensuring time on task, taking responsibility for tasks, persisting with, and completing work, staying on a given task even without a Teacher present, and allowing others to work without disturbance.

h. Giving prompt and meaningful feedback

Students need immediate and appropriate feedback to benefit from classroom processes and improve their learning. Feedback helps students to reflect on what they have learned and what they still need to know.

Providing feedback means giving students an explanation of what they are doing correctly and incorrectly, with the focus of the feedback on what the student is doing right. Waiting too long to give feedback, the student might not connect the feedback with the learning moment. It is vital that we take into consideration each individual when giving student feedback. Some students need to be nudged to achieve at a higher level and other needs to be handled gently so as not to discourage learning and damage self-esteem.

3.3.4 Planning for Teaching

Teaching is a deliberate act carried out with the intention of bringing about learning in children. This deliberate act needs to be well planned. Planning is central to good teaching. Planning includes construction and organization of classroom tasks as per competencies and outcomes to be achieved, pedagogy to be followed, resources to be used and assessment to be carried out. Planning also includes support activities for children, home assignments, and displays in the class relevant to what is being taught.

Good planning requires understanding of Aims of Education, Curricular Goals, Competencies and Learning Outcomes to be achieved along with prior learning of the children for whom the plan is being made, and available teaching learning materials and content to be used.

The major components of a teaching plan are:

a. Competencies, Learning Outcomes and intended lesson objectives
b. Teacher-directed, Teacher-guided and/or Student-led activities to achieve objectives.
c. Prior understanding of the student on which choice of pedagogy is based
d. Content and material to be used
e. Duration and sequence of activities
f. Classroom arrangements e.g., seating, displays, arrangement of material
g. Specific strategies for students who need extra help
h. Methods of assessment

Box A-3.3-v

Panchaadi – Five-Step Learning Process

The five-step learning process - 'Panchaadi' - is a good guide to formulating the sequence that a Teacher may adopt in planning for instruction:

Aditi (Introduction): *As a first step, the Teacher introduces a new concept/topic by establishing a connection with the child's prior knowledge. Children gather relevant information regarding the new topic with the help of the Teacher by asking questions, exploring, and experimenting with ideas and material.*

Bodh (Conceptual Understanding)*: Children try to understand core concepts through play, enquiry, experiments, discussion, or reading in the second step. The Teacher observes the process and guides the children. The teaching plan has the list of concepts to be learnt by the children.*

Abhyas (Practice): *The third step is about practice to strengthen understanding and skills through a range of interesting activities. Teachers can organize group work or small projects to reinforce conceptual understanding and attainment of competencies.*

Prayog (Application): *The fourth step is about applying the acquired understanding in the child's everyday life. This can be accomplished through various activities and small projects.*

Prasar (Expansion): *The fifth step is about spreading the acquired understanding through conversations with friends, telling each other new stories, singing new songs, reading new books together and playing new games with each other. For each and every new topic learnt, a neural pathway is created in our brain. Sharing knowledge strengthens our learning. A neural pathway is incomplete if we don't teach what we have learnt. Teaching makes learning clear and long-lasting.*

3.3.5 Managing Classrooms/Student Behaviour

Students behave inappropriately for many reasons. Behaviour is often the unspoken language through which young children act out feelings and thoughts. Sometimes they use behaviour to seek extra attention. Adolescents could be angry or helpless and don't know any other way to express this. Sometimes this behaviour could be because of lack of sleep, poor nutrition, health reasons or developmental delay or deficits, family dysfunctionality or stress.

Norms, rules, and conventions must enable students' learning. Evolving clear classroom norms that can be implemented, would help everyone own them rather than have a classroom function on the basis of fear.

Instances of indiscipline must be seen through the lens of development with a balance of humour and careful intervention that is firm yet kind. These should be used as learning opportunities in helping students to solve problems.

Discipline must be seen from the lens of self-regulation and self-discipline and as a necessary condition for development and the pursuit of learning. It is important for students to take responsibility for their behaviour and face appropriate consequences as they grow older.

Adults bear greater responsibility than students in creating an environment of respect and equality, illustratively, school staff is expected to intervene if they see students using physical violence, bullying each other or being unkind/unfair to each other and must put a stop to it immediately and firmly. They must encourage students to settle differences of opinion through dialogue and communication.

Box A-3.3-vi

Importance of Concentration

The Taittiriya Upanishad says that the secret of learning lies in the power of concentration in thought. The science of Yoga is based on the process of concentration and the methods by which concentration can be achieved on the object of knowledge in order that the contents, powers, and states of knowledge concerning that object can be realised by the seeker.

Sri Aurobindo also lays central importance on concentration and speaks of four principal methods by which concentration can be attained - meditation, contemplation, witnessing the passage of thoughts as they pass through the mind, and quietening and silencing the mind.

Concentration is a psychological process - it involves no rituals or ceremonies and is free from any doctrines. Hence, the cultivation of the powers of concentration is independent of any activity necessitating faith, belief, or religious prescription.

3.3.6 Responding to Students with Disability or other Individual Learning Needs

Classroom processes should respond to the diverse needs of students. Students learn best when they are challenged but not so much that they feel threatened or overwhelmed by the level of challenge. Therefore, Teachers would need to know and understand the learning needs of every student in their class and provide the appropriate level of challenge and support to each student.

During the normal course of teaching, based on routine observations and assessments, Teachers could identify those students that may require additional support or individualized attention. This in no way should lead to labelling of students as "bright", "slow" or "problem" students nor does it imply "lowering" of standards.

Some of the ways in which this additional support could be provided or children could be offered varying levels of challenge are listed below.

a. A "bridge" course for a month or so at the beginning of the year which will enable students to refresh their previously learnt concepts and prepare for the new class.

b. Specific work on designated days to supplement what has been done in class.

c. Differentiated assignments - the teacher could provide assignments/lass tests of varying levels of difficulty using the same content

d. Making specific resources available to students who need them; extra worksheets for those who need additional practice; "extra-challenging" worksheets for those who need it

e. Set up a buddy system wherever appropriate - pair a child who needs help with another child who can provide it informally – e.g., help with homework, explanations after class, doing projects together.

f. Setting up a conference time once a month or so with every student in class so that the teacher has a chance to communicate one-on-one with every student and identify conceptual problems or learning difficulties or individual needs of all children.

g. Communicate regularly with all parents but particularly those parents whose students may need special help and support so that parents are also able to provide support when required - the nature of this communication needs to be specific and clear to parents so that they know and understand what needs to be done to help their child

    i. In cases where the school is not equipped to help or support a student with an identified disability adequately, it may rely on external resources or resource persons. Schools will understand and opt for all exemptions provided by Boards of Education in specific situations. All such decisions should be made in partnership with families.

3.3.7 Pedagogy across Stages

An effective approach to pedagogy in particular School Stages is based on how children grow and learn (i.e., physical, emotional, social and ethical, and cognitive development) and the overall aims of education to be attained through school education. Such an approach will help to achieve Curricular Goals, Competencies, and Learning Outcomes without compromising the holistic and expansive notion of individual development that the NEP 2020 focuses on.

As stated earlier in this document, while the Stages are distinct, students' growth and maturation are part of a gradual transition with overlaps and commonalities, especially across two adjacent Stages (e.g., teaching for sensorial and perceptual ways of learning in the Foundational and Preparatory Stages, and teaching independent learning habits and discerning use of media gadgets in the Middle and Secondary Stages). It can also be seen that some changes occur in a continued fashion over the same facets within physical, emotional, social and ethical, and cognitive development over the Stages (e.g., changes in physical strength and flexibility, in expressed need for emotional support, in the need for conformity and peer approval, and in abstract thinking and independent reasoning abilities).

a. Pedagogical considerations related to physical development

i. **Foundational Stage:** Early years of school are formative and crucial in paving a positive experience of the learning environment. Any teaching strategy in this Stage that speaks to vibrant energies, enables playful interactions, engages in enjoyable stories, uses curious toys, and allows for full-body engagement with learning would be ideal and effective. Children continuously engage through their senses and make the understand most of the world around them this way. Pedagogy that encourages them to engage physically in aesthetic experiences of music, dance, arts, and crafts makes for an enjoyable school day. Teaching about health and hygiene practices ensures physical well-being in the long term.

ii. **Preparatory Stage:** Students continue to be physically active, highly perceptual, and engage with hands-on activities and make sense of concepts with the help of concrete physical learning aids. This requires Teachers to demonstrate energetic and active participation in the things the students are required to do as part of their learning. The Teacher needs to teach through modelling how to make sense of concepts more perceptually and practically with low levels of verbal complexity and theorising. The content that is chosen, the teaching plan, assessment, and classroom arrangement would need to be activity-based, playfully experimental, and lend themselves to a conversation and consolidation after 'doing'.

iii. **Middle Stage:** This is a Stage of both gradual and sudden changes in physical development. With adolescence and prepubescence on the cards, Teachers will need to be prepared for handling growth pains and growth spurts with changes in strength and increased restlessness in their students. A good understanding of gender and sexuality would also help Teachers understand their students better. Understanding families and local culture will help with understanding student behaviour in school. It is also a time when students must be encouraged to independently practice their learning despite the resistance that might come up.

iv. **Secondary Stage:** At this Stage, students grapple with their changing bodies, may become self-conscious, and may be trying to make sense of their maturation. Pedagogy across subjects must accommodate for changes in students' perceptions of their bodies and abilities, provide adequately challenging physical tasks, and encourage greater participation in both group and individual activities, especially sports and games.

b. Pedagogical considerations related to emotional development

i. **Foundational Stage:** Children would require Teachers to help them learn about understanding their own emotions and the emotions of others. The context of a school allows for a safe space for such conversation and learning. Learning to regulate feelings and behaviour, delaying the need for instant gratification, and practicing positive learning habits will go a long way in the lives of children so these aspects must be facilitated and encouraged actively and regularly. Children will require close individualised attention and care.

ii. **Preparatory Stage:** Students at this Stage are also rapidly learning to make sense of their thoughts and feelings and would need guidance with learning emotional regulation. Many of them would already display temperaments and preferences and Teachers will need to engage and tease out emotional habits coming in the way of learning through their teaching interactions and provide alternative possibilities to the emotional experiences of the students. Gradually, students must be supported and encouraged to become emotionally independent.

iii. **Middle Stage:** The classroom and the school as a site for emotional learning, growth, and expression are probably the most occupying for Teachers at the Stage. Students themselves go through unpredictable mood states and energy fluctuations, often grappling with a sense of unexplainable wellness or not-so-wellness. Middle Stage pedagogy must allow for some amount of engagement with emotional experiences through quiet discussion and reflection. Curricular areas can be used as contexts in which individual responses can be parsed. The Teacher will have to find a balance in the approach to students' emotions - an approach that is neither intrusive nor indulgent, but reasonably firm, rationally clear, and emotionally caring towards students of this Stage.

iv. **Secondary Stage:** It would be necessary for pedagogic strategies to guide individual reflection and group conversation on thoughts and feelings that emerge through engaging with curricular components. A philosophical understanding that feelings are transient and not set in stone, that individuals can act upon their emotions in healthy and unhealthy ways, and the social consequences of rational versus irrational decision-making based on emotional reactions are good discussions to have at this Stage. The focus on emotional regulation must continue. Teachers will have to be discerning about when students require one-on-one attention and find ways to communicate with them effectively.

c. **Pedagogical considerations related to social and ethical development**

i. **Foundational Stage:** Teaching social norms and strategies to adhere to them, teaching valuable social participation and contribution in accomplishing simple tasks, and teaching the meaning of cooperation and respect for others are all immensely important in social and ethical development at the Foundational Stage. Social life is a long-lasting reality that children must learn to intelligently navigate early on. Ethical and moral instructions at this Stage are aimed at teaching children simply the 'good' and appropriate from the 'bad' and inappropriate actions.

ii. **Preparatory Stage:** This Stage is also a time for learning about social participation and contribution. The pedagogic strategies must enable pair work, small group work, and individual work in mixed proportions so that students are actively learning to work together with sensitivity, mutual respect and listening, are learning to cooperate, and also accept cultural differences and diversity of approaches in thinking and feeling. Teachers must engage students with basic ethical and moral questions about equality, fairness, sharing, and cooperation.

iii. **Middle Stage:** Peers seem to become far more prominent in the lives of students at this point and this can be leveraged to the advantage of the learning atmosphere. Like the Preparatory Stage, the pedagogic strategies here too must plan for pair work, small

group work, and individual work in good proportions. Mixed small group work would allow for listening to and thinking together with different people. Many lessons must allow for such learning to work together with others, for healthy ways of testing one's abilities through social facilitation and respectful and sportive competition. The pedagogy must explicitly aim (through content selection and interactional strategies) at fostering sensitivity and respect for diversity in gender, class, and cultural difference. Students will need to learn to navigate their social world (including parents, teachers, and community) and will require clear expectations and rules set in these interactions. Teachers could discuss equity and respect for others as part of ethical reflection in class. It is also a time when they start learning about the world as much bigger than their immediate surroundings, so it is important to give them a sense of the cultural diversity that they are part of in our historically, geographically, and culturally rich country.

iv. **Secondary Stage:** Students at this Stage are young people with emerging opinions and loyal allegiances, and capacities for energetic participation and vehement dissent. Forming strong allegiances, explicit interest in varied ideologies that one can identify with, idealising individuals (from politics or sport or the entertainment industry) and other similar impulses seem to show up in this age group based on the need for belongingness in students. Actual friendships, tightly knit small groups (ingroups and outgroups), and peer conformity would be features that can be used to the advantage of learning about oneself and the world around them. This is also the time to actively encourage individuation in thinking and reasoning while being able to respectfully listen to and understand others. Challenges like bullying, isolation, and confusion with boundaries will need to be met in the context of the classroom and outside. Teaching strategies can include delegating responsibilities, allowing students to take charge of their own learning, and regulating each other's learning with a focus on helping others to learn better. Teachers could actively talk with students about ethical and moral actions connected to social participation and change. It is also an important time in the lives of students to address ideas of identity and heritage about what it means to be Indian (*Bharatiyata*) and belong to our vast and culturally rich nation.

d. Pedagogical considerations related to Cognitive development

i. **Foundational Stage:** Pedagogic strategies for this Stage must ensure literacy and numeracy learning for all children as this forms the basis of all further learning. Exposure to rich learning experiences in language and mathematics, and rich aesthetic and cultural experiences through art, crafts, music, dance, stories, and theatre would enable sound overall cognitive development. Multimodal forms of teaching-learning materials, adequate outdoor experiences, one-on-one Teacher attention, and physical wellness would also address the cognitive developmental needs of children at this Stage.

ii. **Preparatory Stage:** Pedagogy at this Stage will require a gradual move to more thinking and analysing after doing and observation, with plenty of material to engage with, repeat, and practice. This repeated practice will form the basis for study habits, independent thinking, and independent learning that is to come in the Middle Stage.

Multimodal teaching-learning material and one-on-one attention are still necessary to a good extent at this Stage, as these strategies will form a strong conceptual basis for students across curricular areas. Planning for field visits in the various subjects, apportioning sufficient time outdoors in a working week, encouraging students to demonstrate logic in their reasoning, encouraging thoughtful questioning, learning skills to inquire through conversations with people and reading/referring to books are important pedagogical strategies in this phase.

iii. **Middle Stage:** This Stage often demonstrates the most accelerated learning possibilities - individual learning abilities begin to show sharply in distinction from others. This will require pedagogic attention, especially for those who struggle and for those who excel in their achievement levels given the context of group learning processes. Teaching students how to assimilate understanding and shifting from practical to theoretical concepts across curricular areas, demanding greater rigour in, and capacity for, working would be essential pedagogic considerations at this point.

With the introduction of newer curricular areas, it would be important to create adequate scaffolds for students to keep their interest and confidence in their intellectual capacities. Students' capacity for abstract thinking improves markedly and Teachers can present challenging material that requires abstract reasoning and application. Rules for technology and media usage become necessary in this Stage. Teachers need to demonstrate in their teaching transactions (and explicitly teach) a discerning educational use of the internet and media gadgets in learning. This would require conversations about safe and healthy practices in using the internet, new media technology, and gadgets in the context of the curriculum.

iv. **Secondary Stage:** There exist ample possibilities for maturation in thinking, learning, practising, and creative expression in this Stage spread over four years of student life. Teaching students how to independently assimilate understanding and encouraging abstraction and theoretical concepts across curricular areas, demanding rigour in working and presenting their views would be very important pedagogical considerations for Secondary students. Newer curricular areas and choices in specialisations begin at this Stage, it would be important to help them make their decisions (in subject choices) and create adequate opportunities to sustain practice in these. Given their age and independence, technology and media use rules will need strong follow-up and reminders. As less supervision is possible, and the 'discerning educational use of the internet and media gadgets in learning' principle taught in the previous Stage is likely to wane, this will require repeated reminders. Caution against distractions while learning, cyberbullying, compulsive use and many other unhealthy practices in using the internet will be required from Teachers especially, as students will be engaging with online research for learning much more in this Stage.

3.3.8 Overall Principles of Pedagogy

Given all of the above, the following principles of pedagogy must inform classroom planning and instruction across all Stages:

a. Every child is capable of learning. Children are natural learners.

b. Learning is an active process that involves both understanding and doing.

c. Children learn best when they are respected, valued, and involved in the learning process.

d. Children learn in a variety of ways, illustratively, through making something, discussion, listening, speaking, reading, writing, questioning, exploring, discovering, experimenting.

e. Learning happens best when classroom processes make connections with the life of students and their prior experiences, focus on conceptual clarity, and provide variety and challenge to students.

f. Practice is a critical and integral part of the learning process.

The following are non-negotiable:

a. Punishment and fear are detrimental to learning and must not be used in the classroom

b. Inequity in the classroom on the basis of caste, gender, religion, socio-economic conditions, student performance or any other factor is unacceptable

c. Rote memorization must not be the primary form of learning or of assessment

d. Students must not be treated as passive receivers of information - this makes classroom processes lead to boredom and monotonous routines

Effective pedagogy, therefore, encourages conceptual understanding, active discovery, and independent learning, gives serious consideration to student experiences and student voices, acknowledges and accommodates student diversity, builds on students' previous knowledge, uses a range of teaching techniques, and gives timely feedback on work done.

Section 3.4
Approach to Assessment

The aim of assessment in the culture of our schooling system will shift from one that is summative and primarily tests rote memorization skills to one that is more regular and formative, is more competency-based, promotes learning and development for our students, and tests higher-order skills, such as analysis, critical thinking, and conceptual clarity. The primary purpose of assessment will indeed be for learning; it will help the teacher and student, and the entire schooling system, continuously revise teaching-learning processes to optimize learning and development for all students. This will be the underlying principle for assessment at all levels of education. [NEP 2020, 4.34]

The progress card will be a holistic, 360-degree, multidimensional report that reflects in great detail the progress as well as the uniqueness of each learner in the cognitive, affective, and psychomotor domains. It will include self-assessment and peer assessment, and progress of the child in project based and inquiry-based learning, quizzes, role plays, group work, portfolios, etc., along with teacher assessment. The holistic progress card will form an important link between home and school and will be accompanied by parent-teacher meetings in order to actively involve parents in their children's holistic education and development. The progress card would also provide teachers and parents with valuable information on how to support each student in and out of the classroom. AI-based software could be developed and used by students to help track their growth through their school years based on learning data and interactive questionnaires for parents, students, and teachers, in order to provide students with valuable information on their strengths, areas of interest, and needed areas of focus, and to thereby help them make optimal career choices." [NEP 2020, 4.35]

3.4.1 Purposes of Assessment

Assessment has two purpose - measuring achievement of student learning and gauging effectiveness of classroom processes and teaching materials in teaching and learning.

In the everyday of the classroom, assessment refers to any process of gathering information about student learning that can be interpreted, analysed, and used by the Teacher (mainly) for guiding the teaching-learning process, aggregating student learning at relevant junctures and in reporting student progress over time.

Educational assessment, thus, plays a critical role in improving teaching and learning.

Assessment is also used for certifying student learning and education completion at key stages (e.g., Grade 10, Grade 12).

3.4.2 Assessment of Learning; Assessment for Learning; Assessment as Learning

Assessment of learning refers to. the measurement of achievement of student learning.

Assessment for learning refers to evidence of student learning gathered by the Teacher that provides inputs to guide the teaching-learning processes. Assessment, when designed meaningfully, can be used as a powerful tool that contributes to and supports better student learning and teaching practices. Teachers who have a good sense of where students in class do well and where they struggle, can thus take more informed decisions about their pedagogical practices.

Recent studies have shown that students can play an active role in taking charge of their own learning. When assessments are introduced as non-threatening tools for self-reflection and introspection, they become developmental and constructive in nature. This is referred to as *assessments as learning*.

In school education, one needs to look at all three approaches to assessments mentioned above - *assessment of learning, for learning and as learning.*

3.4.3 Current Challenges in Assessment

In school, assessment has mostly become mechanical and routinized. At best, assessment is focused on measuring rote learning of content rather than measuring achievement of Competencies and Learning Outcomes. At worst, assessment is an intimidating process that creates fear and leads to labeling and segregation of students based on the 'marks' they have scored in tests and examination.

The stress of Board examinations at Grade 10 and Grade 12 has repeatedly led to deep anxiety among students and families. They place an enormous amount of pressure on students over just a few days of their lives. Real understanding, thinking, analysing, doing, and learning takes a secondary seat to rote learning, and obtaining coaching for performing on these life-altering examinations. The fact that life-determining Board Examinations are available only on two occasions, in Grade 10 and 12, the pressure on students and families would naturally be high. Also, the current structure of Board Examinations forces students to concentrate only on a few subjects at the expense of others, preventing truly holistic development. Examinations should also be seen as learning experiences, from which one can learn and improve in the future, the current Board Examination system does not lend itself to this.

3.4.4 Key Principles of Good Assessment

Key principles that could guide our thinking on effective use of assessments to aid better teaching and learning are listed below:

a. **Assessment should measure achievement of Competencies and Learning Outcomes leading to attainment of Curricular Goals**
Assessments should explicitly track student progress on all aspects of learning as stated in the Competencies for each Stage and Learning Outcomes for each Grade. Assessments should accurately reflect the intent of evaluating the achievement of a Competency or

Learning Outcome. The connection between the Competency or Learning Outcome and the assessment should be clear and precise. Appropriate modes of assessments may be chosen in alignment with the Competencies and Learning Outcome to be assessed.

b. **Assessments should be constructive, developmental, and learning focused**
Assessments need to be visualized as an ongoing process which Teachers integrate within the teaching learning process using formal and informal ways to elicit reliable evidence about student learning. Collecting such evidence helps Teachers understand the effectiveness of their pedagogy in terms of what the students have understood and what needs to be worked on further; which methods of teaching work and which ones don't; what kind of resources work, and so on. For students, assessments need to be placed as an important tool that will help them understand and reflect on their own learning. Assessment should not become an intimidating process that involves the labelling and segregation of students.

c. **Assessments should be Stage-appropriate**
At the Foundational Stage, Teachers would primarily drive all assessment activities which are largely based on observation. At the Preparatory and Middle Stages, students need to be given a more proactive role in assessing their own learning trajectories. Multiple tools and methods can be introduced at these Stages. At the Secondary Stage, students should be prepared to take standardized tests including Board certifications and other competitive assessments that will prepare them for the future.

d. **Assessments should accommodate student diversity**
It is important to move away from the one size fits all approach while designing assessments. To the extent possible, classroom assessments should be graded in terms of the learning outcomes and competencies to be achieved. As the rate of learning progression for each student can differ, the tools must accommodate for students performing at different levels in a classroom. Well-designed graded assessments can be used to understand individual student needs better so that they can be adequately catered to. Another way of addressing student diversity is also through using variety of assessment methods, e.g., paper-pencil tests, oral assessments, project work, group assignments.

e. **Assessments should be supported by timely, credible, and constructive feedback to students**
Students should be given adequate feedback on their performance. Such feedback needs to be constructive with information on what has worked well and what areas might need improvement and how can this be achieved. Use of Holistic Progress Cards that detail out student performance in multiple aspects including formative and summative assessments should be explored.

f. **Assessments should support in meaningful aggregation/summation of student learning**
While the formative function of assessment is critical, the summative function of assessment is equally important. Summative examinations, including certification examinations, continue to be relevant as it serves as a necessary test to understand student's achievement of Competencies and Learning Outcomes. While the significance of summative exams is well established, what needs immediate attention is the approach to the same. Examinations should move away from testing rote learning skills and instead focus conceptual understanding, application of concepts, problem solving abilities, critical thinking, and other such higher order capacities.

3.4.5 Types of Assessment

Assessments could be formative or summative, both are equally important for improving teaching and learning.

a. **Formative assessments** are continuous and ongoing. They are used to track student learning to provide ongoing feedback that can be used by both Teachers to improve their teaching and students to improve their learning. Formative assessments are generally low stakes and do not have strong consequences. Some examples of formative assessments include observing student behaviour in class, asking students to draw a concept map in class to represent their understanding of a topic or write a few sentences with a friend on a poem they have read.

b. **Summative assessments** evaluate student learning at the end of a lesson or a logical period of teaching. Summative assessments are normally high stakes in that they compare student performance to a benchmark or standard and have some consequence. Some examples of summative assessments include a term-end test, submission of a project or writing a paper. Results of summative assessment can also be used for formative purposes i.e., informing teaching and learning.

3.4.6 Assessment across Stages

3.4.6.1 Foundational Stage

a. Assessment should not contribute to any additional burden for the child. Assessment tools and processes should be designed such that they are a natural extension of the learning experience for the child. Explicit tests and examinations are completely inappropriate assessment tools for this Stage.

b. Assessment should allow for diversity among children and in their learning. Children learn differently and express their learning differently too. There might be many ways to assess the achievement of a Learning Outcome or Competency. The Teacher should have the ability to design different kinds of assessment for the same Learning Outcome and use each assessment appropriately.

c. Assessment should enable recording and documentation. Children's progress should be described and analysed through systematic collection of evidence.

d. Assessment should not overly burden the Teacher. The Teacher should have the autonomy to judiciously choose the appropriate tool for assessment and the periodicity in which assessment-related record keeping is maintained. While such autonomy is important, systematic record keeping of children's assessment should be seen as an important part of a Teacher's professional responsibilities.

e. The two important methods of assessment that are appropriate for the Foundational Stage are observations of the child and analysing artefacts that the child has produced as part of their learning experience.

3.4.6.2 Preparatory Stage

a. With the start of more formal learning across curricular areas, a robust system of formative assessment is required to track progress of individual students. Assessment should act as an instructional tool and help to provide a comprehensive account of student learning.

b. Students from this Stage onwards learn better when they are more aware of the Competencies to be attained. Teachers should help make them understand the desired Competency to be achieved through a lesson or a unit of study.

c. A variety of assessment methods should be used to promote learning. Written tests should be introduced at this Stage. Portfolios can be used to capture student progress holistically through their work. This could also provide a reliable picture of their learning to parents. Peer and Self-assessments could also be introduced to help students monitor the trajectory of their own learning.

d. At the end of the Preparatory Stage, there should be a comprehensive summative assessment of the student's readiness to enter the Middle Stage where several new curricular areas are introduced.

3.4.6.3 Middle Stage

a. With the introduction of more concepts in each subject at this Stage, assessment will continue to be Competency-based, covering all dimensions of learning.

b. At this Stage, the focus of the curriculum moves to conceptual understanding and higher order capacities. Therefore, classroom assessment techniques such as projects, debates, presentations, experiments, investigations, role plays, journals and portfolios should be used to assess learning.

c. Regular summative assessments at this Stage will help students synthesize their learning at logical intervals (e.g., year-end, term-end, unit of learning-end). Summative assessments comprising multiple-choice questions and constructed responses (e.g., short answer, long answer) may be used periodically.

d. By the end of the Middle Stage, there should be a comprehensive summative assessment of student achievement of Competencies in each curricular area. The assessments should also be able to indicate special interest or inclination in specific curricular areas that students may have demonstrated.

3.4.6.4 Secondary Stage

a. Given the demand of greater subject depth, comprehensive classroom assessments should be effectively practiced for facilitating meaningful learning and constructive feedback. Regular summative assessments should be conducted for recording students learning against Competencies.

b. Classroom assessments, like in the Middle Stage, will continue to play important role considering the nature and complexity of the Competencies at this Stage. Self-assessment will play a key role in student learning at this Stage. Students should be facilitated to monitor what they are learning and use the feedback from this monitoring to adjust, adapt, and decide their own strategies for learning.

c. Summative assessments can be designed using case-based questions, simulations, and essay-type questions to enable assessment of Competencies.

d. At this Stage, students should also be prepared to undertake the Board examinations and other selection tests to gain access to higher education and livelihood opportunities.

3.4.7 Approach to Board Examinations at Grade 10 and Grade 12

3.4.7.1 Current Challenges

Board examinations conducted at the end of Grades 10 and 12 are certification examinations to ascertain the extent to which students have achieved Competencies across curricular areas leading to the attainment of Curricular Goals.

Most Board examinations struggle to do this well in a meaningful and consistent manner.

a. The examinations most often focus on the capacity of students to reproduce learnt facts and little else. This issue of misalignment between what these examinations should test and what they do test (i.e., validity of the test) is quite common. Given that most examinations largely test rote memory, a very narrow range of Competencies are assessed. This gives an incomplete (at best) or incorrect (at worst) picture of student learning. Most test instruments are not backed by clear and detailed marking schemes which leads to subjectivity by evaluators and questions of consistency or comparability test scores (i.e., reliability of the test).

b. Students have to take these examinations only when they are offered once a year. There is no provision for examinations to be offered more than once so that students can either take them when they are ready or get a second chance if they miss the examination.

3.4.7.2 Changes in Board Examinations

a. Board examinations should assess the achievement of Competencies for the Secondary Stage as stated in the Curriculum. These examinations should provide a valid and reliable picture of student performance as per the Competencies in the Curriculum.

b. It is the responsibility of Boards of Examination is to design and implement fair, reliable and valid testing processes, and instruments to assess achievement of the articulated Competencies and certify students on the basis of this achievement. As per NEP 2020, Boards of Examination should have no role in the design of the Curriculum or the articulation of Competencies. This is the responsibility of the appropriate academic authority (e.g., NCERT or SCERT).

c. Board examinations should be offered at least twice a year to ensure that students have both enough time and opportunity to perform well. Students can then appear for a Board examination in courses they have completed and feel ready for. This process could be made possible through the creation of a comprehensive test item bank which can be used to create tests using suitable software. This will enable the move towards a system of on-demand examinations in the near future as described in NEP 2020.

d. Selection of test developers, reviewers, translators, and evaluators for Board Examinations should be based on a rigorous process based on detailed guidelines. Boards of Examination should ensure that all test developers, reviewers and evaluators go through formal University-certified courses on test development before they begin this work. In addition, there should be ongoing capacity building of test developers, evaluators, and reviewers to support them in the design of high-quality test instruments.

e. Vocational Education, Arts Education and Physical Education are an integral part of the curriculum in this NCF. Boards of Examination will need to design high-quality test instruments for these curricular areas for certification at Grade 10 and Grade 12. Since these areas will have a significant practice component, they will need to be assessed very differently from what is normally done.

f. Test development processes for written examinations should be significantly streamlined. Some illustrative steps are given below:

    i. Creating Assessment frameworks is the first step to start the process. Assessment frameworks ensure a well-articulated basis for deciding what to test and what not to. Such frameworks detail out the Competencies, Learning Outcomes and content domains to be assessed.

    ii. Designing a blueprint based on the assessment framework is the next step. A blueprint is a planning document where all the relevant information for a test is listed. The blueprint is usually a working document which undergoes change during the process of test item designing. The information in the blueprint includes Competencies, Learning Outcomes and content domains to be tested, format of test items (e.g., multiple choice, short written answers, others), length of the test, and marking schemes.

    iii. Designing good quality test items and scoring guides is the third step. Broadly, test item formats are of two kinds - Selected Response questions (e.g., Multiple Choice Questions, True/False) where student must select the correct response from the options provided and Constructed Response questions where the student must develop the correct response. Some important quality parameters to be kept in mind while designing test items are language clarity, factual accuracy, quality of distractors, choice of stimulus materials (e.g., graphics, illustrations, maps) used. The scoring guides are as important as the test items themselves.

    iv. Once test items are developed, rigorous review procedures (e.g., item panelling with an expert group) should be ensured. Scoring guides should also be reviewed along with test items.

    v. Boards of examination should ensure periodic, rigorous reviews of the quality of test instruments designed.

Section 3.5
Illustrative Time Allocation

3.5.1 Foundational Stage

Young children enjoy free time exploring their immediate environment. However, as they grow older, they also need organised activities that are play-based but guided and structured.

The day needs to be carefully organised so that all domains of development receive adequate time and attention. While activities of each domain of development are connected with other domains (e.g., a good story will help language development as well as socio-emotional and ethical development), the routine must ensure that children get ample opportunity for a range of experiences in every domain.

a. Considerations for the Daily Routine

The organisation of the day is based on the institutional setting and the number of working days, and daily working hours for each day.

Each activity may be planned keeping in mind the attention span of the child. There may be a balance between child-initiated and Teacher-guided activities, group (whole group or small group) and individual or pair activities, and alternating activities (e.g., quieter activity after physical activity, group activity after individual activity, indoor activity after outdoor activity).

Art and Craft, Outdoor Play and Free Play must have adequate time and focus in the day.

b. Illustrative Daily Routine for Ages 3-6

There are multiple ways to organise the daily routine for children of ages 3-6.

Two illustrations given below.

The first illustration is more appropriate in contexts where experiences like Circle Time, Story Time, Concept Time/Pre-numeracy are Teacher-guided and Free Play and Corners Time are independent activities for the children.

Table A-3.5-i

From	To	Duration	Activity
Morning Routine/Free Play/Corners Time			
09:30	10:15	45 minutes	Circle time/Conversation
10:15	10:30	15 minutes	Snack Break
10:30	10:45	15 minutes	Rhyme/Song/Music/Movement
11:45	11:45	1 hour	Concept Time/Pre-numeracy
11:45	12:15	30 minutes	Arts/Craft/Free Play
12:15	13:00	45 minutes	Corners Time
13:00	13:45	45 minutes	Lunch Break (ages 3-4 go home)
13:45	14:30	45 minutes	Emergent Literacy/Story Time
14:30	15:00	30 minutes	Outdoor Play and Wind Up

The second illustration is more appropriate in contexts with fewer children and a range of appropriate material available for them to use. Emphasis is on self-learning and children learn to use materials independently and with care.

'Work Time' is allotted for children to independently choose the activity they would like to engage with. Children select activities of their choice and work with materials for those activities independently. Teachers observe children's activities and extend support as and when required. Teachers also decide and present the next activity to an individual child based on the observations during Work Time. Activities and the corresponding materials are arranged according to the domains of development (e.g., Physical, Cognitive, Language, Arts) and children are made familiar with this arrangement.

Table A-3.5-ii

From	To	Duration	Activity
Morning Routine + Silent Game			
09:30	10:15	45 minutes	Circle Time (Conversation, Songs, Poems)
10:15	10:30	15 minutes	Snack Break
10:30	12:15	1 hour, 45 minutes	Work Time
12:15	13:00	45 minutes	Arts/Craft/Sports/Free Play
13:00	13:45	45 minutes	Lunch Break (ages 3-4 go home)
13:45	15:00	1 hour, 15 minutes	Language and Emergent Literacy (ages 4-6)

Both the illustrations have a five-and-a-half-hour school day with about four-and-a-half hours of active instructional time for children of ages 4-6.

c. Illustrative Daily/Weekly Routine for Ages 6-8

The daily routine for ages 6-8 would be slightly longer and a little more structured. While for ages 3-6, all languages can be handled together; for this age group, dedicated time for each language is necessary. Specific blocks of time for literacy, numeracy and arts can be incorporated. L1 would need 90 minutes every day and L2 would need 60 minutes. Mathematics and numeracy would require 60 minutes a day. These periods of time can be organized into blocks as described in Chapter 4.

Table A-3.5-iii

From	To	Duration	Activity
09:00	09:30	30 minutes	Circle Time - Song/Movement
09:30	10:00	30 minutes	L1 - Oral Language
10:00	10:30	30 minutes	L1 - Word Recognition
10:20	10:35	15 minutes	Snack Time
10:35	11:35	1 hour	Mathematics
11:35	12:05	30 minutes	Arts and Craft
12:05	12:45	30 minutes	L1 - Reading/Writing
12:45	13:30	45 minutes	Lunch Break
13:30	14:30	1 hour	L2 - Oral Language, Word Recognition
14:30	15:00	30 minutes	Play

A longer day would allow more time for activities like arts, sports and gardening. The illustrative weekly timetable below allows for such possibilities. As mentioned earlier, Mathematics and L1 would include activities in blocks of time as described in Chapter 4, Section 4.5.

Table A-3.5-iv

From	To	Monday	Tuesday	Wednesday	Thursday	Friday
9:00	10:00	Math	Math	L2	Math	L2
10:00	10:45	L1	L1	L1	L1	L1
10:45	11:00	Snacks				
11:00	12:00	L1	L1	L1	L1	L1
12:00	13:00	L2	L2	Math	L2	Art
13:00	13:45	Lunch				
13:45	14:45	Art	Math	Art	Art	Math
14:45	15:30	Library	Gardening	Sports	Gardening	Sports

3.5.2 Considerations for time allocation across Preparatory, Middle and Secondary Stages

a. The annual working year for schools has 220 instruction/school-going days after taking into consideration national holidays, term breaks, and vacations.

b. Of these 220 days, around 20 days may be considered for assessments and other assessment-related activities across Stages.

c. Another 20 days may be set aside for school events and other similar activities (or as buffer for less foreseeable events) in schools.

d. Therefore, a safe estimate can be of 180 days of instruction time across these three Stages at school.

e. Given the wide range of contexts in which schools operate across the country, a working school week has been taken as five and a half days (with Saturdays as half working days).

f. Since not all Saturdays are likely to be working for all students, the model here has considered five and a half days of school every alternate week only.

g. Given the range of subjects in the different Stages, and the reasonable number of hours students can spend in school, a working school year would have around 34 working weeks of around 29 hours of instruction hours every week.

3.5.3 Stage-specific considerations

3.5.3.1 Time Allocation for the Preparatory Stage

a. Weekdays begin with an assembly for 25 minutes with 05 minutes to reach the classroom.

b. Class time for all subjects is 40 minutes. Some subjects will require a block period of 80 minutes (1 hour 20 minutes).

c. The transition time for students to prepare for the next class is 05 minutes.

d. The two working Saturdays a month have a slightly different schedule compared to other working weekdays. No assembly on Saturdays.

e. A snack break of 15 minutes and a lunch break of 45 minutes has been built in (see the illustrative timetable) on weekdays. Lunch is 30 minutes on Saturdays.

f. R1 Language has Curricular Goals for the Library built into it in the design of Learning Standards. Therefore, the time is shared between these two subjects on the timetable.

g. R2 has been given more time than R1 in the year as gaining proficiency in the language over this Stage will require additional time. Also, all other curricular areas are in the language of R1 and add to the learning of R1. R2 has also been given more time than Mathematics as the Preparatory Stage is a developmentally critical time to hone the newer language skills and Mathematics has been in the curriculum for around 8 years already.

h. World Around Us (WAU), Art Education, and Physical Education (PE) have been given a fair share of their time considering the Learning Standards built into this curricular framework.

Table A-3.5-v

Preparatory	Annual Hours	Annual Periods
R1+Library	183	275
R2	194	291
Math	183	275
WAU	206	309
Art	103	155
PE	103	155
VE	0	0

Table A-3.5-vi

Illustrative timetable for the Preparatory Stage (Two Working Saturdays)							
Time	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	
830-855	**Assembly**	**Assembly**	**Assembly**	**Assembly**	**Assembly**	**830-910**	**PE**
900-940	R1	Art	R1	Math	Math	915-955	Art
945-1025	R1	Art	R1	Math	Math	955-1015	Snack break
1030-1045	Snack break	Snack break	Snack break	Snack break	Snack break	1020-1100	WAU
1050-1130	Math	R1	R2	R2	R2	1105-1145	WAU
1135-1205	Math	Library	R2	R2	R2	1150-1230	R2
1205-1250	Lunch	Lunch	Lunch	Lunch	Lunch	1230-1300	Lunch
1250-1330	WAU	Math	WAU	R1	WAU		
1335-1415	WAU	Math	WAU	Library	WAU		
1420-1500	PE	R2	Art	WAU	PE		
1505-1545	PE	R2	Art	WAU	PE		

3.5.3.2 Time Allocation for the Middle Stage

a. The weekday begins with an assembly for 25 minutes with 05 minutes to reach the classroom.

b. Class time for all subjects is 40 minutes. Some subjects will require a block period of 80 minutes (1 hour 20 minutes) for activities, lab work, and other such pedagogic requirements.

c. The transition time for students to prepare for the next class is 05 minutes.

d. The two working Saturdays a month have a slightly different schedule compared to other working weekdays. No assembly on Saturdays.

e. A snack break of 15 minutes and a lunch break of 45 minutes has been built in (see the illustrative timetable) on weekdays. Lunch is 30 minutes on Saturdays.

f. R1 Language has Curricular Goals for the Library built into it in the design of Learning Standards. Therefore, the time is shared between these two subjects on the timetable.

g. R3 Language gets introduced in the Middle Stage and requires moderate amounts of time to develop basic interpersonal communications skills only. On the whole, R2 receives more time than R1 as by the end of the Middle Stage, students must be at the same level of proficiency in R1 and R2.

h. Science, Social Science, and Vocational Education as new curricular areas have been given a fair share of their time considering the Learning Standards built into this curricular framework.

Table A-3.5-vii

Middle	Annual Hours	Annual Periods
R1+Library	80	120
R2	91	136.5
R3	46	69
Math	114	171
SS	160	240
Science	160	240
Art	103	154.5
PT	103	154.5
VE	114	171

Table A-3.5-viii

Illustrative timetable for the Preparatory Stage (Two Working Saturdays)							
Time	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	
830-855	*Assembly*	*Assembly*	*Assembly*	*Assembly*	*Assembly*	830-910	VE
900-940	SS	Math	Math	SS	R2	915-955	VE
945-1025	SS	R2	R1	Science	Math	955-1015	*Snack break*
1030-1045	*Snack break*	*Snack break*	*Snack break*	*Snack break*	*Snack break*	1020-1100	Library
1050-1130	R2	Science	R3	Math	Science	1105-1145	Art
1135-1205	R1	SS	R2	Math	R1	1150-1230	PE
1205-1250	*Lunch*	*Lunch*	*Lunch*	*Lunch*	*Lunch*	1230-1300	*Lunch*
1250-1330	Science	Art	Science	Art	R3		
1335-1415	Science	Art	Science	Art	SS		
1420-1500	PE	VE	SS	PE	VE		
1505-1545	PE	VE	SS	PE	VE		

3.5.3.3 Time Allocation for the Secondary Stage

a. The weekday begins with an assembly for 25 minutes with 05 minutes to reach the classroom.

b. Class time for all subjects is 50 minutes. Some subjects will require a block period of 100 minutes (1 hour 40 minutes) for hands-on work, activities, lab work, and other such pedagogic requirements.

c. The transition time for students to prepare for the next class is 05 minutes.

d. The two working Saturdays a month have a slightly different schedule compared to other working weekdays.

e. A lunch break of 55 minutes has been built in (see the illustrative timetable) on weekdays and 30 minutes on Saturdays.

f. There is an 'Additional Enrichment Period' (AEP) every evening and on the two working Saturdays after class. This is for students to use as additional time for enrichment in any subject on the curriculum.

g. There is no separate Library time built into the timetable. Students may use time from the AEP on one of the evenings.

h. On the whole, R1 and R2 put together receive around the same time as Math.

i. Interdisciplinary Studies (IDA) is a new curricular area and has been given a reasonable share of time on the timetable.

Table A-3.5-ix

Secondary	Annual Hours	Annual Periods
R1	86	103.2
R2	71	85.2
Math	143	171.6
Arts	114	136.8
PE	100	120
Science	129	154.8
SS	143	171.6
IDA	143	171.6
VE	143	171.6

Table A-3.5-x

Illustrative timetable for the Secondary Stage (Grades 9 & 10)							
Time	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	
0800-0825	*Assembly*	*Assembly*	*Assembly*	*Assembly*	*Assembly*	800-850	R2
0830-0920	R1	R2	R1	R2	R1	855-945	Science
0925-1015	Math	Math	Math	Math	Math	950-1040	VE
1020-1110	Arts	Science	Science	Science	Arts	1045-1135	VE
1115-1205	Arts	PE	Science	PE	Arts	1140-1230	PE
1135-1205	R1	SS	R2	Math	R1	1150-1230	PE
1205-1300	*Lunch*	*Lunch*	*Lunch*	*Lunch*	*Lunch*	1230-1300	*Lunch*
1300-1350	SS	SS	SS	SS	SS	1305-1355	AEP*
1355-1445	IDA	VE	IDA	VE	IDA		
1450-1540	IDA	VE	PE	VE	IDA		
1545-1635	AEP*	AEP*	AEP*	AEP*	AEP*		
**AEP = Additional Enrichment Period*							

Part B:
School Subjects/Areas

Chapter 1

Foundational Stage in the NCF

The Foundational Stage is for children between the ages of 3 to 8 years. Children start schooling in this Stage. This chapter summarizes the characteristics and importance of this curricular stage, the learning standards – curricular goals, competencies, and illustrative learning outcomes – and the suggested content, pedagogy, and assessment for this stage. The National Curricular Framework for the Foundational Stage (NCF-FS) deals with all these in detail.

Section 1.1
Criticality of the Early Years/Early Childhood Care and Education

The first eight years of a child's life are truly critical and lay the foundation for lifelong well-being, and overall growth and development across all dimensions - physical, cognitive, and socio-emotional.

The pace of brain development in the first eight years of a child's life is more rapid than at any other stage of a person's life. Research from neuroscience informs us that over 85% of an individual's brain development occurs by the age of 6, indicating the critical importance of appropriate care and stimulation in a child's early years to promote sustained and healthy brain development and growth.

The most current research also demonstrates that children under the age of 8 tend not to follow linear, age-based educational trajectories. It is only at about the age of 8 that children begin to converge in their learning trajectories. Even after the age of 8, non-linearity and varied pace continue to be inherent characteristics of learning and development; however, up to the age of 8, the differences are so varied that it is effective to view the age of 8, on average, as a transition point from one stage of learning to another. In particular, it is only at about the age of 8 that children begin to adapt to more structured learning.

Early Childhood Care and Education (ECCE) is thus generally defined as the care and education of children from birth to eight years.

Section 1.2
Foundational Stage

1.2.1 Primarily at home-Ages 0-3

Up to 3 years of age, the environment in which most children grow up is in the home with families, while some children do go to creches. After the age of 3, a large proportion of children spend significant time in institutional settings such as Anganwadis and preschools. Providing high quality preschool education in an organised setting for children above 3 years of age is one of the key priorities of NEP 2020.

Up to age 3, the home environment is (and should remain) almost the sole provider of adequate nutrition, good health practices, responsive care, safety and protection, and stimulation for early childhood learning i.e., everything that constitutes and forms the basis for ECCE. After the age of 3, these components of nutrition, health, care, safety, and stimulation must continue at home, and must also be ensured in an appropriate and complementary manner in institutional settings such as Anganwadis and preschools.

Appropriate ECCE at home for children under the age of 3 includes not only health, safety, and nutrition, but also crucially includes cognitive and emotional care and stimulation of the infant through talking, playing, moving, listening to music and sounds, and stimulating all the other senses particularly sight and touch so that at the end of three years, optimal developmental outcomes are attained, in various development domains, including physical and motor, socio-emotional, cognitive, communication, early language, and emergent literacy and numeracy. It must be noted that these domains are overlapping and indeed deeply interdependent.

The guidelines and/or suggested practices to enable high-quality ECCE at home for the age-group of 0-3 would be developed and disseminated by the Ministry of Woman and Child Development (MWCD).

1.2.2 In Institutional Settings: Ages 3-8

During the ages of 3 to 8, appropriate and high-quality ECCE provided in institutional environments must be available to all children. In India, where available, this is typically carried out as follows:

a. **3-6 years:** Early childhood education programmes in Anganwadis, Balvatikas, or preschools
b. **6-8 years:** Early primary education programmes in school (Grades 1 and 2)

From 3 to 8 years of age, ECCE includes continued attention to health, safety, care, and nutrition; but also, crucially, self-help skills, motor skills, hygiene, the handling of separation anxiety, physical development through movement and exercise, expressing and communicating thoughts and feelings to parents and others, being comfortable around one's peers, sitting for longer periods of time in order to work on and complete a task, ethical development, and forming all-round good habits.

Supervised play-based education, in groups and individually, is particularly important during this age range to nurture and develop the child's innate abilities and capacities of curiosity, creativity, critical thinking, cooperation, teamwork, social interaction, empathy, compassion, inclusiveness, communication, cultural appreciation, playfulness, awareness of the immediate environment, as well as the ability to successfully and respectfully interact with teachers, fellow students, and others.

1.2.3 Importance of Literacy and Numeracy

ECCE during these years also entails the development of early literacy and numeracy, including learning about the alphabet, languages, numbers, counting, colours, shapes, drawing/painting, indoor and outdoor play, puzzles and logical thinking, art, craft, music, and movement. The aim is to build on the developmental outcomes in the domains mentioned above, combined with a focus on early literacy, numeracy, and awareness of one's environment. This becomes particularly important during the age range of 6-8, forming the basis for achievement of Foundational Literacy and Numeracy (FLN). The importance of FLN to overall education is well-understood, and fully emphasized in NEP 2020.

Considering all of the above, NEP 2020 has articulated the age range of 3-8 as the Foundational Stage, in the new 5+3+3+4 system.

Section 1.3
Foundational Stage in NEP 2020

The Foundational Stage is a single curricular and pedagogical phase which comprises five years of flexible, multilevel, play and activity-based learning for children between 3 and 8 years of age.

Due to the critical importance of the Foundational Stage for the development of an individual, and for the long-term benefit to society as a whole, NEP 2020 articulates a clear goal - that every child in the age range of 3–8 years must have access to free, safe, high quality, developmentally-appropriate ECCE by the year 2025.

Regardless of the circumstances of birth or background, quality ECCE enables children to participate and flourish in the educational system throughout their lives. ECCE is thus perhaps one of the greatest and most powerful equalisers. High-quality ECCE in the Foundational Stage gives the best chance for all children to grow into good, ethical, thoughtful, creative, empathetic, and productive human beings.

For the overall well-being and prosperity of our country, all members of our society - from Teachers to school functionaries to parents and community members to policy makers and administrators - must come together to ensure that every child is provided this all-important physical, cognitive, and socio-emotional stimulation, along with appropriate and adequate nutrition, in these earliest and most critical years of life.

1.3.1 Key Guiding Principles for the Foundational Stage based on NEP 2020

a. Every child is capable of learning regardless of the circumstances of birth or background.

b. Each child is different and grows, learns, and develops at their own pace.

c. Children are natural researchers with great observational skills. They are constructors of their own learning experiences and express feelings and ideas through different representations.

d. Children are social beings; they learn through observation, imitation, and collaboration. Children learn through concrete experiences, using their senses and acting upon the environment.

e. Children's experiences and ways of learning must be acknowledged and included. Children learn best when they are respected, valued, and fully involved in the learning process.

f. Play and activity are the primary ways of learning and development with continuous opportunities for children to experience, explore, and experiment with the environment.

g. Children must engage with material, activities, and environments that are developmentally and culturally appropriate and develop conceptual understanding and problem-solving.

h. Content should be drawn from the experiences of children. The novelty of the content or its challenges should be based on the familiar experiences of children.

i. Content should be suited to the developmental needs of children and should provide several opportunities for fantasy, storytelling, art, music, and play.

j. Equity in issues such as gender, caste, class, and disability should be emphasised in the content.

k. Teachers should facilitate and mediate the learning of the children. Scaffolding should be provided by asking open-ended questions, enabling exploration.

l. Family and community are partners in this process and are involved in multiple ways.

m. Care is central to learning. Children at this age naturally perceive familiar adults as caregivers first. Teachers should be sensitive and responsive to the needs and moods of children. Classroom activities must emphasise the emotional aspect of learning (e.g., through storytelling or art).

Section 1.4
How Children Learn at this Stage

Children are natural learners. They are active, eager to learn, and respond with interest in new things. They have an innate sense of curiosity - they wonder, question, explore, try out, and discover to make sense of the world. By acting on their curiosity, they continue to discover and learn more.

Children learn best through play - through activity and doing. They like to run, jump, crawl, and balance, they enjoy repetition, they respond spontaneously to rhythm, they talk, they ask, and they reason, and answer questions posed to them. They learn by first-hand experiences involving manipulation, exploration, and experimentation.

This playfulness with materials, ideas, thoughts, and feelings helps in developing children's creativity, flexible thinking, and problem-solving abilities, and enhances their concentration, attention, and perseverance. Children improve their thinking, vocabulary, imagination, speaking, and listening skills through play, whether they are reconstructing real situations or creating imaginary worlds.

Learning at this Stage is, therefore, an active and interactive process in which children learn through play and through interaction with other children and more experienced others. Children are actively engaged in their social and cultural experiences, and they constantly adjust and use new information to make sense of their perceptions and their experiences.

Children's playing and playfulness can be nurtured and strengthened through experiences of active participation with others, and with natural, real-world materials that provoke and enhance learning, imagination, creativity, innovation, and problem solving in diverse and unique ways.

It is vital that learning of children at this Stage is anchored by nurturing relationships with those around them. These relationships help children feel safe, become more optimistic, curious, and communicative.

1.4.1 Importance of Play

Play is a child's work. Play by its very nature is something young children like to do and actively engage in. We can say that play and learning are a two-way reciprocal process. Play enables learning by allowing children to remain active, engaged, and involved in social interaction with other adults and children, thus meeting all necessary conditions for learning to occur.

When we observe children engaged in play, we notice the following:

a. There is choice: Children choose and decide their goals when they play (e.g., I would like to complete the puzzle, build the block tower, or make tea in the dollhouse). This choice enables them to be active and engaged.

b. There is wonder: This enables them to think and focus (e.g., the balloon is getting so big, how far into the sky the kite has gone, where did the handkerchief disappear - is that magic?).

c. There is joy: Children are enjoying themselves, are excited about playing, and are loving what they are doing. This enables meaningful social interaction and increases the desire to continue learning.

In this active playing process, children are learning - learning to make sense of the world, learning to solve problems, learning about themselves, learning about others, learning language and mathematics.

Play is thus central to children's learning and development. Learning through play in the classroom provides several opportunities for children, actively catering to all domains of development, all Curricular Goals. Choice, wonder, and joy are key aspects of children's play, and our classrooms would do well to be organized around these three aspects.

1.4.2 Significance of Family and Community

Most children in India grow up surrounded by people within and outside the immediate family. While parents play a pivotal role in the child's growing up, bringing up children is often a shared experience with the extended family including grandparents, neighbours, and others in the close community.

The predominant influence during this period are the relationships in the family especially those that ensure adequate nutrition, social engagement, and emotional support. Stable, nurturing, and responsive families contribute to healthy development and positive learning for children. For example, ensuring children eat the right kind of food, talking to children in the mother tongue to improve their vocabulary, narrating traditional stories with good values or local history.

The relationship and engagement between the child and the family during the early years is one of the most powerful predictors of a child's development. Families are children's first teachers - the quality of parent-child relationships and interactions can influence children's learning and development deeply in the early years.

School and classroom processes in the early years must take this critical factor into account. Schools, family, and community are partners in the child's development and learning.

Children at this Stage learn through play which includes a wide range of activities and stimulating experiences. All these activities and experiences need to be organized in a manner that children remain engaged along with being emotionally and mentally motivated to learn.

Within this broad idea of play, it must be noted that children also learn by observing, doing, listening, reading, speaking, writing, thinking, and practicing. They learn new concepts, interpret them, and connect this newly introduced knowledge with their existing knowledge. Explicit and systematic teaching, some practice and application is necessary especially once children begin literacy and mathematics. However, all of this, must adhere to the basic requirement of children's positive engagement with strong elements of fun and play.

Section 1.5
Curricular Goals of the Foundational Stage

The Foundational Stage is for children between the ages of 3 to 8 years. There has been a long tradition of inquiry both in India and other cultures on the various domains of development that have been observed in young children that are both natural and desirable.

There has been a long tradition of inquiry both in India and other cultures on the various domains of development that have been observed in young children that are both natural and desirable. The *Panchakosha* concept in the *Taittiriya Upanishad* is one of the earliest articulations of the different domains of development of the human being. These descriptions remain relevant along with the more modern understanding that has emerged through Developmental Biology, Psychology and Cognitive Neurosciences.

Physical Development, or *annamaya kosha* and *pranamaya kosha* understood together, includes bodily awareness and embodied learning through active engagement of all sensorial perceptions. Emotional and spiritual development or the manomaya kosha involves becoming aware of and skilfully regulating our emotions.

The domain of **Socio-emotional and Ethical Development**, thus emerges as an important domain of development both from the Indian traditions and current research. The development of the intellect, or *vijnanamaya kosha*, is emphasised to engage meaningfully with the cognitive and conscious aspects of human experience.

The domain of **Cognitive Development** captures this aspect of development. *Anandamaya kosha*, or experience of transcendence, is best addressed for this age group through arts and culture. Thus, including the domain of **Aesthetic and Cultural Development**, makes the educational experience holistic and complete. NEP 2020 has emphasised on Foundational Literacy and Numeracy as an 'urgent and necessary prerequisite to learning.'

This emphasis has been realised by giving special attention to Foundational Literacy through the domain of **Language and Literacy Development and Foundational Numeracy** through the domain of Cognitive Development. Finally, the Foundational Stage is also seen as setting the foundations for formal schooling. The development of **Positive Learning Habits** that are more appropriate for formal school environments becomes another important Curricular Goal for this Stage. Thus, the Curricular Goals for the Foundational Stage have been derived by giving equal consideration to the vision and details of NEP 2020, and the domains of development.

The following sections provide details of the flow-down from Aims of Education to Curricular Goals to Competencies to Learning Outcomes.

Table B-1.5-i

Domains	Curricular Goals
Physical Development	**CG-1** Children develop habits that keep them healthy and safe **CG-2** Children develop sharpness in sensorial perceptions **CG-3** Children develop a fit and flexible body
Socio-Emotional and Ethical Development	**CG-4** Children develop emotional intelligence, i.e., the ability to understand and manage their own emotions, and respond positively to social norms **CG-5** Children develop a positive attitude towards productive work and service or 'Seva' **CG-6** Children develop a positive regard for the natural environment around them
Cognitive Development	**CG-7** Children make sense of the world around through observation and logical thinking **CG-8** Children develop mathematical understanding and abilities to recognize the world through quantities, shapes, and measures
Language and Literacy Development	**CG-9** Children develop effective communication skills for day-to-day interactions in two languages **CG-10** Children develop fluency in reading and writing in Language 1 **CG-11** Children begin to read and write in Language 2
Aesthetic and Cultural Development	**CG-12** Children develop abilities and sensibilities in visual and performing arts, and express their emotions through art in meaningful and joyful ways
In addition to the above Curricular Goals based on the domains of development, developing Positive Learning Habits is another relevant Goal for the Foundational Stage.	
	CG-13 Children develop habits of learning that allow them to engage actively in formal learning environments like a school classroom

Section 1.6
Competencies

Competencies are learning achievements that are observable and can be assessed systematically. These Competencies are derived from the Curricular Goals and are expected to be attained by the end of a Stage.

The Competencies for each of the Curricular Goals have been defined in this Section. These Competencies are to be seen as guidelines for curriculum developers and should not be considered as prescriptive.

The Competencies have been numbered as C-1, C-2 and so on.

Domain: Physical Development

Table B-1.6-i

CG-1 Children develop habits that keep them healthy and safe	C-1 Shows a liking for and understanding of nutritious food and does not waste food C-2 Practices basic self-care and hygiene C-3 Keeps school/classroom hygienic and organised C-4 Practices safe use of material and simple tools C-5 Shows awareness of safety in movements (walking, running, cycling) and acts appropriately C-6 Understands unsafe situations and asks for help
CG-2 Children develop sharpness in sensorial perceptions	C-7 Differentiates between shapes, colours, and their shades C-8 Develops visual memory for symbols and representations C-9 Differentiates sounds and sound patterns by their pitch,volume, and tempo C-10 Differentiates multiple smells and tastes C-11 Develops discrimination in the sense of touch C-12 Begins integrating sensorial perceptions to get a holistic awareness of their experiences
CG-3 Children develop a fit and flexible body	C-13 Shows coordination between sensorial perceptions and body movements in various activities C-14 Shows balance, coordination, and flexibility in various physical activities C-15 Shows precision and control in working with their hands and fingers C-16 Shows strength and endurance in carrying, walking, and running

Domain: Socio-Emotional and Ethical Development

Table B-1.6-ii

CG-4 Children develop emotional intelligence, i.e., the ability to understand and manage their own emotions, and responds positively to social norms	C-17 Starts recognising 'self' as an individual belonging to a family and community C-18 Recognises different emotions and makes deliberate efforts to regulate them appropriately C-19 Interacts comfortably with other children and adults C-20 Shows cooperative behaviour with other children C-21 Understands and responds positively to social norms in the classroom and school C-22 Shows kindness and helpfulness to others (including animals, plants) when they are in need C-23 Understands and responds positively to different thoughts, preferences, and emotional needs of other children
CG-5 Children develop a positive attitude towards productive work and service or 'Seva'	C-24 Demonstrates willingness and participation in age-appropriate physical work towards helping others
CG-6 Children develop a positive regard for the natural environment around them	C-25 Shows care for and joy in engaging with all life forms

Domain: Cognitive Development

Table B-1.6-iii

CG-7 Children make sense of the world around through observation and logical thinking	C-26 Observes and understands different categories of objects and relationships between them C-27 Observes and understands cause and effect relationships in nature by forming simple hypothesis and uses observations to explain their hypothesis C-28 Uses appropriate tools and technology in daily life situations and for learning

CG-8 Children develop mathematical understanding and abilities to recognise the world through quantities, shapes, and measures	C-29 Sorts objects into groups and sub-groups based on more than one property C-30 Identifies and extends simple patterns in their surroundings, shapes, and numbers C-31 Counts up to 99, both forward and backward, and in groups of 10s and 20s C-32 Arranges numbers up to 99 in ascending and descending order C-33 Recognises and uses numerals to represent quantities up to 99 with the understanding of decimal place value system C-34 Performs addition and subtraction of 2-digit numbers fluently using flexible strategies of composition and decomposition C-35 Recognises multiplication as repeated addition and division as equal sharing C-36 Recognises basic geometric shapes and their observable properties C-37 Selects appropriate tools and units to perform simple measurements of length, weight, and volume of objects in their immediate environment C-38 Performs simple transactions using money up to INR 100 C-39 Develops adequate and appropriate vocabulary for comprehending and expressing concepts and procedures related to quantities, shapes, space, and measurements C-40 Formulates and solves simple mathematical problems related to quantities, shapes, space, and measurements

Domain: Language and Literacy Development

Table B-1.6-iv

CG-9 Children develop effective communication skills for day-to-day interactions in two languages [1]	C-41 Listens to and appreciates simple songs, rhymes, and poems C-42 Creates simple songs and poems on their own C-43 Converses fluently and can hold a meaningful conversation C-44 Understands oral instructions for a complex task and gives clear oral instructions for the same to others C-45 Comprehends narrated/read-out stories and identifies characters, storyline, and what the author wants to say C-46 Narrates short stories with clear plot and characters C-47 Knows and uses enough words to carry out day-to-day interactions effectively and can guess meaning of new words by using existing vocabulary

1 This should be the goal for most classrooms given the need for multilingualism, but in circumstances where Language 2 is very unfamiliar to the children, many of the Competencies (from C-9.1 to C-9.7) can be in the emergent stage for Language 2 by the end of the Foundational Stage and consolidated in the early Preparatory Stage.

CG-10 Children develop fluency in reading and writing in Language 1	C-48 Develops phonological awareness and blends phonemes/ syllables into words and segments words into phonemes/syllables C-49 Understands basic structure/format of a book, idea of words in print and direction in which they are printed, and recognises basic punctuation marks C-50 Recognises all the letters of the alphabet (forms of *akshara*) of the script and uses this knowledge to read and write words C-51 Reads stories and passages with accuracy and fluency with appropriate pauses and voice modulation C-52 Reads short stories and comprehends its meaning – by identifying characters, storyline, and what the author wanted to say – on their own (L1) C-53 Reads short poems and begins to appreciate the poem for its choice of words and imagination C-54 Reads and comprehends meaning of short news items, instructions and recipes, and publicity material C-55 Writes a paragraph to express their understanding and experiences C-56 Shows interest in picking up and reading a variety of children's books
CG-11 Children begin to read and write in Language 2	C-57 Develops phonological awareness and are able to blend phonemes/syllables into words and segment words intophonemes/syllables C-58 Recognises most frequently occurring letters of the alphabet (forms of *akshara*) of the script and uses this knowledge to read and write simple words and sentences

1.6.1 Domain: Aesthetic and Cultural Development

Table B-1.6-v

CG-12 Children develop abilities and sensibilities in visual and performing arts, and express their emotions through art in meaningful and joyful ways	C-59 Explores and plays with a variety of materials and tools to create two- and three-dimensional artworks in varying sizes C-60 Explores and plays with own voice, body, spaces, and a variety of objects to create music, role play, dance and movement. C-61 Innovates and works imaginatively to express a range of ideas and emotions through the arts C-62 Works collaboratively in the arts C-63 Communicates and appreciates a variety of responses while creating and experiencing different forms of art, local culture, and heritage

Positive Learning Habits

Table B-1.6-vi

CG-13 Children develop habits of learning that allow them to engage actively in formal learning environments like a school classroom	C-64 Attention and intentional action: Acquires skills to plan, focus attention, and direct activities to achieve specific goals C-65 Memory and mental flexibility: Develops adequate working memory, mental flexibility (to sustain or shift attention appropriately), and self-control (to resist impulsive actions or responses) that would assist them in learning in structured environments C-66 Observation, wonder, curiosity, and exploration: Observes minute details of objects, wonders and explores using various senses, tinkers with objects and asks questions C-67 Classroom norms: Adopts and follows norms with agency and understanding

Section 1.7
Illustrative Learning Outcomes

Learning Outcomes are interim markers of learning achievement towards the attainment of Competencies. They are defined based on the specifics of the socio-cultural contexts, the materials and resources available, and contingencies of the classroom. A set of illustrative Learning Outcomes have been defined in this NCF, based on the broad understanding of the context of our education system.

In this Section, one Competency from each domain has been elaborated further into Learning Outcomes. This is a sample to guide how Learning Outcomes for the Foundational Stage can be articulated.

a. Domain: Physical Development

i. Curricular Goal (CG-2): Children develop sharpness in sensorial perceptions

ii. Competency (C-7): Differentiates between shapes, colours, and their shades

Table B-1.7-i

	A	B	C	D	E
	C-7: Differentiates between shapes, colours, and their shades				
	Ages 3 - 8				
1	Differentiates and names the primary colours (red, blue, yellow) and other common colours in their environment (black, white, brown)	Differentiates shades within primary colours and secondary colours (e.g., light blue, dark blue, light green, dark green)	Attempts to predict resulting colour when two colours are mixed (e.g., blue and yellow makes green, or red and white makes pink)	Predicts resulting colour when two colours are mixed	Experiments and uses colours in art forms and drawings, decorating, and displays
2	Groups objects based on their colour (e.g., all red things together)	Groups objects based on dimension - length, breadth, height (e.g., all long things together)	Groups objects based on combinations of visual characteristics of colours and shapes (e.g., all red triangles together, all large green leaves together)	Makes patterns, solves puzzles and plays games using identification and grouping of various shapes, colours and shades	

b. Domain: Socio-Emotional and Ethical Development

i. Curricular Goal (CG-5): Children develop a positive attitude towards productive work and service or 'Seva'

ii. Competency (C-24): Engages in age-appropriate work at school and/or at home

Table B-1.7-ii

	A	B	C	D	E
	C-24: Demonstrates willingness and participation in age-appropriate physical work towards helping others				
	Ages 3 - 8				
1	Places materials and toys back in their appropriate locations after use	Assists the Teacher and organises the classroom	• Cleans their own plates or tiffin after eating food • Performs appropriate chores at home and/or at school (e.g., putting away toys, watering plants)	Plants/Sows and takes care of seedlings of local trees	• Assists Teachers to create TLM • Helps in the kitchen with cleaning and cutting

c. Domain: Cognitive Development

i. Curricular Goal (CG-8): Children develop mathematical understanding and abilities to recognize the world through quantities, shapes, and measures

ii. Competency (C-32): Arranges numbers up to 99 in ascending and descending order

Table B-1.7-iii

	A	B	C	D	E
	C-32: Arranges numbers up to 99 in ascending and descending order				
	Ages 3 - 8				
1	Arranges familiar incidents/ events/ objects in an order (e.g., daily routine, story, shapes, size - 2 to 3)	Arranges objects in order based on size up to 3 levels and verbalises their levels (Big – Small – Smaller; Long – Short – Shorter; Tall – Short – Shorter)	Arranges up to 5 objects based on size/length/ weight in increasing or decreasing order	Arranges the same set of objects in different sequences based on different properties of objects (e.g., by size/length/ weight/colour)	Arranges numbers from a given set of numbers in ascending and descending order

d. Domain: Language and Literacy Development

i. Curricular Goal (CG-10): Children develop fluency in reading and writing in Language 1

ii. Competency (C-54): Reads short stories and comprehends their meaning – by identifying characters, storyline and what the author wants to say – on their own (L1)

Table B-1.7-iv

	A	B	C	D	E
	C-54: Reads short stories and comprehends their meaning – by identifying characters, storyline, and what the author wanted to say – on their own (L1)				
	Ages 3 - 8				
1	Listens to "Read Alouds" and responds to questions posed by the Teacher	Participates in "Shared Reading" with the Teacher and in discussions about the reading.	Participates in "Guided Reading" with the Teacher and in discussions about the reading.	Begins "Independent Reading" of books of equal textual and visual content	Begins "Independent Reading" of books of more textual content than visual content
2	Reads picture books and identifies objects and actions	Reads picture books and identifies characters and plots, and narrates the story in short sequence	Reads books with short, simple texts aloud and uses both, visual cues and text, to infer and retell the story with accurate sequence and elaboration	Begins to read unfamiliar story books and comprehend with guidance from the Teacher Identifies plots, and characters	Reads and identifies characters, plots, sequences, and point of view of the author

e. Domain: Aesthetic and Cultural Development

i. Curricular Goal (CG-12): Children develop abilities and sensibilities in visual and performing arts and express their emotions through art in meaningful and joyful ways

ii. Competency (C-61): Explores and plays with a variety of materials and tools to create two-dimensional and three-dimensional artworks in varying sizes

Table B-1.7-v

C-61: Explores and plays with a variety of materials and tools to create two- and three-dimensional artworks in varying sizes

Ages 3 - 8

	A	B	C	D	E
	Grasps relevant art materials, tools, and instruments	Explores a variety of grasps and grips while using art materials, tools, and instruments (e.g., sticks, seeds, pebbles, stones, chalk, thread, pencils, brushes, crayons, powder, scissors)		Able to vary pressure while using tools to create dark and light impressions/marks/lines	
1	Explores large and small sizes while creating marks, lines, scribbles, and other 2D and 3D imagery in visual artworks		Creates large scale work (e.g., floor rangolis, wall murals, sculptural forms) in collaboration with peers, facilitators, and local community	Able to scale own work in large and small sizes, based on available space or materials (e.g., creating a small clay doll, or a big paper doll)	
	Creates forms and imprints by mixing materials (e.g., mud and water, sand and water, flour and water, paint and water)	Creates three-dimensional forms by rolling and patting materials like clay or dough	• Creates collages by combining materials of varying consistencies, colours, and textures in one's own arrangement • Creates three-dimensional arrangements/ assemblages by combining a variety of found materials and objects		
2	Creates imprints using blocks, stencils, found objects and natural materials		Creates simple patterns using blocks, stencils, found objects and natural materials	Creates patterns by combining and arranging materials in a variety of shapes, forms, textures, and colours	Creates a variety of textures with one material through its manipulation (e.g., clay, cloth, paper, rubber, wood)

i. Curricular Goal (CG-13): Children develop habits of learning that allow them to engage actively in formal learning environments like a school classroom.

ii. Competency (C-69): Classroom norms: Adopts and follows norms with agency and understanding

Table B-1.7-vi

	A	B	C	D	E
	C-66: Classroom norms: Adopts and follows norms with agency and understanding				
	Ages 3 - 8				
1	Observes and imitates adult behaviour for classroom norms	Follows classroom norms with Teacher's cues	• Follows and assists others in following classroom norms • Creates do-it-yourself (DIY) classroom job charts/posters with the support of Teachers and follows it	• Participates in discussing the classroom norms and behaves according to norms • Creates DIY classroom job charts/posters and follows it	• Participates in establishing classroom norms and behaves according to norms • Creates DIY classroom job charts/posters and illustrates them as well; follows it responsibly

Section 1.8
Pedagogy

A safe, secure, comfortable, and happy classroom environment can help children learn better and achieve more at the Foundational Stage. Care and responsiveness with ample opportunities to experience, experiment and explore are the hallmark of pedagogy at this Stage.

1.8.1 Building a Positive Relationship between Teachers and Children

When we walk into our classrooms, we see the wide-eyed children who are bright, quick to observe and interested in everything around them. They constantly ask questions. Sometimes they can quietly observe something for a long time. At other times, they lose interest in a matter of minutes. Sometimes they need to jump and move around. At other times, they enjoy a quiet story. Sometimes they cry and clamour to go home. At the same time, they like to be comforted and cajoled and are willing to be convinced to stay back! They can be curious and considerate, delightful, and determined, affectionate, and adventurous, funny, and fearless.

At this Stage, for many children, it could also be their first experience of spending several hours away from their homes. Children require tenderness, nurturing and love. Working with them, being with them, caring for them means enjoying all the very different personalities that they are. Teachers need to be warm and genuine, patient and calm, understanding and empathetic, we need to give our children unhurried time and attention.

Children must feel that they belong, they can trust, they must feel free to try out and explore and, therefore, learn better.

It is our job as Teachers to ensure that children settle and enjoy their time at school. A safe, positive relationship between Teacher and child is enriching both for emotional and cognitive development. To build such a relationship teachers should get to each child individually, listen to the children, observe them, recognise, and respond to the moods of the children, and visit their homes regularly.

1.8.2 Learning through Play- Conversation, Stories, Toys, Music, Art, and Craft

Classrooms for young children are vibrant and full of life. Children enjoy learning through several ways - talking, listening, using toys, working with material, painting, and drawing, singing, dancing, running, and jumping. As Teachers, we use all these ways to work with our children.

1.8.2.1 Conversations

Language is the medium through which children talk to themselves and to others, and it is with words that they begin to construct and get a grip on their reality. The ability to understand and use language clearly and cogently is essential for learning.

Conversations are very important for children's ability to connect with people and things around them. Continuous conversations with children in the classroom help to build relationships of trust.

Teachers can engage with children through free conversations where children can sit with the teachers and discuss on any interesting things that have occurred throughout the day on their way to school or anything they wish to share. In structured conversation the teacher can plan and organise a session in the morning hour where they talk and think through a topic together. Topics are often about children's daily life events and happenings, and their feelings, they can be guided also. In villages most families have livestock, and the children are familiar with animals like dogs, goats, pigs, ducks. Teachers can have flash cards and small videos to show the children and have a conversation around it.

1.8.2.2 Storytelling

Stories are a particularly good medium for learning about social relationships, ethical choices, for understanding and experiencing emotions, and becoming aware of life skills. While listening to stories, children learn new words thus expanding their vocabulary, and learn sentence structure and problem-solving skills. Children with very short attention span concentrate for a longer time while engrossed in a story. Through culturally contextual stories, we can acquaint children with their culture, social norms and create awareness about their surroundings.

Reading aloud stories helps children realize that formal written language is a little different from the spoken language. Teachers can use books like picture books, story books with or without pictures, or story books in multiple languages. Flash cards that have story scenes drawn or printed on them can also be used to tell stories.

Besides listening to stories, children must also have the opportunity to tell stories. Stories told by children can be the same ones they have heard or something they have created. The Teacher can begin to tell a story and ask children to complete it.

1.8.2.3 Toy-Based Learning

This is an important sub-set of play-based pedagogy. Young children learn from first-hand experiences and working with actual objects. They try out and explore and learn. The classroom environment should cultivate this spirit of exploration through playing with toys and manipulatives.

Many local toys are available in every child's surroundings. These should be used as important resources for teaching and learning. Whether a toy is simple or complex, it has a lesson for the child to learn. When a child holds a toy, and manipulates it, she is practicing her motor skills and strengthening her hand-eye coordination.

When a child builds a tower with blocks and eventually watches it fall to the ground, she learns concepts and thinks about a solution to stop this fall. A puzzle helps a child explore patterns. When children use blocks, dolls, animal toys, balls, mini-cars, or pretend toys, they start creating stories and living out scenarios in their minds. Board games teach children to follow simple rules and enhance understanding of language and mathematics.

Toys can also be made from readily available items such as fabric, bottles, cardboard boxes, yarn, cooking pans, bangles, pipe cleaners and pinecones. Traditionally they toy that are used are Ring Set Puzzle, Dhingli (Cotton Dolls), Kitchen set, etc.

NCERT's handbook on Toy-Based Pedagogy is an excellent guide for this.

1.8.2.4 Songs and Rhymes

Children love singing songs and rhymes, and dancing to music. Songs are also a wonderful means of learning language. Children understand different concepts through songs and their vocabulary also expands. Physical movements accompanying the songs enhance gross and fine motor movements, and body movements and gestures help children in understanding concepts. Songs promote interaction among children and lead to cooperation.

Local context specific songs and rhymes (e.g., Pancharakunju in Malayalam, ghum parani mashi pishi in Bangla, machili jal ki rani hai in Hindi, aane banta in Kannada) are another good way to increase vocabulary, imagination, and expression in different kinds of songs. Songs of different languages provide children an ability to infer, make connections between common and different words in a language. Most of us in India are multilingual, and it is important that the songs and rhymes promote children's ability to remain multilingual.

The Teacher could select a few rhymes or songs in two or three local languages, practice them and sing with children. Grandparents, parents, and community members can be wonderful resources for this.

1.8.2.5 Music and Movement

Music is joy. Children grow up listening to lullabies and the humming of their grandmothers. There are so many sources of music around us - farmers singing in the field, buzzing of the bees, cooing of the koyal or rain pattering on a window.

Music is also a strong stimulation for brain development and formation of synaptic connections. So, following rhythm and playing simple musical instruments, and singing should be encouraged. Body movements can accompany claps or rhythm played on a tin box or a khanjari (tambourine) or manjira (cymbals).

Music and movement activities can also be done in different ways. Children could quietly listen to instrumental music or dance freely to rhythm or make body movements accompanied by rhythm. A range of instruments, which are either local, homemade, or purchased, should be made available to children for first-hand experiences in sound exploration and music-making.

Teachers could include a variety of music, dances, sound sources, rhymes, chants, and songs with different moods, contexts, and languages for children to listen to and perform in the classrooms.

Dancing, singing, rhymes, folk songs, action songs and finger plays provide opportunities for children to learn musical concepts.

1.8.2.6 Art and Craft

Children enjoy playing with colours and creating something that is of interest to them. Art and craft provide another medium for children to express their ideas, emotions, and feelings.

Teachers can encourage children to draw using paper and crayons, sketch pens, coloured or black pencils or charcoal. Children can also draw on slates, blackboards, or floors, every corner of the classroom can be utilised. Similarly painting, pasting, clay-moulding are great ways to engage children, however teachers should make them open-ended, with minimal direction from the teacher.

Notions of 'right' and 'wrong', 'good' and 'bad' in terms of artistic expression must be avoided. Instead, different viewpoints, experiences, expression, and imagination are encouraged and celebrated. Within each arts discipline too, children need to be encouraged to discover their own methods and techniques of using instruments and materials, in addition to conventionally accepted methods. Children not only need to observe their surroundings visually, but also become keen observers of their own thoughts, feelings, emotions, expressions, actions, and overall behaviour. The Teacher should ensure that the arts classroom is always an inclusive environment.

1.8.2.7 Indoor Games

Just as exercising the body is important to keep it fit and healthy, so too is exercising the mind.

Games of strategy, logic and word puzzles, and recreational mathematics are the best way to excite children about mathematics, and to develop the logical skills that are so critical throughout their school years and indeed throughout life.

Jigsaw puzzles, playing with blocks, and solving mazes help to develop a child's spatial reasoning. Different games of strategy (e.g., tic-tac-toe, and leading up to deeper games like chess) develop strategic thinking and problem-solving skills.

Playing games *(e.g., Chaupad, Snakes and Ladders, Ludo)* is fun - it also teaches counting, strategy, collaboration, healthy competition, bonding with peers. Word and logic puzzles are another fun way to teach deductive reasoning. Simple puzzles such as those in the box above help develop in children's skills of logical and creative thinking in an enjoyable manner. The puzzles can get more challenging, and incorporate arithmetic and other elements, as children get older. Arithmetic puzzles and games can help develop a comfort with numbers and develop quantitative reasoning.

Making learning enjoyable through fun exercises, games, and puzzles can be a key aspect in ensuring that children stay engaged and at the same time develop mental capacity and creativity.

1.8.2.8 Outdoor Games

Children in the early years cannot sit in one place for a long period of time - they need to move around. Playing outside gives them a chance to explore the natural environment, test their physical limits, express themselves and build self-confidence. Most importantly, it helps to build gross motor skills, physical fitness, and balance.

Children enjoy the space, the freedom to run and jump and climb and kick and fall. Playing outside also helps many children to relax and calm down. And it is a lot of fun!

1.8.2.9 Spending Time in Nature

Children are naturally curious and need opportunities to explore, experiment, manipulate, create, and learn about the world around them. Children start exploring their environment through their senses by scanning their environment, touching, holding, and handling whatever they see, listening and responding to sounds, music, and rhythm, and getting excited by unusual noises.

Children's thinking evolves as they construct an understanding of people, objects, and real-life situations through first-hand experiences. Children bring their own ideas, interests, and beliefs based on their own experiences and contexts as well as their own abilities.

When Teachers and families provide opportunities to children to explore the world around them, experiment and discover, compare, ask questions, make close observations, think, and talk about their observations and predictions, they are being helped to satisfy their curiosities and make more discoveries. Sustaining children's natural curiosity to explore the world through first-hand experiences at home and in the school lays the foundation for learning.

Spending time with plants and trees and birds and animals or just being quiet around nature can develop the basis for Lifestyle for Environment (LiFE).

1.8.2.10 Field Trips

The local vegetable market could be an equally exciting place full of new sights and sounds! The doctor's clinic, bus depot, post office and police station could all introduce children to an unfamiliar but interesting world, teaching them many new things.

Small, local field trips as part of the learning process reinforce the knowledge the children have gained in the classroom and push them to ask more questions and build further connections with things that they already know. Children also learn to manage themselves and learn to be with others through these experiences.

1.8.2.11 Strategies for Literacy and Numeracy

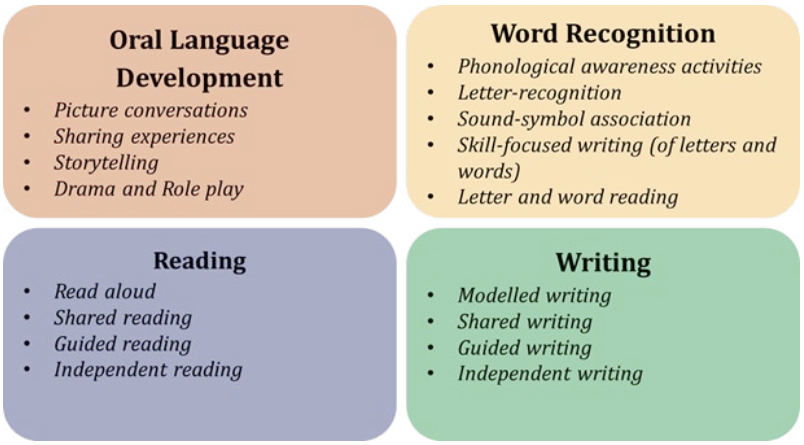
A significant component of structured learning should be added for literacy and numeracy especially for Grades 1 and 2.

a. Classroom Strategies for Literacy

The teaching of language and literacy should provide children with ample opportunities to explore themselves as readers and writers, along with providing a balance of learning 'lower-order' skills (e.g., phonological awareness, decoding, writing letters and words correctly) and 'higher-order' skills (e.g., oral language development, engaging with books, drawing, and original writing) which are meaning-focused.

There are four major components in language and literacy instruction - oral language, word recognition, reading, and writing. While activities for the four blocks may be implemented in an integrated manner, it is important that children spend time working on each of the blocks on a regular basis.

Figure B-1.8-i



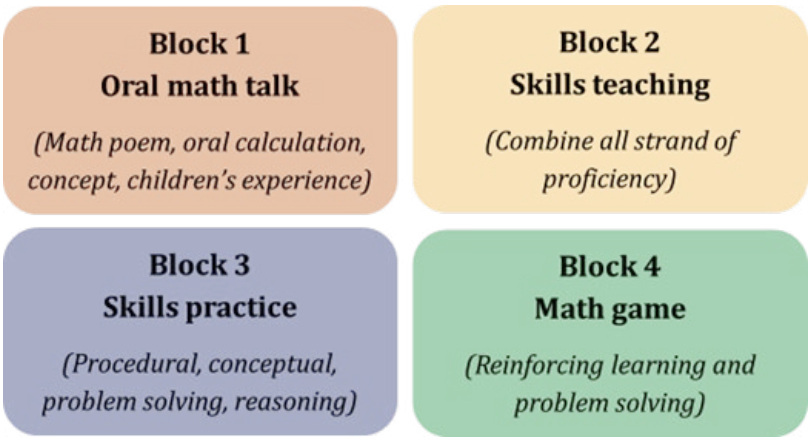
b. Classroom Strategies for Numeracy

Mathematics learning goals can be categorised into higher goals such as mathematization of a child's thought processes (e.g., ability to handle abstract thinking, problem-solving, visualisation, representation, reasoning, and making connections of mathematics concepts with other domains) and content-specific goals (those related to different concepts in mathematics (e.g., understanding numbers, shapes, patterns). Various age-appropriate approaches have been recommended to enable this in the Foundation Stage.

To become mathematically proficient, children also need to build conceptual understanding, procedural understanding, strategies competence/application, communication and reasoning, and a positive attitude towards mathematics.

All these strands of mathematical proficiency can be designed in the following four blocks for the daily classroom process. A mathematical approach/process must be the basis of and based on the nature of the task

Figure B-1.8-ii



Organising and creating a positive learning environment is important for a child's development and learning. The physical as well as psychological environment (safe, secure, comfortable, and happy) helps children to learn better and achieve more. Creating classroom norms with children, understanding why children behave inappropriately and managing this in a suitable way, disciplining focused on responsibility for action and self-control, language used by the teacher etc are important factors in creating a positive learning environment. Physical dimensions like flexible seating arrangements, displays and print-rich environments, colourful and vibrant learning corners etc support children's learning.

Section 1.9
Creating a Positive Classroom Environment

As children enter school, their worlds expand, they make friends, begin connecting with adults beyond the family, and become more and more mobile and verbal. They want to explore and learn about everything. The role of the Teacher is very important in guiding children in their behaviour and in forming strong positive relationships.

Teachers, therefore, have to be thoughtful and responsive to the needs of children. Caring for children is complex and important work. It is complex because there are many parts involved in establishing relationships with children and their families. Enforcing norms should be done in a positive manner.

A safe, secure, comfortable, and happy classroom environment can help children to learn better. It is important that the necessary facilities such as learning materials, equipment, and space for doing activities, working together, and playing so as to help each child learn better are available. Care is central to the classroom environment at the Foundational Stage - an attitude of concern and responsibility for children and relationships. The classroom must be an inclusive, enabling learning environment that provides every child freedom, openness, acceptance, meaningfulness, belonging and challenge.

1.9.1 Managing Difficult Behaviour

Teachers will also have to learn to manage difficult behaviours as behaviour is often the unspoken language through which children act out feelings and thoughts. It is also because they are unaware of behaviour norms or alternative ways of behaving.

Teachers should help children settle and guide their behaviour positively. Positive guidance is crucial because they promote children's self-control, teach children responsibility, and help children make thoughtful choices. Caring and respectful adults create a supportive atmosphere to help young children explore alternative behaviours, develop social skills, and learn to solve problems. This is called a positive approach to guidance. An effective guidance approach is interactive. Adults and children both learn to change as they interact with one another toward a common goal.

Understanding the development of a child will help us set appropriate standards of behaviour/expectations from children, think of appropriate alternatives, as well as age-appropriate explanations or ways to explain to the child.

Actions that insult or belittle are likely to cause children to view their teachers, parents and other caregivers negatively, which can inhibit learning and can teach the child to be unkind to others. However, actions that acknowledge the child's efforts and progress, no matter how slow or small, are likely to encourage healthy development.

Discipline is a part of the guidance strategies adults use to help children become responsible for their actions, learn self-control, and behave appropriately. Discipline does not mean punishing and preventing behaviours.

One of the major goals of a good guidance process is to help children achieve self-discipline. This happens only if adults lead in ways that support children's developing ability to control themselves. By gradually handing over to children the opportunity to govern their actions, adults communicate trust.

1.9.2 Language Used by Teacher

As Teachers gain experience in handling problem behaviours, they learn to use the right kind of language. Teachers discover how potent the voice can be and what words will work best and when. They become aware of facial expressions and what a touch or a look will convey to children.

How they use their body reflects a distinct attitude and approach to discipline. Through experience, new Teachers learn how to use these tools in ways that will work best for them and the children. Teachers should talk to children in the same way they talk to other people. Learn to control the volume and use good speech patterns for children to imitate. To be heard, get close enough to speak in a normal tone; get down to the child's physical level. Often, lowering volume and pitch is effective. Use simple, clear statements, spoken once, will have more impact. The child will be able to focus on the real issues involved. When working with small children, the Teacher must be aware of body height and position and get down to the level of the child. The way Teachers use their body invites or rejects close relationships and familiarity. A child will find Teachers more approachable if they are seated low, with arms available, rather than standing, with arms folded.

The Teacher has to examine the way she was disciplined and acknowledge her experiences and feelings about it, particularly assumptions she may have on how children be- have depending on their context and background.

Through experience, new Teachers will learn how to use these tools in ways that will work best for them and the children. The most effective methods of guidance are clear, consistent, and fair rules that are enforced in consistent, humane ways. Children should be aware of the consequences if the rules are broken. Good guidance practices emphasize the positive aspects of a child's behaviour, not just problem behaviours. Guidance measures have greater meaning to children if they are encouraged to take responsibility for their actions and are part of the problem-solving process.

Section 1.10
Choosing, Organising and Contextualising Content for Teaching

Teachers at the Foundational Stage must be informed by the curricular goals, competencies and learning outcomes. The syllabus must contextualise the learning outcomes, guide teachers through handbooks on the sequence of learning planned in the syllabus, and also provide broad guidelines for assessments. The content should be derived from children's life experiences and reflect the cultural, geographical, and social context in which the child is developing and growing, move from familiar to unfamiliar, simple to complex, and from self to others, and accommodate the diverse interests of children.

1.10.1 Teaching-Learning Materials

Teaching Learning Materials at this stage are for engaging children in multi-sensorial activities and actively use their hands; simple toys to manipulatives for counting and numeracy, children's books, picture books, activity books, worksheets, audio-visual materials etc support learning. Textbooks should be designed specifically to achieve the Competencies as articulated for the Foundational Stage. Textbook developers should have sound knowledge of applied linguistics and mathematics, a clear understanding of the pedagogy that is appropriate for the competency and content, and also be aware of the current technology and audio-visual materials available for enhancing the learning experience of children. Local context and environment are also important considerations. If practicable, a teacher manual can be developed as a companion to the textbook, aligned to both its approach and content.

a. Children at the Foundational Stage need to engage with texts in a variety of forms (e.g., picture books, storybooks, graded readers, and worksheets). A wide variety of books that are appropriate for all children including 3-year-olds should be made available to schools. Large picture books, colourful graded readers, books with engaging stories and poems, all these would make reading books an exciting and engaging experience for children. Our country has a rich heritage of stories, folklores and legends that vary from region to region. These stories need to be translated into all languages and good children's literature can be produced from these sources and be made available to all. By making a variety of books available in schools, a sense and taste of sahitya can be encouraged in young minds.

1.10.2 An Inclusive, Welcoming, Colourful, and Joyful Learning Environment

An inclusive, welcoming, colourful, and joyful learning environment that supports every child's participation is very critical for achieving the Competencies outlined in the NCF.

a. The indoor environment needs to be well lit and well ventilated.
b. It should feel safe and inviting for the children.
c. It needs to be inclusive.
d. It should have a balance of both familiar and novel experiences for the child.
e. It should have a balance of materials that encourage different domains of development.
f. fIt should allow for both individual work and cooperative work.
g. It should include displays of children's work and also allow for children's work-in-progress to be preserved.

Chapter 2

Language Education

Languages are at the centre of human cognitive, social, and cultural experience. Language serves many simple and complex functions. It gives individuals the capacity to comprehend, analyse, and to relate to their own self and the world. It mediates knowledge acquisition as well as production. Language enables effective communication, which is integral to formation and functioning of societies, of culture and of identity.

Thus, issues related to language are some of the most fundamental in education and the effects of language learning are beyond language in themselves.

The NCF gives central importance to language learning, across all stages, from Foundational to Secondary. It is guided by the commitment to multilingualism in NEP 2020 *[NEP 2020 4.11-4.22]*.

Section 2.1
Aims

Language education is critical for the development of the individual and so for the society. Knowing languages enable students to access the understanding, knowledge, and skills available in written or spoken forms in society. It develops their ability to express ideas and feelings, to be creative, to think rationally, to make well-informed choices, and act on those choices.

Proficiency in languages is essential for a democratic society in which individuals participate and contribute to its political, economic, social, and cultural life. Proficiency in multiple languages including regional and home languages promotes a society which respects and appreciates one's own as well as others' culture. Such multilingualism also has direct benefits for the individual in terms of cognitive development and flexibility.

Language learning in schools must specifically aim to achieve the following:

a. **Achieving literacy:** Literacy is fundamental to school education. Students attaining the knowledge of grammatical structure and vocabulary of a language and applying these skills and understanding to daily life is an important achievement. Achieving literacy means all students demonstrating fluent and critical reading, writing, and comprehension capacities in the language.

b. **Developing effective communication skills and other functional abilities:** Students will develop their language capacities to think critically, identify real-world problems, analyse them, make rational arguments, and work out solutions. Learning a language well, means using language to think and communicate effectively in a variety of situations, and to be able to make sense of concepts to build an understanding of the world.

c. **Building literary and creative capacities:** Language teaching in schools must aim at building capacities in students towards an appreciation of the aesthetic aspects of language and allow for an exploration of how to be creative and imaginative in their spoken and written expressions. Language serves as the vehicle for aesthetic and creative expression in cultures.

d. **Building multilingual capacities:** The National Education Policy (NEP) 2020 explicitly guides language development in schools to focus on teaching many languages and developing multilingual capacities. It says, *"As ... multilingualism has great cognitive benefits to young students, children will be exposed to different languages early on (but with a particular emphasis on the mother tongue), starting from the Foundational Stage onwards..." [NEP 2020, 4.12]*

e. **Appreciation of linguistic diversity:** Given the wide range of languages and the richness of their cultures in India, students must be taught to understand and appreciate diversity in linguistic cultures and identities through samples of various kinds of literature from languages across the subcontinent.

Section 2.2
Nature of Knowledge

In its most basic function, language is a system of the use of words and sentences used in the form of speaking, writing, or gestures for communication among human beings.

a. **Language is a rule-governed system**. The spoken and written components of language are governed by rules that are often a set of conventions or practices. The learning of relevant sounds, shapes, words, sentence structures, and grammar rules, and an understanding of the functional and situational aspects of language use requires understanding and engagement with these rules.

b. **Language is an integral part of a culture and a marker of cultural identity**. Language does not operate in isolation and is related to social interaction, context, and culture. Language development among students is the act of cultural development; it invariably requires learning about its culture and society.

c. **Language evolves constantly, there is no 'pure' and static language**. Many languages learn from other languages and contexts and evolves over time. No language can be treated as intrinsically pure and superior. Learning any language would mean being able to appreciate and engage with such evolution.

d. **Language(s) cannot be distinguished from dialect(s) with any universally accepted criterion.** Such distinctions are usually based on political, social, and cultural factors. In this NCF we use only the word 'language', which would denote all variants of the language, without affixing any particular variant as 'the language' and the rest as 'dialects'.
Such specific characteristics of languages in addition to other aspects like its aims (described earlier) and how children learn languages (described later in this chapter), guides the framing of the curriculum for language and its teaching.

Section 2.3
Current Challenges

Language learning in schools is currently facing a few challenges which need urgent addressing.

a. **Low levels of literacy**: India is currently in a crisis of learning where a large proportion of students currently in elementary school have not attained foundational skills in literacy, i.e., the ability to read and comprehend basic text.

b. **Insufficient time allocated to language learning**: The amount of time allotted to language learning in a week's timetable in too many schools is inadequate to meet the current literacy crisis, let alone achieve the further aims of language.

c. **Low-quality learning materials**: The learning materials used for language teaching across the stages are currently of uneven quality, with a lot of it being of low quality. Good quality materials need careful selection of relevant content (words, context, illustrations, layout) that is age-appropriate and interesting for students to learn from.

d. **Inadequate levels of teacher preparation**: Too often an assumption is made that that anyone can teach language to students without adequate training in the subject and/or without adequate time for preparation. This contributes underachievement in language learning and the classes becoming boring. The NEP acknowledges that *"There has been a severe scarcity of skilled language teachers in India, despite various measures being taken. Language-teaching too must be improved to be more experiential and to focus on the ability to converse and interact in each language and not just on the literature, vocabulary, and grammar of the language. Languages must be used more extensively for conversation and for teaching-learning." [NEP 2020, 22.7]* Teachers with appropriate training, flair, and practice in the subject are essential for a meaningful and enjoyable student experience in language learning.

e. **Ineffective pedagogic strategies:** Many often used teaching practices are not based on a sound understanding of how languages work and how students learn languages across various age groups. Teachers need to take stock of the strategies they have been using till now for their enjoyability and effectiveness.

f. **Content-completion-focused rather than competency-focused teaching**: Like other subjects, language classrooms have become a place for mechanically going through the steps in activities or in a textbook. Effective language teaching must be driven by achievement of competencies and outcomes in students rather than a focus to merely finish the content given in textbook.

g. **Memory-based assessment**: Language learning intended to accomplish language proficiency, communication and functional ability and appreciation of literature. But most of the assessment focus on assessing memory of the content given in text book rather than assessing language abilities.

Section 2.4
Learning Standards

As mentioned earlier, the approach to language teaching and learning in schools, including the learning standards to be achieved, is guided by the three-language formula committed in the NEP 2020.

Box B-2.4-i

Learning three languages

Students will learn at least three languages in their school years, denoted R1, R2, and R3 in this document.

R1: This is the language used as medium of instruction (MoI), and in which literacy is first attained. Preferably it should be the most familiar language of the students, which is usually the mother tongue/home language. With India's linguistic diversity, even within a classroom, it may not be possible to have the home language as the R1 for all students; in such circumstances a language which is familiar to the students should be chosen as R1 -- which is often the most commonly used local language.

R2: This could be any other language, including English.

R3: This is any other language that is not R1 or R2.

The state or the relevant bodies need to decide upon R1, R2, or R3.

"All efforts will be made early on to ensure that any gaps that exist between the language spoken by the child and the medium of teaching are bridged. In cases where home language/mother tongue textbook material is not available, the language of transaction between teachers and students will still remain the home language/mother tongue wherever possible…." [NEP 2020, 4.11].

The approach to literacy in R1 is taken up in detail in the chapter on the Foundational Stage – Chapter 3, section 3.2

The aim is to be an independent reader and writer in R1 by age 8 (Grade 3). A student will demonstrate similar level of literacy in R2 by age 11 (Grade 6), and in R3 by age 14 (Grade 9). Schools will develop in students the capacity for basic communication for social purposes and linguistic proficiency for academic use in the classrooms in R1 and R2, and only the capacity for basic communication for social purposes in R3.

This section lays out the Curricular Goals, Competencies, and a few illustrative Learning Outcomes for R1, R2, and R3 for Preparatory, Middle, and Secondary Stages.

2.4.1 For Language 1 (R1)

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

2.4.1.1 Preparatory Stage

CG-1 Students develop oral language skills using complex sentence structures to understand and communicate abstract ideas.	C-1.1	Converses fluently and meaningfully in different contexts
	C-1.2	Describes an outline of the material that has been read out and answers questions related to it
	C-1.3	Summarizes core ideas from the material that was read out
	C-1.4	Demonstrates the ability to speak their reasoning coherently
	C-1.5	Makes oral presentations (class debates, short welcome notes, anchoring of small events, short speech, and so on)
CG-2 Students develop their reading skills through a basic understanding of different forms of texts (like prose and poetry), and different kinds of writing (like narrative, descriptive, argumentative, and analytical) by reading unfamiliar texts.	C-2.1	Applies varied comprehension strategies (inferring, predicting, visualizing) to understand different texts
	C-2.2	Infers the author's intention behind writing the text material
	C-2.3	Draws essential conclusions from the material read
CG-3 Students develop the ability to write compound and complex sentence structures to express their understanding and experiences	C-3.1	Writes content keeping in mind the intended audience and purpose using compound and complex sentences
	C-3.2	Uses prewriting strategies like planning sequence of ideas, mind-mapping, graphic organizers
	C-3.3	Creates posters, banners, and invites, with appropriate information and purpose
	C-3.4	Proofreads and edits grammar and structure in their writing
CG-4 Students acquire a more comprehensive range of words in various contexts (of home and school experience) and through different sources.	C-4.1	Uses knowledge of homophones, word roots, affixes, suffixes, synonyms, and antonyms
	C-4.2	Discusses meanings of words and develops vocabulary by listening and reading a variety of texts or other content areas

CG-5 Students develop interest and preferences in reading.	C-5.1 Borrows books from the library regularly to be read at home C-5.2 Demonstrates interest in reading books in general and from the library C-5.3 Draws connections with books in the library by linking ideas learned from the textbook

2.4.1.1.1 An illustrative learning outcome for the Preparatory Stage

Curricular Goal (CG-1): Students develop oral language skills using complex sentence structures to understand and communicate abstract ideas.

Competency (C-1.5): Makes oral presentations (class debates, short welcome notes, anchoring of small events, short speech, and so on)

Table B-2.4-i

	A	B	C
	C-1.5: Makes oral presentations (class debates, short welcome notes, anchoring of small events, short speech, and so on)		
	Grade 3	**Grade 4**	**Grade 5**
1	Understands the basic structures of oral presentation like class debates, short welcome notes, anchoring	Makes oral presentations in groups like class debates, short welcome notes, anchoring	Makes oral presentations independently and demonstrates the ability to self-evaluate

2.4.1.2 The Middle Stage

CG-1 Students develop the capacity for effective communication using language skills for description, analysis, and response	C-1.1 Identifies main points and summarizes from a careful listening and reading of the text (news articles, reports, and editorials) C-1.2 Listens critically and paraphrases ideas (distinguishes between facts and opinions stated in panel discussions and debates) C-1.3 Listens to, plans, and conducts different kinds of interviews (structured and unstructured) C-1.4 Raises probing questions about social experiences using appropriate language (open-ended/closed-ended, formal/informal, relevance to context, with sensitivity) C-1.5 Writes different kinds of letters, essays, and reports in appropriate style and registers for different media for different audiences and purposes C-1.6 Creates content for audio, visual, or both for different audiences and purposes

CG-2 Students explore the form (poetry, prose, drama) and structure of different genres (humour, suspense, tragedy) and literary devices.	C-2.1 Identifies and appreciates different forms of literature (prose, poetry, drama) and styles of writing (narrative, descriptive, expository, persuasive) C-2.2 Identifies literary devices [simile, metaphor, personification (the alankaras), hyperbole (athishayokthi), and alliteration (anuprasa)] and idioms, proverbs, and riddles by reading a variety of literature C-2.3 Expresses through speech and writing their ideas and critiques on the various aspects of their social and cultural surroundings
CG-3 Students develop the ability to recognize basic linguistic aspects (vocabulary and sentence structure) and use them in oral and written expression.	C-3.1 Understands the basic linguistic aspects such as sentence style, punctuation, tense, gender, and parts of speech while reading different forms of literature C-3.2 Writes prose, poetry, and drama by using appropriate style and language C-3.3 Writes and edits articles, news reports, and essays with appropriate grammar to express his/her points coherently
CG-4 Students develop the ability to use language effectively in other curricular areas to comprehend concepts and share their understanding with others.	C-4.1 Comprehends the way words and sentences are used in different subjects across the curriculum C-4.2 Describes concepts in different subjects across the curriculum through the effective use of language
CG-5 Students develop the ability to enjoy reading and writing reviews, and use reading for references.	C-5.1 Reads, responds to, and critically reviews books of varied genres (fiction and non-fiction) C-5.2 Uses books and other media resources effectively in one's projects and other activities

2.4.1.2.1 An illustrative learning outcome for the Middle Stage

Curricular Goal (CG-1): Students develop the capacity for effective communication using language skills for description, analysis, and response.

Competency (C-1.1): Identifies main points and summarizes from a careful listening and reading of the text (news articles, reports, and editorials.

Table B-2.4-ii

	A	B	C
	C-1.1: Identifies main points and summarizes from a careful listening and reading of the text (news articles, reports, and editorials)		
	Grade 6	**Grade 7**	**Grade 8**
1	Listens critically and expresses opinions in oral presentations	Listens critically and expresses opinions in oral presentations and compares viewpoints	Listens critically and expresses opinions orally, presents a convincing argument, paraphrases, and summarizes what is heard
2	Identifies the main points in the text after reading or listening to them	Identifies the word choice, purpose, and viewpoint of the author/speaker in the text in creating an effect in the reader	Raises relevant questions about the text and gives a logical response in support or contradiction to the author/speaker's views

2.4.1.3 The Secondary Stage

CG-1 Students use language for effective communication through writing various forms (essays, letters, articles, discussions, interviews, and public speeches) and for new media (email, audio, and visual material).	C-1.1 Uses language appropriate to social context, expresses agreements and disagreements with reasons and arrives at conclusions through discussion and debate C-1.2 Writes in different styles (narrative, descriptive, expository, persuasive) from one's own experiences and experiences of others C-1.3 Writes for real-life situations (invitations, speeches, condolence messages, notices, creative slogans, advertisements) and for school newsletter/magazine/journal C-1.4 Scripts to inform and communicate ideas effectively with the use of technology
CG-2 Students develop an appreciation of the aesthetics in different genres (humour, suspense, tragedy) through analysis of style (narrative, descriptive, expository, persuasive) and content and employ these elements in their writing.	C-2.1 Distinguishes characteristics of works of literature from different periods (like early, medieval, contemporary) C-2.2 Analyses a piece of literary text by close reading, critiquing form and style, and interpreting possible meanings C-2.3 Composes literary text by using appropriate literary devices

CG-3 Students use language to develop reasoning and argumentation skills by engaging with a variety of audio and written material.	C-3.1 Analyses, and evaluates the different audio and written material C-3.2 Argues with proper rationale by carefully evaluating premises
CG-4 Students develop an appreciation for different regional languages acknowledging, respecting, and responding to ideas from across the country.	C-4.1 Recognizes the multilingual nature of Indian society through different materials (selection of literature either translations or original text, documentaries, cinema) C-4.2 Appreciates the diversity of cultural ideas in the different works of regional literature C-4.3 Shows an understanding of the role of language in the formation of our identities and culture
CG-5 Students develop the ability to enjoy reading and writing reviews, and use reading for references.	C-5.1 Reads, responds to, and critically reviews books of varied genres (fiction and non-fiction) C-5.2 Uses books and other media resources effectively in one's projects and other activities

2.4.1.3.1 An illustrative learning outcome for the Secondary Stage:

Curricular Goal (CG-2): Students develop an appreciation of the aesthetics in different genres (humour, suspense, tragedy) through analysis of style (narrative, descriptive, expository, persuasive) and content and employ these elements in their writing.

Competency (C-2.3): Composes literary text by using appropriate literary devices.

Table B-2.4-iii

	A	B
	C-2.3: Composes literary text by using appropriate literary devices articles, reports, and editorials)	
	Grade 9	**Grade 10**
1	Identifies different types of literary devices (simile, metaphor, personification, hyperbole, alliteration, allegory, allusion, oxymoron, foreshadowing, imagery, symbolism, repetition, irony, collocation, parallelism) in the text	Composes poems, stories, drama by using different types of literary devices (simile, metaphor, personification, hyperbole, alliteration, allegory, allusion, oxymoron, foreshadowing, imagery, symbolism, repetition, irony, collocation, parallelism)

2.4.2 For Language 2 (R2)

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

2.4.2.1 The Preparatory Stage

CG-1 Students develop oral language skills using complex sentence structures to understand and communicate abstract ideas.	C-1.1	Appreciates poems, stories, and conversations, and locates important ideas in them
	C-1.2	Comprehends narrated/read-out stories and identifies characters, storyline, and author's view
	C-1.3	Converses fluently, meaningfully, and coherently in different contexts
	C-1.4	Makes oral presentations (class debates, short welcome notes, anchoring of small events, short speeches)
CG-2 Students develop fluency in reading and the ability to read with comprehension	C-2.1	Develops phonological awareness further by blending phonemes/ syllables into words and segments words into phonemes/ syllables
	C-2.2	Examines the basic structure of the text, the idea of words and sentences in print, and recognizes basic punctuation marks
	C-2.3	Reads stories and passages with accuracy and fluency with appropriate pauses and intonation
	C-2.4	Comprehends the meaning of stories, poems, conversations, posters, and instructions in a text by identifying characters, the main idea in the text, and connecting to their experiences
	C-2.5	Demonstrates interest in picking up and reading a variety of children's books
CG-3 Students develop the ability to express their understanding, experiences, feelings, and ideas in writing.	C-3.1	Writes a paragraph to express their understanding and experiences
	C-3.2	Creates simple posters, invites, and instructions with appropriate information and purpose
	C-3.3	Writes stories, poems, and conversations based on their imagination and experiences
CG-4 Students develop a comprehensive range of vocabulary in various contexts and through different sources.	C-4.1	Applies knowledge of homophones, word roots, affixes, suffixes, synonyms, and antonyms
	C-4.2	Applies contextual clues and language structure to make meaning while reading new material
	C-4.3	Discusses meanings of words and develops vocabulary by listening and reading a variety of texts or other content area

2.4.2.1.1 An illustrative learning outcome for the Preparatory Stage

Curricular Goal (CG-3): Students develop the ability to express their understanding, experiences, feelings, and ideas in writing.

Competency (C-3.1): Writes a paragraph to express their understanding and experiences

Table B-2.4-iv

	A	B	C
	C-3.1: Writes a paragraph to express their understanding and experiences		
	Grade 3	**Grade 4**	**Grade 5**
1	Writes 3-4 meaningful sentences to describe picture and classroom/home experience	Writes ideas and experiences in sequence using appropriate words	Writes a few paragraphs on a theme with accuracy
2	Draws/paints and writes sentences to the drawing/painting	Describes a picture card by writing short sentences	Writes ideas and experiences for the purpose intended using compound sentences

2.4.2.2 The Middle Stage

CG-1 Students develop independent reading comprehension and summarising skills of a variety of texts (stories, poems, extracts of plays, essays, articles, and news reports).	C-1.1 Identifies main points and summarizes from a careful reading of the text and responds coherently C-1.2 Makes own judgments and choices and evaluates the different texts (stories, poems, extracts of plays) C-1.3 Shows interest in picking up and reading a variety of books
CG-2 Students attain the ability to write about thoughts, feelings, and experiences of social events (village fairs, festivals, occasions).	C-2.1 Uses strategies to organize ideas and information to write for an intended purpose and audience C-2.2 Expresses experiences, emotions, and critiques on the various aspects of their surroundings in writing
CG-3 Students develop the capacity for effective communication using language skills for description, analysis, and response	C-3.1 Listens critically and raises probing questions about social experiences C-3.2 Writes different kinds of letters and essays in appropriate style and registers for different media for different audiences and purposes

CG-4 Students explore the structure of different literary devices and forms of literature.	C-4.1	Identifies and appreciates different forms of literature (samples of prose, poetry, and plays)
	C-4.2	Identifies literary devices such as simile, metaphor, personification (the alankaras), hyperbole (athishayokthi), and alliteration (anuprasa) by reading a variety of literature
CG-5 Students develop the ability to recognize basic linguistic aspects (vocabulary and sentence structure) and use them in oral and written expression.	C-5.1	Identifies the basic linguistic aspects such as sentence style, punctuation, tense, gender, and parts of speech while reading different forms of literature

2.4.2.2.1 An illustrative learning outcome for the Middle Stage:

Curricular Goals (CG-2): Students attain the ability to write about thoughts, feelings, and experiences of social events (village fairs, festivals, occasions).

Competencies (C-2.1): Uses strategies to organize ideas and information to write for an intended purpose and audience

Table B-2.4-v

	A	B	C
	C-2.1: Uses strategies to organize ideas and information to write for an intended purpose and audience		
	Grade 6	**Grade 7**	**Grade 8**
1	Identifies strategies to organize ideas for writing (in the order of time, space, and individual)	Writes ideas in sequence with the teacher's help using words appropriate for the purpose and audience intended	Writes ideas in sequence independently using words appropriate for the purpose and audience intended

2.4.2.3 The Secondary Stage

CG-1 Students use language for effective communication through various oral activities (discussions, interviews, public speeches) and writing activities (essays, letters, articles), including new media (email, audio, and visual material).	C-1.1 Uses language appropriate to social context, expresses agreements and disagreements with reasons, and arrives at conclusions through discussion and debate C-1.2 Writes in different styles (narrative, descriptive, expository, persuasive) from one's own experiences and experiences of others C-1.3 Writes for real-life situations (invitations, speeches, condolence messages, notices, creative slogans, advertisements) and for school newsletter/magazine/ journal C-1.4 Scripts to inform and communicate ideas effectively with the use of technology
CG-2 Students use language to develop reasoning and argumentation skills by engaging with a variety of written material.	C-2.1 Analyses and evaluates the different audio and written material C-2.2 Argues with a proper rationale by carefully evaluating premises

2.4.2.3.1 An illustrative learning outcome for the Secondary Stage:

Curricular Goal (CG-2): Students use language to develop reasoning and argumentation skills by engaging with a variety of audio and written material.

Competency (C-2.1): Analyses, and evaluates the different audio and written material

Table B-2.4-vi

	A	B
	C-2.1: Analyses and evaluates the different audio and written material	
	Grade 9	**Grade 10**
1	Engages with a variety of audio and written material and observes details and notes them down in a systematic way	Finds out the evidence in the audio and written material, analyses it and evaluates its significance to the overall meaning of the material

2.4.3 For Language 3 (R3)

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

2.4.3.1 The Middle Stage:

CG-1 Students develop effective communication skills for day-to-day interactions, enhancing their oral ability to express ideas by describing and narrating.	C-1.1 Makes conversations relevant to the context C-1.2 Listens to varied texts (stories, poems, and conversations) and summarizes core ideas from the material that was listening to C-1.3 Makes oral presentations (class debates, short welcome notes, anchoring of small events, short speeches)
CG-2 Students develop fluency and the ability to comprehend while reading.	C-2.1 Reads stories and passages with accuracy and fluency with appropriate pauses and intonation C-2.2 Comprehends the meaning of stories, poems, conversations, posters, and instructions and the main idea in the text
CG-3 Students develop the ability to express their understanding, experiences, feelings, and ideas in writing instructions, invitations, and letters.	C-3.1 Writes a paragraph to express their understanding and experiences C-3.2 Writes letters, invitations, and instructions with the appropriate information, with relevance to the audience and purpose

2.4.3.1.1 An illustrative learning outcome for the Middle Stage:

Curricular Goal (CG-3): Students develop the ability to express their understanding, experiences, feelings, and ideas in writing instructions, invitations, and letters.

Competency (C-3.1): Writes a paragraph to express their understanding and experiences

Table B-2.4-vii

	A	B	C
	C-3.1 Writes a paragraph to express their understanding and experiences		
	Grade 3	**Grade 4**	**Grade 5**
1	Writes 3-4 meaningful sentences to describe picture and classroom/home experience	Writes ideas and experiences in sequence using appropriate words	Writes a few paragraphs on a theme with accuracy
2	Draws/paints and writes sentences to the drawing/painting	Describes a picture card by writing short sentences	Writes ideas and experiences for the purpose intended using compound sentences

2.4.4 An Additional Curricular Goal

To ensure that all students in the Indian subcontinent get the opportunity to familiarize themselves with the vast literary heritage of any one language that is native to India, it would be necessary to define a compulsory component in language learning in the secondary stage. This could be in any of the R1, R2, or R3 languages that a student may choose to engage with.

CG-1 Students develop an appreciation of the literary components in the literature of any Indian native language	C-1.1 Reads different samples of contemporary literature of any Indian native language C-1.2 Appreciates diversity in the literature of the language chosen through putting together of a small project

2.4.4.1.1 An illustrative learning outcome for the Secondary Stage:

Curricular Goal (CG-1): Students develop an appreciation of the literary components in the literature of any Indian native language.

Competency (C-1.2): Appreciates diversity in the literature of the language chosen through putting together of a small project

Table B-2.4-viii

	A	B
	C-1.2 Appreciates diversity in the literature of the language chosen through putting together of a small project	
	Grade 9	**Grade 10**
1	Compiles various samples of different forms of literature of three to four authors based on personal preference	Organises and presents a small project with commentary on various samples of different forms of literature of three to four authors based on personal preference

Section 2.5
Principles of Content Selection

It is important to choose content that is appropriate and relevant to the developmental stages of language learning in students. Inadequate, age-inappropriate, and low-quality materials are taking away the value and joy in language classrooms. Teachers must ensure the use of good quality teaching-learning materials, carefully chosen and curated for students across all age groups. This will ensure enthusiasm for learning and foster a connection with the languages being learned.

2.5.1 For the Preparatory stage (R1 and R2):

a. **For developing oracy**: Learning materials that lend themselves to students to practice conversation with each other should be chosen. Playful language activities remove the fear of language and induce the fun element into learning. Content should have a variety of activities like role plays, dramas, and interviews that allow students to practice these in the classroom.

b. **For developing reading skills**: Reading material should have variety, including stories, poems, plays, essays, diaries, comics, cartoons, letters, and travelogues. It should have a balance of familiar and unfamiliar text and context. Large font sizes, coloured pictures, and catchy titles of the chapters would arouse interest in the students. The text should be thought-provoking and generate imagination and interest among students. Content should lend itself to help students progress from guided reading to independent reading.

c. **For developing writing skills**: Chosen content must enable students to learn writing skills systematically and joyfully. The material must be designed to make students practice simple sentences on their own. Activities like the completion of stories, finding suitable titles for pictures, catchy headlines for incidents, poster making, and banners should be part of textbooks.

d. **For developing values and dispositions**: The content chosen should align with the larger purposes of education and values and dispositions that are embedded in NEP 2020 and Constitutional values. This means choosing content that includes authors from all walks of life, kinds of literature that represent local, regional, and linguistic diversity in languages, and explicit teaching of appreciation for the cultures of the subcontinent.

Teacher's Voice B-2.5-i (To be edited)

A very short story

Choosing appropriate content is vital for teachers to meaningfully engage class 4 students in achieving the expected Learning Outcomes for that grade.

Following is the one of the learning outcomes chosen for class 4 students.

Learning outcome: Comments independently on the main ideas with their own impressions of the themes, events, pictures, characters, and title of the text that was read out.

To achieve this, I must choose a story that has many characters, a clear plot, and theme. Additionally, the following principles will help with the choice for class 4 to achieve the learning outcome mentioned above.

Content selection principles:

a. *The text should be thought-provoking and generate imagination and interest among students.*

b. *The content chosen should align with the larger purposes of education and values and dispositions that are embedded in Curriculum and Constitutional values. In this case, the values are of empathy and concern for others.*

c. *Learning materials that lend themselves for students to practice conversation with each other should be chosen.*

Content: A very short story, A Happy Family

There was once a family that had very few things, but many joys. They had two buffaloes but no money for food. One morning, the man's wife said, 'We have two buffaloes and four mouths to feed. Let us sell one of the buffaloes.' The man agreed and began his trip to the market.

The man came home that evening, looking hungry, sad, and tired. His wife and children ran up to him and asked, 'What happened? What did you bring from the market?'

'I sold the buffalo for a horse...' the man began, when his children began to jump up and down. 'A horse, a horse! We can ride it every day!'

'No, the horse was blind. So, I exchanged it for a goat...' the man continued, when his children began to jump up and down. 'A goat, a goat! We can drink milk every day!'

'No, the goat was sick. So, I sold it for some money...' the man added, when his children began to jump up and down. 'Good! We can eat good food today!'

'No, I gave the money to a beggar. He looked very hungry...' the man finished. His wife and children came up to him and said, 'It is alright. His hunger must have been bigger than ours. Come, let us eat now.' So, the whole family sat down and ate ganji like any other night.*

** ganji – rice porridge in Kannada*

The above story is appropriate for grade 4 as it is simple, familiar, interesting and has the scope for students to have thought provoking and imaginative conversations. It does not explicitly preach any value to students but allows for thinking about values, as it is embedded with values of empathy and concern for others. Students can easily converse about the story and connect it to their real-life experiences. The story also gives space for students reflect and comment with their impressions and experiences on the characters, plots, and the title too while talking about the story.

2.5.2 For the Middle and Secondary Stages (R1 & R2)

a. **For developing functional language skills**: Any learning material that is chosen must allow the learners to grow in the functional use of language. Here is a list of suggested content for this.

   i. Choosing themes and topics that are familiar to students and impact their daily life, allowing them to participate in group discussions, debates, role plays etc. For example, traffic jams in cities, effective town planning, floods, drought, pollution, and so on.

   ii. Letter writing, whether on paper or by email, is an important skill. Content must have samples of various kinds of letters, especially formal letters, including samples of letters for real-life situations like applying for a new course in a college, a scholarship, a loan in the bank, any application in a government office, police station, court, etc.

   iii. Apart from this, a variety of content including notes, presentations, statements of purpose, and presentations; articles, features, news items, and reports; advertisements, posters, banners, headlines, videos, and scripts for social media should be used in language classrooms.

b. **For developing literary skills**: Students must be introduced to and given adequate exposure to different genres of literature. In the middle stage, introducing nonfiction and fiction would help students broaden there would help their critical reading and writing abilities. In the secondary stage, students must be taught to enjoy the beauty of literature in greater depth and breadth. The selection of literature should be from regional, national, and global writers and varied genres. These can be relevant extracts that students can engage with close and critical reading. The content should also have a diversity of experiences from writers from all walks of life. For example, in Kannada literature, Vachanaganu, Janapadageete, Janapadakathe, and Lavani are good examples of this. In Tamil Literature, the Thirukkural, and in Assamese literature, stories like Koni Jun, and works of Krishan Kant Hantikar and Jyoti Prasad Agarwala.

c. **For developing linguistic skills**: The content should help with improving fluency and accuracy of the language. Linguistic aspects such as punctuation marks, use of gender, sentence structures, and tenses must be prominently identifiable in the material to enhance language proficiency in reading, speaking, and writing. Similarly, the selected content should allow students to practice advanced creative writing with greater sophistication using various literary devices and contexts.

d. **For eliciting appreciation of linguistic heritage and diversity**: Content should consider the multilingual aspect of the Indian subcontinent, making a place for local and regional dialects and language variations in the materials selected. There should be a provision for neighbouring states' literature to be read by students of each state in the Middle and Secondary Stages (E.g., In Kannada, works of Pampa, Ranna, Janna, and Keshiraja; in Assamese, the story Bir Lasit Phukari that talks about the freedom struggle of local Assamese people and the poetry of Shankardev who has written about the culture of Assamese people).

e. **For art and sports integration in the learning of languages**: Compositions in art and language can share some common aspects in aesthetics of form, style, and content. Using art to access ideas, to represent feelings and events along with descriptive writing would only enhance the connection to the learning and the expression of the students. Making posters, signs, and symbols, and illustrating for narrative and descriptive writing can lead to an interesting interdisciplinarity of approach in the understanding of language and expression (E.g., Utsara in Assamese textbooks talks about various festivals in the state of Assam and various dance and art forms linked to the festivals). Similarly, using games and activities in language classes as springboards to a conversation (and as energisers) can improve the experience of language learning significantly.

f. **For developing values and dispositions**: The content chosen should be aligned with the larger purposes of education and values and dispositions that are embedded in NEP 2020 and Constitutional values. This means choosing content that includes authors from all walks of life, kinds of literature that represent local, regional, and linguistic diversity in languages, and explicit teaching of appreciation for the cultures of the subcontinent.

Teacher's Voice B-2.5-ii (To be edited)

Poem: to analyse a literary text

*A **curricular goal** for secondary grades is for students to develop an appreciation of the aesthetics in different genres through analysis of style and content and employ these elements in their writing. One of the **competencies** being that the student analyses a literary text by close reading, critiquing form, and style, interpreting possible meanings.*

In grade 9, towards this goal, I want my students to achieve the learning outcome: Infers and draws conclusions from the text, identifies different points of view in it, and interprets possible meanings.

***The principles** I keep in mind for selecting an appropriate content to achieve this learning outcome are:*

a. Choose themes and topics that are familiar to students and impact their daily life, allowing them to participate in group discussions, debates, role plays etc.

b. Content should provide opportunity for the students to enjoy the beauty of literature in greater depth and breadth.

c. Linguistic aspects such as punctuation marks, use of gender, sentence structures, and tenses must be prominently identifiable in the material to enhance language proficiency in reading, speaking, and writing.

d. The selected content should allow students to practice advanced creative writing with greater sophistication using various literary devices and contexts.

Keeping these in mind, I chose the following ***poem as content:***

'You said, I Agreed' by Anita Nair

(From her book Malabar Mind)

You Said, I Agreed

Let us be friends, you said

Let us be friends, I agreed

Let there be nothing more, you said

Let there be nothing more, I agreed

I made no declaration, no promises, you said

You made no declaration, no promises, I agreed

It was a minor aberration, a detour, you said

It was a minor aberration, a detour, I agreed

It isn't as if I did anything, you said

It isn't as if anything happened, I agreed

We got out of it with dignity, you said

We got out of it with dignity, I agreed

The poem is suitable for high school students as it allows them to think hard for possible meanings in a piece of literary text.

The subject of the poem is about a close relationship between two people. The literary element of 'repetition' is beautifully used in the poem. It is this 'repetition' that gives an opportunity for the students to interpret possible meanings of the text. Right from the title till the last word in the poem, the element of 'repetition' is used, and it serves multiple purpose.

The title 'you said, I agreed' depicts stress on an important point 'dominance of one partner over other' which is crucial for high school students to note in understanding inequality in relationships. But there can be multiple views here on the type of relationships as it is not clear whether it is between male and female or female and female or male and male.

Since the whole poem has repetition of the title in almost each stanza, it creates an impact on the readers and persuades them to think deeply about what is happening in the situation. Again, there can be multiple views on the theme here. Some may argue it is about power struggle, some may call it conflict, some may refer to it as complexity of human relationships. The text offers huge scope for the students to interpret poem differently and brings multiple point of views by close reading of the text.

Lastly the 'repetition' also brings a rhythm in the poetry making it like song but again offers multiple ways to recite/sing it. The selection of the words (dignity, aberration) and sentence structures (repetition in all lines except few words that are not changed) can be analysed by each student in the class differently based on his or her previous experience and connecting it with the poet's actual intention of writing this poem.

2.5.3 For R3 (Middle Stage)

For learning R3, the chosen content should have materials such as letter charts and sentence cards that introduce the basic script.

a. For reading and writing development in R3, the book should contain small stories and poems of that language as we use in the Preparatory Stage level.

b. Reading and writing materials of R3 should be organized from simple to complex levels of learning, they should have some basic introduction to simple literature in R3.

c. The chosen content must lend itself to oral presentations and conversations like continuing a story, completing a conversation and so on.

d. Content should enable the learning of functional skills in the language of R3 like basic letter writing, day-to-day conversations, poster making, invitations etc.

Box B-2.5-i

Teaching print and digital reading skills: Future 'biliteracy'

One important thing to consider given the nature of the current social milieu and what is to likely come is the daily presence of digital media and screen-based devices in the lives of students. Reading and writing on smartphones and computers are the rising norms among people from different walks of life. Given this, it is the need of the hour to teach students to be 'biliterate' in their reading skills. This will not only save them from the 'shallow reading' that digital media seems to foster, but also maximize the benefits of digital media in their learning. Contemporary research suggests the value of 'deep reading' in the lives of human beings and while well-meaning adults still struggle to switch between printed text and screens, students could be taught to read each medium and switch easily between the two (much like switching between two languages) without compromising on focused attention, the pace of reading, and good meaning-making. This would mean a planned and deliberate teaching for students on how to read digital media, instead of treating the two mediums as the same.

Students need to develop a deep reading circuit in the first place, before being flooded with the distractions that are common to digital media. So, students spending their early years immersed in printed material and then being introduced to digital reading with teacher guidance may be a way forward in this realm.

Section 2.6
Pedagogic Strategies

While all children have an innate and natural capacity to learn languages, it is necessary to know how language is learned best by students in the educational context of a school. This will inform effective pedagogic strategies in each stage.

a. **Language learning must be a deliberative process in schools**: 'Language learning' is a formal education method where a language is deliberatively taught through direct instructions and essential rules. This is a conscious process unlike 'language acquisition' in early life when a language is absorbed subconsciously. Reading and writing in languages involve an active teaching-learning process as they are not natural or intuitive skills. Students learn the letter/symbol and sound association, letters forming words which are ascribed meaning, and words forming sentences to convey thoughts. They learn rules of language related to the position of the words in a sentence, and varying intonations can change the meaning of the word and sentence. A word can have different meanings depending on the context and usage. Students practice these rules and apply them to communicate in different forms of speaking and writing.

b. **A strong base in literacy is crucial for good language learning later**: Early literacy sets the base for children to learn reading and writing well. Expanding vocabulary through stories and rhymes, exposure to picture-text books and a print-rich class experience, playing with sounds and reading aloud picture books help children acquire early literacy in their Foundational Stage. Research shows that children's phonemic (sound structure) awareness in the early years is strongly related to later reading achievement. Students in the Preparatory Stage would need such continued support and sustained practice to attain good levels of literacy.

c. **Students learn better from a balanced approach to literacy**: Students become independent readers gradually when exposed to a balance of instructions for meaning making, and instructions for reading through decoding and spelling. Proficiency in literacy can be achieved by focusing on word recognition and accuracy and language comprehension and expression.

d. **Students read better with focused practice and repeated reading of familiar texts**: Students' reading expression, fluency, and comprehension improve when they read familiar texts. The practice of repeatedly reading short texts significantly enhances their confidence, fluency, and comprehension in reading. This helps students self-correct and adjust their reading when they are unable to understand a new text material. Making sense of each word, connecting its meaning with the previous and next word, seeing a sentence in a single sight, and grasping the meaning of the sentence is the beginning of comprehension in reading. Predicting the sentence that follows, or the paragraph that follows is a sign of students growing in their comprehension skills.

e. **Students grow in their overall language abilities from sustained exposure to a variety of literature**: Exposure to a variety of literature and forms appropriate to a student's grade level would create an interest in reading. Both language and library classes that allow students to explore books that they are interested in, give class time for reading, support student literacy, and provide a literature-rich experience develop in students an abiding interest in reading. Students will then graduate from 'learning to read' to the 'reading to

learn' stage. By the Middle Stage students are developmentally ready with the capacity to analyse, synthesise, describe, narrate, and apply their language skills. In their Secondary Stage, students can recognise, think about, and express independent responses to social events and interactions.

f. **Students grow in their writing capacities through constant, integrated, guided practice**: Integrating reading and writing in classroom instruction makes students develop the ability of purposive writing. Purpose gives direction to writing. Students use language better once they understand the context and the format of the activity. The practical and functional use of language in the middle school and high school years are formative in their enjoyment of language learning in later life. Exploring creative writing, interpretive, descriptive, and narrative writing further enhances their linguistic sensibilities.

2.6.1 Strategies for the Preparatory Stage (R1 and R2)

a. Oral language development:

A strong base in speaking skills has a significant influence on writing and reading abilities in the case of language learning. Listening to a variety of contexts, texts and literature would enhance the vocabulary which further leads to proficiency in speaking. Students must be encouraged to speak about their experiences and describe the texts that they listen to or read. They need to listen to teachers talking about books and reading out text from diverse genres. Similarly, students listen to/watch the news (radio/TV), movies, serials, educational channels with subtitles, and audio-video materials. They could be asked to respond, describe, narrate, summarise, and do role play from what they listened to. Student interactions among themselves based on the activities mentioned above will be useful too. Activities such as storytelling and discussion, conversation on themes, and opportunities for students to talk and share their experiences through free and guided conversations enable oral language skills.

b. Developing reading comprehension:

This is the stage where the beginnings of 'reading-to-learn' can happen. Teachers facilitate reading activities for developing the ability to understand different texts. The ability of comprehension encompasses multiple abilities such as making meaning of words, building connections between the words, making meaning of the whole sentence, predicting the next sentence, building connections of meaning between sentences, and grasping the main ideas of a paragraph/text through connecting their imagination and experiences. Through developing this ability, students get the pleasure of reading and continue to explore different genres of reading.

Some classroom strategies to develop reading comprehension are students reading aloud, reading and talking, repeated reading for fluency, doing shared readings, guided readings, independent readings, relating readings to prior knowledge, and summarising.

c. Developing writing skills

To improve writing skills, writing activities require persistent practice and deliberative focus in the classroom. Many times, writing is limited to copying a given text, copying answers to questions, and reproducing what is memorized. This does not help with the development of writing skills. Writing to express their understanding of the text, their views, and their opinion, and independent writing need to be taught and practised. The ability to write requires organizing thoughts and presenting them in writing form to present to the audience. Writing is also essential for fulfilling many functional requirements in life.

Writing skills can be taught effectively by reinforcing with lots of purposive speaking first, by exposing students to different samples of writing forms and styles, teaching them planning and drafting before writing a piece based on audience and purpose, and modelling good writing for them. Writing is also learned better when students are taught to write to communicate with a relatable purpose, encourage to write on varied themes, help them with guided writing, and finally allow to do independent writing.

d. Vocabulary development:

The richness of vocabulary determines students' proficiency in comprehension and language use. Teaching writing, reading or speaking to communicate their ideas, and vocabulary should be part of daily instruction.

Some useful strategies for developing vocabulary are helping students predict contextual meaning of words, engaging them in word games and word building activities, and teaching them to use a dictionary.

Teacher's Voice B-2.6-i (To be edited)

Developing interest and preference in reading

To create interest in books among children, it is necessary to give these students books to read. It would also be important to read books to students and discuss books with them. As a teacher of class 4, I keep doing such efforts for my students often. Because of this, I can see that some children are getting interested in reading books.

Today I thought that I should read the book 'Kali Aur Dhamin Saap' by Zai Whitaker to the children. The book belongs to the school library. The book is about Kali, a child of the snake-catchers of the Irula tribe in Tamil Nadu. The story depicts Kali's isolation from school, lack of friendship with children as he comes from a marginalized section of society. He is also very clever in catching rat snakes which other children cannot do.

Before narrating from the book, I sat the children down in a circle. I started talking to the children by showing the pictures of the book to the children. They were given chances to guess what the story might be about.

First, the children were asked to read the name of the book. Some children read out its name. After this, we discussed about the writer and the illustrators. Next, the children were asked, "Who is Kali?". The students said, "Kali is the name of the boy who is in the picture

and Dhamin is the name of the snake." Students further added, "From the picture it looks as if the snake and the boy would be friends." Then the children were told that just like the Paniha snake which lives in the water, there is also the Dhamin snake, which is long, lives in the agriculture fields and eats rats.

Then further I talked to the children, "Looking at this picture, what will happen in the story?". Then, Sahiba spoke, "There will be a snake near the river. The boy will go there and make him his friend". Then Muskan spoke, "The boy will go there, he will say to the snake that will you befriend me?". Lucky then guessed, "Kali will be very poor. He will earn money by showing the snake to people". Sammo quickly followed, "Kali will be sad". And Tauseef was not far behind, "Kali will see a snake on the canal", he declared. Similarly, few other children also expressed their guesses.

The conversation continued with students. I asked them by showing the next picture "How does Kali go to school?". A few students said, "He looks sad. He might not want to go to school." Here the children were able to capture the emotion depicted in picture. When I asked, "Why would he be sad?", one of them said, "His mother must be telling him to go to school and he will not feel like going". Fiza was rather insistent, "His grandmother must have sent him to school". Another eagerly said, "He will be late for school, and he will be scolded in school."

Then I read from book, "...he has no friends in school". I asked the children "why wouldn't he has any friends?". They managed to say, "Because his father catches snakes, no one would make him a friend." They were able to guess rather accurately indeed. From this, I was also getting to know that without reading, they identified the social discrimination with the help of experiences gathered from their own social interactions. Later, when the children saw the picture of a snake hanging on a stick in the picture, the story suddenly expanded in their imagination. The children started saying, "Kali catches the snakes and then he will become friends with the children in school." After this, I continued reading on the next few pages and they were able to guess accurately what happened next by looking at the pictures.

The children liked the pictures of this book very much. Each student shared their favourite pictures from book like Kali catching the snake, putting it in the bag, the classmates clapping for Kali, and getting ready to be his friend, the class teacher coming out from under the table, etc. At the end of the book, the children are happy looking at picture where many children who did not talk to him before finally agreed to be friends with Kali.

I also understood during the discussion that Gulfam, a child in the class, found this story very relatable to him. Gulfam belongs to a family of performing arts and during the holidays he goes to perform at different places with his grandfather. His grandfather also keeps a snake with him and displays it too. During the conversation in the class, he tried to mention that earlier in the class, couple of his friends used to tease him by saying 'Kalandar-Kalandar'. It seems that students who teased him got reflected and felt bad about it.

After discussing about the book, the children in the class also discussed about their food habits. In this conversation, Sammo and Gulfam kept their point, "whatever food that we all eat. we should not discriminate in the class".

Then the children were asked which parts of the story they liked best. Children said, "When Kali caught the snake and the children clapped." Couple of more questions related to how teacher scared, Kali's friends acted earlier and later, etc. were asked and discussed with students.

On completing the book, I showed them many story books from school library with diverse context and talked about how interesting those stories are. I also gently pushed them to choose the books which they want to read and asked them to borrow the books. It is clear that children have diverse interests while choosing books. A few wanted to explore other books in the library too.

2.6.2 Strategies for the Middle Stage (R1 & R2)

a. Critical listening and oral presentations:

The focus in the Middle Stage of language learning is more on the functional and literary aspects, which will help students to use language formally. In this stage, students will progress to learning critical listening skills. Here listening to a variety of texts, contexts, and kinds of literature would enhance vocabulary, leading to proficiency in speaking, reading, and writing. Listening and speaking activities occur together.

i. **Panel discussions/debates**: The teacher shows the students a sample discussion or conversation and asks the students to listen to the conversation carefully. The students identify the main theme, differentiate between facts and opinions, and recognise logical arguments. After each segment of the conversation, the teacher asks students to paraphrase the discussion. Students themselves can choose the and the teacher facilitates and moderates the gathering of information, helps with making notes, and preparing reports, and teaches how to compare viewpoints and present a convincing argument, how to paraphrase, and how to summarize. As a closure to such activities, students can reflect on their presentation and get a chance to correct themselves. They learn to rearticulate and conduct such events in the classroom.

ii. **Interviews**: After a mock interview without any preparation, the teacher elicits a discussion on the elements of an interview and how the interaction may be improved for clarity and purpose. Students also listen to different types of interviews like job interviews, and interviews with authors and famous personalities. This exposure will help the students prepare for their interviews. As the second step in the process, the teacher explains the structure of an interview and allows students to prepare and ask relevant questions for the interview. Finally, students begin to compile questions and publish responses. The class evaluates the interviews and their effectiveness.

iii. **Anchoring and public speaking**: Students are encouraged and supported to be anchors for school events, festivals, and school levels meetings. They learn to speak in public on topics like health and hygiene, school processes, and the importance of education. The teacher can help the students in choosing a topic, gathering information, practising, and handling questions from the audience.

iv. **Reviews of movies, plays, and short films**: As part of critical listening activities, the teacher can screen the movies and plays. A pre-viewing and a post-viewing talk about the movie/play and its significance can be discussed. Students also do a detailed review of movies/plays/short films that can be presented orally in the classroom.

b. Activities for developing reading skills:

This is the stage where 'reading-to-learn' would happen to a greater extent. Here, reading is not for just meaning-making but also to develop other higher-order skills of interpreting, analysing, and summarizing. Later, this will help the students to develop reading habits.

i. **Developing functional reading skills:** Teaching-learning materials for functional reading that are useful for their day-to-day life such as applications, letters, reports, invitations, emails, and essays should be chosen. Students need to see different kinds of letters, posters, and circulars. They get the chance to recognize and understand the purpose of each of these with the teacher's help. Additionally, some specific materials can be used where students learn to recognize the use of ambiguity, contradiction, paradox, irony, sarcasm, and understatement in the text.

ii. **Developing literary reading skills:** In the Middle Stage, reading literature is one of the main components of language learning. Teachers can conduct a variety of literature-related activities (E.g., choosing a genre for the week, or a theme for the week). In these activities, students learn to describe the effect of words used, identify basic literary devices, and share their overall experience of reading the text.

iii. **Developing critical reading skills:** The teacher encourages independent student reading of a fiction or non-fiction text and gives space to discuss the intent of the author, understand the context, identify core content, and interpret possible meanings thus enabling critical reading.

c. Building students' interest in reading:

It is necessary to build interest among students through engaging in exciting activities at school. These activities must be a part of the regular language classroom. For example, activities like 'book of the day' (where extracts from a chosen book gets read in the class, and students discuss the plotline, characters, and themes in the book), 'author of the day' (where students read many works of the same author and discuss their style and broader concerns of the author), making a trip to the local library (to learn about book cataloguing, book search, and library maintenance), organising for a literature festival (filled with book talks, exhibitions, creative writing competitions, have exhibits about authors from all walks of life), and a book exhibition (students display their current readings) would enhance student interest in books and reading.

d. Activities for developing writing skills:

i. **Functional language writing skills**: Students will learn some basic forms here.

1) **Essays and reports**: The teacher provide students with one or two samples of essays and reports pointing out how to identify the audience and purpose in each sample of the report and essay. The teacher then explains how to use a variety of planning strategies (including graphic organizers) to generate and organize ideas. As the second step in this process, the teacher asks the students to ideate and come up with ideas and organize their essays/reports. Students then move on to compose a few paragraphs with elaboration and continuity. The teacher explains how vocabulary and information enhance writing about an idea, and how tone and voice add to the style of writing. Students must be encouraged to proofread and revise their writing for clarity of content, appropriateness of vocabulary, and relevance of information.

2) **Writing for the media (emails, blogs, comments, and posts)**: Students learn to construct appropriate messages for the media in the classroom and identify the attributes of media writing, namely, authorship, format, content, and purpose. While learning to write in this context, the teacher could provide samples of well-written blogs, emails, and comments.

ii. **Literary language writing skills:**

1) **Experiential writing**: A book/situation may be done collaboratively selected by the teacher and the students. The teacher asks them to share their initial thoughts or experiences with others, which helps the children to articulate orally. This will bring further clarity to thoughts for the third step, which is, the teacher shares an example of well-known experiential writing and explains the nuances of the same. Finally, the teacher allows the children to write independently and freely, which can be proofread and reviewed.

2) **Literary appreciation and critique**: For Literary appreciation or critique writing, a book or a literary piece must be read carefully and repeatedly. The teacher encourages students to write the critique without any help. The teacher can then explain a few attributes of critique writing (comparing viewpoints, interpreting the character's voice/author's intent, and assessing the word/content choice).

Teacher's Voice B-2.6-ii (To be edited)

Interviews

I am a teacher working with class 6 students. A learning outcome on developing the interviewing skills in students was in the prescribed list of learning outcomes. I designed four activities to help my students develop this skill – one of them is described here in detail.

I can speak to and learn from others

***Step 1** – To provide students with initial/preliminary experience of interviewing, I gave the students a chance to converse with the ayahs, clerks, head teachers and other personnel working in the school. and asked them to learn more about their work and areas of interest/ hobbies.*

I divided the students into four teams. I told them that they could conduct interviews of the school personnel and staff during the break. I also encouraged them to interview whoever they wanted/wished to talk to. (At this point, there had been no discussion about the preparation needed to conduct an interview.)

I ensured that the children were allowed to interview people of their choice during recess. While observing the interviews conducted by the children, I identified some key points that could be discussed at the next stage.

***Step 2** – I put forth a question to the students who had engaged in conducting interviews at this stage. "Class, what do you think are the points that you should keep in mind while conducting an interview?" I gave each student an opportunity to share their experience. As students shared their thoughts and feelings, I recorded/wrote their experiences on the blackboard while appreciating the students' efforts.*

Drawing the attention of the students to specific the points on the blackboard, including ***mutual introduction and statement of purpose, preparation of interview questions, punctuality, documentation,*** *I planned to provide opportunities to strengthen their skills on these topics.*

To start with, I asked the class "Imagine that you are interviewing a farmer. How would you make the introduction/ introduce yourselves to each other? Let us act out this situation." I allowed six students to act out this scenario. While the children were engaging in the role play and making introductions, I made sure that the purpose of the interview was clearly stated and that the other students also notice.

To develop the skill of preparing interview questions in the students, I gave the students a list of questions to the students and asked them to identify which questions were appropriate and those that were not.

Why do you engage in agriculture?

Your efforts are encouraging to all. How has farming made you happy in life?

Isn't it hard get water for the crops?

What do you feel about people's over reliance on vehicles?

What were your childhood memories like?

What kind of facilities have you put in place to ensure sufficient water supply to your field?

Will your children continue this work?

How would you encourage your children to continue this work after you?

I also asked them to specify their reasons for deeming certain questions appropriate and others as inappropriate.

Following this discussion, to provide students the experience of constructing interview questions, I asked the students to create interview questions for a difference situation – that of an interview with an Anganwadi teacher.

Upon observing the questions constructed by the students, I reminded them that the questions should be clear, simple, and relevant to the topic. I also informed them that the questions should be respectful of the person and of the profession.

Further, I informed the class that punctuality was important when interviewing someone. First, the interviewer (here, the students) had to inform the interviewees the time they would require completing the interview and adhere to it.

I then told the class ***regarding the way to record interviews:*** *I introduced the two models/examples to record interviews, depending on the purpose of the interview. I provided the two samples to the class and asked them to observe the differences between the two. Further said to reserve the same model for use in documentation activity.*

Method 1: Recording the Dialogue/ Conversation	Method 2: Summarising with Key Points
Interviewer: In which field have you worked? Interviewee: I am originally from a village. At first, I studied and worked in a company as an engineer. Then, I got interested in agriculture and chose this field. Interviewer: What made you interested in agriculture? Interviewee: As said before, I am originally from a village. When I was studying in the town, I used to come and do agricultural work in my spare time. After joining the company, the modern developments in the field of agriculture attracted me here.	*The respectable farmer was originally from the village and later studied to become an engineer. But his interest in agriculture drew him back to the village. At present, he is an ideal farmer growing many crops in his field.*

The second activity involved the students watching a video of an interview on my mobile phone and discussing it. Following these two activities, I decided to provide practical experience in conducting interviews and in applying their knowledge to conduct interviews. I told the class, "Now, we have understood the method of conducting an interview. Can you conduct an interview with any one person of your choice outside the school?" The final activity involved narrating and editing the interview they did.

2.6.3 Strategies for the Middle Stage (R3)

R3 is introduced in the middle stage. The goal is to build basic skills in the R3 language, which means students should be able to converse, read, and write in R3. Since the students would have already become proficient in their basic skills in R1 And R2, they will acquire these competencies much faster given the nature of the transfer of language skills.

a. Listening and Oral development:

To develop oral proficiency in R3, students must get a chance to listen and converse in that language first.

i. **Listening and talking about movies, plays, and short films**: As part of these listening activities, the teacher can screen the movies and plays. A pre-viewing and a post-viewing talk about the movie/play and its significance can be discussed. Students also do a detailed review of movies/plays/short films that can be presented orally in the classroom.

ii. **Engaging in basic conversations**: To develop day-to-day speaking skills in the language, the teacher can provide relevant imaginary contexts for conversation between/among students (E.g., interactions between a shopkeeper and a customer, between a teacher and a student, between a doctor and a patient, and so on). After

acquiring basic conversation skills, students may use real-world issues to discuss and debate in the classroom using R3. This will help the students sustain the conversation in the targeted language.

b. Development of reading skills:

i. **Script encoding**: Since R1 and R2 scripts are already familiar to the students, the teacher can straightaway teach the aksharaas and maatras of R3. Students will learn to read letters of the alphabet in R3 much faster as they are older and more experienced with languages by now.

ii. **Reading comprehension**: After teaching the basics of the R3 script, the teacher can share small stories and poems for reading comprehension. To help with comprehension teachers can give outlines of the text, share its central theme, and explain the difficult words. Group reading activities would work well in this context and enable students' confidence in reading too.

iii. **Reading and talking**: Students read different kinds of literature in R3 and talk about the same. The teacher organizes events (like 'book for the day' and 'author of the day') to help students sustain their interest and improve their talking skills in the language.

iv. **Vocabulary building**: The use of a dictionary would greatly enable the learning of words in R3. Reading comprehension, word-building exercises, and regular use of the dictionary for a meaning search will help students in expanding their vocabulary.

v. **Reading for functional purposes**: In R3, the student should get the opportunity to read simple manuals (E.g., recipe books and instruction booklets) and other functional forms of writing (E.g., samples of letters and invitations).

c. Development of writing skills:

Here, students learn to apply already learned writing strategies (from R1 and R2 languages) to write in R3.

i. **Introduction to the script**: The teacher can introduce the R3 script contextually with help of sign boards, nameplates, and invitations (this can help in guessing the letters). Immediately after, the teacher may give students writing practice with the *aksharas* and *maatras* in the language.

ii. **Sentence formation**: After learning the script, the teacher can give students basic tasks like writing signboards, nameplates, and invitations. Gradually, they can be given the task of writing small conversations helping the students use the language coherently.

iii. **Writing for functional use**: Even though R3 is meant to be learned at the basic level only, writing for functional use is a necessary skill. This can be achieved through simple activities like diary writing, letter writing, and short story writing.

Box B-2.6-i

Individual Differences in Classroom Participation

It is common to find some students in the Middle Stage communicating more freely in the classrooms than others. In many cultures, boys are encouraged to interact more freely and assertively than girls, and some students from economically privileged backgrounds express themselves more confidently than others who come from less privileged backgrounds. Students who tend to speak with hesitation for various reasons must be encouraged to participate freely in language class activities. Language classes can be a space for empowering students and giving them encouragement and equal opportunities to express themselves through reading, speaking, and writing.

2.6.4 Strategies for the Secondary Stage (R1 & R2):

At the secondary level, added to the effective use of language for functional and literary purposes, skills like sound reasoning, argumentation, and reasoning also should be focused on in the classroom. Along with these, students must be taught an awareness of the cultural history of their languages and literature. To achieve these expectations, we must include a few of the points mentioned below in all our teaching methods.

a. Oral presentations:

Since high school students can connect things with their lives easier, the language classroom needs to give them opportunities where they can freely share their ideas, should listen to others' points of view, should be free to ask questions, argue on their points and should accept others' views with proper justification. Teachers must teach students about the differences between 'just talking' and 'conversation and dialogue'. Hence students must be taught a few things early on like organising their thoughts for better clarity, the art of raising relevant questions, brainstorming and thinking aloud, active participation, and skills of literary appreciation.

Teachers must use methods like role play, group discussion, debate, open house dialogue, and interviews to allow students to ask questions and learn to respond impromptu. Club-based activities, assembly gatherings, and celebrations in the school should be used as platforms to practice these methods and should not be seen as a separate exercise. Teachers must also find ways to teach students how to work on their listening skills (paying attention to details, summarizing) and use the same in day-to-day life.

b. Developing reading skills:

i. **Literary language skills**: By the time students reach high school, they must have learned reading skills and must have also read various kinds of literature in their middle school years. At the Secondary Stage level, they must continue to engage with comprehension, analysis, reviewing, commenting, and critiquing different kinds of literature. For this, they should be encouraged to participate in group activities in

critically analysing a literary text in the class and participate in the activities of the school literature club, poetry house, and fiction-reading groups. Overall, how students read a piece of literature (both in the mechanics of reading and the conceptual understanding of the reading) and analyse it is fundamental to any language pedagogy in high school.

ii. **Critical reading skills**: Though they have already learned this in the Middle Stage, the teacher must take them to the next level of sophistication in critical reading. For that, they must be taught to take meaning from a variety of texts, taught to move from initial impressions to a closer reading of the text, and taught to experience the effect of the language used in a text for specific purposes.

iii. **Exposure to reading multicultural texts**: Students in high school need to be aware of languages and literature across the country. Teachers must bring a variety of text from different regions, and languages and should encourage students to read it and then share views on it. Activities like the literary comparison of two different writers should be promoted and cherished. For example, reading the poetry of Amrita Pritam and Rabindra Nath Tagore would be a great opportunity for students to experience two different regional literature. Similarly reading folk tales of Vikram Betaal and Sulasa and Sattuka (Jataka tales) would help students to connect with Indian traditions in literature. Projects, plays, performances around folk songs, and posters are important methods at this stage for an introduction to ancient text.

c. Developing writing skills:

i. **Functional language writing skills**: Since functional writing becomes an important part of one's daily life, students at the high school level should be given enough opportunity to practice writing reports, essays, notes, applications, letters to editors, advertisements, and notices. Students should also be encouraged to write in magazines, newsletters, newspapers, and blogs

Similarly, being literate about the new media is the need of the hour and any language teacher who does not see the pervasiveness of media in the lives of students will struggle with them. Teachers must encourage students to make well-planned and scripted videos, start educational YouTube channels, and podcasts and should guide students to pick up the right kind of content for these means. Here, the focus should be on writing the script for the content than the technical aspect, how a few words in a three-second frame of a video can influence the audience, and how a particular sentence can be powerful to evoke emotions in any kind of audience.

ii. **Literary language writing skills**: At the high school level, the pedagogy should be such that students are guided towards independent and creative writing. For this, they also need to improve their capacities for critically analysing and thinking. This would help them to connect any literature to its historical and socio-economical aspects rather than reading it in isolation. After reading, they should be able to write a critical review with their thoughts and opinions about the piece. Similarly, students should get ample opportunities to create literature in the form of poems, stories, or plays. They should be encouraged to use literary devices like similes, metaphors, hyperbole, irony, puns, and oxymorons in their writings. Students must be encouraged to find

their voice and style as a writer taking cues from the material they read. Journal writing can be another brilliant way to take children towards reflective writing. Since writing is an acquired skill, the teacher should give constant feedback to help the students improve their writing. The feedback of teachers should comprise inputs on students' level of literary skills, proficiency in grammar, and appropriateness of style in writing.

Box B-2.6-ii

Specific Learning Disabilities in the Language Classroom

Specific Learning Disabilities are a group of conditions that obstruct a person's ability to listen, think, speak, write, spell, or do mathematical calculations. One or more of these abilities may be affecting a student at a time. Specific Learning Disability interferes with the developmentally predictable learning process of a student. The term does not include learning problems that are primarily the result of visual impairment, hearing impairment, motor disabilities, mental retardation, emotional disturbance, or of cultural, environmental, or economic disadvantage.

As language classrooms are one of the biggest sites for observation of such learning disabilities, teachers must be alert to the presence of any such learning challenges a student may be experiencing.

The Rights of Persons with Disability Act (RPWD) 2016 defines Specific Learning Disabilities as a dissimilar group of conditions wherein there is a deficit in processing language, spoken or written, that may show itself as a difficulty to comprehend, speak, read, write, spell, or to do mathematical calculations.

Teachers will need to find a professional diagnosis of such disabilities in grade 3 (or at eight years of age, whichever is earlier). The school principal, teachers, parents, and the clinical psychologist or doctor will have to collaborate to develop learning strategies for a student with a learning disability based on the kind and extent of their learning challenges.

This means framing special considerations in the kind of content selected, the methods of pedagogy used, and the assessment tools used for the learning of such a student.

Section 2.7
Assessments

2.7.1 Formative assessments

This should be part of the teaching-learning process as an 'assessment for learning' and 'assessment as learning'. Giving marks for formative assessment should be avoided as it is to be used for the individual progress of learners. Different kinds of tools and techniques like student portfolios, observation sheets, project-based work, and anecdotal records should be part of formative assessment.

a. A few tools for formative assessment are worksheets, role play, projects, and oral presentations.

   i. Worksheets: These are important in the teaching-learning process. Each worksheet will help in students' learning and makes it easy for the teacher to track the learning trajectories. But the nature of the worksheets needs some consideration: they should not be memory-based and mechanical but should be created in an exploratory manner for promoting students' thinking and reasoning abilities.

   ii. Role plays: In all three stages, there are many role-plays that can be conducted in the class, and for each of them, the teacher can have a checklist of criteria that will help in the planning of the activity and the assessment.

   iii. Projects: A project work is a planned and formulated piece of study involving a task or problem taken up by the learner, either individually or in a group. As projects are great self-learning, self-assessing tools, all projects should relate to the learning outcomes. The nature of the project and its quality checklist and its expectations can be shared with students.

   iv. Oral presentations: These are useful and make classrooms lively and interactive.

Example 1: Illustrative assessment strategy for formative assessment:

Table B-2.7-i

Learning outcome in Grade 5	Classroom oppotunities	Assessment strategies	Source for tracking
Writes ideas in sequence, using words appropriate for the purpose intended with a sense of tone (description, narration, persuasion	Wall writing Letter writing (invitation) Poetry writing Picture writing Poster writing	Worksheets projects, checklist for writing expression	Written sheets Checklist

Example 2: A sample checklist for formative assessment- Oral presentations

Table B-2.7-ii

Criteria	Level 1	Level 2	Level 3
Adherence to the theme	The propositions put forward do not match the theme	The team seems to understand the gist of the topic	The team shows a thorough understanding of the topic in all its dimensions
Content	Most of the information is inaccurate	Most of the information is clear and accurate	The information given is clear, accurate, and detailed
Organization of ideas and fluency	Most of the arguments are not relevant and there are many transitional jumps	Most of the arguments are relevant and there were just a few abrupt transitions	All arguments are relevant and there is a logical transition from one point of argument to another
Vocabulary and pronunciation	The range of vocabulary is limited. Most of the words are mispronounced	The range of vocabulary is limited. Many of the words are mispronounced	A wide range of vocabulary is used. Pronunciation is appropriate.

2.7.2 Summative Assessment

Summative assessments can be conducted half-yearly or yearly. The specific purpose is to track the children's progress as per learning outcomes. Normally these exams are heavily memory-based, but the real intent of the summative assessment is to assess knowledge, understanding, application, and dispositions. Summative assessment can be quantified, and students can receive marks for these. It will help in getting a sense larger picture of the class and learning trajectory. Though summative assessment is often a paper-pencil test, teachers can also incorporate oral tests, projects, and assignments as part of this process.

2.7.3 Techniques for Assessment

a. **Portfolios**: A portfolio is a file, folder, pocket, or space allocated for each child where actual work done by a child, over a period, is collected. It may include written material (worksheets, samples of creative writing, test papers, reports of out-of-classroom activities, like a visit to the nearby post office, bank, etc.), drawings, pictures, or observations by the teachers, observations from others (letters to or by the child to or by friends, family members, any other), craftwork (paper folding, paper cutting, origami, greeting cards, etc.), collections (leaves, textiles, stamps, list of books, etc.), recordings of oral activities or presentations by the child herself or himself (opinion or feelings of self for others, samples of self-assessment sheets on questions framed by teachers or even by children themselves).

b. **Anecdotal Records**: An anecdotal record is an examination that is written like a short story. They are the explanation of occasions or events that are important to the person perceiving them. Anecdotal records are short, objective, and as correct as possible.

c. **Checklists**: Checklists usually offer a yes/no format concerning student illustration of criteria. This is like a light switch; the light is either on or off. They may be used in recording observations of an individual, a group, or a whole class.

d. **Rating Scales**: Rating Scales allow teachers to show the degree or frequency of the behaviours, skills, and strategies displayed by the learner. To continue the light switch analogy, a rating scale is like a feeble switch that provides scope for performance levels.

e. **Observation**: In observation, information about a child is collected in a natural setting inside and outside the classes with the help of observation.

f. **Questions**: Questions are the frequently applied tool for finding out what children know, think, imagine, and feel. A teacher, while teaching, comes to know of learning difficulties in children by asking questions. Questions may be of various types like essay-type questions, short answer type questions, very short answer type questions, and objective-type questions.

Teacher's Voice B-2.7-i (To be edited)

My journey with assessments

My name is Malavika, and I teach students of class 6. There are a total of 20 children in my class. Last week, I was supposed to teach and assess the following learning outcome for the children.

Students explain how authors use characters, conflict, point of view, voice, and tone to create meaning with supporting details from the text

This learning outcome has two parts.

a. Students must read the text and explain their opinion about the characters in it and the uniqueness of those characters.

b. Students identify points of conflict in the text and the tone of the text. This will require them to mark out details in the text and some reasoning.

So, keeping these in mind, I designed two kinds of activities for the students. I also had to plan how to assess the learning outcome.

***Activity 1**: The first activity was to read aloud the story to the students and ask them to discuss the characters in the story. They were to discuss the main and other characters among those. Later in this process, I asked the students to write about something they like about a character and how important that character is to the story.*

Reading 1: The Camp by Girija Rani Asthana

Brief description of the story: We rarely do come across people who are willing to help others. Such people can change the world with their love and care. Here is an interesting story of a village girl who saves her friend's life.

Looking at what the students wrote, I regrouped children based on the rubrics I had created for the next activity.

a. *Level 1: Identifies the main character and supporting characters in the story.*

b. *Level 2: Writes about why they have liked a particular character in the story.*

c. *Level 3: Explains how any character is important to the story.*

On checking students' responses, I noticed that 12 students were able to achieve the first level and 4 students had reached the second level. The remaining four students struggled to achieve level 1, and I read out a different, simpler story to them. These four students then discussed the simpler story and wrote about the characters from this story.

Reading 2: Making A Mango Pickle- Bibhuti Bhushan Bandopadhyay

This revolves around a poor family. The main characters of the story are Apu and Durga. Durga is a dark-complexioned beautiful girl, who loves to wander in nature, and Apu is her brother. The story reveals the beautiful relationship between the siblings.

This way, all the students learned how to observe and write about characters of a story. I put all their writing worksheets into their individual Student Portfolios.

***Activity 2**: The second activity was about identifying theme, conflict between characters, the author's viewpoint, voice, and overall tone in the writing.*

Reading 3: The Tiger in the Tunnel by Ruskin bond

Brief description of the story: The story is about an Indian family who faces the difficult reality of their existence with a sense of honour and duty. The story highlights through its characters' lives and actions the place of service to society and protectiveness in relation to family.

I started the activity with students sharing their overall view of the story, listen to others' views, and discussed the author's viewpoint. All students expressed their views orally and while they presented, I assessed their ability to explain the point of view. For this activity, I had put down the following rubrics based on which I regrouped the class students.

a. *Level 1: Identifies the main theme of the story.*

b. *Level 2: Identifies the main theme of the story as well as, distinguish the conflicts between the character in the story.*

c. *Level 3: Can identify the author's point of view, voice, and tone to create meaning with supporting details from the text.*

After assessing the students' performance in the second activity, I realized, they were facing some difficulty to reach level 3.

I came back to class the next day with a few other stories to show the students how to identify the author's point of view, voice, and tone with supporting details from the text. For example:

Reading 4: The Girl and the Mushrooms by Leo Tolstoy

Brief description of the story: Leo Tolstoy's story about two sisters while carrying mush-rooms to the home they were about met tian accident but at last everything goes well, this story brings out the extent of innocence, heart-wrenching emotions, and love that are the hallmarks of kids all over the world.

After sufficient examples and conversation for this learning outcome, I decided to consolidate the overall performance of the students. I gave them one fresh text (Final reading) and asked a list of questions based on characters, conflict, author's point of view, voice, and tone of the text.

Final reading: How Far is the river? by Ruskin Bond

Brief description of the story: How Far is the River by Ruskin Bond is a short story about a child who wants to discover a river which he has never seen in his life. Between the boy and the river, stands a tall mountain full of shrubs, trees, and forest. The boy is aware that beyond that mountain runs a river and he has never seen that river.

List of questions for students:

a. *What is the main theme of the story?*

b. *Why does the boy want to see the river in the story?*

c. *How do you think the boy would have responded if the river was not there even after he crossed the mountain?*

d. *What is your opinion on the boy character of the story?*

e. *What is the author's voice like across the two to three short stories you have read in the class? Can you identify his style of writing in anyway?*

Based on the responses, I assessed all the students once again and located their performance in three levels as follows.

Level-1	*Identifies the main theme, character(s), and supporting characters in the story*	*0 to 5 Marks (C)* *Tells only characters of the story – 3 marks (in question one)* *Answers the first question clearly describing the theme – 4 to 5 marks.*
Level-2	*Identifies the main theme of the story as well as distinguish the conflicts between the character in the story.*	*5 to 7 Marks (B)* *If a student answers this along with the first question (including no 2) clearly - 6 marks* *If a student has answered questions nos. 3 - 7 marks*
Level-3	*Can identify the point of view, voice, and tone to create meaning with supporting details from the text*	*7 to 10 Marks (A)* *If a student has answered questions no4 - 8 marks* *If the student has answered question number 5 coherently- 9 to 10 marks*

Chapter 3

Mathematics Education

Mathematics can be summarized as the art and science of discovering patterns and explaining them. As such, Mathematics is both ubiquitous and universal. It is all around us, in nature, in technology, and in the motion of the earth, sun, moon, and stars above. There is Mathematics in everything that we do and see, from shopping and cooking, to throwing a ball and playing games, to solar eclipses and climate patterns. Mathematics and numeracy thus give us the fundamental ideas and tools required to think about the world around us and the world beyond us. But most of all, when taught well, mathematics is truly enjoyable and can become a lifetime passion. The goal of mathematics education is indeed to bring to life these aspects of mathematics.

Mathematics education involves learning creative and logical thinking through fundamental concepts such as numbers and operations, geometry, algebra, probability, and statistics. It also aims to nurture the fundamental mathematical capacities of finding patterns, making conjectures, providing explanations through logical reasoning, creativity, problem-solving, computational thinking, and logical communication (both oral and written)**.**

In the **Foundational Stage,** attaining Foundational numeracy (i.e., understanding, and adding and subtracting with, Indian numerals) represents the key focus of Mathematics Education. In the **Preparatory Stage**, the focus shifts to the development of concepts such as numbers, basic operations (including multiplication and division), shapes, and measurement. In the **Middle Stage**, the emphasis moves towards abstracting some of the concepts learned in the Preparatory Stage in order to make them more widely applicable. The **Secondary Stage** focuses on developing the ability to justify claims and arguments through logical reasoning.

Section 3.1
Aims

Mathematics education develops in the individual not only basic arithmetic skills but also the truly crucial capacities of logical reasoning, mental rigor, and creative problem solving. Mathematical knowledge also plays a crucial role in understanding the contents of other school subjects such as science, social science, and even sports, visual arts, and music.

NEP 2020 states that ``*It is recognized that Mathematics and mathematical thinking will be very important for India's future and India's leadership role in the numerous upcoming fields and professions that will involve artificial intelligence, machine learning, data science, etc.*'' (Para 4.25)

The specific aims of Mathematics Education are to develop:

a. Capacities such as finding patterns, making conjectures, justification with logical reasoning, creativity, problem solving, computational thinking, and clear communication (both oral and written).
b. Conceptual and procedural knowledge of numbers, operations, geometry, algebra, probability, and statistics.
c. Values such as rigor and integrity in communication and formulation of arguments; and dispositions such as curiosity, wonder, and perseverance.

Section 3.2
Nature of Knowledge

Unlike any other subject, the notion of truth in mathematics is absolute. In other words, once assumptions (sometimes called *axioms*) are agreed upon, and a mathematical truth is established based on those assumptions through logical and rigorous reasoning (sometimes called *proof*), then that truth cannot be refuted or debated and is true for all time. On occasion, mathematicians may find completely new logical arguments or proofs to establish the same truth, and this too is considered a breakthrough; this is because mathematics is not just a collection of truths, but is also a framework of methods, tools, and arguments used to arrive at these truths.

Over thousands of years, the mathematical truths that are known to humans have grown in number and scope. Quite often, new mathematical truths that are discovered and established build on previously known truths. For that reason, mathematical education, like mathematics knowledge, is cumulative—new concepts that are learned often build on those learned previously.

Mathematical knowledge is built through finding patterns, making conjectures (i.e., proposed truths), and then verifying/refuting those conjectures through logical and rigorous reasoning (i.e., through a proof or a counterexample). The process of finding patterns, making conjectures, and finding proofs or counterexamples often involves a tremendous amount of creativity, sense of aesthetics, and elegance. Often there are many different ways to arrive at the same mathematical truth, and many different ways of solving the same problem. It is for that reason that mathematicians often refer to their own subject as more of an art than a science.

Mathematics education too therefore must aim to develop in students that sense and appreciation of the creativity, beauty, and elegance of mathematics. In classroom discussions, patterns should require creativity to discover, and creativity to explain; problems should require creativity to solve and should, in many cases, allow for multiple approaches--some of which the teacher herself may not be aware of--as this is the nature of the discovery of mathematical knowledge.

Section 3.3
Key Challenges

Our current education system has faced multiple challenges with respect to mathematics learning.

a. Currently, a large proportion of students in the early grades are not achieving foundational literacy and numeracy. This makes it difficult for students to achieve any further higher learning in mathematics. Attaining foundational literacy and numeracy for all children must therefore become an immediate national mission and a central goal of the Foundational Stage curriculum.

b. At both the foundational and higher stages, mathematics learning has traditionally been more `robotic' and `algorithmic' rather than creative and aesthetic. This is a misrepresentation of the nature of mathematics and must be addressed in the school curriculum.

c. There have been some unfortunate practices that have discouraged many girls from pursuing mathematics. Girls possess abilities in mathematics equal to boys and must be given equal opportunity to pursue mathematics and equal participation in the processes of mathematical discovery.

d. New mathematical concepts are difficult to absorb by young children when these concepts are not connected to students' home experiences and languages. Textbooks, classroom activities, and examples should aim to be connected to and related to students' lives and presented also in students' home languages whenever possible. Mathematical vocabulary should additionally be given in students' home languages in cases where the medium of instruction is different from the student's home/most familiar language.

e. Methods of assessment too have encouraged rote learning and meaningless practice and have thus promoted the perception of mathematics as mechanical computation. Assessment must move towards testing real understanding – i.e., core mathematical capacities and competencies - rather than mechanical procedures and rote learning.

f. Ultimately, many students in the current system have unfortunately developed a real fear of mathematics. This has occurred due to non-optimal teaching methods involving lectures, rote learning, and meaningless practice, rather than interactive learning involving games, activities, and discussions emphasising the creative side of mathematics. Countering this fear of mathematics would require a shift in teaching-learning methods towards play-based, activity-based, discovery-based, and discussion-based learning.

Box B-3.3-i

Fear of Mathematics

There are two major aspects that cause fear of mathematics; (a) the nature of the subject and how it is being taught and (b) how it is being perceived in the society.

a. **Nature of Mathematics and how it is taught:**

i. The concepts in Mathematics are cumulative in nature. If students struggle with place value, then certainly they will struggle with all four basic operations, decimal numbers and hence in word problems. So, as a teacher we need to prepare plan in such a way that we can work with students of different level in different methods by using teaching learning materials (TLMs) to engage student and learn the concepts so that the child can feel comfortable to learn the new concepts that are connected to the previously learnt concepts.

ii. When symbols – part of the 'language' of Mathematics – are manipulated without understanding, after a point, boredom and bewilderment dominate for many students, and dissociation develops. So, it is important for teacher to start teaching the concept connecting to the real-life using the local language (especially up to Preparatory Stage), provide exposure to explore using concrete objects or examples and gradually shift to the language of mathematics.

iii. Most of the assessment techniques and questions focus on facts, procedure, and memorisation of formulas. However, the assessment should focus on understanding, reasoning, when and how a mathematical technique is to be used in different context is important.

d. **Societal perceptions and expectations:**

i. Prevalent social attitudes which see girls as incapable of mathematics, or association of formal computational abilities with the upper castes. Such social discriminations also cause the fear and anxiety in students. We need to break that belief exist in the society.

ii. Due to immense competition in the world to be a successful person, parents are burdening the students with immense pressure without considering the interest of students. Majorly it is observed that parents expect their child to choose career in science stream and that puts pressure on the children to learn Mathematics.

Hence, we must rethink the approach of teaching where students see mathematics as a part of their life, enjoy mathematics, with a greater focus on reasoning and creative problem solving. Also, at the same time we need to work with the society to understand the objective of education and some of the beliefs that cause harm to the learning of the students

Section 3.4
Learning Standards

3.4.1 Curricular Goals & Competencies

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

3.4.1.1 Preparatory Stage

CG-1 Understands numbers (counting numbers and fractions), represents whole numbers using the Indian place value system, understands and carries out the four basic operations with whole numbers, and discovers and recognizes patterns in number sequences.	C-1.1 Represents numbers using the place-value structure of the Indian number system, appreciates the key role of zero in this system, compares the sizes of whole numbers, and knows and can read the names of very large numbers. C-1.2 Represents and compares commonly used fractions in daily life (such as ½, ¼, etc.) as parts of unit wholes, as locations on number lines, and as divisions of whole numbers. C-1.3 Identifies relationships amongst operations and applies the four basic operations on whole numbers to solve daily life problems. C-1.4 Discovers, recognises, describes, and extends simple number patterns such as odd numbers, even numbers, square numbers, cubes, powers of 2, powers of 10, and Virahanka--Fibonacci numbers.
CG-2 Analyses the characteristics and properties of two- and three-dimensional geometric shapes, specifies locations and describes spatial relationships, and recognises and creates shapes that have symmetry.	C-2.1 Identifies, compares, and analyses attributes of two- and three-dimensional shapes and develops vocabulary to describe their attributes/properties. C-2.2 Identifies and builds a three-dimensional object from two-dimensional representations of that object. C-2.3 Describes location and movement using both common language and mathematical vocabulary; understands the notion of map (najri naksha). C-2.4 Recognises and creates symmetry (reflection, rotation) in familiar 2D and 3D shapes. C-2.5 Discovers, recognizes, describes, and extends patterns in 2D and 3D shapes.

CG-3 Understands measurable attributes of objects and the units, systems, and processes of such measurement, including those related to distance, length, mass, weight, area, volume, and time, using non-standard and standard units.	C-3.1 Measures using non-standard and standard units and recognises and appreciates the need for standard units. C-3.2 Uses an appropriate unit and tool for the attribute being measured. C-3.3 Carries out simple unit conversions, such as from centimetres to metres, within a system of measurement, and solves daily life problems. C-3.4 Devises strategies for estimating the distance, length, time, , perimeter (for regular and irregular shapes), area (for regular and irregular shapes), weight and volume. C-3.5 Deduces that shapes having equal areas can have different perimeters and shapes having equal perimeters can have different areas. C-3.6 Measures distance, length, perimeter, time, weight, area, and volume and to solve daily life problems.
CG-4 Develops problem-solving skills with procedural fluency, to solve mathematical puzzles as well as daily life problems, and as a step towards developing computational thinking.	C-4.1 Solves puzzles and daily life problems involving one or more operations on whole numbers. C-4.2 Selects appropriate methods and tools for computing with whole numbers such as mental computation, estimation, or paper and pencil calculation, in accordance with the context.
CG-5 Knows and appreciates the development of numeration through human history including the major contributions of India.	C-5.1 Understands the development of the representation of numbers through human history, from tallying (e.g., on the Lebombo bones), to Roman numerals, to the Mayan and Babylonian systems, leading up to the development of zero in India and the modern Indian system of writing numerals (from Yajurveda, story of Buddha, Bakshali Manuscript, Vasavadatta, Aryabhatiya, Brahmasphutasiddanta, Gwalior inscription, etc.) and its transmission to the world (due to Al-Kharizmi, Al-Kindi, Fibonacci, etc.).

3.4.1.2 Middle Stage

CG-1 Understands numbers and sets of numbers (Whole numbers, Fractions, Integers, and Rational numbers) looks for patterns, and appreciates relationships between numbers.	C-1.1 Develops a sense for and an ability to manipulate (e.g., read, write, form, compare, estimate, and apply operations) large whole numbers of up to 10 digits and expresses them in scientific notation using exponents and powers. C-1.2 Discovers, identifies, and explores patterns in numbers and describes rules for their formation (e.g., prime numbers, powers of 3, etc.) and explain relations between different patterns. C-1.3 Explores and understands sets of numbers such as whole numbers, fractions, integers, and rational numbers, and their properties. C-1.4 Represents rational numbers in decimal form as an extension of the Indian system of numeration `past the decimal point'. C-1.5 Explores the idea of percentage and apply it in solving problems. C-1.6 Explores and applies fractions (both as ratios and in decimal form) in daily life situations.
CG-2 Understands the concepts of variable, constant, coefficient, expression, and (one-variable) equation, and uses these concepts to solve meaningful daily life problems with procedural fluency.	C-2.1 Extends the abstract representation of a number in the form of a variable or an algebraic expression using a variable. C-2.2 Forms algebraic expressions using variables, coefficients, and constants, and manipulates them through addition, subtraction, and multiplication. C-2.3 Poses and solves linear equations to find the value of an unknown, including to solve puzzles and word problems. C-2.4 Develops own methods to solve puzzles and problems using algebraic thinking.
CG-3 Understands, formulates, and applies properties and theorems regarding simple geometric shapes (2D and 3D).	C-3.1 Describes, classifies, and understands relationships among different types of two and three-dimensional shapes using their defining properties/attributes. C-3.2 Knows properties of lines, angles, triangles, quadrilaterals, and polygons, and applies them to solve related problems. C-3.3 Identifies attributes of three-dimensional shapes (cubes, parallelepipeds, cylinders, cones, etc.) and uses two-dimensional representations of three-dimensional objects to visualise and solve problems. C-3.4 Draws and constructs geometric shapes such as lines, parallel lines, angles, and simple triangles, with specified properties, using compass and straightedge.

CG-4 Develops understanding of perimeter and area for 2D shapes and uses them to solve day-to-day life problems.	C-4.1 Identifies, selects, and uses units of appropriate size and type to measure and examine the relationship between perimeter and area for 2D shapes (both regular and irregular shapes). C-4.2 Discovers, understands, and uses formulas to determine the circumference of a circle and the area of a triangle, parallelogram, and trapezium, and develops strategies to find the areas of more complex 2D shapes. C-4.3 Explores and uses Baudhayana's Theorem on right triangles and other fundamental geometric theorems to solve puzzles and everyday problems. C-4.4 Discovers and constructs tilings of the plane using 2D shapes and identifies and appreciates their appearances in art in India and around the world. C-4.5 Develops the notion of fractal and identifies and appreciates the appearances of fractals in nature and art in India and around the world.
CG-5 Collects, organises, represents (graphically and in tables), and interprets data/ information from daily life experiences.	C-5.1 Collects, organises data, and applies measures of central tendencies such as average/mean, mode, and median. C-5.2 Selects, creates, and uses appropriate graphical representations of data, including pictographs, bar graphs, histograms, line graphs, and pie charts.
CG-6 Develops mathematical thinking and the ability to logically and precisely communicate mathematical ideas.	C-6.1 Applies both inductive and deductive logic to formulate definitions and conjectures, evaluates and produces convincing arguments/proofs to turn these definitions and conjectures into theorems or correct statements, particularly in the areas of algebra, elementary number theory, and geometry.
CG-7 Engages with puzzles and mathematical problems and develops own creative methods and strategies to solve them.	C-7.1 Applies creativity to develop one's own solutions to puzzles and other problems and appreciates the work of others to develop their own solutions. C-7.2 Engages in and appreciates the artistry and aesthetics of puzzle-making, puzzle-posing, and puzzle-solving.

CG-8 Knows and appreciates the development of mathematical ideas over human history, and the contributions of past and modern mathematicians from India and across the world.	C-8.1 Recognises important mathematical contributions of India (e.g., zero, Indian numerals, ideas around infinity, concepts of algebra, etc.) as well as the contributions of specific Indian mathematicians (such as Baudhayana, Panini, Pingala, Aryabhata, Brahmagupta, Virahanka, Bhaskara, Madhava, and Ramanujan). C-8.2 Recognizes and appreciates how concepts (like the notion of number, from counting numbers, to 0, to negative numbers, to rational evolved over a period of time across different civilizations.
CG-9 Develops basic skills and capacities of computational thinking, namely, decomposition, pattern recognition, data representation, generalization, abstraction, and algorithms, in order to solve problems where such techniques of computational thinking are effective.	C-9.1 Approaches problems using programmatic thinking techniques such as iteration, symbolic representation, and logical operations and reformulates problems into series of ordered steps (algorithmic thinking). C-9.2 Identifies, analyses, and implements possible solutions to problems, with the goal of achieving the most efficient and effective combination of steps and resources and generalizes this process to a wide variety of problems.

3.4.1.3 Secondary Stage

CG-1 Understands numbers, ways of representing numbers, relationships among numbers, and number sets.	C-1.1 Develops a deeper understanding of numbers, including the set of real numbers and its properties. C-1.2 Uses deductive logic to prove theorems such as '$\sqrt{2}$ is an irrational number' and `there are infinitely many prime numbers'. C-1.3 Uses inductive logic to prove theorems such as the recursion relation for Virahanka numbers, `the sum of consecutive odd numbers starting with 1 is a square number', `the sum of consecutive cubes starting with 1 is the square of a triangular number', etc. C-1.4 Explores that every counting number has a unique factorisation into prime numbers (fundamental theorem of arithmetic). C-1.5 Recognises and appropriately uses powers and exponents. C-1.6 Computes powers and roots and applies them to solve problems. C-1.7 Computes simple and compound interest and solve real-life problems.

CG-2 Discovers and proves algebraic identities and uses such identities to solve equations.	C-2.1 Learns the art of factoring polynomials. C-2.2 Applies the division algorithm to both integers and polynomials in order to solve problems such as those involving GCDs and LCMs. C-2.3 Models and solves contextualised problems using equations (e.g., simultaneous linear equations in two variables or single polynomial equations) and draws conclusions about a situation being modelled.
CG-3 Analyses characteristics and properties of two-dimensional geometric shapes and develops mathematical arguments to explain geometric relationships.	C-3.1 Describes relationships including congruence of two-dimensional geometric shapes (such as lines, angles, triangles) to make and test conjectures and solve problems. C-3.2 Proves theorems using Euclid's axioms and postulates – for triangles, quadrilaterals, and circles and applies them to solve geometric problems. C-3.3 Specifies locations and describes spatial relationships using coordinate geometry, e.g., plotting a pair of linear equations and graphically finding solution, or finding the area of triangle with given coordinates as vertices.
CG-4 Derives and uses formulas to calculate areas of plane figures, and surface areas and volumes of solid objects.	C-4.1 Visualises, represents, and calculates the area of a triangle using Heron's formula. C-4.2 Visualises and uses mathematical thinking to discover formulas to calculate surface areas and volumes of solid objects (cubes, cuboids, spheres, hemispheres, right circular cylinders/cones, and their combinations).
CG-5 Analyses and interprets data using statistical concepts (such as measures of central tendency, standard deviations) and probability.	C-5.1 Applies measures of central tendencies such as mean, median, and mode. C-5.2 Applies concepts from probability to solve problems on the likelihood of everyday events.
CG-6 Begins to perceive and appreciate the axiomatic and deductive structure of mathematics. Uses stated assumptions, axioms, postulates, definitions, and mathematics vocabulary to prove mathematical statements and carry out geometric constructions.	C-6.1 Uses deductive and inductive logic to prove theorems about numbers, measurements such as areas and shapes. C-6.2 Visualises and appreciates geometric proofs for algebraic identities and other `proofs without words'. C-6.3 Proves theorems using Euclid's axioms and postulates – for angles, triangles, quadrilaterals, circles, area-related theorems for triangles and parallelograms. C-6.4 Constructs different geometrical shapes like bisectors of line segments, angles and their bisectors, triangles, and other polygons, satisfying given constraints.

CG-7 Appreciates important contributions of mathematicians from India and around the world.	C-7.1 Recognises the important contributions made by Indian mathematicians in the field of mathematics. C-7.2 Recognizes how concepts (like evolution of numbers, geometry, etc.) evolved over a period of time across different civilizations.
CG-8 Sharpens skills such as visualisation, optimisation, representation, and mathematical modelling, and their application in daily life.	C-8.1 Models daily life phenomena and uses representations such as graphs, tables, and equations to draw conclusions. C-8.2 Uses two-dimensional representations of three-dimensional objects to visualise and solve problems such as those involving surface area and volume. C-8.3 Employs optimisation strategies to maximise desired quantities (such as area, volume, or other output) under given constraints.
CG-9 Develops computational thinking, i.e., deals with complex problems and is able to break them down into a series of simple problems that can then be solved by suitable procedures/algorithms.	C-9.1 Decomposes a problem into sub problems. C-9.2 Describes and analyses a sequence of instructions being followed. C-9.3 Analyses similarities and differences among problems to make one solution or procedure work for multiple problems. C-9.4 Engages in algorithmic problem solving to design such solutions.
CG-10 Explores connections of mathematics with other subjects.	C-10.1 Applies mathematical knowledge and tools to analyse problems/situations in multiple subjects across science, social science, visual arts, music, and sports.

3.4.1.4 Illustrative Learning Outcomes

In this section, one Competency for one Curricular Goal (CG) has been elaborated further into Learning Outcomes for different Stages i.e., Preparatory Stage, Middle Stage, and Secondary Stage. These are samples to illustrate how Learning Outcomes for the Stages can be articulated.

3.4.1.5 Preparatory Stage

Curricular Goal (CG-1): Understands numbers (counting numbers and fractions), represents whole numbers using the Indian place value system, understands and carries out the four basic operations with whole numbers, and discovers and recognizes patterns in number sequences.

Competency (C-1.1): Represents numbers using the place-value structure of the Indian number system, appreciates the key role of zero in this system, compares the sizes of whole numbers, and knows and can read the names of very large numbers.

Table B-3.4-i

C-1.1: Represents numbers using the place-value structure of the Indian number system, appreciates the key role of zero in this system, compares the sizes of whole numbers, and knows and can read the names of very large numbers.

	A	B	C
	Ages 9 to 11		
	Grade 3	**Grade 4**	**Grade 5**
1	Recognises, reads, and writes number names and numerals up to 999 using place value concept.	Recognises, reads, and writes number names and numerals up to 9999 using place value concept.	Reads, writes, and compares numbers bigger than 9999 (being used in her/his surroundings) using Indian numeration system.
2	*Compares and forms the greatest and smallest three-digit number (with and without repetition of given digits) using the place value concept.*	Compares and forms the greatest and smallest four-digit number (with and without repetition of given digits) using the place value concept.	

3.4.1.6 Middle Stage

Curricular Goal (CG-2): Understands the concepts of variable, constant, coefficient, expression, and (one-variable) equation, and uses these concepts to solve meaningful daily life problems with procedural fluency.

Competency (C-2.3): Poses and solves linear equations to find the value of an unknown, including to solve puzzles and word problems.

Table B-3.4-ii

	A	B	C
	C-2.3: Poses and solves linear equations to find the value of an unknown, including to solve puzzles and word problems.		
	Ages 12 to 14		
	Grade 6	**Grade 7**	**Grade 8**
1	Uses variable(s) to write down formulas and equation.	Uses number and variable with different operations and expresses a real-life situation in the form of a simple linear equation and vice versa.	Reads, writes, and compares numbers bigger than 9999 (being used in her/his surroundings) using Indian numeration system.
2		Uses trial and error method and determines the solution of a simple equation.	Writes simple contextual problems as linear equations in one variable, finds its solution, and verifies.

3.4.1.7 Secondary Stage

Curricular Goal (CG-6): Begins to perceive and appreciate the axiomatic and deductive structure of mathematics. Uses stated assumptions, axioms, postulates, definitions, and mathematics vocabulary to prove mathematical statements and carry out geometric constructions.

Competency (C-6.1): Uses deductive and inductive logic to prove theorems about numbers, measurements (such as areas), and shapes.

Table B-3.4-iii

	A	B
	C-6.1: Uses deductive and inductive logic to prove theorems about numbers, measurements (such as areas), and shapes.	
	Ages 15 to 16	
	Grade 9	**Grade 10**
1	Applies deductive logic to prove theorems related to parallel lines.	Applies deductive logic to prove statements like - $\sqrt{2}$ is an irrational number, sum of two odds is even etc.
2	Applies deductive logic to proves theorems related to triangles, congruence of triangles.	Applies deductive logic to prove theorems related to properties of quadrilaterals, areas of parallelograms and triangles, mid-point theorem and theorems related to circles.

3.4.2 Rationale for Selection of Concepts

The Learning Standards – the Curricular Goals, Competencies, and Learning Outcomes – defined here makes choices for the concepts that will be taught and learnt in each of the Stages. The key principles that underlie these choices are described here.

a. **Principle of essentiality**

This principle involves three key questions: What mathematics is essential to learn so that one can solve one's day to day problems, live a normal life, and be able to ably participate in the democratic processes of the country? What mathematics is essential to be able to adequately understand other essential school subjects, such as science and social science? And, finally, what mathematical ideas are essential for developing interest in students to further pursue the intellectual discipline if one desires to do so?

b. **Principle of coherence**

Concepts that are selected for each Stage must be in coherence with each other and with the overall and Stage-specific Curricular Goals, Competencies and Learning Outcomes. The goal must not be to bombard the child with all mathematical concepts at the expense of coherence.

c. **Principle of practicality and balance**

Due to a rush for completing the syllabus, the focus on building conceptual understanding often gets compromised and rote memorisation of formulae and direct use of algorithms becomes a central part of the teaching process. NEP 2020 strongly recommends reducing content to give time to discussion, analytical thinking, and fully appreciating concepts.

At each Stage, while choosing the concepts for mathematics, we have given emphasis to the idea of balancing content load with discussion, analytical thinking, and true conceptual understanding. The selection of concepts in each stage must aim to increase the space for bal-

ancing between the conceptual and procedural understanding of the concepts. This will create space for teachers to focus more on building conceptual understanding and meaningful practice.

With this rationale, Learning Standards have been configured to give emphasis to understand Mathematics as a discipline by the end of Grade 10 so that students can also appreciate its intrinsic beauty and value and thereby pursue higher education in mathematics. All areas and concepts that are necessary for all students in daily life to interact with the world are covered within Grade 10 so that if they decide to drop mathematics after Grade 10, they are still equipped with necessary skills, concepts, and Competencies in mathematics. At every Stage, all concepts are included that may be needed as prerequisites for concepts in later Stages.

Section 3.5
Content Selection

3.5.1 Principles for Content Selection

To have better teaching and learning experiences, the following principles would be followed while choosing the content for the mathematics classroom. Stagewise principles are laid down; for each Stage, principles for the previous Stage may also be considered wherever applicable.

3.5.1.1 Preparatory Stage

a. Plenty of space to be given to children's local context and surroundings for developing concepts in mathematics. Case studies, stories, situations from daily life, and vocabulary and phrasing in the home language should be brought in to help introduce and unfold a concept and its sub-concepts.

b. We need to encourage the development of a culture of learning outside the classroom. More play way activities to be included in the content.

c. Mathematics is about thinking in a certain way and providing logical arguments to support the reasoning. Avenues for this are to be created in all activities, projects, assignments, and exercises. Encourage children to articulate their reasons behind their observations and guesses/conjectures, e.g., ask them: why is a pattern extending in a certain way and what is the rule behind it?

d. Language of the content is to be simple so that students can also express their thoughts using similar language; gradually increase their vocabulary and guide them to be specific (using mathematical vocabulary, symbols, and notation).

e. Content that encourages learning processes (meaningful practice leads to building memory and procedural fluency) and cognitive skills (reasoning, comparing, contrasting, and classifying), as well as the acquisition of specific mathematical capacities.

f. There should be consistency and coherence across the content and the progression of the concepts should be spiral instead of linear.

g. For content selection, focus should be on activities that are engaging, i.e., built around daily life experiences of children. It should cater to more than one learning objective/Competency simultaneously and take in to account one or more learning areas at the same time.

h. Definitions should naturally evolve at the end of the discussion, as students develop clear understanding of a concept.

i. Content selection should be carried out keeping in mind the needs of diverse students – differently abled and children with learning disabilities.

j. Develop awareness for the need for national integration, protection of environment, observance of small family norms, removal of social barriers, and elimination of gender biases.

3.5.1.2 Middle Stage

a. Content should allow children to explore several strategies for solving a problem.

b. Content should have situations and problems that offer multiple correct answers. For this, open-ended questions should be given more space in the exercises.

c. Problem posing is an important part of doing mathematics. Exercises that require children to formulate and create a variety of problems for their peers and others should be encouraged.

d. Content should allow children to explore, create, appreciate, and understand instead of just memorising concepts and algorithms without understanding the rationale behind how they work.

e. Content should offer meaningful practice (through worksheets, games, puzzles, etc.) that leads to working memory (smriti) and ultimately builds a procedural/computational fluency.

f. Mathematics should emerge as a subject of exploration, discovery, and creativity rather than a mechanical subject.

g. Content should give opportunities to naturally motivate the usefulness of abstraction.

Teacher's Voice B-3.5-i [to be edited]

Teaching Aids

Teaching aids, in my opinion, are a big assistance in maintaining students' attention in the classroom and, consequently, in learning. The use of manipulatives and visual representations is quite effective, along with the symbolic language in teaching of math concepts.

For example, to teach the circumference of a circle, what I do is that I asked the each student to draw a circle of any radius. Then I asked them to measure the length of the boundary of the circle using the thread. Then with the help of the ruler find the length of the thread used to completely cover the boundary without stretching the thread. Diameter they can easily know by just doubling the radius of the circle.

Now I asked each of them to fill the data (2^{nd} and 3^{rd} column) in the table drawn on the white board as below –

S.No.	Circumference or length of the thread (C)	Diameter (D)	Ratio of Circumference to Diameter

In next step, I asked them to find the ratio of Circumference to the diameter in each case and write in the last column. When the students divide the circumference by the diameter, they will all have about the same answer of about 3.142. Then I introduced them with this constant which is famously called as Pi and denoted by a Greek symbol 'π'.

Follow up question I put to them is – if we know the diameter or radius of any circle then can we find the circumference of the circle. My students easily comes with the response as yes with explanation as below –

Since, C/D= Π which remains a constant for all circles.

Hence, C= Π ×D

Or C= Π ×2r

Or C= 2Πr

The use of teaching aids makes students active throughout the lesson and enhances understanding and retention of mathematical concepts.

3.5.1.3 Secondary Stage

a. Content should be chosen and designed in a way that it enables the students to understand notions of abstraction, the axiomatic system, and deductive logic.

b. More project-based work should be designed and given space in the content so that students have opportunities to weave together several concepts simultaneously. This will help students appreciate the unity and inter-relatedness of mathematical concepts.

c. Interdisciplinary approaches should be kept in consideration while designing the content. Project-based work could be designed based on themes to ensure the integration of other subjects.

d. Content at this Stage should allow students to develop and consolidate the mathematical knowledge and skills acquired during the Middle Stage.

e. Students should develop necessary skills to work with tools, modern technological devices, and mathematical software useful in mathematical discovery and learning.

f. Content should highlight the history of mathematics and how mathematical concepts developed, and in particular the contributions of Indian and other mathematicians in the development of mathematics knowledge.

3.5.2 Materials and Resources

Materials and resources form a critical part of content based on such principles of selecting content for teaching and learning of Mathematics. These include:

a. **Concrete materials:** Teaching–learning materials can be useful resources that make learning experiences more interesting and enjoyable. Such material can be used in understanding concepts, practice, and in assessment. These resources facilitate students to comprehend subject concepts effectively as they can correlate the verbal instruction with real experience, assist students to learn effectively, and remember concepts for long, help students to comprehend concept with clarity, help students to concretise abstract concepts, and thereby enhances the comprehension, reduce verbal communication on the part of teachers, and help students to develop curiosity, and interest in learning. Math Space or corner can be established in a school/classroom, which will have various equipment, apparatus, charts, models: working and static, etc., that can help in building the learning of abstract concepts in mathematics by having experimentation, activities, hands on experience, verification, etc. In mathematics laboratory, electronic calculator, graph machines, mathematical games, puzzles, a mathematical kit containing ginmala, bundle-sticks, geo-board, algebra tiles, dienes blocks or flat long cards, dominoes, pentominoes, Mathematics-related videos, and inclinometers, etc. can also be made available.

b. **Textbooks:** Textbooks should provide authentic content knowledge, content selected should be familiar as much as possible for the students particular to state or region. It should be logical, coherent, and sequential keeping in mind the nature of mathematics – formation of concepts from concrete to abstract, progression of concepts – building of new concepts on previously learnt concepts, language – used in the textbook needs to be simple, and comprehensible, should give space to students to build their own definitions and gradually start using mathematical terms etc. Content chosen should be in alignment with the pedagogical instructional practices specific to mathematics (stated above in section 9.8). Concepts and propositions need to be explained with examples and illustration, lots of opportunities to learn by doing. Enough space for meaningful deliberate practice for better understanding of the conceptual understanding and to build procedural and computational fluency.

c. **Workbooks:** Workbooks are a very useful and helpful tool in the teaching and learning of mathematics. Worksheets for a workbook can be designed to fulfil three purposes (a) Introducing a new concept, (b) Practice and drill for better understanding of the concept and for procedural & computational fluency, and (c) Worksheets can be used as assessment tools also for the learnt concepts.

d. **Technology:** Technology provides additional opportunities for students to see and interact with mathematical concepts. Students can explore and make discoveries with games, simulations, and digital tools. One excellent platform is 'Desmos' the web-based graphing calculator, another is Geo-gebra and there are many more digital tools which make the teaching of mathematics more interesting and joyful.

Section 3.6
Pedagogy

Children begin learning much prior to the time when they come to school. They start learning from their routine experiences, from their surroundings, such as while playing games or interacting with the people around. By the time they join formal schooling, they already have learnt many concepts. Formal learning of mathematics depends a lot on the knowledge and experiences that children bring with them to school. Children learn in several ways and teachers ought to have this understanding about their learning, so that they can enrich children's experiences and existing knowledge in all teaching learning processes.

Children can learn from anything that they watch being carried out around them. They continue to learn beyond school hours. When a child spends substantiate amount of time engaged with solving a jigsaw puzzle, adults often perceive and label it as a time-wasting activity. Instead, they need to realise that it is through such interesting games that the children may be increasing their understanding of shapes and size by continuously improving the visualisation skill. A curriculum built upon assumptions about children's learning that ignore these aspects, is also responsible for children losing interest in mathematics in particular or in any formal learning in general.

Children learn when they are provided with opportunities to engage with meaningful multiple concrete experiences through which they draw common properties which then form a concept. In this process of formation of concept child needs to be exposed to a variety of concrete experiences which they can describe in their own language followed by visual experiences through pictures that represents their experiences and then with symbols to form better understanding of a concept. This progression in learning any concept is quite appropriate in the Preparatory Stage.

For children, problem solving as well as problem posing are critical steps in learning mathematics. Solving mathematics problems and the process of problem solving, although are different, have a lot of similarity in understanding the problem, suggesting, and trying out different possible procedures of solution. Problem solving abilities can be developed when we encourage children in solving the problems independently or in groups without providing any direct support. Besides promoting problem solving abilities in children, they should be encouraged to pose problems. Posing relevant problems indicates the level of understanding of the concepts, processes, and procedures of mathematics. Children could be encouraged for such deliberate practices in the classroom as much and as frequently as possible.

Children learn with interest when they are involved in some discovery process in which they have to recognise how to find out things and think on their own. In fact, in this process students become less dependent on getting knowledge from teachers and acknowledge the conclusion of others. Discovery learning allows learners to see in what way knowledge is achieved. In this student to be enabled to learn by gathering, organising, and analysing information to achieve their own conclusion.

In any effective teaching-learning process, it is inevitable that the Teacher should employ impactful practices to ensure learning of the students. For this to happen, the Teacher should have the firm belief that all students have the potential to learn and do Mathematics. The Teacher should use culturally relevant practices and differentiated learning experiences to meet learning needs of the diverse students. The focus should be on the development of conceptual understanding with procedural fluency, effective communication, creative problem solving, and other mathematical skills. Effective teaching practices in the mathematics classroom must be supported by an inclusive, positive, and safe learning environment, where students feel valued and engaged.

The teaching of Mathematics should be ground on this understanding of how children learn Mathematics. The rest of this section describes key instructional practices and methods that are useful in Mathematics teaching. It also describes the aspect of multi-level and remedial teaching that Teachers often encounter in Mathematics classrooms. Finally, it gives attention to how to cater to specific learning difficulties.

3.6.1 Instructional practices

a. Instruction should help students to understand a particular mathematical concept and encourage students to use various representations for deeper understanding of each concept, as each representation provides a different perspective.

b. The Teacher should focus on building understanding of the concept, encourage them to express their understanding in their own words using mathematical vocabulary and terms (including in their own home language when different from the medium of instruction).

c. The Teacher should provide opportunities to engage in meaningful discussions involving questions that require explanations ("How could you explain your thinking to someone just learning this?", "How do you know?").

d. Incorporate problem-solving tasks in classroom that encourage students to reason, communicate, represent, and connect, as well as justify their thinking.

e. Effective use of tools and representations (particularly pictorial or physical representations) can help students to think through a problem and devise strategies for solution. Tools and representations assist students in modelling situations concretely, pictorially, and abstractly.

f. Teachers should spend some time daily to support mental Mathematics and visualisation strategies, including solving questions involving computation that will help them build computational fluency, solving puzzles, answering riddles, and playing games.

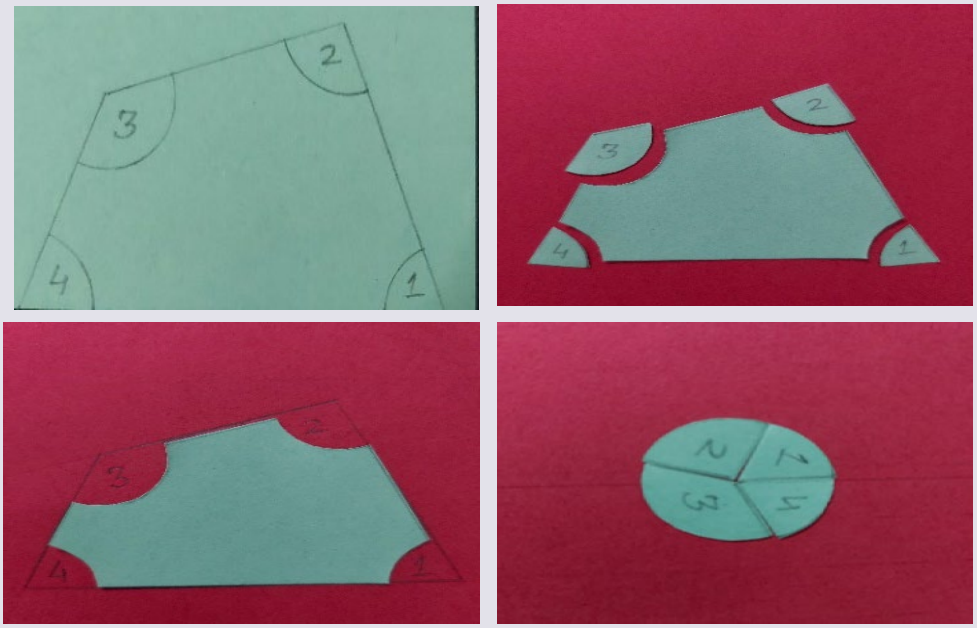
g. Small group work can be effective for better learning and for promoting peer learning. Group work may include problem solving, group discussion and reasoning, proving, etc. However, it should be of small duration so as to manage the groups effectively.

h. Meaningful practice should be an integral part of the Mathematics classroom through the use of worksheets, puzzles, games, mental and oral Mathematics, group work, and homework involving paper and pencil. Practice should be meaningful and purposeful.

Teacher's Voice B-3.6-i [to be edited]

Discovery-Based Method

My understanding of 'Discovery-Based Method of Teaching' is a teaching strategy in which teachers assist students in discovering mathematical facts and formulas through organized activities and observations. In this approach the teacher provides the necessary teaching materials and guides the students to carry out some activities which would lead the students to arrive at a new knowledge. Such discovery activities could be done individually or in small groups of students. This approach enables students to actively participate in the learning process and discover things for themselves. For instance, to teach the students that the sum of the angles of a triangle is 180˚, I asked students to draw their triangles, measure the three angles and add them together. The students would discover that the sum of the angles is 180˚.



Alternatively, I asked them to draw triangles on papers, cut out the three angles and arrange them together to form a straight line and the sum of angles on a straight line is 180˚. So instead of telling them the mathematical knowledge as just facts it is always better to apply discovery approach which enhances active learning in the mathematics classroom. Same exercise I repeat for sum of the angles of a quadrilateral is 360˚. Here, students are to draw any quadrilateral, measure the four angles and add to discover that it is 360˚. Then like they did for triangles I asked them to draw different quadrilateral and cut out the angles from the corners and join them to meet their all four vertices at a point without leaving any gap as shown below to form a complete angle i.e. 360˚.

Here, my emphasis is always on to design activities that help my students learn mathematical concepts instead of just memorizing them as facts and formulas.

3.6.2 Some suggested methods of teaching

a. **Play-way (activity based) method:** Play-way or activity-based method helps in developing desirable attitudes and skills. It gives confidence to students. Many types of games and toys are now available to students which have their roots in mathematical concepts or ideas. These games use patterns, quizzes, and puzzles. Many types of dominoes, number checkers, counting frames, patterns of magic squares, puzzle boards or blocks are now easily available or can be made locally. These may be effectively used for teaching in the classroom.

b. **Discovery/Inquiry-based method:** This method allows students to explore academic content by posing, investigating, and answering questions. It demands complete self-activity of self-learning on the part of the student. Through this method, the student learns to reason and that helps in the development of a scientific attitude. It also allows students to draw connections between academic content and their own lives, which can be particularly important for culturally and linguistically diverse students.

c. **Problem solving method:** Word and logic puzzles (including grid-process-of-elimination puzzles) are a fun way to teach deductive reasoning. Simple puzzles can help develop in students' skills of logical and creative thinking in an enjoyable manner (DNEP 2020, Sec. 4.6.5 pg.93).

d. **Inductive method:** Inductive method is based on principle of induction. Induction means to establish a universal truth by showing that if it is true for a particular case and is further true for a reasonably adequate number of cases then it is true for all such cases. Thus, inductive method of teaching leads us from known to unknown, particular case to general rule and from concrete to abstract. When a number of concrete cases have been understood, the student is able to attempt for generalisation. Here only various facts and examples are presented to the students and from where they have to find out rules or establish a general formula.

e. **Deductive method:** Deduction is the process by which a particular fact is derived from some general known truths. Thus, in the deductive method of teaching student proceeds from general to particular, abstract to concrete and from formula to examples. Here a pre-established rule or formula is given to the student, and they are asked to solve the related problems by using that formula or to prove theorems using definitions, axioms and postulates.

All of the above methods are suggestive and have their appropriateness at different Stages and with students of different age groups. It is also true that one method does not work for all students and Teacher has to intelligently choose a combination of methods to ensure the learning of every individual. The matrix below has suggestive methods in rows and Stages in three columns.

Table B-3.6-i

Suggestive Methods	Stages		
	Preparatory	Middle	Secondary
Play-way	✓ ✓✓	✓ ✓	✓
Discovery/ Inquiry	✓ ✓	✓ ✓✓	✓ ✓
Problem solving	✓ ✓	✓ ✓✓	✓ ✓✓
Inductive	✓ ✓✓	✓ ✓	✓
Deductive	✓	✓ ✓	✓ ✓✓
Recommendation on Use: ✓ ✓✓ - More Often, ✓ ✓ - Often & ✓ - Less Often			

3.6.3 Multi-Level and Remedial Teaching

a. **Multi-level teaching in regular class:** In a multi-level mathematics classroom teaching process, the Teacher starts with the pre-requisite concepts and in the initial few classes, the Teacher may not require working at different levels, but as classes go on, the Teacher needs to work with different learning levels of the students. Let's understand the multi-level Grade with an example.
Context: There are 30 students in Grade 4 and Teacher is planning to teach the concept of fraction.

Table B-3.6-ii

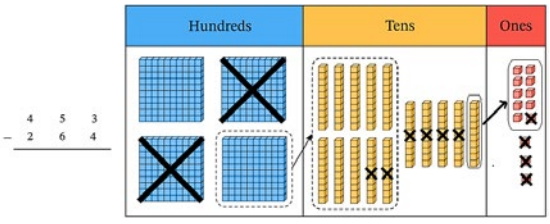
Concept – Fraction (Grade 4)	
Day	**Activity/Discussion**
1	**Equal division (Whole class activity):** a. Fold the paper or divide the shape into two/four equal parts. b. Identify shapes that are equally divided into two/four equal parts.
2	**Identifies half and Symbol ½ (Whole class activity)** a. Fold a rectangular paper into two parts and color one part. The color part is half. b. Do the same process with different shapes. c. Ask students to show half using different object and shapes. d. Extend the discussion to write in symbol as 1/2. **Assessment:** Identify half and 1/2. Shaded 1/2 of the given figures. **Observation:** Out of 30 students, a. 7 students are marking unequal divisions as 1/2.
3	**Discussion (Whole class activity)** a. Importance of equal division in fraction

	Group 1 (7 students) a. After assigning the task to group 2. Teacher will work with the 7 students and focus on the issues of equal division through various objects and shapes. b. Provide some more questions to those students to ensure the learning. c. Based on the time available and level of students, Teacher can assign one higher-order thinking question like - How many ways you can divide the shape into half?	**Group 2 (23 students)** a. Teacher will make groups of 4-5 students. Ask them to solve and discuss on the questions. b. Assign few questions discussed in the last day with some higher-order thinking questions like – i. How many ways you can divide the shape into half?  ii. Write the fraction representing the shaded part.  c. After assigning task to Group 1, Teacher will observe the copy of students and can ask questions to trigger their understanding.
	If the mistakes made by group 1 are resolved, then in the next day Teacher will focus on identifying and writing 1/4, 3/4 with whole group. Else continue to work with group 1 and assign questions of 1/4 and 3/4 to group 2.	

b. Remedial teaching: Remedial teaching is a short-term engagement. The concepts chosen for discussion in the remedial classes could be concepts from regular classes or any basic conceptual mistakes like – Operation on numbers or algebraic expressions.

Suppose in Grade 5, the Teacher observes that three students are making mistakes in subtraction of numbers with regrouping of the types below.

$$\begin{array}{r} 300 \\ -\ 35 \\ \hline \end{array} \qquad \begin{array}{r} 2406 \\ -\ 527 \\ \hline \end{array}$$



Teacher plans remedial classes for the three students, using the dienes blocks and worksheets. First, Teacher explains a subtraction problem (as in the figure) using the blocks, stepwise by regrouping and connecting it with the algorithm. Then, Teacher will assign similar problems and will ask the students to explain using the dienes blocks. When Teacher is assured that students are able to solve, Teacher will assign more questions of similar types for practice. Students can use dienes blocks if they face difficulty. When Teacher observes that they are able to solve the problems, the remedial classes for those students will be completed.

3.6.4 Learning Difficulties

Many students find difficulties in understanding and manipulating numbers, learning facts and processes related to mathematical operations, use of rules and formulae, measurement, spatial understanding, keeping information in their working memory, etc.

Students with learning difficulties struggle to achieve desired Competencies within the expected time frame due to sensory impairment (weaknesses in vision or hearing); behavioural and emotional issues; language used in school (medium of instruction, terminologies used in Mathematics classroom) and home are different, high absenteeism; teaching without empathy, less exposure or inadequate curriculum.

Many concepts in mathematics are hierarchical in nature, it's very important for any student to have understanding of previous/linked concepts, algorithm, and processes. Word problems are often challenging for students with learning difficulties because reading and understanding the problem, concepts and process required are prerequisite skills to solve word problems.

For students with a learning difficulty, diagnosis of the challenges and issues are very important. Discussion with student, parents & peers for support to find the causes and to plan accordingly. There may be following strategies that may help the teacher -

a. Continuous support, encouragement, and motivation to the students.
b. Use of appropriate teaching learning material (TLM) and visual representations.
c. Creating more opportunities for doing, sharing and to revise basic concepts like numbers, operations, rules etc. in routine manner.
d. Recapitulation of key previous concepts/process before introducing the new concept/s.
e. Allowing students to think aloud while they work.
f. Assigning problems/assignments for practice to engage meaningfully through discovery, problem solving and inquiry method.
g. At Preparatory Stage, more play-way methods to be employed. Games, puzzles, riddles should be included more and more to deal with the concepts. Exposure to be given with concrete materials and experiences from their daily life.
h. Keep fair balance between building conceptual understanding of concepts and procedural understanding to solve problems. Avoid practice which supports rote memorisation and solving problems using algorithms directly without going into how algorithms work.

Section 3.7
Integrating Mathematics with Other Curricular Areas

An interdisciplinary approach offers students to expand themselves beyond one subject domain by allowing them to tackle problems that do not fit exactly into one subject. It also changes how students learn by asking them to synthesize multiple perspectives, instead of driving their thoughts unidirectionally based on the understanding of one discipline. It allows students to explore and involves multiple perspective and dimensions from different curricular areas to deal with daily life problems. Hence, integration of mathematics with other curricular areas is important to develop interest in the subject and build holistic view of the purpose of education.

Mathematics learning could be made more meaningful and interesting by integrating other curricular areas and use them as a medium of teaching-learning processes, like:

a. **Integrating mathematics and arts:** Art and Mathematics are closely linked through several concepts. Most importantly, both these disciplines play an important role in understanding patterns, as well as enhancing spatial abilities and visualisation. Integrating the arts with mathematics would need to not only include art activities that engage students in creating visual patterns, tessellations, and making origami, the pedagogy could also include an exposure to examples of artworks that contain interesting patterns. Students need to be exposed to the deeper connections between these two disciplines. Some ideas for integrating the arts in the Mathematics classroom could be:

   i. Learning a variety of rangoli patterns, with dots matrices and without dots. Analysing various rangoli patterns e.g., estimating the number of unbroken lines used in a *sikku kolam/kambi kolam.*

   ii. Creating origami and then opening it back to its original form of a flat paper, to analyse how two-dimensional forms become three-dimensional forms. During this exercise, students can observe the crease patterns, symmetries and angles that are at play. Similar activities can be done with commonly used packaging material like cardboard cartons to study the transformations from 2D to 3D.

   iii. Recognising the geometries in architecture e.g., comparing the different shapes of buildings, monuments, and their ground plans.

   iv. Recognising the geometries in visual arts e.g., images of artworks by abstract artists, Buddhist mandala paintings, and so on can be used as visual triggers to discuss shapes, colours, and patterns.

   v. Symmetry can be explored through dance and movement by assigning mirroring exercises for students. This concept can also be explored through visual games, self-designed board games, simple print-making activities based on traditional art forms like Rogan printing, and by viewing examples of architecture, painting, and sculpture.

   vi. Pattern activities could also include art forms like weaving, embroidery, and bead work where patterning is heavily reliant on mathematical precision, grids and matrices.

vii. Ratio and proportion are fundamental to the arts- the technique of drawing the human body requires an understanding of proportion e.g., the length of an arm is about thrice the length of the head. The study of ratio and proportion can also be related to different cultures and their canons of beauty being defined by specific ratios and proportions.

viii. Music is rife with patterns. The joy of making music lies in creating innumerable permutations and combinations of patterns by grouping notes, sounds, and beats. Tempo determines how notes can be combined and fitted into specific rhythm cycles in multiple variations. Music is an extremely useful way to understand fractions since it uses full notes, half-notes, quarter-notes, and one-eighth notes which also related to tempo in terms of ek *gun, dugun, trigun, chaugun*. Improvisation in the classical forms of music require an immense alertness and ability to do mental math. For example, creating note patterns in multiples of 3, 5, or 7 in a 4-beat rhythm can be both challenging and aesthetically pleasing. The way frequencies are chosen in music also involves understanding simple fractions, due to what sounds good and most resonant to the ear. For example, the ratio of frequencies of the top and bottom Sa in a saptak is 2:1, and the ratio of frequencies of Pa and Sa is 3:2. There are reasons from physics (namely, the notion of resonance) as to why particular combinations of notes sound good to the ear, and the notes (shrutis) that are used in Indian classical music (and also in music around the world), as explained in Bharata's Natyashastra, are based on simple whole number ratios of frequencies.

b. Integrating Mathematics and Sports – Teaching Mathematics through sports could be fun for most of the students those who really struggle in understanding the concepts in Mathematics. Through sports concepts related to measurement and mensuration could be easily taught and related unit conversion can also be discussed simultaneously. Similarly, many geometrical shapes can be discussed on the field like angles, triangles, circles etc. Many concepts from data handling, statistics and probability are closely linked with almost all the sports like averages, drawing different types of graphs, and interpreting them, calculating the chance of winning etc.

Similarly, other curricular areas can also be integrated with Mathematics to understand and see more meaning of Mathematics in daily life.

Teacher's Voice B-3.7-i [to be edited]

Integrating Mathematics and Language

Integrated mathematics and language classroom helps me to utilize my time better in a classroom while working on the skills of the students in both subjects.

In my plan, I selects activities that could serve the objectives for both the subjects. This helps me to channelize my work and energy better as I am single teacher so as to optimize the learning of my students in both fundamental subjects and I also use valuable time in my classroom to the fullest.
With current need as also laid out clearly in per NEP 2020 about emphasis on literacy and numeracy, it makes great sense to combine these two subjects. I wanted to share one example on how stories could be used to teach both language and mathematics together.

Using stories to promote recognition of conservation of number or fractions: To an adult, it's obvious that three apples on a table that are moved to a floor are still three apples. But to a student, who needs to learn conservation of number it is not. Student who lacks this understanding has to re-count the apples to be sure.

It is simple to enhance understanding of number conservation by using several picture books. To keep track of and count moving things, I use books like The Alphabet Room, which has the added benefit of teaching the alphabet. Simply say, "I see the apples moved. Right now, how many apples are there? Do the three remain? Where are they? Let us count.

Dialogue can change into a discussion around fraction, if your students can already see at a look that there are still three apples. Well, the apples are arranged with one-third on the left. The remaining two-thirds are missing; where are they? This way building understanding of math concept using the content from language could be used together.

Section 3.8
Assessment

3.8.1 Formative Assessment

While the teaching-learning process is going on, it is important for Teacher to assess and monitor the student's learning focusing on identifying different levels of learning, appropriateness of the activity for the Grade, finding out what the student has learnt. Continuous assessment during teaching-learning will also provide inputs/feedback to Teacher to improve the teaching methods.

3.8.1.1 Preparatory Stage

Learning mathematics at this Stage should encourage the development of a culture of learning by linking with experiences outside the classrooms and by giving interesting exercises. The focus is on utilising students' present interests and enthusiasms as opportunities for developing the concepts in mathematics. It stresses on giving particular attention to allow the students to articulate their reasons behind doing an exercise in a certain way, e.g., why do they want to continue a pattern in a particular way? While teaching-learning process is going on, Teacher observes and assesses-

a. Which student is actively participating in the discussion and contributing to it and which student is not able to do so.
b. Whether students are trying to explore for the possible solutions of a problem and are looking for the best one.
c. The extent of the participation of the students in group discussions, problem solving and their communication skills during these exercises.
d. How students are trying to solve the problem through various ways and are using appropriate methods for doing this.
e. Assessment in groups, peer assessment and opportunities for self-assessment also help in self-correction. Teacher should collect information and evidence through different sources, methods and techniques, record of information or evidence and make sense of collected information or evidence and share and communicate feedback.

3.8.1.2 Middle Stage

The assessment of students may focus on key capabilities so that they may–

a. Apply mathematical facts, generalise, and provide reason for it.
b. Argue logically the truth and falsity of statements.
c. Understand the basic structure of different branches of mathematics such as number and operations, algebra, geometry, probability and statistics, measurement and mensuration.
d. Understand and apply different ways of dealing with and handling abstractions.
e. Apply mathematical concepts learnt to solve problems in newer contexts.

It is important to note that prior thinking by Teacher on what is expected to be learnt from a lesson/unit is extremely important. For example, Teacher wants to assess the understanding about the area and perimeter of geometrical shapes, especially rectangle. Teacher may give some tasks to the students to do in the groups and observe groups and notes down about their functioning on the following aspects: (a) Discussion within the group regarding the task; (b) Decision making about how to do the task; (c) Strategy/strategies for finding out various possibilities; (d) On the aspect of peer learning (learning from each other) (e) On the functioning of the group-coming to a decision, working together & helping each other.

After the group work, Teacher may ask a few questions and assess students on the basis of their responses. Teacher may also provide opportunities for self and peer assessment as well.

3.8.1.3 Secondary Stage

All projects and assignments should be done as group activities within the class and school time only. The other modes of assessment could be a part of classroom interactive activities.

Tasks for problem solving, Multiple-Choice Questions (MCQ), data handling and analysis, investigative projects, math lab activities, models including origami, etc., research projects and presentations, group projects, peer assessment, presentations including the use of Information and Communication Technology (ICT) may help for the formative assessment in mathematics.

3.8.2 Summative Assessment

After completion of each unit/theme, Teacher will assess the students keeping in view the indicators of learning related to that unit/theme. After a quarter, such data will provide the comprehensive picture of student's performance in mathematics. The cumulative record of the progress of the student would help to get an overall view. By using different teaching-learning strategies, Teacher can assess various other aspects of student's behaviour (concern for others, teamwork, etc.). This progress made by the students can be communicated to their parents along with the records of their progress. This data will provide a comprehensive picture of student's progress in a holistic manner.

All across the schools, the most commonly used tools/techniques are those developed by teachers themselves. Among these are paper-pencil tests and tasks, written and oral tests, questions on pictures, simulated activities, and discussion with students. Short class tests are used by most teachers as a quick and easy way of assessing the learning progress of students. As these are generally conducted at the end of a unit/month covering the specified content taught during that period, though these are important, they need to be used effectively. Every item in the test, should contribute to establishing and understanding where students are in the aspect of learning in focus – that is, every item should contribute to the purpose of the assessment. Questions/tasks/activities/projects for assessment should be based on Competencies. More items on higher-order thinking (creating, evaluating, analysing, applying, and understanding) in assessment may help to achieve Competencies and will take the shift away from mechanical and rote memorisation of the facts.

Stage wise suggestive tools and techniques for assessment may be as follows -

a. Preparatory Stage - Oral questions, Question Paper, Assignment, Project, Diagnostic test, Self-evaluation

b. Middle Stage - Oral questions, Question Paper, Assignment, Project, Diagnostic test, Self – Evaluation, Activity/experiment, Peer Evaluation, Maths lab activities

c. Secondary Stage - Questions, Observation, Tests and inventories, Checklist, Rating scale, Anecdotal records, Document analysis, Portfolio, Assignments, Projects, Group discussions, Maths Club activities.

For recording and reporting student's performance, following points of concern may be kept in focus:

a. All the evidence collected through the use of various techniques - written, oral, activity, project or assignment-based; may be given weightage.

b. Effort should be to report the student's strengths in the areas in which he/she is making progress.

c. Merely offering grades to students is not sufficient, it should be followed by providing qualitative remarks about the strengths/learning gaps, covering other aspects of student's behaviour (personal-social qualities).

At Preparatory and Middle Stages summative assessment may be done on monthly basis and this should include activities, oral and written work. Grade wise and Stage-wise progress can be recorded by compiling the performances in all monthly assessments. For Secondary Stage, there may be quarterly assessments (oral, written, activity, projects etc.) with a weightage of 80% to written and 20% to practicum/projects, and similarly for assessment at the end of the year. Grade wise and Stage wise result should be cumulative of performances in quarterly assessments that would help to reduce the pressure of board exams and would lend importance to the progress throughout the year.

Teacher's Voice B-3.8-i [to be edited]

Assessment: Percentages

While teaching percentage in my class, I posed some questions to the students. Usually, we give questions from the textbook and the learners are able to solve them. But I feel that it doesn't suffice for a complete understanding of the concepts because the exercise items are far removed from real life and practical situations where the children actually apply their experiences. So, I assigned them some tasks so that I can understand if the students are able to connect the concept of percentage to their real-life. This involved splitting the students to two groups. One of the groups was assigned a task to look at newspapers and collect clippings of news-items wherever there is a number in percentage. The other group was assigned to collect pamphlets or click photographs of banners around shops that showed percentage, for instance, the discount offers. This involved children's efforts to understand where they could find percentage and what it could have meant. When both the groups brought back the clippings, pamphlets, or photographs, we sat in the whole class-group where they shared their understanding. For instance, the clippings or snips read 'Moist and damp town: Humidity at highest in fifteen years for September at 98%', 'Voter turn-out stands at 58%- lower than usual trend for the state', '15% off as Raksha Bandhan offer' etc. Students were then asked what do they think it meant and how do we calculate it, like how

many people have voted, or how much would some article cost under 15% off offer. Further, students were asked questions such as which shop was offering the best discount or which brand is having the most variety of offers, etc. During this exercise, students asked questions when they encountered new terms such as inflation or humidity. Interestingly, students noticed percentage at other places and shared in the class such as when they play video games and mission completion percent is shown or when they open e-commerce websites such as Amazon or Flipkart.

Chapter 4

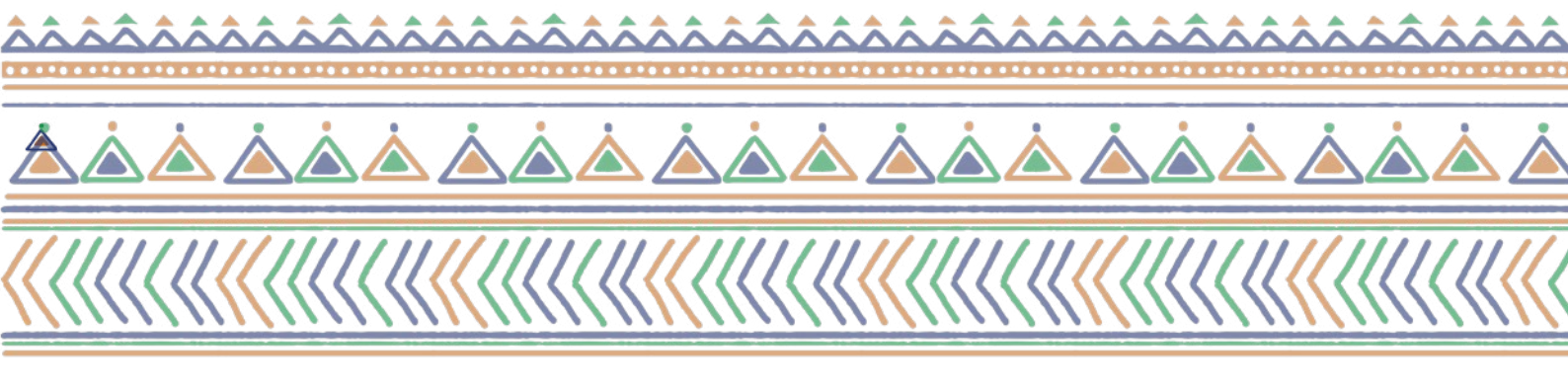
Science Education

Science is a dynamic body of knowledge that enables an understanding of the world around us through a process of inquiry. This process leads to acquisition of valid knowledge about the world, and of scientific values and capacities, such as formulating questions and hypotheses, inquiry, evidence-based thinking, creativity, understanding cause and effect relationships, and decision making.

In the school curriculum, children start learning the processes of science from the Foundational Stage itself. In the Preparatory Stage, they continue learning the processes of science, and observe simple patterns and relationships in their natural environment. This lays the basis for concepts related to science. Science is introduced as a separate curricular area only in the Middle Stage. In this Stage, the approach integrates Biology, Chemistry and Physics. This integrated approach develops fundamental capacities related to all disciplines, while using connections across disciplinary areas to help students make sense of their observations and experiences,

The integrated approach continues in the first two years of the Secondary Stage (Grades 9 and 10). In the next two years (Grades 11 and 12), a disciplinary approach is taken, with Physics, Chemistry and Biology being offered separately. Students get the opportunity to understand the nature of each discipline more deeply and develop specific competencies related to each. They also get the opportunity to explore their interest in taking the discipline up for further study.

At all Stages, along with conceptual understanding, the process capacities of science are developed with increasing complexity, as the methods are learnt. Students would understand the world around them with increasing depth and would also be able to explore scientific questions at different levels, across the stages. They are able to strengthen the understanding acquired at earlier stages, and also learn to communicate this understanding in different ways. Connections with other curricular areas are also emphasised.



Section 4.1
Aims

Science develops a valid understanding of the physical world, and develops other important capacities, along with values and dispositions. This in turn enables the meaningful participation of individuals in society and the world of work with scientific temper, critical and evidence-based thinking, asking fundamental questions, analysing practices and norms, and acting for necessary changes.

The world itself is undergoing rapid changes, and human beings need to adapt to these changes effectively, while also being the creators of change. It is this dynamic in which science contributes to societal, human, technological, and economic development through new knowledge and innovation.

With this context, the aims of science education are:

a. **Developing understanding of scientific knowledge:** Students develop an understanding of the concepts, principles, laws, and theories, and process capacities of science in keeping with their developmental stage. They use this understanding to explore and make sense of the world independently and in collaboration with peers.

b. **Developing the ability to use the scientific method:** Students develop the ability to put forth arguments, predict, analyse, draw logical conclusions, take decisions and evaluate situations using the scientific method.

c. **Developing an understanding of how scientific knowledge evolves:** Students develop a historical and developmental perspective of science. They understand that scientific knowledge developed as a result of the efforts of many individuals across many years. They also understand how the methods of science evolved over time.

d. **Developing an understanding of the connection between science and other curricular areas:** Students view science as part of a larger canvas of disciplines. They become aware of interlinkages across disciplines. They understand that concepts, principles, laws and theories cannot be viewed as isolated parts, but together contribute to a holistic understanding of the world.

e. **Developing an understanding of the relationship between science, technology, and society:** Students appreciate the contribution of science to society, and how different societal needs led to the generation of scientific knowledge. They develop an understanding of issues related to connections between science, technology, and society, including the ethical aspects and implications.

f. **Developing a scientific temper:** Students develop critical and evidence-based thinking, and freedom from fear and prejudice. They develop curiosity, a sense of aesthetics, and creativity in science. They imbibe scientific values and dispositions – honesty, integrity, scepticism, objectivity, tenacity, perseverance, collaboration and cooperation, concern for life, preservation of the environment.

Section 4.2
Nature of Knowledge

Science is an organized system of knowledge, which evolved as a result of curiosity, inquiry, logical reasoning, experimentation, and examination of empirical evidence. It enables an understanding of the physical and biological environments and phenomena, identification of meaningful patterns and relations, including cause(s) and effect(s), and supports the development of conceptual models and theories, laws, and principles.

a. Science provides the **methods and necessary tools to explore and understand the world.** These methods and tools lead to explanations supported by empirical evidence that can be tested in a variety of diverse real-life situations against rigorous criteria (observation, rational argument, inference, replicability).

b. Scientific knowledge keeps evolving – this is reflected in its history. Scientific knowledge is both reliable and subject to change. Having confidence in scientific knowledge is justified, while also realizing that such knowledge may be changed or modified based on new evidence, or a re-conceptualization of prior evidence and knowledge. Science, therefore, develops an appreciation for change, as well as the rigorous process through which scientific knowledge changes.

c. Science is fundamentally a creative endeavour. It involves imagination of different possibilities – new ideas, alternatives, and possibilities to understand the world. It requires imagination to engage with the concepts of science – natural selection to explain diversity, planetary models to represent motion of planets, 'see' the microscopic world beyond our capacity for observation. Model making, and design of experimental setups also require creativity.

d. Scientific methods, and values and dispositions are integral not only to the learning and doing of science, but also in all walks of life. They offer individuals a framework with which to engage with their activities, and to base their decisions.

Section 4.3
Subject-Specific Challenges

A major challenge related to science in the school curriculum is neglect of the development of conceptual understanding and the process capacities of doing science.

a. Science teaching-learning is mostly based on the textbook, with the **focus on facts and definitions.** One reason for this is the curricular load, which reduces the time available for exploration and discussion. The development of conceptual understanding and process capacities requires time, which is currently missing. The process of inquiry, central to learning science, requires some flexibility with respect to time. However, schools have a rigid timetable.

b. Another challenge is the **disconnect between what students observe and experience outside school, and the school curriculum.** Students come to school with their own theories about the world around them. These theories develop as they observe the world around them and seek explanations for what they see. Often, these theories conflict with what is being discussed in the classroom. Their existing notions do not get addressed in the classroom, and there is a separation between 'home' and 'school' science.

c. As students move to higher grades, the demands on them increase, and the **curricular load** becomes greater. The need for abstract thinking also increases. It is critical that the students develop the capacities to be able to make the progression. However, the current focus on facts does not build these capacities. Also, the time for understanding each concept is limited, so alternative conceptions may develop that are difficult to address.Even when events like science fest, *Baal vaigyanik,* science exhibitions, etc are organized, the focus is on theoretical understanding rather than problem solving or discovery.

d. While lack of **infrastructure** is common across curricular areas, learning science especially requires access to apparatus, equipment, and laboratories. Unfortunately, this is a neglected area. Low cost, easily available materials are also not used since Teachers lack the capacity to identify what is needed and how to develop it. At the Secondary Stage, access to a laboratory is non-negotiable – students must be able to manipulate apparatus, use materials and design simple experiments to truly develop important competencies related to science.

Section 4.4
Learning Standards

4.4.1 Stagewise Curricular Goals and Competencies

Students start observing their environment and playing with objects around them in the Foundational Stage itself. This exploration continues in the Preparatory Stage. The focus at this stage is on the immediate environment of students, with the interdisciplinary approach in the curriculum reflecting the lives of children. The necessary competencies for learning science in the Middle Stage are developed in the Preparatory Stage through the interdisciplinary area 'World Around Us'.

Science is introduced as a separate curricular area in the Middle Stage and continues in the Secondary Stage. This chapter deals with the separate curricular area of science. Therefore, this section deals with the Curricular Goals and Competencies of Science in the Middle and Secondary Stages only.

4.4.1.1 Middle Stage

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

CG-1 Explores the world of matter, and its constituents, properties, and behavior	C-1.1 Classifies matter based on observable physical (solid, liquid, gas, shape, volume, density, transparent, opaque, translucent, magnetic, non-magnetic, conducting, non-conducting) and chemical characteristics (pure, impure; acids, bases; metals, non-metals; solutions, mixtures, separation techniques; elements, compounds)
	C-1.2 Describes changes in matter (physical and chemical change) and uses particulate nature to represent the properties of matter and the changes.
	C-1.3 Explains the importance of measurement, and measures physical properties of matter (volume, weight, temperature, density) in indigenous and standard units using simple instruments.
	C-1.4 Observes and explains the phenomena caused due to difference in pressure, temperature, and density (breathing, sinking-floating, water pumps in homes, cooling of things, formation of winds)

CG-2 Explores the physical world around them in scientific and mathematical terms	C-2.1 Describes one-dimensional motion (uniform, non-uniform, horizontal, vertical) using physical quantities (position, distance, time – speed, and changes in speed) through mathematical and diagrammatic representations C-2.2 Describes how electricity works through manipulating different elements in simple circuits, and demonstrate the heating and magnetic effects of electricity C-2.3 Describes the properties of a magnet (natural and artificial, earth as a magnet) C-2.4 Demonstrates rectilinear propagation of light from different sources of light (natural, artificial, reflecting surfaces), and verify the laws of reflection through manipulation of light source and objects, and use of apparatus and artefact (plane and curved mirrors, pinhole camera, kaleidoscope, periscope) C-2.5 Observes and identifies celestial objects in the night sky using simple telescope and images (planets, stars, natural and artificial satellites, constellation, comets), and explains their role in navigation, calendars, and phenomena (phases of the moon, eclipse, life on earth)
CG-3 Explores the living world around us, and its interaction with the inanimate world in scientific terms	C-3.1 Describes the diversity of living things observed in the natural surroundings (insects, earthworms, snails, birds, mammals, reptiles, spiders, diverse plants, and fungi), and at a smaller scale (pond water, animal and plant bodies, other microscopic organisms) C-3.2 Distinguishes the characteristics of living organisms (need for nutrition, growth, and development, need for respiration, response to stimuli, reproduction, excretion, cellular organization) from non-living things. C-3.3 Analyses patterns of relationship between living organisms and their environment in terms of dependence on and response to each other C-3.4 Explains the conditions suitable for sustaining life on earth and other planets (atmosphere; suitable temperature-pressure, light; properties of water)

CG-4 Understands the components of health, hygiene, and well-being	C-4.1 Undertakes a nutrition-based analysis of food components with reference to Indian and modern dietary and culinary practices, and explain the effect of nutrition on health C-4.2 Examines different dimensions of diversity of food – sources, nutrients, geographical, social, time-period based, diets C-4.3 Describes biological changes (growth, hormonal, reproductive) during adolescence, and measures to ensure overall well-being C-4.4 Recognizes and discuss substance abuse, viewing school as a safe space to raise these concerns
CG-5 Understands the interface of science, technology, and society	C-5.1 Illustrates how science and technology help improve the quality of lives in every walk of human life (health care, communication, transportation, food security, mitigation of climate change, judicious consumption of resources, applications of artificial satellites, etc.) C-5.2 Shares views on news and articles related to the impact science and technology, and society have on each other.
CG-6 Explores the nature and processes of science through engaging with the evolution of scientific knowledge and conducting scientific inquiry	C-6.1 Illustrates how the scientific knowledge and ideas have changed over time (description of motion of objects and planets, spontaneous generation of life, number of planets), and identifies the scientific values that are inherent and common across the evolution of scientific knowledge (scientific temper, science as a collective endeavor, conserving biodiversity and ecosystems) C-6.2 Formulates questions using scientific terminology (to identify possible causes for an event, patterns, or behavior of objects), and collects data that is usable as evidence (through observation of the natural environment, designing simple experiments or use of simple scientific instruments)
CG-7 Communicates own questions, observations and conclusions related to science	C-7.1 Uses scientific vocabulary to communicate inferences and ideas about science accurately in oral and written form, and through visual representation C-7.2 Designs and build simple models to demonstrate scientific concepts C-7.3 Represents real world events and relationships through diagrams and simple mathematical representations

Illustrative Learning Outcomes for the Middle Stage

Curricular Goal (CG-2): Explores the physical world around them in scientific and mathematical terms

Competency (C-2.2): Describes how electricity works through manipulating different elements in simple circuits, and demonstrate the heating and magnetic effects of electricity

Table B-4.4-i

	A	B	C
	Competency: Describes how electricity works through manipulating different elements in simple circuits, and demonstrate the heating and magnetic effects of electricity		
	Grade 6	**Grade 7**	**Grade 8**
1	Identifies the different components of a simple circuit – bulb, cell, and wire	Identifies role of switch in a complete simple circuit	Demonstrates the heating effect of electricity in various appliances (ex: geyser, immersion rod)
2	Makes a functioning simple circuit using bulb, cell, and wire with different arrangements	Makes a complete functional simple circuit using bulb, cell, wire and switch	Demonstrates the magnetising of an iron nail due to electricity passing through a conducting wire wrapped around it
3	Draws representative circuit diagrammatically (without symbols)	Corresponds symbols in circuit diagram with components of a simple circuit	
4	Analyses whether a circuit will function looking at the diagrammatic representation (without symbols)	Draws circuit diagram with different arrangements using symbols	
5		Assembles a functional simple circuit based on the circuit diagram	

4.4.1.2 Secondary Stage

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

CG-1 Explores the world of matter, its interactions, and properties at the atomic level	C-1.1 Describes classification of elements in the Periodic Table, and explains how compounds (including carbon compounds) are formed based on atomic structure (Bohr's model) and properties (valency) C-1.2 Investigates the nature and properties of chemical substances (distillation, crystallization, chromatography, types and properties of mixtures, solutions, colloids, and suspensions) C-1.3 Describes and represents chemical interactions and changes using symbols and chemical equations (acid and base, metal, and non-metal, reversible and irreversible)
CG-2 Explores the physical world around us, and understands scientific principles and laws based on observations and analysis	C-2.1 Applies Newton's laws to explain the effect of forces (change in state of motion – displacement and direction, velocity and acceleration, uniform circular motion, acceleration due to gravity), and analyses graphical and mathematical representations of motion in one dimension. C-2.2 Explains the relationship between mass and weight using universal law of gravitation and connect it to laws of motion. C-2.3 Manipulates the position of object and properties of lenses (focus, centre of curvature) to observe image characteristics and correspondence with a ray diagram, and extends this understanding to a combination of lenses (telescope, microscope) C-2.4 Manipulates and analyses different characteristics of the circuit (current, voltage, resistance) and mathematize their relationship (Ohm's law), and applies it to everyday usage (electricity bill, short circuit, and safety measures) C-2.5 Defines work in scientific terms, and represents the relationship between potential and kinetic energy (conservation of energy) in mathematical expressions C-2.6 Demonstrates the principle of mechanical advantage by constructing simple machines (system of levers and pulleys) C-2.7 Describes the origin and properties of sound (wavelength, frequency, amplitude), and differences in what we hear as it propagates through different instruments

CG-3 Explores the structure and function of the living world at the cellular level	C-3.1 Explains the role of cellular components (nucleus, mitochondria, endoplasmic reticulum, vacuoles, chloroplast, cell wall), including the semi-permeability of cell membrane in making cell the structural basis of living organisms and functional basis of life processes C-3.2 Analyses similarities and differences in the life processes associated with nutrition, reproduction, and transport of materials in organisms (transport of water and photosynthesis in plants; digestion, circulation, breathing and excretion in animals; absorption of nutrients in fungi) C-3.3 Describes cellular mechanisms of heredity (DNA, genes, chromosomes), variation and diversity (changes in sequence of DNA, movement of organisms carrying alleles in the population)
CG-4 Explores interconnectedness between organisms and their environment	C-4.1 Applies the knowledge of diversity at the cellular level and the ecological role organisms play for the classification of living organisms (five-kingdom classification; autotrophic, heterotrophic nutrition; prey, predator, and parasite) C-4.2 Illustrates different levels of organisations of living organisms (from molecules to organisms) C-4.3 Analyses different levels of biological organisation from organisms to ecosystems and biomes, and interactions that take place at each level C-4.4 Analyses patterns of inheritance of traits in terms of Mendel's laws and its consequences at a population level (using models and/or simulations) C-4.5 Analyse evidence demonstrating the consequences of the process of natural selection on biological evolution in terms of changes - structure, and function of organisms
CG-5 Draws linkages between scientific knowledge and knowledge across other curricular areas	C-5.1 Analyses and communicates views on the impact of science and technology on human life through various modes (essay, poster, play, story, presentation, picture book, cartoons, graphic novel) C-5.2 Examines a case study related to the use of science in human life from the perspective of social sciences and ethics (e.g., Marie Curie, Jenner, treatment of patients with mental illness, the story of the atomic bomb, green revolution and GMOs, conservation of biodiversity) C-5.3 Applies scientific principles to explain phenomena in other subjects (sound pitch, octave, and amplitude in music; use of muscles in dance form and sports)

CG-6 Explores knowledge in India and its connection to scientific ideas	C-6.1 Describes indigenous practices related to health and medicinal herbs C-6.2 Describes the empirical evidence used in Indian medical practices (Ayurveda, Unani) and astronomy (Aryabhata's and Varahamihira's contributions to astronomy) C-6.3 Identifies contributions of Indian thought to scientific ideas (atom, sound, material properties, metallurgy, chemical reactions, motion of bodies, estimations at astronomical scales)
CG-7 Explores the nature of science by doing science	C-7.1 Develops accurate and appropriate models (including geometric, mathematical, graphical) to represent of real-life events and phenomena using scientific principles, and use these models to manipulate variables and predict results C-7.2 Designs and implements a plan for scientific inquiry (formulates hypotheses, makes predictions, identifies variables, accurately uses scientific instruments, represents data – primary and secondary – in multiple modes, draws inferences based on data and understanding of scientific concepts, theories, laws, and principles, communicates findings using scientific terminology)

Illustrative Learning Outcomes for the Secondary Stage

Curricular Goal (CG-2): Explores the physical world around us, and understands scientific principles and laws based on observations and analysis

Competency (C-2.4): Manipulates and analyses different characteristics of the circuit (current, voltage, resistance) and mathematizes their relationship (Ohm's law), and applies it to everyday usage (electricity bill, short circuit, and safety measures)

Table B-4.4-ii

	A	B
	Competency: Manipulates and analyses different characteristics of the circuit (current, voltage, resistance) and mathematizes their relationship (Ohm's law), and apply it to everyday usage (electricity bill, short circuit, and safety measures)	
	Grade 9	**Grade 10**
1	Investigates the effect of increasing the number of cells on the brightness of the bulb.	Analyses a domestic electric bill in terms of consumption.
2	Demonstrates the change in the brightness as the number of bulbs increase.	Calculates energy consumed by a device based on its wattage.
3	Tabulates voltage data based on number of cells and current based on reading in ammeter.	Explains the role of fuse in domestic circuits.
4	Derives relationship of voltage and current based on brightness of bulb.	
5	States Ohm's Law mathematically.	
6	Identifies arrangement of different forms of circuits – series and parallel.	
7	Compares the brightness of bulbs in series and parallel circuits as number of bulbs increases, keeping source of electricity constant.	
8	Derives the effective resistance for bulbs connected in series and parallel arrangements.	

4.4.2 Rationale for Selection of Essential Concepts

There is a general agreement that processes of science are equally important to learn as the concepts. But usually this does not seem to get translated into our classrooms. There is a tendency to treat science as merely a 'bunch of facts'. This approach assumes that there are certain concepts, theories, facts, and information that students must know, and that they have knowledge of science. However, the knowledge base of science known today is vast and continues to grow at an unprecedented rate. This implies that no matter how much 'facts of science' we learn, it will never be enough.

The question that this throws up is –are there essential concepts that students must learn in science at the school level?

Even though it would be clear that this not complete 'knowledge of science', this 'essential set' could be decided based on three criteria:

a. It provides adequate knowledge of the world for that age group
b. It provides the base and platform for learning science further
c. It provides adequate 'material' for developing the capacities and values related to science education

In addition, whatever concepts are chosen should be interesting, challenging, and intelligible for young minds.

The Learning Standards must make a judicious choice of content on the basis of these principles to reduce the 'content load' on the students.

This section provides the rationale that has guided the selection of essential concepts to frame the learning standards. Common considerations that have guided the selection of concepts across the Middle Stage, and Grades 9 and 10 are: (i) alignment with the developmental stages of students; (ii) ensuring sufficient time for inquiry and development of process capacities; and (iii) alignment with real life.

Curricular Goals at the Middle Stage are based on the concrete experiences of students. They are based on how the science curriculum can respond to the following questions:

a. What do students see around them?
b. What are the common observations they make?
c. What are the aspects of science and technology that are part of their daily lives?
d. What are their immediate concerns related to their own selves?
e. How can they start making sense of multiple aspects of their environment – how can they start learning to abstract 'science' as the explanation of their observations and experiences?
f. How do students learn best – what capacities enable them to learn at this stage?
g. And most importantly, how will their learning of science help them in their daily life?

Curricular Goals at the Secondary Stage move from the concrete nature of the Middle Stage towards abstraction. This abstraction could be in the nature of exploring what cannot be seen or in terms of more abstract representations (e.g. using a circuit diagram instead of drawing the components of a circuit). They help students extend their understanding with increasing complexity

and abstraction. The effort is to continue with the concepts discussed in the Middle Stage; a few new concepts are also introduced. The questions the curriculum must respond to at this Stage are:

a. Is there something happening around us that we cannot directly observe?
b. Why do events and phenomenon repeat themselves – what are the general principles that govern the world?
c. What are the reasons for diversity around?
d. What is the role of science and technology in society?
e. What is the contribution of India to scientific knowledge?
f. How can science be applied in other areas?
g. What are the connections of other areas to science?
h. How should science be practised?

The responses to these questions at both Stages require an identification of essential concepts that will enable students to attain the Curricular Goals and develop the capacity to explore further on their own. They must be able to use their understanding of these concepts to explore other concepts they may not have formally engaged with. The matter of process capacities and communication of scientific questions and ideas is much simpler – there is clear agreement on the process capacities and competencies related to communication to be developed at each Stage.

4.4.2.1 Middle Stage

Essential concepts that are part of the Learning Standards for this Stage are chosen based on the following rationale.

a. **Relate to the students' observations of their immediate environment, from a small scale to a large scale –** characteristics of matter, changes in matter, diversity of living things, and the night sky.
Understanding these concepts enables them to further explore the material and living world. For example, they may develop an interest in astronomy through this introduction and be able to pursue it as a hobby. They will be able to independently understand different aspects of biodiversity. They will be able to apply their understanding of matter to other important events and phenomenon, such as the reason for loss of aquatic life due to changes in temperature.

b. **Help students find scientific explanations for a variety of commonly observed and experienced phenomena –** effect of differences in pressure, temperature and density, magnets, path of light and how it changes as it reflects from different surfaces.
Understanding these concepts enables them to apply scientific concepts to understand other phenomena, and activities in real life. For example, understanding the formation of winds will help them understand the formation of cyclones.

c. **Help students see differences and relationships between different parts of their environment –** characteristics of living and non-living things, relationship between living organisms and their environment. For example, they will understand the importance of environmental factors in different ecosystems, and how any change in the ecosystem has far-reaching effects. They will be able to understand how the effect of introducing chemicals in farming.

d. **Help students engage with common experiences, and 'see' them through the lens of science –** one-dimensional motion, simple circuits, heating and magnetic effects of electricity, particulate nature of matter and change, measurement and measuring physical properties of matter.
They will be able to understand that there is a need to go beyond the obvious, and to represent what they see in simpler terms than is possible in real life. This further enables them to move towards abstraction and to be able to represent their understanding diagrammatically and mathematically. Understanding these concepts enables them to independently extend their understanding and capacities for representation. For example, they will be able to understand how the electric bell at home rings. They will be able to discuss the motion of vehicles using scientific vocabulary. They will be able to communicate more complex ideas, which may or may not be related to science, visually or mathematically.

e. **Help students engage with aspects of their daily life that are of immediate interest and concern –** nutrition-based analysis of food they eat, diversity in food, biological changes in their body and overall well-being, substance abuse, role of science and technology in improving their lives.
They will be able to apply this understanding to explore aspects of health, hygiene and well-being independently. For example, they will be able to make informed choices about food, they are able to rationalise why to do something or not basis an informed understanding.

f. **Help students engage with the nature and processes of science –** while all the concepts will enable this, tracing the evolution of scientific knowledge, and taking up questions for inquiry will help bring focus to these aspects. They will be able to apply their understanding of the scientific method to other subjects, and to independently conducting inquiry in all aspects of life.

g. **Help students develop values and dispositions** which will enable them to make decisions in their daily lives as well as participate in larger society.

4.4.2.2 Secondary Stage

Essential concepts that are part of the Learning Standards for the Secondary Stage are chosen based on the following rationale.

a. **Help students to develop foundations of key ideas in science that have wider application –** origin, properties and propagation of sound introduces students to the idea of waves.
These concepts are useful not only in understanding more advanced concepts in science but also to understand real life applications. For example, like how television, echo, sonar, musical instruments work.

b. **Help students to explain processes and materials around them in scientific terms –** application of concepts related to electricity to home, nature and properties of chemical substances used in daily life, work and energy, principle of mechanical advantage. Understanding these concepts enables them to evolve their scientific vocabulary and explore how the things that make our lives convenient work. For example, understanding the principle of mechanical advantage and applying it to systems of levers and pulleys will help students to not only make simple tasks easier but also to understand the working of more complex machines like elevators. They also understand the difference between common usage of terms like work and energy, and scientific explanations.

c. **Help students to engage with what they cannot 'see' to provide explanations for what they can observe –** atomic structure and valency, formations of compounds, cellular processes, life processes, diversity, cellular mechanisms of heredity, and natural selection. Understanding these concepts enables them to appreciate the existence of the microscopic and atomic world, and how these impact our lives.

d. **Help students to see patterns in the world and to organise them to form generalisations –** periodic table, linkage between the universal law of gravitation and laws of motion, classification of living organisms, biological organisation at different levels and interactions.

e. **Help students to identify and manipulate variables to develop causal relationships –** manipulation of object and lenses and image characteristics, and manipulation of characteristics of a circuit.
These concepts enable students to 'play' with variables and objects, developing their powers of reasoning and creativity. They help students see the beauty of science as not a collection of facts but as a process of doing and evidence-based thinking.

f. **Help students to represent the world in scientific terms, draw inferences, and make predictions –** representation of simple chemical interactions and changes, graphical and mathematical representation of motion, ray diagrams and building working models.

g. **Help students formalise their observations and understanding in the form of generalisation and mathematisation –** relationship between mass and weight using the universal law of gravitation, relationship between kinetic and potential energy, Newton's laws, Ohm's laws, and Mendel's laws of inheritance.
These concepts enable students to apply and derive scientific laws, and how they lead to a simplified understanding of complex realities.

h. **Help students to understand the contribution of India to the world's scientific knowledge –** indigenous practices related to health and medicinal herbs, empirical evidence used in Indian medical practices and development of ideas around astronomy in India.
These concepts, along with contribution of Indian thought to scientific ideas, enable students to develop an appreciation for the scientific knowledge available in our country. Students will be motivated to explore more of what is available locally and in our ancient texts.

i. **Help students to develop a multidisciplinary understanding of science, and its linkages with other curricular areas.** Students use their understanding from other curricular areas to support science learning and apply scientific ideas to other areas. This enables them to understand the connections of science with other curricular areas, as well as with life.

j. Students' **understanding of the nature and processes of science is deepened** at this Stage by engaging with the science curriculum. They are enabled to conduct scientific inquiry independently and connect their findings to their understanding of scientific concepts, laws, and principles. They will be able to communicate their findings in different modes with accuracy and creativity.

Section 4.5
Principles of Content Selection

Concepts by themselves are abstract. They need to be presented to students though content that helps them connect the concept with their previous knowledge as well as with their observations and experiences in the real world. For example, simply stating the rectilinear propagation of light is insufficient. This concept must be demonstrated to students, or they should be able to conclude that light travels in a straight light through observation or manipulation. Without suitable content, we reduce science to mere facts. To extend the example of rectilinear propagation of light, students can observe this through the formation of shadows, or the simple manipulation of cardboard sheets with small holes in front of a candle, or using a pinhole camera/periscope made in the classroom. Thus, content is extremely important, and must be selected carefully.

This selection of content must be guided by following considerations:

a. Content across all stages must foster scientific inquiry with increasing complexity of what students are able to do. For example, observation should progress from 'seeing' in the Foundational Stage, to observation at the Preparatory Stage, to simple manipulation in order to observe changes in the Middle Stage, to the manipulation of variables at the Secondary Stage.

b. Existing assessment structure tends to assess recall of the facts of science rather than the ability to use to processes of science. Content should provide enough opportunities to comprehensively assess the process capacities at the respective stage.

With the above in mind, the principles for content selection are:

a. Content should be connected to the students' lives and surroundings to the maximum possible extent.

A student in Andaman and Nicobar Islands and a student in Jharkhand will observe different kinds of plants and animals around them. But they should also understand the role of environmental factors. This generalization will require them to understand environments they may not have experienced as well as some abstract ideas (e.g., temperature, precipitation).

Light and its use is also all around us – we use mirrors, we see rainbows, we see the sun and other sources of light. light reflects off different surfaces in different ways. When we see objects in water, they get distorted. Content must encourage students to question and inquire about these phenomena, that will lead them to explore scientific ideas related to light. Thus, they will engage with a critical area that shows the progression of concepts (from the representation of the behaviour of light through a simple ray diagram in the Middle Stage to representation of the behaviour of plane waves in the Secondary Stage) as well as the advance of science and technology (from the transition of night-to-day to the use of lenses and mirrors, to optic fibres to observatories).

b. Content should enable progression of concepts and build complexity across stages.

For example, students observe sunrise and sunset, and connect it to-day and night in the Foundational Stage. In the Preparatory Stage, they observe the night sky, connect direction with the setting of the sun and moon, observe sunset and sunrise at different times of the

year, share their observations on the brightness of the sun, and moon. In the Middle Stage, they understand what distinguishes different celestial bodies, our place in the universe, what holds solar systems and galaxies together, and how technological advances in satellites make lives easier on earth. At this stage, a simple telescope can be used to help students observe the night sky and distinguish between celestial objects. In Grades 9 and 10, they learn about the forces in play in the universe and how they impact celestial bodies (shape of celestial bodies).

c. **Content should provide opportunities to actively engage in the process of scientific inquiry as relevant for the stage.**
For example, in the earlier stages, students explore ideas of floating and sinking by making simple observations of different objects and making inferences about common properties. In the middle stage, students identify and measure the physical properties, and determine mathematical relationship between physical properties (e.g., relationship between mass, volume, and density and how this relates to floatation). They understand the concepts and represent diagrammatically the states of float and sink. They measure displacement of liquid and relate it to density. They may design simple experimental designs (e.g., clay boat of different shapes, weight) using instruments for measurement (measuring jar and overflow jar). Given data about density of liquids, they make predictions about the state of float and sink of objects in them (relative density). They communicate their inferences in different modes (oral, mathematical diagrammatic, in words). Thus, from verifying similar properties at earlier stages they progress to making quantitative predictions and measurements to arrive at theories about floatation. At the secondary stage, they can arrive at the conclusion that the density of water is 1 and the engage with the idea of buoyancy through quantitative measurements.
In this approach, students are active participants in the learning process as opposed to passive receivers of information.

d. **Content should allow a comprehensive assessment of process capacities at each stage.**
Content must be chosen to allow students to use the range of process capacities in an observable manner so that teachers can assess process capacities explicitly. This is aligned with the approach of defining competencies related to process capacities under separate goals. Assessment data must reflect the goals and competencies of the science curriculum as well. Student achievement related to process capacities should be represented explicitly. This means making a choice between presentation of a concept versus ensuring students 'do' something to attain the understanding of the concept. On the other hand, content can offer tasks (e.g., activity, experiment, writing task) that are observable, and provide scope for interpretation and understanding of students. For example, the effect on time period of the pendulum of changing the length of the thread and mass of a simple pendulum can be discussed through a description and presentation on the blackboard/textbook. On the other hand, students can make simple pendulums using different easily available materials and record their observations. Their conclusion may not be entirely perfect compared to a well-designed pendulum, but they can draw inferences, which lead to constructing theory

(e.g., relationship between mass and length of thread, and time period). The content selected changes from 'time period of simple pendulum' to 'investigating factors affecting time period of simple pendulum'

Content of this nature allows the student to reflect on the process, enabling self-reflection. If the experiment is not proceeding well (e.g., the bob swings wildly), the student must examine what needs to be done. This is relevant for each stage and ensures progression of attainment of the process capacities across stages. This process also enables students to take up collaborative as well as independent study as stages progress.

e. **Content should enable an adequate sense of achievement at each stage – while concepts become complex across stages, milestones can be defined for subsidiary concepts that are complete and whole.**

For example, we introduce students to plane mirrors, then spherical mirrors, and then lenses and system of lenses. They move from understanding reflection and image characteristics at each stage in a complete manner.

Similarly, in the preparatory and early middle stage observing diversity of living organisms around and classifying them based on the observable characteristics at earlier stages allows students to make sense of living world around. In the later part of middle stage and the secondary stage, when microscopes are introduced, they make observations of living organisms, and their cellular organization allows student to re-classify or comprehend other ways of classifications of organisms based on the nature of cellular organization such as five kingdom system. At each stage, different scales of complexities of living organisms are observed and understood. Thus, at each stage, the criteria for classification are valid while providing scope for expanding these criteria with newer concepts.

f. **Content should provide opportunities for students to engage in extended durations of inquiry.**

Content should lead to extended, long-term inquiry beyond the classroom engagement. This can be in the form of long-term projects like documenting the cycle of food production over a season. It can also be a recording of simple observations over a period of a month or so to understand a concept better, such as drawing the phases of the moon on a classroom calendar. Or it can be a short observation like fermentation by yeast to make bread. Students could monitor the life cycle of mosquitoes, butterflies, or moths; they could also grow fruit flies to observe organisms around them. Long term projects that allow students to learn from deeper engagement with content they learn in the classroom. For example, growing food and using that process of farm work to inform learning of scientific ideas and processes. This encourages students to go into the depth and breadth of concept. It also connects concepts to real life.

g. **Content should cater to the diverse needs of students.**

Content should cover a range of concepts that are interesting for all students. They must have opportunities to engage with the concept in different ways. For example, if a student is struggling to represent a concept in mathematical terms, they can start with representation

through a simple working model, diagram or a verbal description, and progress from there. Students with disabilities should be included in the process of learning as far as possible. In this context, a range of materials and technology (simulation, audio-video resources) is necessary. For example, a force diagram can be made using tactile materials, detailed descriptions of the force diagram can be made available, etc.

h. **Content must develop the ability to use the language of science.**
Communicating scientific ideas is critical – for this, both representation of the world as well as the development of a scientific vocabulary are critical. While the development of the scientific vocabulary progresses as engagement with scientific ideas increases, content must enable representation of natural phenomenon – from simple diagrammatic representations (evaporation, solar system, structure of plants) to more complex representations (atomic structure, structure of cell) and abstractions that make understanding easy (forces acting on a body) to mathematical representations (laws of motion, vectors, use of trigonometry and calculus to further break down abstractions to calculate magnitude of variables and make predictions).

i. **Content should prepare students to engage with life as responsible member of the community, as well as a career in scientific professions.**
Using available scientific evidence to make decisions and guide choices people make should be enabled by the science education at the school level such as decisions to vaccinate oneself, making healthier eating choices, examine media claims critically or contributing to inclusive society by critically examining one's belief and so on. Science content can help students make informed decisions about one's career (teacher, doctor, engineer, technician, bureaucrats and so on) that directly apply or build upon capacities and capabilities developed during school education.

j. **Content should enable students to examine and practice scientific values and other values in the NEP 2020.**
Content must also demonstrate scientific values (integrity, honesty, transparency, pluralism, looking at information in an unbiased manner; objectivity; acceptance for heterogeneous and alternative views) and enable processes that will help individual take position on societal issues.
For example, examining how the geocentric conceptualization of the universe shifted to the heliocentric conceptualization (established beliefs), and observations of the orbit of Pluto being classified as a dwarf planet (Middle Stage and Grades 9 and 10). The journey of these scientific ideas reflects the changing nature of scientific theories and the tenacity of scientists.
Also, studying heredity, evolution and biological diversity can lend themselves to an examination of how long-held beliefs were challenged by science based on evidence and how it is often presented – the superiority of humans (anthropocentricism); assumptions of superiority of certain races; how every life matters for the symbiotic existence of every other life; similarity of the origins and beginning of life despite later diversity of physical characteristics.

k. Content must enable integration across and within curricular areas.
Learning of science can be enhanced through integration of other curricular areas. For example, playing with different musical instruments allows children to understand frequency and amplitude. Games allow students to develop concepts related to motion; examining play on the moon helps them engage with concepts of gravity and force. The use of muscles while playing, stretching, etc. are related to physical education – which muscles are used, their use in the body.

Section 4.6
Pedagogy

Learning science involves not just learning theories and facts of science, but also making connections between conceptual learning and real life, acquiring the process capacities of science, and most importantly, applying these to understanding the world.

Students like to explore the world around them and understand why and how things happen. In this process of exploration, they use trial and error methods to test their hypothesis and reach a possible conclusion. This exploration need not take place individually – children learn science best through engaging with peers and adults.

Students have theories about why things happen, patterns they see around them, about cause-and-effect relationships. As they learn about science in a more formal set-up, these ideas get tested. Some concepts fit into the students' current understanding, while others require a shift in thinking. If there is alignment between current ideas and what is discussed in classrooms, ideas get strengthened.

At the same time, some concepts do not fit into the students' current thinking. If not addressed, they can turn into alternative conceptions. For example, heavy objects fall faster, plants and seeds are non-living because they don't move, or heavy/big objects always sink in water. If these ideas are not challenged and suitably modified through investigation, they can turn into alternative conceptions, which persist as students move through school.

Apart from these theories, students also bring with them the ability to reason, understand, and explain relationships between cause and effect. These capacities serve as the basis for developing scientific reasoning. Opportunities, therefore, to inquire are important, as opposed to being 'told'.

Scientific values, like honesty and integrity, also develop through 'doing science'. For example, while demonstrating an experiment on the boiling point of water, we should write the reading on the thermometer accurately, even if water is not boiling at 100 degrees.

The role of the Teacher in aligning pedagogy and assessment to how children learn science is critical. Teachers must build an environment that promotes natural curiosity, encourages questions, gives maximum possible opportunities for hands-on activities, and space to discuss ideas. Opportunities to students to express their understanding through different modes, and formative assessments to track growing understanding are also key to learning science.

Teacher's Voice B-4.6-i [to be edited]

Addressing alternate conceptions

As a teacher I have experienced students already have some ideas/theories constructed through their observations and social interactions which are at times not in alignment with the accepted form of scientific knowledge. Hence, before beginning any concept I try to find out what and how students are thinking about the concept through some activities/ questions and work in a planned way to help students test and redefine their thinking in light of accepted scientific knowledge.

For example, while teaching living-non-living I asked students to categorize listed things into living and non-living. Going through the responses I came across some students of my class struggled hard to accept seeds are living, they believed dry seeds are non-living and had rationale to explain the same (seeds do not move, it does not respire). Instead of directly enforcing them to accept that seeds are living, we conducted a few experiments to understand if seeds respire (by preparing three jars, one containing dry seeds, one containing germinated seeds and third jar is kept empty as control, cotton dipped in phenolphthalein solution is kept hanging in the 3 jars and observed after an interval for colour change when it interacts with Carbon dioxide, given out by living things during respiration). It helped students to reconsider their belief and accept that even dry seeds are actually living.

4.6.1 Pedagogic Principles

Science pedagogy across stages must be informed by the following principles:

a. Learning science requires active engagement of students with the world around them to understand it. Science pedagogy achieves this through:
   i. Simulating the processes of science such as asking questions, hypothesising, observing, testing, finding evidence, collecting data, analysing, modifying conclusions, communicating, and re-questioning.
   ii. Exposing students to a variety of aspects of learning science in varied settings – the laboratory, classroom, and field – through approaches such as inquiry, discovery, didactic, hands-on science.
   iii. Encouraging and sustaining curiosity by providing varied experiences that may challenge students' existing notions and ideas.

b. Learning science requires communication and sharing of ideas and observations. Science pedagogy achieves this through:
   i. Using scientific vocabulary in transaction and creating a variety of contexts and situations for students to communicate their understanding, ideas, observations.
   ii. Peer and collaborative learning.

c. Learning science requires gradual increase in the capacity to engage with complex and abstract ideas, aligned with the cognitive and procedural capacities of students. Science pedagogy achieves this through building on children's existing knowledge and using multiple representations (mathematical, graphical, diagrammatic, models).

d. Learning science requires making linkages of knowledge for the holistic and multidisciplinary learning emphasized in the NEP 2020. Science pedagogy achieves this through:

   i. Connecting scientific knowledge inside and outside the classroom.

   ii. Horizontal connections with other curricular areas.

e. Learning science enables development of certain values, such as collaboration, sensitivity, empathy, equality of opportunities, respect for diversity and other values mentioned in NEP 2020. Science pedagogy must facilitate this process.

f. Learning science must be done in a variety of settings – classroom, field and laboratory. An appropriate combination of approaches and settings can be used to teach a concept. The following is a non-comprehensive list of considerations on the basis of which Teachers can choose pedagogical approaches and settings:

   i. Nature of concept should guide decision regarding the approach and setting. For example, speed can be discussed in the play field, but structure of cell requires a microscope.

   ii. The approach and setting chosen should not affect the attainment of learning outcomes and competencies.

   iii. Each of recommended approaches and settings must be selected at least once in an academic year, if not more. This will ensure exposure to varied approaches and settings.

   iv. Even when Teachers choose a didactic approach, areas that students could have potentially inquired about or discovered should be highlighted.

4.6.1.1 Recommended Pedagogical Approaches and Settings

The same pedagogical approach can be used across the three settings most suitable for learning science – the classroom, the field, and the laboratory. This section details recommended pedagogical approaches across a variety of settings.

a. ***Hands-on science:***
The most important part of learning science is actually 'doing science' through hands-on experiential learning. 'Doing science' can range from trial and error, using materials around them, or using basic scientific instruments (measuring instruments), and laboratory apparatus. In this process, students gain conceptual understanding and develop process capacities through manipulating, designing and building to.

b. ***Discovery approach:***
Students explore the natural world following their own interests and discover patterns of how the world works during their explorations. Teachers may also create opportunities or draw attention to natural phenomena that students can explore further. Often, this discovery is followed by other more structured approaches to ensure learning. For example, the

Teacher draws attention of the students to changes in the length of the shadows as the day progresses or to the venation patterns of the leaves of different plants. Students' observations are then connected to scientific concepts such as the path of light, and the venation pattern is connected to the shapes of the leaves.

c. ***Inquiry approach:***
Inquiry approach allows students to navigate through unknown questions, and to explore solutions by themselves. It allows students to work in the same way as scientists. Inquiry approach engages students with systematic observation, visualizing, experimenting, inferring, communicating, discovering relations. This approach allows Teachers to choose the appropriate type of inquiry with respect to the concept, and to scaffold (support as per needs) students' learning. For example, students could explore questions such as: How does the image characteristics vary with relative position between lens and object? How does the surface area of the reactants affect the rate of reaction? How does the intensity of light affect the rate of Photosynthesis?

d. ***Project-centred approach:***
This approach allows learning within the classroom to continue outside the classroom, and to extend over a period of time. For example, observing the changes in moon over a month to understand the phases of moon. In this process, connections to daily life are also made. The project centred approach allows students to develop artefacts/products (charts, presentations, speech, etc.) that reflect and communicates their emerging understanding. It also allows integration of concepts across different curricular areas. For example, visits to the sites of local professional communities and interactions with the people engaged there such as potters, weavers, crafts persons, farmers, blacksmith, cobbler, butcher would enable integrating concepts from vocational education and art with science.

e. ***Didactic approach:***
Often, teaching science involves communicating certain important information in the form scientific terms, phenomena, and historical development of concepts and ideas. In this approach, the teacher largely regulates the direction and flow of the lesson. For example, after students have discovered changes in the length of the shadows throughout a day, teacher can explain effect of position of the sun on the length of the shadow, and how students can use it to keep track of the time as well.

f. ***Demonstration:***
Teacher demonstrates working of certain instruments or outcomes of experimental set-ups to draw attention of the students to relevant concepts. These demonstrations enrich student learning experiences of the concepts.
These approaches can be implemented in variety of settings as illustrated in the Table below. The Table illustrated how only a few competencies and related learning outcomes can be addressed. It is not comprehensive in terms of illustrated all possible combinations of pedagogical approaches and settings.

Teacher's Voice B-4.6-ii [to be edited]

Physical and Chemical Changes

As a science teacher, I think it's important to understand the value experimentation and discussion can add to learning of science in a student's life. Experimentation must be understood in a way that it is not something to be carried in class just to test and verify the science concepts mentioned in textbook but to examine and connect with the pre-knowledge, opinions students already hold.

For example- while working with physical and chemical changes in grade 7, I initiated the discussion for building the context of changes by asking them about the story of magic stick, that changes things it touches as per the desire of the person holding it. I asked one of the students to share the story. Further, I asked that if you suddenly get magic stick to change things around you, what are the things you would like to change? Students responded, my school bag, school dress, my toys, my home etc. Now I told without magic stick can we change things around us? Students shared some changes which they already observed in their surroundings and daily life like formation of curd from milk, cooking, boiling of water, ripening of fruits, decomposition of leaves, rusting of iron etc. Now I told them, various changes are taking place in our surrounding and daily life some of the changes involve formation of new substance while some do not (chemical and physical change).

Next, I divided them into groups and asked them list and classify the changes which we discussed earlier as physical and chemical change.

Now students performed experiments to verify their reasons for classification based on our earlier discussions on criteria for classification of changes.

Activity Sheet:

Experiment	*Observation*	*Conclusion with Reasons*
Take water in test tube and boil		
Dissolve 2g of salt in a test tube containing 5ml water		
Drop an iron nail in a test tube containing CuSO4 solution.		
Burning of paper/wood or a match-stick		

After performing the experiments and drawing the conclusion, I asked groups to share their observation, results, and learnings with others. All groups shared their results, and I wrote all these in board and shared formation of new substance is fundamental criteria for chemical change. To assess their understanding, I asked the students to write two physical and two chemical changes from their daily life and mention the reason. I also provided an assessment sheet to analyse their understanding.

Assessment Sheet:

Changes	*Physical*	*Chemical*	*Not sure*	*Reason*
Tearing of paper				
Formation of carbon dioxide by burning of wood				
Change in the colour of water by adding Copper Sulphate				
Formation of bubbles and heat is evolved after adding calcium oxide to a beaker containing water.				

Table B-4.6-i

Setting > Approach\/	Laboratory		Field		Classroom	
	Middle	Secondary	Middle	Secondary	Middle	Secondary
Hands-on science	Studying properties of acids and bases.	Manipulating different components of electric circuit.	Separating solids from liquid and solids from solids of mixtures collected from outside.	Building model bird and simulating the process of natural selection of flight.	Recording sinking and floating of different objects in water and other fluids.	
Didactic					Listing the conditions required for sustaining life on Mars or other celestial objects.	Arriving at the law of inertia by analyzing the motion of a ball going up and down an inclined plane.
Inquiry (may be preceded by Discovery)	Investigating effect on the pH of an acid with addition of base.	Investigating effects of colour of light on the rate of evolution of oxygen release from aquatic plant.	Recording Students record sunrise time, and sunset time data every day for 10 days. Tabulating this data and predicting the times the sun would rise and set the next day.	Investigating the factors that determines the rate of decent of a parachute.	Investigating effect of folding of cloth on rate of drying of the cloth.	Observing plant and animal cells under a microscope and illustrate differences between them.
Demonstration	Showing working of water pump or hot air balloon.	Setting up a rate of falling of objects along an inclined plane.	Showing large shadow clock and its use.	Demonstrating use of pulleys in real life work.	Using computer simulations to understand functioning of circuits.	Using computer simulation to see the effects of predation on changes in the allele frequency and natural selection in mice.
Project-centered	Observing different materials through microscope and documenting their observations.	Documenting microscopic organisms found in the surrounding area.	Collecting observation data on phases of the moon over a period of month.	Collecting information on traditional medicinal herbs or health practices from the elder members of the community.		

A combination of the recommended pedagogical approaches and settings can be used for teaching a concept.

Teacher's Voice B-4.6-iii [to be edited]

What floats and what sinks?

Material Required -

Tumblers of Water, Alcohol/kerosene/petrol, and Sugar solution (250 ml each – per group)

Cork, eraser, plastic straw, betel seed, metal paperclip, candle piece, cut pencil piece, Clay, Carrot & potato pieces

The students are asked to guess first as to whether a particular object would float or sink in each of the given liquids based on either the previous experience or the assumption based on their understanding. They are given the below observation table printed in a sheet. First, they are put in about five or six groups and each group contains 4 to 5 children. Objects are given to the students. They write the names of all the objects given against each liquid and they fill the third column with educated guesswork. Then they are asked to test their predictions by dropping the object into the liquids given to them. While doing so, students are also asked to look for any pattern, if they can see any.

Liquid	***Objects***	***Predict (Before the experiment) Float/sink***	***Result Float / Sink***
Alcohol/Petrol/Kerosene			
Water			
Sugar / Salt Solution			

When the students come back to a large group to discuss their predictions and what happened actually, the Teacher writes the various responses from the students in two columns in such a way that one column carries properties of liquid and the other carries the properties of the object. In case of lack of ideas from the students, the Teacher can use the following questions to elicit responses in line with the flow of the activities.

a. *Why do you think some objects floated and some did not? Why do you think this floated in sugar solution/salt solution and did not in water?*

b. *Why does this object sink in all three liquids? Why does this object float in all three liquids?*

c. *Why does any object that floats in alcohol, floats in water and Sugar/salt solution too?*

d. *Why does any object that sink in sugar/salt solution sinks in alcohol and water too?*

e. *This object did not float as you predicted. Can we work out why that is? Do you have a different view now?*

f. This crushed Aluminium foil is floating in water. Do you think you could find a way to make it sink?

g. Do you think floating objects have anything in common? Why do you think the potato sinks while the apple floats?

The questions of the above nature to be asked to students highlight sinking and floating depend upon properties of object as well as properties of liquid. This naturally warrants a situation to explore properties of object as well as liquid in which it is dropped. The questions for discussion can be used by the Teacher to assess the understanding of students (formative assessment during the activity). Questions also lead the discussion towards appreciation of fact that floatation depends on both the liquids and the objects. For example, questions 3 and 4 steer the discussion towards this understanding. Later questions encourage students to examine their understanding. They help them try and find patterns in their observations.

4.6.1.2 Horizontal Connections

a. Horizontal connections with other curricular areas are necessary for the holistic and multidisciplinary learning emphasized in the NEP 2020. Some curricular goals and competencies in both the Middle and Secondary Stage are designed to ensure horizontal connections between science and other curricular areas. At the same time, pedagogy must be designed so that these connections are actually made in the classroom.

b. Pedagogic approaches and methods such as inquiry and project by their nature provide scope to utilise concepts and process capacities that cut across the disciplines of science. For example, a project on investigating the sound produced by different musical instruments, and how this sound can be varied. Qualities and properties of sound produced both in terms of aesthetics, physics concepts involved, mathematical patterns and human perception lead to a holistic appreciation and integration of competencies across curricular areas.

c. Pedagogic methods like survey- and field-based methods enable students to see concepts through socio-cultural, economic, emotional, and scientific lenses. For example, survey of traditional medicinal and cooking practices, and their connection with the seasons.

4.6.2 Resources in Science Teaching

Science laboratories are essential for a good science education. However, there is currently no separate room for science laboratory in Middle schools, although science kits are provided. In this situation, Teachers can use their classrooms or any open space for performing experiments. The following must inform the use of resources:

a. The materials and equipment should be simple and easy to use. This makes it more likely that they will be used in classrooms by Teachers. At the Middle Stage, science kits available at most schools provide a good start.

b. However, students should not be restricted to the science kits. The more materials they use, the more opportunities they get to do science and hence, learn science. For example, improvised apparatus can be made using inexpensive materials to extend the use of materials beyond the science kit.

Teacher's VoiceB- 4.6-iv [to be edited]

Making a Measuring Jar

Measuring jar is usually a part of every science kit. It can also be made from simple material available around.

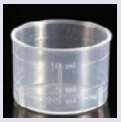


Figure 1 Measuring cup on syrup bottles

Material required: *Syringes (10 ml), plastic measuring cups (of 5 ml) that are usually available with syrups (figure 1), a plain paper strip, and an empty transparent bottle (that can hold at least 100 ml, a thin bottle would serve the purpose better)*

Procedure:

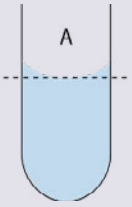


Figure 2 Lower Meniscus

a. *Paste a thin strip of paper along the length of the bottle (1cm wide)*
b. *Fill the syringe/measuring cup to its full quantity (10 ml/5ml)*
c. *Pour it in the bottle.*
d. *Make a mark at the level of water. It is advisable to mark at the lower meniscus. (The dotted line in figure 1 is the lower meniscus)*
e. *Continue steps 2 to 4 till the expected measurement quantity is reached.*

c. At this stage, if the school can provide dedicated lab space, with adequate space for simple materials and resources, it must be done.

d. At the same time, doing science must not be restricted to science laboratories or science kits. Classrooms, especially in the Middle Stage, must allow the doing of science. At the same time, all safety considerations must be kept in mind.

e. Tinkering laboratories – informal spaces where students can 'play' with simple scientific materials and equipment independently – can be set up in any room within the school. This will help students strengthen design thinking, creating and experimental capacities. Initially, students would have to be supported by the teacher.

f. Students at the Secondary Stage would require standard scientific equipment and apparatus, and basic infrastructure, in which they perform experiments with convenience and safety. Therefore, Secondary schools should have well equipped, resourceful, and spacious science laboratory to conduct science experiments and investigations.

g. If a school has a laboratory, but the number of the students is large, the teacher can alternatively allow students to do the experiments in groups or ask students to perform the experiments on alternate days.

h. Budgets for science in the Middle and Secondary Stages are limited, so science equipment and materials should be inexpensive. However, if the equipment is of inferior quality (e.g., weak magnet, cheap microscope with plastic lens), it may not be worth using.

i. Alternatives can be used. For example, in case of unavailability of litmus paper, a teacher can use turmeric solution or turmeric paper strips for identifying the acidic and basic characteristics of the substances. For this, the Teacher will take turmeric (powder or solid) and add it in a paper or glass cup containing water. This solution can be used for identification of acids and bases. Teacher can also make wet paper strips dipped in turmeric solution. Students can be asked to do the following - Dry these paper strips, prepare solutions of each substance in water, dip the strip in the solution, and check the colour change of the turmeric paper strips. Could you make list of change in colours of these substances?

4.6.3 Classroom management

Classroom environment plays a vital role in student's learning. An ideal classroom of science is one which has sufficient space and flexible seating to enable both small group work and whole class seating. Flexibility of the classroom is key in terms of allowing enough space to accommodate a wide range of activities.

The displays, charts and other teaching-learning material in the classroom should change and get renewed in sync with the concept being dealt in the classroom. Some storage space in the room makes it easier for the teacher to have materials handy.

Classroom arrangement should complement instructional strategies – one way to ensure this is to have the same classroom for science lessons, with students coming to the room instead of the teacher going to the classroom. Having a dedicated science classroom for Middle and Secondary Stages will also help in managing the resources efficiently and reduce the operational load of the teacher. The burden of bringing materials together and ensuring they are replaced, arranging the classroom to enable students to work in groups, access to simple equipment that students may want to use (e.g., magnifying glass in a lesson on magnets in case students want to examine the surface of the magnets), and so on will be taken care of in case of a dedicated classroom.

Section 4.7
Assessment in Science

4.7.1 Assessment Principles

The following principles must inform assessment in science across stages:

a. Assessment in science includes assessment of conceptual understanding as well as process capacities. Process capacities, like any other skill set, need sustained nurturing and constant assessment. Observation, identification of areas of inquiry, formulating questions and hypotheses, data collation and analysis, prediction, and so on – the core capacities of doing science – must be assessed from the Foundational stage onwards.

b. Therefore, emphasis should be on the assessment of activities and experiments, as well as inferences drawn from them, rather than assessment of facts and information.

c. The following principles should inform formative assessment

   i. Formative assessments help the Teacher understand alternative conceptions that students hold, and the extent to which they are interfering with learning.

   ii. This assessment is not for evaluation but to help Teachers align pedagogical strategies to students' current understanding.

   iii. Ongoing assessments will help the Teacher to track the alignment of students growing understanding to scientific concepts.

d. The following principles should inform formative assessment

   i. Summative assessment must include assessment of process capacities.

   ii. It should assess different cognitive levels – it should not be limited to recall of science facts.

e. Assessment in science could happen in different modes/settings – for example, formulating questions, participation in debates and discussions, developing models (including mathematical representations) to explain or demonstrate phenomenon, communicating understanding through written and other modes of expression, designing, and conducting experiments.

Teacher's Voice B-4.7-i [to be edited]

Assessment: Volume

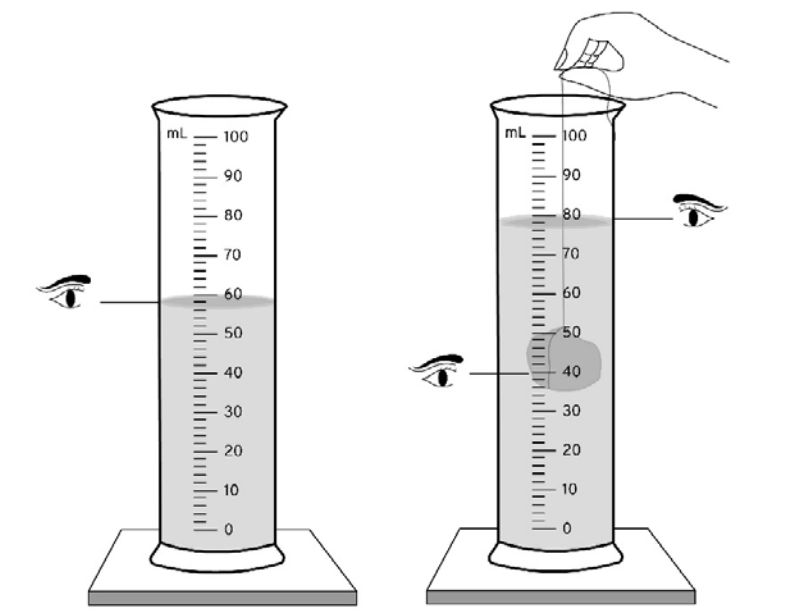
Even though most of my Grade 7 students recall the mathematical calculations for calculating volume of regular geometric objects very accurately, I'm not very sure if they have really understood the meaning of it and see its connections with floating/sinking as well. I feel paper pencil test through questions cannot sufficiently address the assessment of such skills because just solving numerical by applying mathematical formula is not adequate to claim student have understood the concept and can apply the same in daily life situations. Hence, I was looking for tools/techniques that are valid and reliable to assess conceptual understanding where students get an opportunity to engage with meaningful activity to test if they can apply their understanding. I believe designing appropriate assessment tool/ technique is highly crucial to understand if students have really understood the concept. I decided to use investigation as an assessment tool to understand and extend students' learning and move a step towards independent thinking and learning. There are three assessment tasks I used in my class:

Task 1: *I provide a table with data showing the volume measured and volume of water displaced for a small set of unknown objects. I ask students to make predictions if the object will sink or float based on this data.*

Task 2: *I ask students to measure the volume of irregular objects such as stone, metal spoon etc. And report their findings.*

Task 3: *I ask students to write a note if the same approach would work for other liquids and the same set of objects, for example, oil, medical spirit etc.*

I expected these three tasks would also help me identify levels of understanding of the students and I make changes in my plan for subsequent lessons.



4.7.2 Assessment approaches

Table B-4.7-i

	Formative assessment		Summative Assessment	
	Informal	**Formal**	**Informal**	**Formal**
Internal	During a task related to inquiry: If students are able to define the problem for investigation or proposing hypotheses during discussions While using scientific apparatus independently: Observing if the students are using apparatus such as microscope/ telescope with care and appropriately While doing tasks related to investigation/ inquiry: Assessing if a student is open to other's ideas to incorporate into investigation	Rubric based evaluation of science process competencies when students are engaged in an investigation/ inquiry	Asking students to recall what was studied in the previous unit/class which connects it to the planned unit/ class	Quizzes and tests evaluating at the end of the unit or a set of units
External				Board examinations and certifications

4.7.2.1 Homework:

Homework allows extended engagement with the concepts outside of the classroom. Certain specific areas where homework can extend science learning are as follows:

a. Applications of scientific concepts to the daily life.

b. Practising procedural knowledge of scientific process.

c. Collecting information from the community members – for projects or for feeding into the next set of lessons.

d. Practicing expressing scientific understanding and ideas in written form.

Teacher's Voice B-4.7-ii [to be edited]

Assessment of Process Capacities – Summative Activity

Students are provided with three containers (say, a paper cup, a metal can, and a coffee mug), three thermometers, a stopwatch, and a sheet of paper with the following instructions:

Hot container activity:

Your challenge is to determine which of the three containers will keep a hot drink warm for the greatest length of time. Your experiment will last ten minutes, and you are expected to keep records of your work.

a. *Gently place a thermometer in each container and ask your teacher to pour hot water into them. Measure the temperature of the water in the container. Decide how you will gather your data and record it in the table. When you have collected the data for 10 minutes, then you must answer the questions.*

Sl. No.	*Time*	*Cup A*	*Cup B*	*Cup C*

b. *According to your data, which container will keep a hot drink warm for the longest amount of time? Explain your choice.*

c. *What is about this container that explains these results?*

d. *Which container do you think will be the best for keeping ice cream cold? What is the reason for your choice?*

Rubric: *To assess this skill, a rubric need to be designed to grade assessment of students.*

Sl. No.	*Item*	*Criteria & Indicators*	*Points allocated*
1	*Item 1*	***Use of equipment*** *a. Use of thermometer properly and safely without any help from teacher*	***1 point*** *1 point*
		b. Needs assistance with using or reading the thermometer	*0 point*
		Recording data *a. Entire data chart filled in with times and temperatures*	***3 points*** *1 Point*
		b. Data gathered over entire time period	*1 Point*
		c. Temperature data show temperature declining over time	*1 point*

2	*Item 2*	***Identifying container*** *a. Choice of container that says warm the longest is consistent with data*	***1 point*** *1 point*
		b. Data does not support choice of container	*0 points*
		Explaining choice *a. Explanation contrasts chosen container with the other two*	*3 points* *2 points*
		b. Explanations focus on only the chosen container	*1 point*
		c. No explanation for chosen container	*0 point*
3	*Item 3*	***Inference about container characteristics*** *a. Compares composition of all containers and ability to transfer and retain heat*	***3 points*** *2 points*
		b. Identifies chosen container's characteristics without comparison	*1 point*
		c. Lack of logical explanation about container's property	*0 point*
4	*Item 4*	***Identifying container*** *a. Selects the same container as was identified for item 2*	***1 point*** *1 point*
		b. Selects different container from item 2	*0 point*
5	*Item 5*	***Explaining choice*** *a. Describe how transfer and retaining heat applies to hot and cold substances*	*3 points* *2 points*
		b. Provide reasonable explanations but without referring to it	*1 point*
		c. Explanation not provided or is not sensible	*0 point*

4.7.3 Outcome of assessment –

Given the importance of the processes of science in the science curriculum, a narrow view of the outcomes would fail to reflect the competencies included in science curricular area. The process of assessment leads to certain specific outcomes for students, teachers, head teachers, parents, and other stakeholders.

Student – For students, the outcomes should provide a clear view of the present learning across curricular goals and competencies.

Teacher – For of teacher, the outcomes should guide classroom practices, pedagogic choices to ensure attainment of competencies. This is particularly true for process capacities.

Head-teacher – For head-teachers, the outcomes should give comprehensive view of the academic health of the school across grades and stage levels with respect to science.

Chapter 5

Social Science

Social Science is a systemic study of human society and the relationship between the individual and society, social institutions, and organizations. It draws its content from the disciplines of History, Geography, Political Science, and Economics, to provide an interdisciplinary understanding of society and its functions. At the heart of Social Science education lies an understanding of the world, the diverse concerns of human society, and participating in it as empathetic and responsible citizens.

In the school curriculum, the study of Social Science starts in the Middle Stage. Students in this Stage will engage with various aspects of society through a thematic approach to Social Science learning. The themes will progress from the local to the regional, then to the national and the world. The students will engage in an empirical enquiry into content drawn from all four disciplines on various aspects of society in an integrated manner. At the Secondary Stage, students will develop a deep conceptual understanding of the four disciplines comprising Social Science. This will enable the learning of discipline-specific methods of enquiry and knowledge.

Section 5.1
Aims

Social Science plays an important role in developing in an individual student a comprehensive sense of the human world and its functioning. In an increasingly globalizing and interdependent world, this understanding is critical to help students see how things around them are changing, what the causes of these changes are, and how the change impacts human societies. It also helps them realize the need for interdependence, collaboration, and an appreciation for the diversity of human culture and societies.

The subject also teaches students the method of observing and interpreting the world wearing the hat of a social scientist. It does so by building core skills such as observing what is going on around them, analysing causes of various phenomena (historical, geographical, socio-political, or economic) using evidence, asking questions, making connections, forming viewpoints based on conceptual understanding and evidence, recognizing patterns and generalizations, and arriving at logical conclusions. These skills prepare students in contributing as responsible citizens of society.

Social Science also helps in nurturing the values and dispositions that are essential for sustaining cooperative and collaborative communities. It promotes ethical, humane, and Constitutional values. It encourages them to understand and appreciate the feeling of Indianness '*Bhartiyata'* by valuing the rich cultural heritage and tradition of the country. The subject also helps students recognize the importance of sustainable development through the preservation and conservation of natural resources. It sensitizes them to the impact of human activity on the environment and the sustenance of life on earth. In doing so the subject helps students develop a critical understanding of the environment and the impact of their actions on human and environmental well-being.

The aims of Social Science in school education can be summarised as follows:

a. Develop the disciplinary knowledge and understanding of how society functions through an interplay of historical, geographical, social, economic, and political factors. This can be enabled through:

i. an understanding of continuity and change in human civilisation, its causation and effect, and its impact on modern life,

ii. an understanding of the interaction between nature and human beings, the spatial patterns arising out of this interaction, and its effect on human life,

iii. awareness and understanding of the diversity of people and their practices in different societies, regions, and cultures within societies,

iv. an awareness of various social, political, and economic institutions, their origin, functioning and transformations over time.

b. **Develop an understanding and appreciation for the methods of enquiry relevant to Social Science and deepen students' skills to engage with the key questions and issues confronting society.** These could be specifically seen as:

   i. Skills in sourcing evidence, interpreting them, confirming through multiple sources and evidence, and constructing a coherent narrative,

   ii. Skills in recognizing spatial patterns, map-reading, interpretation and analysis of various interconnected concepts and processes,

   iii. Skills of creative and analytical thinking to form informed opinions, demonstrate logical decision-making, and incline towards a problem-solving attitude,

   iv. Skills to collect, organize, analyse, represent, and present data and information on various historical, geographical, and socio-political issues,

   v. Skills to question unsubstantiated ideas, biases, stereotypes, and assumptions to foster scientific temper and propose meaningful responses to contemporary concerns of society.

c. **Foster ethical, human, and Constitutional values:** As the DNEP 2019 emphasises, to foster a "democratic outlook and commitment to liberty and freedom; equality, justice, and fairness; embracing diversity, plurality, and inclusion; humaneness and fraternal spirit; social responsibility and the spirit of service; ethics of integrity and honesty; scientific temper and commitment to rational and public dialogue; peace; social action through Constitutional means; unity and integrity of the nation, and a true rootedness and pride in India with a forward-looking spirit to continuously improve as a nation."[2]

Section 5.2
Nature of Knowledge

The nature of knowledge of Social Sciences can be understood as follows:

a. **Evidence-based, empirical, and verifiable:** Social Science relies on globally accepted norms of enquiry and verifiable evidence, and it cannot be based on the mere speculations of an interpreter. It is a subject that is verifiable through observation and experience in nature as it is an analysis of what human beings witness in their lives. Its study often leads to multiple interpretations of a single event. However, this does not make Social Science imaginary or unreliable in its claims.

b. **Social Science is the study of human society:** "Social Science is the study of the human society which includes people as nearby as family and as far away as those who live in the most distant nations. And, the people who are living now, those who lived long ago, and those who will live in the future." [3] It allows students to connect with other people and cultural groups and understand their differences and commonalities which creates a shared sense of humanity. It is a complex task to understand human society, and this requires a multidisciplinary lens consisting of Geography, Political Science, History, Economics, Sociology, Public Administration, and Psychology. **Geography** studies the human relationship with the natural environment, **History** traces the journey of changes and continuity from past to present of human life that has undergone major events which impacted society and culture, **Political Science** deals with the socio-political existence of human beings, and **Economics** analyses economic activity and their impact upon social and behavioural changes of human beings.

c. **Social Science requires an interdisciplinary approach:** As Social Science relies on sources, the nature of these sources is always multi-dimensional, found in the form of performing and visual arts, literature, artefacts, numerical data, and oral narratives.[4] These serve two significant functions. First, they help students to understand people, places, ideas, and about the people who created them. Second, such sources enable the students to analyse and interpret the beliefs of societies that have expressed themselves through various mediums.

d. **Values in Social Science vary contextually:** Social Science ideas are context dependent. The socio-cultural beliefs and values are subject to historical, geographical, and political contexts. To understand any society holistically, Social Science evaluates the social and political events and issues in keeping with the context of that time and space.

Section 5.3
Current Challenges

Social Science teaching confronts a few challenges in schools. This curriculum attempts to address these systematically. The issues are highlighted as follows:

a. It is well known that Social Science is usually taught as a subject with **predominantly rote learning of facts** like dates in history, names of geographical features across the globe, the listing of fundamental rights and duties, and naming of economic institutions. The understanding of concepts is often missing in Social Science classrooms. This in turn makes students lose interest in the subject as there are too many facts that are expected to be learnt without adequately engaging with the reasons behind learning them or the core concepts underlying those facts.

b. The other critical issue with Social Science is that **the subject is divided into water-tight compartments** of History, Geography, Political Science, and Economics too early on and too strictly. Therefore, the interdisciplinary thinking that students need to acquire to understand society is left unaddressed. Students are not exposed to a comprehensive engagement with a particular social phenomenon and might merely look at it from the lens of one of the subjects.

c. Information in the chapters is transacted in the classroom with little or **no connection to the immediate life of the student.** Since the subject is not made relevant to the students, it ends up being boring or distant from the students' lives.

d. Another pressing issue with Social Science is that the **content in textbooks is not based on facts derived from inquiry and investigation.** While there is often multiple contrasting evidence to understand a particular social phenomenon, stressing one piece of evidence alone often gives a lopsided/inadequate picture. Within a Social Science class, students need to interpret the pieces of evidence and arrive at reasonable and justifiable narratives.

Section 5.4
Learning Standards

Learning Standards provide a comprehensive framework with details of Curricular Goals, Competencies, and Learning Outcomes for teaching any subject. The Curricular Goals explain the broader aims and objectives of teaching Social Sciences as a part of the school curriculum conveying the knowledge, skills and dispositions needed for developing disciplinary thinking and values and capacities to function as responsible and empathetic human beings. The competencies are observable learning behaviours that guide the teacher in assessing the learning of a student as they move along a given stage in a subject. The Competency statements are further broken down into observable Learning Outcomes. These will serve as guiding posts for teachers to plan their lessons, design assessments, modify teaching-learning strategies and track students' progress in a subject.

5.4.1 Curricular Goals & Competencies

5.4.1.1 The Middle Stage

This Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

CG-1 Comprehends and interprets sources related to different aspects of human life and makes meaningful interpretations of social reality	C-1.1 Recognizes multiple sources of information (primary and secondary) to understand the historical, geographical, and socio-political aspects of an issue/ behaviour/ practice/ belief /event C-1.2 Comprehends and analyses data using tables, charts, diagrams, and maps representing socio-political, cultural, economic, or geographic phenomenon
CG-2 Determines the process of continuity and change in human civilisation through some specific examples from students' context and a few historical episodes	C-2.1 Collects oral and written sources to analyse changes that have happened in their family/ surrounding, in terms of livelihood, technology, migration, availability of resources, lifestyle, and political condition. C-2.2 Explains key phases of history which denote major changes in the world history. C-2.3 Examines the reasons for the sustenance/continued prevalence of certain beliefs, relationships, practices, and activities in human society, regardless of the major changes in society.

CG-3 Draws connections between the cause and effect of different social and historical events or episodes and connects it with the overall impact on human life	C-3.1 Identifies reasons behind conflicts among social groups and communities in their own region and their impact on the society C-3.2 Explains and analyses various changes that have occurred in human life from nomadism to early civilisation (such as changes in food habits, emergence of commercial agriculture, people's beliefs and ideas like ahimsa, equality, and events related to major wars which influenced human society significantly)
CG-4 Appreciates the importance of being an Indian (Bhartiya) by understanding (a) India's glorious past: its cultural diversity, heritage, traditions, literature, art, philosophy, and medicine, and (b) the geographical diversity in India	C-4.1 Explains and upholds the cultural diversity of India by recognizing various political ideologies, dialects, languages, traditional practices, religious ideas, trade, and commerce, Indian ayurveda, yoga, etc. C-4.2 Discovers the topographical diversity of the Indian landform- from the semi-arid zone in the west to the areas of heavy rains in the north-east, from the long coastal areas in the south to the snow-clad mountains in the north, and the rich biodiversity of the country.
CG-5 Understands the spatial distribution of resources (from local to global), their conservation and the interdependence between natural phenomena and human life	C-5.1 Explains key natural phenomena like rain, weather, climate, soil formation, the flow of rivers, agents of erosion and how it is spatially distributed. C-5.2 Inquires about the distribution of resources such as water, agriculture, raw materials, services and the disparity in the availability of resources to people from different sections of society (both in geographical and social terms). C-5.3 Illustrates attempts at conservation happening in society and advocates the importance of the same. C-5.4 Correlates the existence of different patterns of livelihoods with the different types of landforms, availability of resources and climatic conditions (in local, regional, national, and global contexts).
CG-6 Evaluates the functioning of the family and other social and political institutions and situates them in the context of other existing grassroots and larger democratic institutions	C-6.1 Collects, organizes, and interprets information about various social and political institutions in one's locality and region, and realizes its significance for human society C-6.2 Assesses the influence of social and political institutions on an individual/ group/ community/ and society in general

CG-7 Understands various forms of inequality and discrimination in society right from those prevalent in a family to a community/regional/national level and explores its possible causes	C-7.1 Observes, records, and classifies work roles, importance, autonomy (who gets most or least attention/ appreciation, scope and flexibility to work, access to opportunities) in one's own family, other families of the locality C-7.2 Raises questions about prejudices, stereotyping and other forms of discrimination of individuals/ groups in society.
CG-8 Acknowledges the process of development of the Constitution of India and upholds its importance to promote democratic values in the Indian society	C-8.1 Discusses the need for a constitution for any country, especially a country like India. C-8.2 Explains the process of formation of the Indian Constitution and evaluates the ideals of Indian national movement in it. C-8.3 Elaborates on the working of three tiers of local self-government and its significance in upholding democracy at grassroot level.
CG-9 Understands the process of economic activities (production, trade, and commerce) and its impact on shaping an individual's life as well as its influence on any country's history and geography,	C-9.1 Identifies trade and commerce activities in one's own region and sees similar patterns in the country. C-9.2 Explains the key elements of trade and commerce (commodity, production, capital, profit, and loss) and its impact on various historical and geographical development in a country. C-9.3 Evaluates the concept of surplus and its relationship with various economic activities.

5.4.1.2 The Secondary Stage

This Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

CG-1 Analyses important phases in world history and draws insights to understand the present-day world	C-1.1 Explains historical events and processes with different types of sources with specific examples from India and world history. C-1.2 Explains and analyses the chronology of human life from nomadism to settled life and other phases of human civilization. C-1.3 Traces aspects of continuity and change in subsequent phases of Indian and world history (in the use of tools, techniques, instruments, and technologies, religious ideas, beliefs symbols and practices, in the organization of power structures like rich and poor, gender differences, caste structures). C-1.4 Explains the growth of new ideas in Europe and Asia (humanism, mercantilism, industrialisation, colonialism, scientific developments and explorations, imperialism, and the rise of new nation-states across the world) and how it affected the course of human history.
CG-2 Understands the idea of a nation and the emergence of the modern Indian state	C-2.1 Analyses the meaning of nation and how the concept evolved across the world and in the specific context of India C-2.2 Identifies and explains important phases of the Indian national movement against British colonial rule with special reference to Gandhian and other subaltern movements C-2.3 Appreciates that Indian people collectively fought against British rule and rediscovered the idea of one common nation for everybody living in this geography.

CG-3 Develops an understanding of the inter-relationship between human beings and their physical environment and how that influences the livelihoods, cultural diversity, and biodiversity of the region	C-3.1 Locates physiographic regions of India and climatic zones of the world on a globe/map. C-3.2 Explains important geographical concepts, characteristics of key landforms and its origin and other physical factors of a region. C-3.3 Draws inter-linkages between various components of the physical environment such as relief and climate, climate and vegetation, vegetation and wildlife. C-3.4 Analyses and evaluates the inter-relationship between the natural environment and human beings across regions. C-3.5 Critically evaluates the impact of human interventions on the environment and loss of biodiversity. C-3.6 Develops sensitivity towards judicious use of natural resources and suggests measures for its conservation.
CG-4 Understands the Indian Constitution and explores the basic essence of Indian democracy and the characteristics of a democratic government	C-4.1 Acknowledges that the Indian Constitution represents the great cultural heritage and common aspirations of the Indian Nation State. C-4.2 Appreciates fundamental Constitutional values and identifies their significance for the prosperity of the Indian nation. C-4.3 Explains that fundamental rights are the most basic human rights, and it flourishes when people also perform their fundamental duties for the nation. C-4.4 Analyse the basic features of a democracy and democratic government and compares them with other forms of government. C-4.5 Analyses the critical role of media in shaping public opinion and in the functioning of a democratic government.
CG-5 Understands and analyses social and political life in India and recognizes hurdles in the path of national unity and constitutional values	C-5.1 Examines the existence of diversity in the Indian context based on gender, religion, ethnicity, language, and region. Differentiate between diversity and inequality. C-5.2 Analyses the root causes of all kinds of discrimination against disadvantaged sections of our society and traces its roots in history. C-5.3 Identifies and analyses the various forms of struggles/movements against discrimination initiated by different sections of Indian society in the past and what happened to those movements.

CG-6 Realises the need for people's constructive civic engagement with the issues directly affecting their life	C-6.1 Analyses how people across the world have mobilised and safeguarded their rights.
CG-7 Develops an understanding of the economy of a nation-state, with specific reference to India	C-7.1 Define key features of the economy like production, distribution, demand, supply, trade, and commerce and factors that influence these aspects. C-7.2 Evaluates the importance of the three sectors of production (primary, secondary, and tertiary) in any country's economy, especially India. C-7.3 Distinguishes between unorganised and organised sectors of the economy and their role in production for the local market to small, medium, and large-scale production centres (industries). C-7.4 Traces the beginning and importance of large-scale trade and commerce (including e-commerce) between one country to another – the key items of trade in the beginning and how it kept changing.
CG-8 Evaluates the economic development of a country in terms of its impact on its citizens' life	C-8.1 Gathers, comprehends, and analyses data related to poverty and unemployment in one's locality and at the national level C-8.2 Analyses the concepts of the free market and social welfare schemes C-8.3 Discusses about consumer rights and its importance in the global market.

5.4.2 Design of Content in the Middle and Secondary Stages

5.4.2.1 Content for the Middle Stage

a. **Content must be taught in an integrated manner.**
In the Middle Stage, methods of enquiry used in Social Science would help students understand the nature of History, Geography, Social and Political Life, and Economic life in an integrated manner. The choice of content must lend itself to this integrated approach rather than requiring strict disciplinary boundaries.

b. **The organisation of content must use a thematic approach (from the local and regional to the national and global).**
A thematic approach will guide the curriculum at this Stage. The four themes are to be done in progression starting from the local to the regional, then moving on to the country and then the world. This approach would ensure that the learning of Social Science is based on observable, real-world, relevant, and day-to-day occurrences for Middle Stage students,

drawing them into thinking and talking about these. This would also give them a sense of their location in the world. Equally importantly, students at this Stage need to learn to see real-life Social Science thinking as an interplay of principles drawn from multiple disciplines.

As highlighted in the NEP 2022, "All curriculum and pedagogy, from the foundational stage onwards, will be redesigned to be strongly rooted in the Indian and local context and ethos in terms of culture, traditions, heritage, customs, language, philosophy, geography, ancient and contemporary knowledge, societal and scientific needs, indigenous and traditional ways of learning etc. – in order to ensure that education is maximally relatable, relevant, interesting, and effective for our students...."[1]. This remains a strong anchor for the content in the Middle Stage which would engage students in the understanding of the social realities of their society.

i. **Content about the local context will be 20% of the whole curriculum at this stage.** Students will explore the various facets of their locality from historical context, geographical variations, and its socio-political, and economic life in an integrated manner through collecting information/data from multiple sources, comparing data, making meaning out of it, doing analysis, and learning how social scientists build knowledge about a society based on empirical evidence.

ii. **Content about the regional context will be 30% of the whole curriculum at this stage.** The understanding developed at the local level would be used to deal with content at the **r**egional level. In this, a deeper interdisciplinary perspective by identifying similarities and differences between their locality and the region would be acquired.

iii. **Content about the national context will be 30% of the whole curriculum at this stage.** After the regional, the next theme is India, where students would be expected to apply some of the skills learned in the previous themes. Actively engaging with secondary sources, the students would make meaning out of them in the context of India. This covers the interrelatedness of History, Geography, Economy, and Social and Political Life of people. The richness of the multi-ethnic people and their identities and the cultural heritage of the country must be introduced here.

iv. **Content about the global context will be 20% of the whole curriculum at this stage.** Lastly, the world level is intended to prepare students for the 21st century, which is an era of globalisation. An understanding of the culture and society of other countries would help students to widen their worldview. Students can build a comparative understanding of life in other countries in relation to one's own. This would lead to a sense of pluralism and appreciation of various cultures in the world. A comprehensive understanding of any three countries that meet the following criteria may be chosen:

    1) The three countries must be from different continents with different socio-cultural and civilisational histories,

    2) One Eastern country that has geographical challenges and has gone through rapid growth after struggling through challenging times in its history (E.g., Japan, South Korea),

3) One country that has geographical diversity, has been a colony and has struggled through foreign rule and internal difficulties (E.g., South Africa, Nigeria),

4) One country from the West that has grown rapidly, is influential in the global economy, with multi-ethnic composition (E.g., the United States of America, Germany).

The three countries (Japan, South Africa, and the USA) have been chosen as useable examples based on the above criteria and they have been illustrated in the table below. Curriculum/syllabus developers may choose other countries that fulfil the criteria mentioned above, and there may be multiple choices for the countries within the same syllabus.

c. All content must be truly and comprehensively representative with verifiable evidence.

Another important design consideration at this Stage is with regard to the choice of content material. Whatever content is chosen, it must be truly and comprehensively representative. All Social Science concepts that the students are expected to learn must be backed by verifiable evidence. These two criteria mean that the choice of overall content must cover the whole sweep and the key issues of the discipline (or the concept at hand) and for these, the specific content(s) chosen should be good examples and truly representative of the issues/matter. There can be more than one example for given criteria to be incorporated in the classroom, and schools can choose based on the judgement that the content is sufficiently representing the key issues or narratives that must be learned in the subject.

An elaboration of the suggested content follows.

Suggested Content for the Middle Stage

Table B-5.4-i

	Class- 6	Class-7	Class-8
Your Locality 20% (Workbook)	**Unit-1: Your City Your Village**		
	• **CH_1 Knowing your Family:** a. Understanding one's own family-history (at least 3 elder generations) b. Developing family tree c. Tracing changes in occupations, living styles, types of housing, clothing, food habits, cooking, utensils, migration across generations, education, etc. d. Roles and responsibilities of family members and decision making. • **CH_2 Knowing your Neighbourhood:** a. Livelihood, Education, Types of houses, Migration, Different Communities, Clothing, Languages, Festivals, etc. b. Inter-dependence of people in the locality. • CH_3 Mapping your Neighbourhood: a. Geographical features, crops, roads, schools, health centres, market, etc. b. Sketch and maps; components of a map (Location, direction, scale, and symbols) c. Developing map of the school and the village/ locality	• **CH_1 Places of Eminence- Investigate and construct history:** a. Identifying eminent places in the village or town e.g., temple, mosque, church, gurudwara, well, bavar/bawri, palace, ruins, other places of historical importance, etc. b. Sources of evidence about these sites- such as older members of the locality, inscriptions, folktales, other narratives, etc. c. Collating various sources to build history of places in one's locality. • **CH_2 Locality: Then and Now:** a. Changes in society with time: collecting information from the elders in their locality about lifestyle, transportation modes, crops grown, goods, and services, cultural practices, etc. b. Causes of changes c. Consequences/impact of change d. What has changed/what has prevailed in one's locality. • **CH_3 Local Administration: *Panchayat* (for Rural Students) / *Nagar Palika* (For Urban Students):** a. Local self-government b. Roles, responsibilities and functions of local administration c. Case studies	• **CH_1 Economic activities in your Locality: Part 1** a. Livelihood and sources of income: Types of occupation, e.g. agriculture, animal husbandry, local industries (handicrafts), other commercial activities, services, etc. b. Distribution of economic activities in locality as per social context/gender context • **CH_2 Understanding Local Markets** a. Concept and Function of Market b. Haat/ bazaar/mandi/ c. Other local markets • **CH_3: Block and District: *PARISHAD*:** a. Tiers of government b. Roles and responsibilities c. Functioning- their work, their source of income, ways in which they make their decisions. d. Electoral process e. Issues and Challenges

	Unit-2: Know Your Region		
Your Region (Workbook Based) (Rajasthan as Exemplar) 30%	• **CH_4- Geographical Region and life, for example in the context of Rajasthan:** **Part 1** a. Physical features of Thar desert-landforms, vegetation, others b. Way of life of people in the region-culture, food, economic activities, languages spoken, etc. c. Physical features of Aravalli Range and hilly region d. Way of life of people in the region-culture, food, economic activities, languages spoken, etc **Part 2-** a. Physical features of South-eastern Plateau b. Way of life of people in the region-culture, food, economic activities, languages spoken, etc c. Physical features of eastern plains d. Way of life of people in the region-culture, food, economic activities, languages spoken, etc e. Inter-relationship of physical and human environment	• **CH_4 Places of Historical Significance-** Any site of Historical significance in a Particular Region (For example, **in Rajasthan:** Kalibanga, Ganeshwar, Khetri, Matsya Janpada, Chittor, Jaipur, etc.; **In Uttar Pradesh:** Premodern city and its historical significance-Sarnath, Benaras, Prayagraj, Agra, Lucknow; **In Tamil Nādu:** Premodern City and Historical significance- Madurai, Tanjavur) a. a. Case study of any one pre-modern historical site of one's region. b. b. How do we know it is of significance? Specific Features and importance and seeing it as cultural heritage of India. c. c. Studying the life of people, governance, socio-cultural aspects at that time, etc. d. d. Knowing about similar historical sites of the region through various primary and secondary sources. • **CH_5 People's life and Culture:** **Part 1** Eminent Festival of the region: a. One case study of Regional Festival and Its importance and Significance in social life. (E.g., Ramdevra in Rajasthan, Pandharpur in Maharashtra, - b. Exploring the socio-cultural aspects of the region in connection to the festival c. Understanding the festival as a platform for unifying various cultures and social inclusion. **Part 2** a. Difference and discriminations prevalent in the region: b. a. Case studies depicting differences and discrimination on the basis of class, caste, religion, gender, in urban and rural parts of the region.	• **CH_4 Indian National Movement in that state:** a. a. Assertions against colonial/local rulers b. b. How were these assertions different from Indian national movement? c. (Example: in UP, Chauri-Chaura, Kishan (Baba Ramchand) Movement, Balia 1942, Quit India movement in states like Rajasthan, which was governed by Maharajas, the nature of the struggles was different like the Khejari Movement, and the Rajasthan Praja Mandal Movement. In Karnataka, the abridged version of 'Kanthapura' a Novel by Raja Rao may be used.) • **CH_5: Mineral resources and Industry** a. Distribution of mineral resources b. Manufacturing Industries in the region c. Issues related to environmental pollution. d. Measures of conservation and sustainable development • **CH_6: Livelihood pattern of the state.** a. Cropping/agriculture pattern b. Challenges/threats to agriculture c. Local small-scale industries and Handicrafts d. Migration and associated impact on the regions • **CH-7: Government and people** a. Making and functioning of law – RTI and RTE b. Challenges in practicing a law

India 30%	Unit-3 Your Country		
	• **CH_5 Rotation and revolution of the earth and Latitude and Longitude:** a. Two motions of the earth and their effect on Human life (concept of day and night, and seasons) b. Latitudes and Longitudes- significance for time and location, its importance in a map • **CH_6 Overview of Indian Sub-Continent: Geographical Diversity:** a. Geographical and Political boundaries b. One case study from each terrain- Hilly/ mountains, plateau, dessert, plain, coastal c. Case Study of any one state of that terrain highlighting: i. The geographical features ii. Historical overview iii. Local Architecture iv. Historical heritage v. Relationship of human life and culture influenced by geographical features- culture, food, economic activities, languages spoken, folk art and dance, social practices/ local beliefs etc. d. Sensitivity towards the environment (contextual content related to each case study should be given under this)	• **CH_6 Indian Sub-continent climate, Rainfall (Monsoon):** a. Difference between weather and climate b. Factors affecting climate of a region. c. Overview of Indian Monsoon cycle and Rainfall Pattern across India d. Impact of monsoon on life of people • **CH_7 Agriculture Pattern:** a. Major crops in India b. Types of farming c. Modern agricultural practices (Green Revolution) • **CH_8 Medieval Society:** a. Comparative Analysis of any two large empires (Eg., Krishnadevaraya and Akbar) b. State policies c. Social Structure d. Nature of land holding e. Economic activities • **CH_9 Socio-Religious Movement:** a. Overview of the syncretic cult thoughts and composite culture prevalent in the medieval Indian society, E.g., Sufi- Bhakti Movement b. Case study of Basvanna and Nanak highlighting the concepts of human dignity, equality, ahimsa, unity of God c. Major religious ideas and their social implication during that period and long-term impact on our societies	• **CH_8 India: Natural and Human Resource distribution:** a. Meaning and types of resources b. Natural Resource distribution and relationship with major industry c. Distribution of different industries across the country d. Case study of steel industry in Chhattisgarh and Orissa. e. Economic Activities, Industrialization, and its impact, environment, society, migration, etc. (Case Study of Delhi NCR) • **CH_9 The Colonial Rule in India** a. From being a trading company to becoming a ruling power b. Consolidation of power, imposition of the new rule. c. Impact of colonial rule in a different section of society. d. Unrest against British policy (E.g., Tribal, Peasant, and others) in 19th Century • **CH_10 Indian National Movement: Rise of Nationalism:** a. Mainstream movements led by India National Congress and their major characteristics and phases b. Movements in other parts of the country (subaltern and revolutionary nationalist movements)

	• **CH_7 Emergence of Agriculture and its impact on society:** **Part 1:** a. Emergence of settled life b. Surplus, trade, and commerce **Part 2:** a. **Formation of the early State (Mahajanpads)** **Part 3:** b. Emergence of Empire- Case of Magadh- development of the early administrative system, state economic policy, and social process • ***CH_8 The emergence of New Ideas:*** a. Main ideas that emerged- Jain, Buddhist, Materialistic Ideas b. Reasons behind the emergence- its importance in that era and relevance in contemporary society c. Excerpts from sources related to these traditions- like, Jataka, Upanishads.		• **CH_11 Constitution of India:** **Part 1** a. Freedom movement as a building stone of the constitution, b. Need of Constitution c. Constitution as a major source of Indian laws **Part 2** d. Constitutional as an evolving document as per the need of time and aspirations of society e. Constitutional values, rights, and duties of citizens in a democratic society.
World 20%	***Unit-4 The World***		
	• **CH_9 Japan** a. Japan on world map b. Geographical features of Japan- climate, rainfall, soil, landforms, forests etc. c. Brief history of Japan after Meiji restoration d. Society and people e. Industry, trade, and commerce	• **CH_10 South Africa** a. South Africa on world map b. Geographical features of South Africa- climate, rainfall, soil, landforms, forests etc. c. Brief history of South Africa- Apartheid movement and after d. Society and people e. Industry, mining, trade, and commerce	• **CH_12 United States of America** a. USA on world map b. Geographical features of USA- climate, rainfall, soil, landforms, forests etc. c. Brief history of USA- War of independence, Declaration of Rights Civil war. d. Emergence as world power e. Society and people f. Industry, technology, scientific development mining, trade, and commerce

5.4.2.2 Content for the Secondary Stage

a. **Content must be organised according to the disciplines of History, Geography, Social and Political Life, and Economics.**

In the Secondary Stage, the curricular design need not follow the thematic approach strictly. The students are encouraged to develop an interest in academic disciplines and form a worldview. The focus of the classes is on enabling the cognitive preparedness of students to deal with more complex concepts that require a disciplinary approach.

The content in **History** urges the student to understand the evolution of human society. Suggested content is aimed at developing a holistic view of the human past by interpreting primary and secondary sources. The content must be based on different sources and is expected to help students arrive at different narratives about a particular event or period. It must cover important phases of the past which shaped the present of human beings. In addition, the content explains the concept of 'many pasts' and justifies that there cannot be a fixed common narrative for everything.

In **Geography**, the suggested content focuses on highlighting the interrelation of human beings with their geographical environment and other life forms. Concepts highlighting interdependence between humans and nature are kept as core areas. The connection between various geographical phenomena and the cultural diversity found in the world is included.

In **Social and Political Life,** understanding democracy and democratic life are the main concepts. The content includes an in-depth understanding of the Constitution and the working of the Indian Government through a network of social and political institutions. Along with this, the prevalence of discrimination in society, its reasons, and ways of safeguarding against it are also included. The students are expected to find probable solutions to these challenges. With this, the importance of democratic values and voices to ensure a dignified life for all in society is highlighted.

Lastly, in **Economics**, an introductory understanding of economic activities and the interrelatedness of these activities with human life, market, and money has been included. The content areas encourage the students to understand, observe, and interpret economic life in their immediate environment. With this, they would be able to make sense of the economy in the emerging global world.

b. **All content must be truly and comprehensively representative with verifiable evidence.**

Just like the consideration for the choice of content material in the Middle Stage, whatever content is chosen for the Secondary Stage too must be truly and comprehensively representative. All Social Science concepts that the students are expected to learn must be backed by verifiable evidence. These two criteria mean that the choice of overall content must cover the whole sweep and the key issues of the discipline (or the concept at hand) and for these, the specific content(s) chosen should be good examples and truly representative of the issues/matter. There can be more than one example for given criteria to be incorporated in the classroom, and schools can choose based on the judgement that the content is sufficiently representing the key issues or narratives that must be learned in the subject.

An elaboration of the suggested content follows.

Suggested Content for the Secondary Stage

Table B-5.4-ii

Subject	Class 9	Class 10
History	• **CH_1 Nomadism to Settle life in India and World** ◦ Hunter and gatherer Society-One case each from India and World ◦ Early Agrarian Society and its feature-One case from India and world ◦ Impact of Agriculture on Human Society and Culture • **CH_2 Formation of State in Ancient World** ◦ Emergence of large empire in context of Greek and Magadh ◦ Nature of State- Administration, taxes, trade, and commerce ◦ People belief and Feature of Society • **CH_3 Emergence of New Idea's in Ancient World** ◦ Backgrounds of Emergence ◦ Similarity among Major Philosophical Schools of India and World- Buddhism, Jainism, Materialist and Vaidic Schools and Confucius, Judaism ◦ Impact and relevance of their thoughts in that era and Today's world • **CH_4 Decentralization of Power and Expansion of State** ◦ Background- Extension of Agriculture in different region ◦ Changes in people life, culture, and belief in 4 to 7 Century CE across India, ◦ Power Structure, Taxes trade and commerce ◦ Growth of art, literature, and scientific ideas. • **CH_5 India in 900 to 1200CE** ◦ Brief overview of Major Political power in that era ◦ Feature of State-North and South India (in Context of Cholas and Pal, Pratihar and Chalukya. ◦ Economics Activities and Culture- Taxes, Trade, Architecture ◦ Nature of Struggle for Expansion of Empire (One case Study of Each Part)	• **CH_1 Renaissance- Emergence of New Europe** ◦ Background ◦ Major ideas and Component of Renaissance-Humanism, Reformations-Art, Architecture, Religion ◦ Printing Press- Spread of Ideas • **CH_2 Religious Reformation Movement Medieval India and World** ◦ Social and Political background ◦ Similarity of Ideas in Protestant and Bhakti Reformation ◦ Impact on Today's World • **CH_3 Colonialism and Industrial Revolutions** ◦ Mercantilism and Exploration of New Trade route ◦ Emergence of Colonial Power and their Policy ◦ Impact of Colonial Rule on Native Society • **CH_4 French Revolution and Rise of Modern Nation State** ◦ Causes and Impact of French Revolution on the development of Nationalism. ◦ Idea of Liberty, Fraternity, Equality, and their transmission across the world ◦ Impact on Social and Economic Structure of European Society (in context of Class and Gender) ◦ Legacy and continuing impact on Modern Politics and Society • **CH_5 Indian Freedom Struggle** ◦ Different Phases of Mainstream Freedom Struggle in India ◦ Subaltern and other Form of Struggle ◦ Role of different class, community, and Section of Society (Gender, Caste, Tribe) ◦ Values and Ideals derived from Protest Method used by Indian Freedom Fighter

Geography	• **Chapter 1- Life in the Himalayas-6 hours** ◦ Indian Himalayas- extent, western and easter Himalayas, key characteristics ◦ Origin of the Himalayas ◦ Drainage, Climate, Vegetation, Soil, Wildlife in the Himalayas ◦ Biodiversity in Himalayas and efforts for its Conservation ◦ Resources, Livelihoods and People in the Himalayan Region • **Chapter 2- Life in the Gangetic Plains-6 hours** ◦ Ganga plains- extent, key landforms, bhabar and terai, bhangra and khadar ◦ Origin of the Indo-Gangetic Plains ◦ Drainage, Climate, Vegetation, Soil, Wildlife in the Plains ◦ River Pollution, and its impact on the ecosystem ◦ Resources and Livelihood in the Indo-Gangetic plains- agriculture, minerals, industries, population • **Chapter 3- Life in the Peninsular Plateau- 5 hours** ◦ Extent, western and eastern Ghats, ◦ Origin of the Deccan Plateau ◦ Drainage, Climate, Vegetation, Soil, Wildlife in the Plateau ◦ Agricultural Distress and Farmer's Plight ◦ Resources and Livelihood in the Plateaus- agriculture, minerals, industries, population • **Chapter 4- Life in the Desert- 4 hours** ◦ Location, key landforms in the desert ◦ Climate, Vegetation, Soil and Wildlife in the desert ◦ Resources and Livelihood in the Desert-agriculture, minerals, industries, population • **Chapter 5- Life in the Coastal Region-4 hours** ◦ Location, key landforms in the coasts ◦ Climate, Vegetation, Soil and marine life in the coasts ◦ Resources, Livelihood and People in the Coasts	• **Chapter 1-Climatic Zones Across the World-6 hours** ◦ Temperature and pressure belts ◦ Climatic zones of the world and their characteristics ◦ Uniqueness of each climatic zone ◦ Climate and its impact on life ◦ Climate Change and its Consequences • **Chapter 2- Life in the Tundras-6 hours** ◦ description of the region, geographical extent, climate ◦ natural resources-vegetation, soil, wildlife ◦ livelihood and economic development in the region ◦ life of people in the Tundra • **Chapter 3- Life in the Equatorial Region-6 hours** ◦ description of the region, geographical extent, climate ◦ natural resources-vegetation, soil, wildlife ◦ livelihood and economic development in the region ◦ similarities and differences in the life of people between the tundra and equatorial region • **Chapter 4: Resources and Development/ Resources, Uses and Conservation-6 hours** ◦ Major resources in the world and its distribution- in relation to its geographical position ◦ Case study- e.g. fishing industry in specific regions where cold and warm currents meet/Petroleum industry ◦ Pressure on non-renewable natural resources - threat to multiple lifeforms that exist on earth and a threat to ecology and the ecosystem. ◦ Conservation of resources and preservation of the ecosystem is essential for the very existence of human life on earth and sustainable development.

Social and Political Life	• **Ch_1 Constitution of India** ◦ Freedom struggle and constitution of India ◦ Basic features of the constitution ◦ Preamble ◦ Federal Government ◦ Process of legislation and constitutional amendment • **CH_2 Power sharing and its role in Indian democracy** ◦ Separation and balance of Power ◦ (Executive, Legislative, Judiciary) • **CH_3 Functioning of constitutional bodies in India.** ◦ Election commission ◦ National Human Rights Commission ◦ National commission for scheduled tribes and scheduled caste ◦ National Commission for Women • **CH_4 Democracy and its feature and challenges** ◦ Different form of government ◦ What is democracy? ◦ Why democracy ◦ Basic features of democracy ◦ Various forms of democracy in the world	• **Ch_1 Democracy and Society in India** ◦ Cast ◦ Gender ◦ The idea of Pluralism. ◦ Identity Politics and Society. ◦ (Inclusion of different segments of Society in the context of caste, gender, Ethnicity and Religion) • **Ch_2 Participative Democracy in India:** ◦ Social Political Movement after independence and its impact on Society (JP movement) ◦ Conflict Resolution mechanism in Democracy, Culture of Dialogue (North-east, Language issue) • • **Ch_3 Democracy and public opinion** ◦ Mass Media and its Role in Democracy ◦ Types of media ◦ Functioning and its impact in democracy • **Ch_4 Democracy and Role of Citizen** ◦ Right of Citizen and its Role and Responsibility for Vibrant democracy ◦ Democratic Ethics and Value and Role of Citizens in transforming the Society.

Economic life	• **CH_1 Economy and Human Lives:** ◦ Economics as a mechanism of exchange of goods and services in the market/ society ◦ The concept of 'earning' in economics and its importance in running the market. ◦ Population as a resource for socio-economic upliftment of society ◦ Importance of investing in education and health of a nation's population for a healthy economic cycle ◦ Issues and challenges in economy- poverty, unemployment. • **CH_2 Production and consumption** ◦ How market runs ◦ Production ◦ Patterns of consumption ◦ Proportionate relationship between production and consumption ◦ Role of marketing in influencing consumption • **CH_3 Organized, un-organized and the three sectors of economy** ◦ Primary, secondary, and tertiary sector ◦ Organised and unorganised sector ◦ Reasons behind the differences and socio-economic disparities- access to education, social capital, identity based disparities, access to heath, and opportunities, etc. ◦ Government schemes for addressing the issues of unorganised sector (contemporary case of social welfare/ government schemes for enabling employment, food security, health care, etc.)	• **CH_1 Money and Credit** ◦ Concept of Money, ◦ Finance and capital and its role in Economic Activities like production ◦ Banks and its key features ◦ The way credit system works. ◦ Case study of SHG as an empowering model of credit • **CH_2 Understanding the global market.** ◦ Globalisation and functioning of market in the global world (Role of MNCs, technology) ◦ Production and consumption in a globalised market ◦ Its impact on human and societal behaviour ◦ World organisations regulating free and fair trade (WTO, World Bank, IMF, etc.) • **CH_3 Consumer Rights** ◦ Importance of a consumer in a market ◦ Consumer Rights ◦ Mechanism of redressal (case studies from consumer courts) ◦ Explains the importance of consumer rights as a safeguard of any kind of cheating, fraud, misleading, etc. possible in the market. ◦ Demonstrates the usage of consumer rights in a global market through using case studies

5.4.3 Illustrative Learning Outcomes

5.4.3.1 The Middle Stage

In this section, for every curricular goal (CG) a corresponding competency (under the same goal) has been further elaborated with illustrative learning outcomes.

This is a sample to guide how Learning Outcomes for the Preparatory Stage.

Curricular Goal (CG- 1): Comprehends and interprets sources related to different aspects of human life and makes meaningful interpretations of social reality.

Competency (C-1.1): Recognizes multiple sources of information (primary and secondary) to understand the historical, geographical, and socio-political aspects of an issue/ behavior/ practice/ belief/event

Table B-5.4-iii

	A	B	C
	C-1.1: Recognizes multiple sources of information (primary and secondary) to understand the historical, geographical, and socio-political aspects of an issue/ behavior/ practice/ belief/event		
	Grade 6	**Grade 7**	**Grade 8**
1	Collects information from family members about their family history, their relationship with the neighboring families and discusses in class with the help of teacher	Surveys historical places in their locality- observes and documents the history of these places.	Lists out livelihoods and various economic conditions of different communities in one's locality.
2	Surveys in one's neighborhood- occupation of people, places of historical importance, and geographical features like – Plains, hills, valleys, plateau, and seashore.	Creates narrative about their locality's history and geographical features using multiple sources – like talking to older members of community, visiting historical places in their village/ town- e.g. temple, mosque, well, Bavari, palace/forts and referring documentaries and books other than textbook.	Examines relevant sources of information related to colonial rule and national movement in one's region.
3	Identify different types of sources in their locality/ region and explain their significance in reconstruction of history of locality	Compares accounts of information related to social structure, state policies, economic activities from the empires of Akbar and Krishnadevaraya.	Collates multiple sources of information to know about distribution of minerals, industries, and agriculture in one's own region.

4	Uses multiple sources to understand about life of people in Japan in specific reference to their history, customs, traditions, occupations, and society.	Examines primary sources (poetry) of Bhakti and Sufi poets about the social order of that era	Uses multiple sources to understand about life of people in USA in special reference to their history, customs, traditions, occupations, and society.
5		Uses multiple sources to understand about life of people in South Africa in reference to their history, customs, traditions, occupations, and society.	

5.4.3.2 The Secondary Stage

In this section, for every curricular goal (CG) a corresponding competency (under the same goal) has been further elaborated with illustrative learning outcomes.

This is a sample to guide how Learning Outcomes for the Secondary Stage.

Curricular Goal (CG- 1): Analyses important phases in world history and draws insights to understand the present-day world.

Competency (C-1.4): Explains the growth of new ideas in Europe and Asia (humanism, mercantilism, industrialization, colonialism, scientific developments and explorations, imperialism, and the rise of new nation-states across the world), and how it affected the course of human history

Table B-5.4-iv

	A	B
	C-1.4 Explains the growth of new ideas in Europe and Asia (humanism, mercantilism, industrialization, colonialism, scientific developments and explorations, imperialism, and the rise of new nation-states across the world), and how it affected the course of human history	
	Grade 9	**Grade 10**
1	Describes the historical, social, and economic contexts in which new ideas emerged in the ancient period (India and World).	Identifies the major ideas and components of the Renaissance.
2	Appreciates the diversity of human thought in fostering empathy, respect, and tolerance.	Explains the cultural and intellectual exchange that occurred during the Renaissance between different regions of Europe and world.
3	Evaluate the impact Buddhism and Jainism on ancient society.	Describes the key technological advancements occurred during the Renaissance.
4		Describe the principles of liberty, fraternity, and equality in context of French revolution.

Section 5.5
Content

5.5.1 Principles of Content Selection

The driving principle of content selection in Social Science is directed by NEP which emphasises "The contents of languages, literature, history, and the Social Sciences will incorporate discussions particularly aimed at addressing ethical and moral principles and values such as patriotism, sacrifice, nonviolence, truth, honesty, peace, righteous conduct, forgiveness, tolerance, mercy, sympathy, helpfulness, courtesy, cleanliness, equality, and fraternity."[2] The following principles need to be taken into consideration while selecting the content:

a. **Content must be based on multiple pieces of evidence and narratives:** As asserted in DNEP, "Evidence-based reasoning and the scientific method will be incorporated throughout the school curriculum...in order to encourage rational, analytical, logical, and quantitative thinking in all aspects of the curriculum."[2] A good social scientific engagement with any concept or event is only when the person remains open to engaging with adequate evidence, sources, references, and narratives. The content should be adequately representative of multiple pieces of evidence and narratives, of a single event. For example, understanding the Gandhian philosophy of non-violence should be done through the readings of multiple writers. The content must lend itself to grooming students into confident beings who will be able to form and express their opinion after considerable research.

b. **Content must be interdisciplinary in approach:** Social Science, by its very nature, is an interdisciplinary subject. The subject-wise division of history, geography, social and political life, and economics cannot be seen as four separate areas in isolation. None of these subjects can be taught (or understood) without referring to another. For example, the concept of cultural diversity cannot be taught without introducing the student to geographical diversity. Students learn to investigate a concept from a multi-dimensional view and develop an expansive view.

c. **Content must enable building core disciplinary skills:** Social Science aims at developing social decision-making and problem-solving skills which involves the interpretation of facts and maps, relying on evidence, and connecting many concepts to form rational opinions. The content in Social Science should not only present facts but also encourage analytical and inferential capacities through activities in which students consciously engage.

d. **Concepts are built from the simple to the complex:** The content in Social Science should be organized from simpler to more complex concepts enabling the construction of meaning like a building bloc. This is done progressively based on the thinking abilities of students. For example, for teaching historical inquiry in the Middle Stage, the content would first focus on the identification and differentiation of sources of information. As a second step, students must interpret the sources to draw meaning out of them. Third, they collect and analyse multiple sources for a single event. And finally, they do a comparative analysis between two or more similar events based on findings made through multiple sources. At

the Secondary Stage, when the skills of dealing with content from familiar to unfamiliar have been acquired, the content starts dealing with concepts with a more disciplinary approach.

e. **Content progresses from local to global:** As much as possible, conceptual understanding should start from the local context. For example, understanding history by engaging with a historical place (*Panchayat Ghar*, an old school) in the locality, and then moving to the regional and national level institutions/sources.

f. **Content includes real and diverse experiences of people:** As Social Science deals with society, the study is incomplete with just theories and concepts. Without references to the real-world experiences of the people, every concept would be vague and irrelevant. For example, the concept of discrimination cannot be taught without introducing the students to accounts of people who have faced it personally. This adds relevance to the learning. Real experiential accounts would also develop socio-emotional skills of empathy and sensitivity.

5.5.2 Materials and Resources

A Social Science classroom should include a variety of teaching-learning materials in addition to the textbook. Students must be exposed to social and cultural phenomena across time and space through sources like local literature, folksongs, stories from one's region, ancient monuments and documents, magazines and newspapers, films and documentaries, autobiographies, biographies, memoirs and travelogues, audio-visual aids, and maps of all kinds (topographical, political, physiographic, demographic, thematic, and GIS maps).

a. **Textbooks:** Social Science textbooks should be made interactive by including reflective prompts for the students. These prompts must help with connecting concepts with the current lives of the students and suggest activities they can do to explore the ideas with their immediate surroundings. Textbooks must have a good number of illustrations and thinking activities for students to work on.

b. **Digital Material:** Social Science teaching become challenging when students are still struggling with basic literacy. While literacy needs are fulfilled through reading in Social Science, the concepts in the subject cannot be limited by a lack of literacy. If a student can engage with a concept through other mediums (songs, movies, and audio clips) they must be included as content. Such diversity in content is not only good for students struggling with literacy but the whole class as it is enjoyable and an enriched medium of learning. Unfamiliar content becomes easier to understand this way. It is also possible to give students access to a distant world (in time and space) virtually.

c. **Maps and Atlas:** A geographical basis for understanding any social event makes the learning of Social Science rooted in the physical world. A Social Science classroom should always have maps and atlases available for students to refer to. The collection of maps should have physical geography maps, political boundaries maps, along with thematic maps (population density, minerals etc). And these should be of the locality, region, country, and world.

d. **Literature:** Works of Literature (fictional and non-fictional) are a very good source for the Social Science classroom. Literature that is representative of identities, cultures, phases of history, and personalities and forms like historical accounts, diary records, and folktales can be used to the advantage of the class.

e. **Sources from the visual and performing arts:** Art forms which depict culture and traditions are good sources of information and conversation in the Social Sciences. These would enrich the class discussions. Also, field visits or digital content can be used to introduce the students to the arts related to Social Science ideas.

Teacher's Voice B-5.5-i (To be edited)

Sources in History

As a Social Science teacher in middle school, I have been very determined to give my students firsthand experience of social science skill as much as possible. In class 6th, I have 36 students with whom I started the lesson on 'Sources in History' and planned to use samples of sources, so that my students can do the interpretation themselves.

***The objective** of the planned activity was to introduce the students with the process of source interpretation as the first step to historical investigation. Through this, it was expected that:*

The students should be able to understand the different type of sources which are used for interpreting history

The students should be able to interpret the sources keeping in mind the context of the society the source represent

*The objectives were aimed at students achieving the following **learning outcomes**:*

Recognizes multiple sources of information (primary and secondary) to understand the historical, geographical, and socio-political aspects of an issue/behavior/practice/belief/event

Comprehends tables, charts, diagrams, and maps representing social, political, cultural, economic, or geographic phenomena

I divided the whole class in six groups and gave these sources to each group with a set of questions to discuss amongst themselves. For example, for one of the groups, I gave this picture of rock paintings from Bhimbetka Caves, Madhya Pradesh.

The following questions were then discussed:

What can you say about the relationship between animals and people from the picture?

What does the painting scene depict? Discuss amongst yourself if the people are hunting, celebrating something, migrating, or doing something else. Build your views with supporting arguments.

What are the people holding in their hands? Why are they doing so? Elaborate on your views.

Why do you think the paintings were made on the rock walls?

Where else can you get information about Bhimbetka? What can be the possible methods?

Other groups were given other sources and similar related questions.

Section 5.6
Pedagogy

Social Science is often taught as a fixed set of facts without an understanding of how interpretations play a role in its construction. This has pushed students towards merely memorizing the facts from a textbook and this is not an actual learning of Social Science. A Social Science classroom has to become participative and interactive in nature.[6] Only when students are allowed to immerse themselves in the process of Social Science thinking, they will be able to learn the subject better. Below are some guiding points indicating how children learn Social Science.

Students learn Social Science best when:

a. **Content starts with the familiar and the observable to students**

b. **Newer concepts are learned in connection to existing knowledge:** Students learn when the knowledge in their long-term memory is used to understand newer concepts [7]. Thus, a new concept is taught by making relevant connections to what the students have already learnt before.

c. **Students are involved as active participants and not passive listeners:** Social Science has been a textbook-intensive subject for a long time. That makes it a tiring experience where students just listen and memorize what is printed as text. For students to become active contributors, they must start acquiring this role right from the beginning of learning Social Science. For example, a class on governance can begin with the formation of *Bal Sabha* (Children's Assembly) within the classroom and then be tried at the school level.

d. **Students apply Social Science skills to understand their immediate surroundings:** When students apply the skills of Social Science like the interpretation of sources, referring to multiple pieces of evidence, drawing a cohesive argument from these, and being able to discuss an issue with evidence and not speculations, in their day-to-day lives and for understanding their surroundings, they learn the subject better.

e. **Students are given diverse learning experiences:** Students must get exposure to diverse ways of learning Social Science. The students should be taken for field excursions, be given project work, and be introduced to digital content. Also, student diversity in the classroom can be used as a learning resource, allowing for discussion of diverse viewpoints. This would allow for multiple perspectives too.

Pedagogy in a Social Science classroom must consider how students learn the subject better and plan accordingly. It must inculcate in students' conceptual knowledge, fundamental capacities, and Constitutional values and dispositions, all of which enable disciplinary thinking among students.

5.6.1 Pedagogical Considerations

The following pedagogical considerations should be kept in mind while planning for Social Science classes:

a. **Classroom transactions should help students to engage with the method of doing Social Science** so that learners can appreciate the methods for knowledge creation in Social Science. For instance, students may be encouraged to notice patterns in the distribution of different forms of government like democracies, monarchies, and dictatorships across the globe and propose reasons (historical, geographical, socio-political, economic) for the existence of those patterns.

b. **Classroom teaching should inculcate an awareness and appreciation of normative concerns.** Students should be given opportunities to reflect on inequities, stereotypes, discrimination, and other social and environmental issues in their own environments. This should lead to thinking and discussion of meaningful responses to these challenges.

c. **Interdisciplinary thinking should be encouraged and supported** to ensure that the students develop a holistic and integrated understanding of concepts as they appear in society. Any event in history needs to be interpreted in the socio-political context of its origin, any geographical phenomena should be evaluated from its impact on space and human lives, and its influence on the economy and society. Similarly, any economic concept needs to be understood from its historical and socio-political context.

d. **A Social Science classroom should be a place for contesting ideas, debating, and arguing with empathy and care.** Students must be encouraged to share their diverse experiences and reasoning without the fear of being judged or ridiculed. The teacher must refrain from imposing their own biases and beliefs upon the children. The entire pedagogy in a Social Science classroom should be an attempt to reveal newer dimensions of social reality and work towards creating self-awareness and introspection among teachers and students.

e. **Facts and concepts in Social Science should be made relevant to the students' contexts and experiences.** Such sharing and interactions must be respectful of the cultural and socio-economic differences and multiple perspectives among students.

f. **Concepts in Social Science need to be clarified with adequate depth and rigour:** In a Social Science classroom, adequate time and attention should be given towards concept formation and clarity in history, geography, political science, and economics. For example, students need to understand the processes of weathering and erosion to see their impact on topography and human civilization; engage with the meaning of different types of sources of evidence in order to frame meaningful interpretations of historical events; develop a comprehensive understanding of concepts of plurality, democracy and diversity to appreciate the values enshrined in the Constitution, and those stressed upon in the NEP 2020. The overall classroom environment should encourage academic rigour in acquiring disciplinary thinking.

g. **Opportunity to engage with various social-political and environmental challenges** through investigating and interpreting multiple sources of evidence available such as documentaries, literature (books, local stories, travelogues), newspaper reports, relevant

films, etc. should be undertaken. Selecting materials that are relatable to students and help in developing curiosity about the discipline should be prioritized. At the same time, care should be taken to ensure that materials are from reliable sources of information and do not depict biases towards/against a particular ideology.

h. **Authentic tasks/performance-based tasks such as project-based learning activities, assignments should be incorporated** to give learners an opportunity to develop different type of capacities like surveying, data analysis, problem solving, and cooperative skills to validate and investigate their assumptions and beliefs.

5.6.2 Pedagogical Strategies

To design lessons along these considerations, there are many strategies that teachers can deploy.

These strategies are as follows:

a. **Inquiry**: Inquiry-based methods help students understand how social scientists generate knowledge. For instance, students can make and test hypotheses about factors that influence migration in their locality or region, the genesis of various settlement patterns in their region, why specific types of occupations are more prevalent in specific regions, why people along the coastal regions have a specific dietary preference, and so on.

b. **Issues-based learning**: Issues-based learning can be a conducive tool for acquainting students with various aspects of social realities, integrating perspectives from different disciplines in investigating the causes of problems, and in thinking about relevant social action. As a subject addressing normative concerns, it is also vital that students learn Social Science content by engaging with real issues in their immediate/distant context. For instance, students may consider the problem of drinking water shortage in their area which may involve engaging with questions like – what are the available sources of water? How is water consumption across different parts of the region/locality? Are there wastages that can be avoided? How is water being made accessible to all sections of society? Is there unequal distribution? What steps are being taken to purify water- how is it being made available to the poorer sections of society? etc.

c. **Conversations, discussions, and debates:** Conversations are extremely vital in a Social Science classroom. These conversations should lead to focused discussions on concepts, ideas, belief systems, and value claims. Sometimes these discussions may convert into debates in the classroom. It is important to encourage such debates as it provides students with the opportunity to put forth their perspectives, resolve conflicts, iron out contradictory ideas, and learn from each other. However, care must be taken that such discussions and debates do not hurt the sentiments of any caste, class, gender or other social groups. Some common topics could be - there can be a discussion on climate change, reservation policy, diversity in food/clothing as per historical and geographical reasons, practising democratic processes in schools, etc.

d. **Role plays and simulations**: Role play and simulations may help students explore decision-making processes and finding means of conflict resolution. For instance, role plays of the Gram Panchayat/Corporation may be used as a vehicle to explain the functioning of democratic institution.

e. **Community service and field excursions:** Community service is yet another upcoming strategy in a Social Science classroom. It not only involves concrete experiences for learning concepts of the curriculum, but also enables students develop the desired values and sensitivity towards normative concerns. Students may take up various projects to work with local government agencies to acquire first-hand experience of issues and work with people in need. Similarly, field excursions are meaningful ways of engaging with the content- for instance nature walks, heritage walks, food walks, visit to police stations, museums, post offices, planetariums, visit to government and digital archives, investigation e.g., Old family documents, objects, etc.

f. **Reflective essays:** Students can write reflective essays on various topics related to the curriculum. These essays can also be used by teachers to assess the extent to which students have learnt the desired concepts and skills. For instance, a reflective essay topic could be, "What would be the future of Indian democracy?" "How will dams transform the agricultural productivity in India?" "What are the issues and opportunities of linking rivers?"

g. **Project work**: Effective Social Science teaching happens when students collaborate around a project or a specific task. These could be conducting a survey and interviews (e.g. household survey, interview of stakeholders of the society such as village sarpanch, etc.), drawing a map of their classroom, investigating the historical sources in their region, tabulating the types of bazaars/markets, etc. Such projects should be collaboratively designed along with students with sufficient time given to collect data, analyze it and present it in the classrooms.

h. **Some specific opportunities for projects to create models and artefacts**: The students should be given opportunities where they can apply their knowledge in creating models and artefacts. These could be in the form of poster-making, collection (old coins, newspapers, stamps, types of rocks, leaves, flowers, photographs, pamphlets, etc., models (2-dimendional or 3-dimensional. E.g. monuments, volcano, still scenes, etc.), videos of rally/ haat bazaar/book fair/any social event in their surroundings, etc.

Teacher's Voice B-5.6-i (To be edited)

Field excursion

As a Social Science teacher in middle school, I believe that field exposure is a very strong part of the pedagogy. It helps teachers in giving a practical usage of Social Science skills, and guides students how to observe, investigate, interpret, and come to some conclusion. In my class on historical investigation, I planned to take my class 7th of 30 students on a field excursion to a local historical site.

*The **objectives** of planning the visit were as follows:*

The students would understand the people, events, problems, and ideas that were significant in creating the history of their locality.

To make the students keen observers towards the place where they live. These skills would be used by them to decode about the societies beyond their own locality/ region. This leads towards making them holistic thinkers about their own as well other societies.

The students can describe distinctive developments in style and technology used for construction of temples, tombs, and mosques with examples, with help of their local context.

Before the excursion, certain lessons on sources of history and their interpretation were done. After 3-4 in-depth classes which involved working with scriptures, paintings, social structure, and their own family history, the excursion was planned. I divided the class in five groups with each group having a different thing to work upon during and after the field visit. This helped giving a clear objective to each student and preparing themselves accordingly before the visit. The division was done as follows:

Explore what you see	***Let us interpret***	***Why? Who and What?***	***Time travel to the past***	***We will become the preservers***
Study the details of the architecture. The children would need to observe the patterns in the architecture, the possible materials that were used to make it, the styles that were used to make it, etc. *Mode of presentation: this group can make an elaborate drawing of the place visited or a model presentation. They can also try presenting by making a model/ elaborate drawing of a building they would like to build.*	*Dig in the forms of documentation available of that place. Paste pictures or try writing them down. Along with this, the group needs to record oral stories/ myths/ poems/ folk songs of that place. For this they will have to interact with the older people of the community for oral records of the place. This can also record the beliefs people have related to that place.*	*Understand the relevance and the connection that place had with the community from a social, political, cultural and economic angle. Some suggestive questions for the learners to explore:* *What was the place used for?* *Who could access the place? Think in terms of class, caste and gender.* *Did the place play any role in the economic activities of the community? If yes, what type of market or trade scenario was there?* *What cultural significance did the place hold?* *What do you think was there before this place was built?*	*This group time travels back to the era when the place was built. They are to frame a flow of their own story about how it would have been back then. The group writes about the life people live, what they eat, what they wear, what they do for a living, the relation they have with animals and how did they use this place.*	*This group works on present and future of the place. They need to capture the details of this place 'today':* *How is it being used?* *Who all access it?* *Why is it still an eminent place?* *Does this place need maintenance? Would they like to save it from diminishing?* *If yes, how would they do so?*

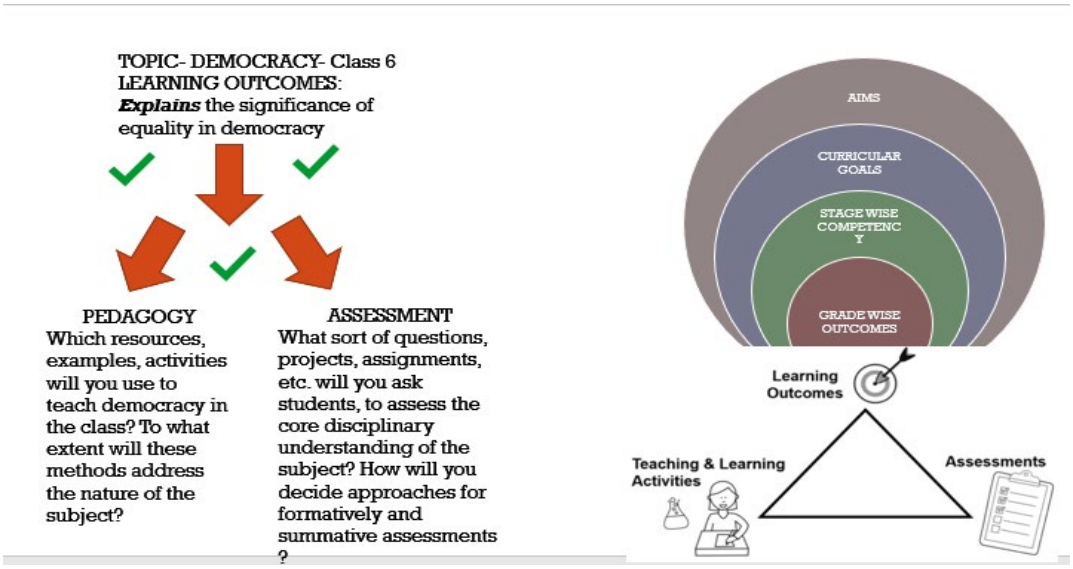
This kind of planned excursion will introduce the students to work on interpreting and even trying out building history on their own. Involving the students in the process would help them relate to historical inquiry more concretely.

5.6.3 Learning Outcome-Pedagogy and Assessment Interlinkage in the Classroom

The pedagogy in a Social Science classroom must be centered around objectives and achievable outcomes and competencies. Assessments should be neatly integrated in the process. All 3 components of Learning Outcomes, pedagogical processes and assessments should be carried out as an iterative process within a classroom,

Illustratively,

Figure B-5.6-i



In the example given above, the teaching of the concept of democracy should begin with an understanding of what the expected outcomes are from this topic. These outcomes are a combination of concepts, skills, and dispositions that students need to acquire. Once the teacher is familiar with the outcomes, they need to systematically use relevant pedagogical approaches to initiate and sustain discussions on ideas of democracy in a class moving towards a realization of the outcomes expected from them. Well-planned resources, activities, and assignments will help in deepening the understanding of this concept. The lesson plan and class process will both determine to what extent the core and essential skills of the subject are to be built. Assessments in such a case must be visualized in both formative and summative ways. In this case, a wide variety of assessment tasks to check the understanding of the students regarding the concept of democracy would be helpful to modify the teaching-learning processes as the teacher moves along the lesson.

Section 5.7
Assessment

In education, assessments have usually served a limited purpose of ranking students using paper pencil tests and exams. While such assessments have helped in grading students and taking decisions on promotion or detention, their educational value in helping the teacher improve their practice or in helping the students learn better has been quite limited.

Despite several policy level changes in the past few decades in the aims of education and the curricular expectation from different school subjects, assessments have unfortunately remained unchanged. The narrowness of the assessment has reduced the scope of the subject and the teaching to a means of passing the test. Teaching to the test has become detrimental to learning a subject well.

5.7.1 Challenges in Assessment and Evaluation

Designing and implementing quality assessments in Social Sciences has several challenges:

a. Social Science question papers appear to be general knowledge papers where mastery over inert facts such as names and dates of events, textbook definitions, names of institutions, and key personalities take precedence over the assessment of conceptual clarity, disciplinary thinking, and Social Science skills. This has been one of the fundamental problems of Social Science assessment that needs immediate attention.

   One reason for the above scenario has been a **lack of clarity on the curricular goals** of Social Science and the kind of competencies and learning outcomes that need to be achieved through the subject. For example, while learning about a specific period in history is it only important to remember the names of the rulers and their key contributions? or is it necessary to understand why certain historical events took place during that time? How did it influence various aspects of society during that period? What were the implications of that period and its events in later times? How were events in one region connected to those in another? In the absence of clarity of competencies and outcomes, Social Science assessments suffer from the issue of validity.

a. Another issue in the assessment of Social Science is a **lack of common shared understanding of what is expected as a response to a particular question**. Very often facts take precedence over the student's ability to connect facts, give their opinion on events or for that matter suggest a solution to a problem. Even when application-level questions are tested in the paper, the expected responses are directly quoted from the textbook. As a result, students' ability is merely judged on the quantity of facts reproduced rather than their ability to apply or analyse their thinking. This compromises the reliability of the assessment.

b. The third issue in the assessment of Social Science is **little depth and excessive breadth of knowledge and understanding**. Very often the content in Social Science is so broad that teachers end up developing a question paper that tries to cover as much content as possible. As a result, students get stressed in remembering disproportionately large amount of

information. There is also a tendency to mug up few chapters because of which students are unable to form a holistic understanding of various interrelated events or phenomena. For instance, a student may learn about climate without engaging enough with vegetation or soil. As a result of this, their competency to make connections between climate, vegetation and soil remains under-developed.

5.7.2 Principles of Assessment

a. Assessment in Social Science should be 'understanding what children have learnt and their ability to problem-solving and put that knowledge into practice'. **It should serve as a tool for gathering evidence about students' learning to make changes in the teacher's pedagogy.**

b. Assessments should avoid only assessing inert facts and information. They should **measure the core concepts, skills, and dispositions** that define the curricular goals of Social Science. For instance, asking children to trace the history of any monument/temple/mosque/church/monastery in their locality by asking questions to the local people, looking at documents of local revenue officer, and other related available records.

c. Assessment must move beyond paper-pencil tests. It must use authentic assessment methods that allow for **complex skills and diverse abilities to be tested in more valid and reliable ways.** Assignments, reflective essays, project works, field surveys, map reading, and interviews must be planned in a manner that the students can be assessed based on their understanding of concepts and the processes involved in Social Science. Assessment of collaborative work involving the designing of a poster, developing a movie on a historical monument, collecting occupational data of different persons in one's locality, representing poverty or unemployment data in one's region, interpreting a topographical map, etc. should be encouraged. All methods and tools of assessment should trigger students to apply and reflect on the concepts of the curriculum.

d. Assessment items should, as far as possible, **address normative concerns such as peace, equality, justice, and fraternity amongst students.** An important aim of Social Science teaching is also to foster values and dispositions. It is necessary for Social Science assessments to help students examine beliefs and biases, do the given task with promptness, do the work with efficiency and understanding, argue in favour of and opposition to given social reality, participate in group work, consolidate a discussion, be able to find the elements of equality and diversity in social phenomenon, be able to adjust with diversity and change, and have a sensitive relationship with human beings, animals, and the natural environment. There is a need to adopt 'continuous and multi-faceted assessment' as suggested by the New Education Policy 2020 to highlight the overall capabilities and life-skills of the students.

e. Assessment in Social Science should **enable students to form reasonable views and arguments that are evidence based and follow an empirical approach.** Open ended questions that encourage students to evaluate the information, provide arguments and support it with valid evidence, must be encouraged. For instance, instead of asking students to list the advantages of building dams, students can be asked to evaluate the pros and cons of building dams and take a position on whether it is necessary for a country/region's

development? While asking such questions, the answer key/marking scheme should be in the form of a rubric where along with facts the quality of the students' reasoning is assessed.

f. Assessments should be **ongoing and integrated with the teaching-learning process.** Questioning students, making them do group work, think-pair and share, etc. can be effective ways to conduct formative assessments in the classroom. While doing such informal assessments teacher should be mindful of taking stock of what is the quality of discussion in the classroom and accordingly modify her teaching plan.

g. It is just as important for teachers and assessment administrators to **analyse students' responses to develop better quality assessment.** Analysing students' responses will inform them about areas of improvement, along with additional support and resources required for better attainment of learning objectives.

5.7.3 Framework for Classroom Assessment

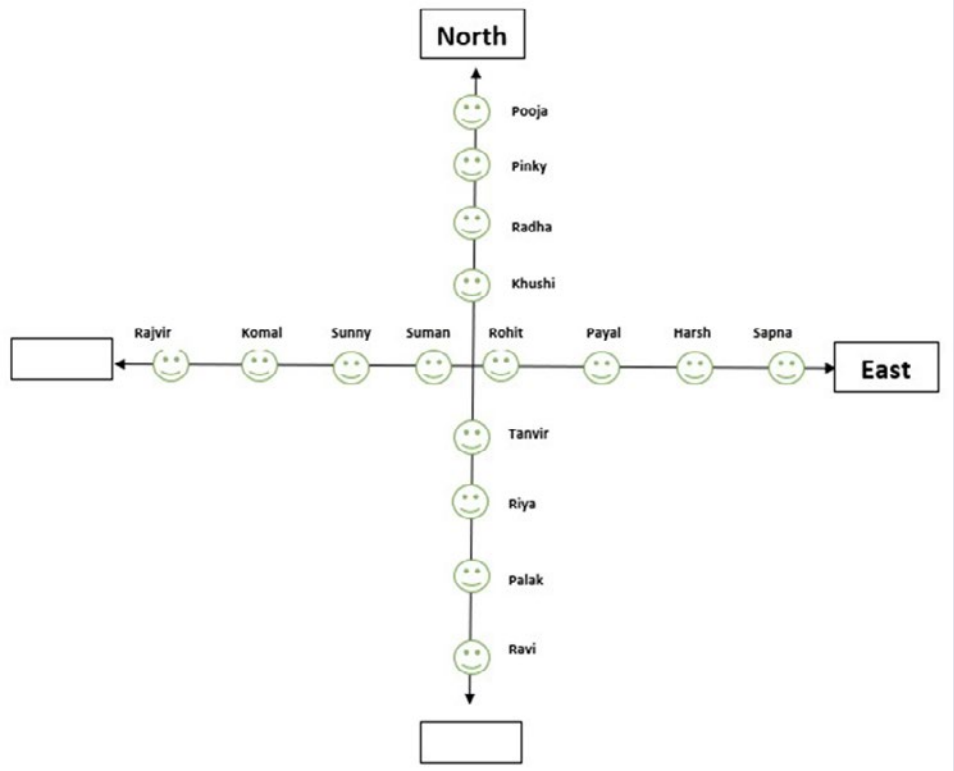
In any classroom, assessment is an iterative process of planning, designing, and using. The framework below is a handy guide for teachers to think through the assessments in their class

Planning assessment	Designing assessment	Using assessment
• What to assess? • Why to assess (purpose)? • How frequently to assess? • What form of data or reporting is needed? • Who will conduct the assessment- teacher/students/ peers? • How will the assessment information be used?	• Choice of tools and methods • Selected response questions - like MCQ, fill in the blanks, true or false • Constructed response questions- essay type, short answers, open ended questions • Perfomance based assessments • Authentic assessments • Rubrics for evaluation	• Formative purposes- giving feedback to students; modifying teacher strategies; peer and self assessment; response analysis of students' misconceptions and errors • Summative purposes-tracking overall progress of class, reporting to parents, promotion/detention/remediation

Teacher's Voice B-5.7-i (To be edited)

Assessment, Maps

I wanted to assess my students' understanding of directions during the class on maps. I planned a mid-class assessment with an interactive worksheet so that I could get a sense where each of my student's understanding has reached.



The following questions were asked:

a. *Fill the missing directions in the blocks*

b. *In what directions are others standing:*

   i. *Rohit till Sapna*

   ii. *Suman till Ravi*

   iii. *Tanvir till Ravi*

   iv. *Khushi till Pooja*

c. *How many students are standing to the North and South of Riya?*

d. *Who is standing to the East of Sunny?*

e. *How many students are standing to the South of Pinky?*

f. *Write the names of all those standing West of Payal?*

Chapter 6

Arts Education

The Arts are a vast range of individual and collective human activity that is aimed at creative pursuit through innovative and imaginative expression and cultural engagement. They involve a wide range of thinking, doing, and responding activities using various materials and media. They can very broadly be classified into the visual, literary, and performing arts.

In the school curriculum, Arts education is about developing the creative capacities, aesthetic sensibilities, and cultural literacy achieved through various forms of visual arts, a variety of crafts (local living traditions), digital art, as well as the performing arts such as storytelling, puppetry, dramatic arts, music, dance, and movement arts. The range of genres could include traditional, classical, folk, popular, and contemporary styles of creative expression.

When students share their ideas and feelings through a variety of art forms like painting, crafts, music, dance, and theatre, they recognise one another's strengths and challenges, which nurtures empathy, appreciation, cooperation, and trust. This is fundamental for developing social and human values like *ahimsa*, love, compassion, friendship, and peaceful co-existence.

Section 6.1
Aims

For the individual student, arts education in all Stages of school education teaches students capacities for *making, thinking,* and *appreciating*. These three processes are critical for developing **creative thought and expression** in them. The arts are also well known to enable socio-emotional well-being. Research suggests strong links between arts training and overall brain development. Exposure to art and the experiences of producing art help with improvement in cognition and significantly impact individuals in their **emotional awareness and regulation**.

Since the arts lend themselves to learning experiences that engage many senses at a time, students with diverse interests and learning abilities often find their place in the arts. They develop skills in crafting and creating artworks, develop aesthetic sensibilities, an appreciation for nature, creativity, innovation, and confidence in their abilities. They learn to find **diverse ways of persisting and solving various challenges**. All these are important for individual growth and contribution towards society.

The arts are valuable in celebrating human experiences with collective joy, a means to knowledge, and learning about life. The arts provide enjoyable opportunities for students to connect with their own culture and appreciate the diversity of artistic expression in other cultures. As a common language, the **arts bring people together and lead them to develop tolerance, understanding, and mutual respect.**

Through a good, effective arts education programme, every student in every school in India must be provided equal opportunities to:

a. Enjoy exploring and creating artworks, gain a variety of aesthetic experiences, and derive joy from all forms of art

b. Apply one's imagination and creativity, and learn a variety of artistic capacities through experimentation and sustained practice in the arts

c. Express ideas and emotions through the arts, as well as nurture empathy and sensitivity towards the expressions of others

d. Appreciate the beauty in nature and discover connections between the arts and other disciplines and with everyday life

e. Develop a sense of belonging towards one's own culture and traditions, as well as an appreciation for India's multicultural diversity and the knowledge of contemporary artists and art practices.

Section 6.2
Nature of Knowledge in the Arts

The Arts are about human aesthetic sensibility. **Aesthetic sensibility refers to our ability to perceive beauty, arrive at considered judgements regarding the good and beautiful, and strive towards a sense of refinement in the art-making process.** Art is a personal form of understanding beauty, shape, symmetry, pattern, and movement blended in expression to evoke feelings. Artistic work covers both conceptual and procedural knowledge and deals with the 'embodied' sensory and emotional experiences of human beings.

Yatho hasta tatho drishti

Yatho drishti tatho manah

Yatho manah tatho bhaava

Yatho bhaava tatho rasa

- Verse from the *Natyashastra*

Translation:

Where the hand (action) goes, there follows vision

Where the vision goes, there follows the mind (thought)

Where the mind goes, there follows feeling (emotion)

Where the feeling goes, there follows aesthetic pleasure

'Making' is at the centre of artistic work: The above verse in Sanskrit captures the essence of making art where the creative process of exploring making first, thinking/reflecting, and appreciating after. The concrete experience of 'making' or 'doing' is central to the arts, through which both artistic processes and concepts are understood. Along with this, 'how something is done' defines its artistic nature e.g., one can play with utensils to either make disturbing noises or create soothing music.

Art sparks attention to new ways of looking: We often are creatures of habit and tend towards inattentive repetition. The arts spark attention and a 'new life' into our habitual perceptions and produce unique and enjoyable experiences. Such experiences contain an 'activated flavour' that is known as *rasa* or the aesthetic/artistic experience.

Artistic exploration occurs within defined rules: Creating art or responding to it requires the ability to distinguish aesthetic experiences and make choices based on context, ideas, emotional experiences, intentions, and the presence of an audience. Most art forms follow some conventions within which artistic exploration happens. Although these may be read as constraints (e.g.,

the structure of classical *raagas* in music), they in fact help in pushing the boundaries of imagination and creativity since it requires more effort to be creative within defined rules or structures.

There are differences in the natures of visual and performing arts: There are innumerable forms of art broadly categorised into the visual arts and the performing arts (some art forms have characteristics of both these). The visual arts offer 'static' experiences to viewers e.g., paintings and sculptures that are viewed as complete artworks and do not undergo changes while viewing. The performing arts on the other hand offer 'dynamic' (time-based) experiences to their audience e.g., music, dance, and theatre are dependent on the passage of time for their audience to experience a completed work. A tradition like *Patachitra* combines aspects of painting and performance when the artist sings and narrates the story depicted in the scroll painting.

Art is a comprehensive engagement: The arts involve complex processes of critical thought, expression, and response through a comprehensive engagement of mind, body, and emotion Art, like language, permeates all human knowledge in processes of information acquisition, learning, and sharing. Playing the flute not only produces an aesthetic experience *(rasanubhava)* but learning to play it develops an understanding of sound and its production, as well as the knowledge of similar materials and acoustics. Theatre and the dramatic arts are by nature holistic knowledge systems that combine literature, music, movement, visual arts and crafts.

Section 6.3
Approach to Arts Education

NEP 2020 mentions that there would be 'no hard separation among 'curricular', 'extracurricular', or 'co-curricular', among 'arts', 'humanities', and 'sciences', or between 'vocational' or 'academic' streams. Subjects such as physical education, arts and crafts, and vocational skills, in addition to science, humanities, and mathematics, will be incorporated throughout the school curriculum.' This NCF, therefore, places the arts as one of the main curricular areas. It recognises the vast diversity of cultural expressions that exist across the length and breadth of India. Local arts and cultures would be the starting point for arts education in all Stages of school education. This approach aims to develop an understanding among Teachers and students that the arts are around us, and they are an integral part of our life, and therefore an essential subject for students of all Stages of education.

6.3.1 Arts in Stages

At every Stage of Arts Education students learn to express their views on what is 'aesthetic' which is good and beautiful, and the characteristics that contribute to their ideas of beauty. While subjective student views are encouraged, they must also learn about the overarching criteria that define the aesthetic qualities of visual artworks, music, theatre, dance and movement. These criteria are established through the art form, as well as society and culture. For example, the principles of visual design like focus, balance, and proportion would determine the aesthetic qualities in various forms of visual arts. However, what is considered a beautiful proportion may vary from one culture to another. Students imbibe their aesthetic sensibility from their local culture. An arts practice helps them examine their aesthetics more closely, and expand their 'tastes' by participating in art processes.

In the Foundational Stage, children are encouraged to express their views while responding to artworks, and they share their personal preferences. By the end of the Preparatory Stage, students can be expected to distinguish artworks by quality and level of completion. In the Middle and Secondary Stages, students must reflect on their aesthetic choices and not blindly conform to trends and cliques because of social acceptance. In these ages, they can learn to push the boundaries of aesthetics and culture through gradual steps of inquiry, rigorous exploration, and practice, through which they validate their aesthetic choices. As students mature, their observation and sensitivity to detail develop and this enables them to appreciate well-crafted objects and acquire sophistication in their artistic expressions. They develop aesthetic judgement and an ability to evaluate artworks based on common criteria.

All creative processes that take place in the art classroom need to involve the pursuit of aesthetic qualities. This in turn reflects in their art-making process by setting higher benchmarks for creative refinement in thought, expression, and technical skills.

6.3.2 Arts Integration

In addition to teaching and learning the arts as a main curricular subject, the arts must also be integrated into the classroom practices of all other curricular areas. According to NEP 2020, "Art-integration is a cross-curricular pedagogical approach that utilizes various aspects and forms of art and culture as the basis for learning concepts across subjects. As a part of the thrust on experiential learning, art-integrated education will be embedded in classroom transactions not only for creating joyful classrooms but also for imbibing the Indian ethos through the integration of Indian art and culture in the teaching and learning process at every level". Schools need to ensure that arts-integrated learning is practised in the teaching of all subjects in a manner that gives equal importance to achieving learning in the arts in other disciplines. Arts integration cannot be a replacement for dedicated art classes in the school curriculum. The arts as a body of knowledge have their content, skills, methods, and processes, which require dedicated space and time. This document focuses on arts education specific to art knowledge and Learning Standards in the visual and performing arts. This would not only guide Teachers in teaching the arts as a curricular subject, but also find meaningful connections with other disciplines to integrate concepts, content, pedagogy, and assessment practices.

6.3.3 Emphasis on Process, not Product

Process and not the product is central to learning the arts. Arts curricula across the world have recognised the educational value of developing frameworks that are marked by artistic processes like ideation, creation, production, performance/presentation, response, review, and making connections. This ensures that Teachers and students focus on all aspects of development (cognitive, affective, psychomotor, socio-emotional and language) while learning the arts. Accordingly, the Learning Standards integrate the thinking, making and appreciation processes that are fundamental to arts education.

Thinking processes refer to the development of ideas and concepts, creating new meanings and connections, understanding art forms and their elements, inquiry and critical reflection on art practices and aesthetic experiences, and connecting arts knowledge with the knowledge of other disciplines.

Making processes are about the multisensorial engagement in creating artwork, expression of thoughts and emotions through different art forms, exploration of materials, tools, and techniques, improvisation, developing and refining craft and skills, and the production of artwork or performances.

Appreciation processes refer to gaining exposure to a wide range of art forms and practices through both active and passive modes, developing an awareness of sense perception as well as physical, emotional, and intellectual states, communicating a variety of responses to art and aesthetic experiences, understanding the social, historical, and contextual background of artistic practices, assessing artworks, and developing aesthetic judgement.

All these processes are interlinked and cannot be addressed in isolation if a meaningful and complete art learning experience is desired.

Section 6.4
Current Challenges

The status of arts education in schools is troubled by several challenges, some of which are as follows:

a. Lack of time, resources, and seriousness given to the arts
Art activities are often limited to fun and entertainment during occasions and cultural events at schools. Art Education is either not timetabled at all or they are stopped before and during exams. Time allocated for Arts classes is often taken away for exam preparation or syllabus completion in other subjects. There is often little/no physical space allocated for art activities and little appropriate utilization of art resources in most schools. Added to this, there is often very little planning, organizing, assessments, and review in art teaching. There are no textbooks/handbooks to guide the art teacher and there is no serious assessment of learning in the arts.

b. Reinforcing stereotypes and meaningless ideas
In the name of arts, students are made to admire and reproduce stale/unoriginal images, e.g., drawings of landscapes with triangular mountains, a semi-circular sun, and a few trees regardless of whether the student has witnessed such a landscape. Similarly in Dramatic arts, students perform morally heavy plays based on themes with which they have no personal connections, or dance to the tunes of popular songs that further reinforce social stereotypes.

c. Acute shortage of well-prepared Arts Teachers
Schools across the country need many more art Teacher recruitments. Art teaching needs preparation. Artists, craftspeople, and performers cannot simply become teachers. Becoming an Arts Teacher requires an understanding of educational perspectives, capacity for educational judgement, as well as initial guided practice in art teaching. Teacher Education programmes do not have appropriate arts orientation for all Teachers and initial preparation of specialised arts Teachers. As a result, Arts Teachers struggle to understand the requirements of Arts Education and end up imposing inappropriate expectations on students. In cases where Teachers of other subjects show an interest in the arts and their teaching, it is neither appreciated nor supported.

d. Social aspirations
There is a general lack of interest towards arts education in society since people lack awareness about its educational value in developing aesthetic, creative, and cultural capacities in students. The wide scope for pursuing arts as a career also remains unknown to many.

Box B-6.4-i

Addressing the Constraint of Teacher Availability

Many schools do not have dedicated art teachers or adequate space and materials for the arts. In such cases, schools could choose from various forms of visual and performing arts that are already practised in the region, identify ***local artists who could be resource persons and use natural materials and local resources*** *for arts facilitation. Local potters, toy-makers, basket weavers (E.g., Gond, Warli, Madhubani, Maandana), and practising artists (E.g., sculptors, photographers, book illustrators, muralists) in the locality could be invited to the school to lecture-demonstrate. With some education and initial support in learning pedagogical practices, these artists may even be employed part-time or full-time by schools. However, until such an arrangement happens, Teachers need to ensure that arts education aligns with the core principles mentioned in this document by assisting resource persons when they visit to teach the arts.*

In the Foundational and Preparatory Stages, art ***classes may be facilitated by any Teacher in the school who has a basic orientation on arts education*** *for the respective Stages, or with the assistance of local resource persons. They must encourage students to openly express their ideas and emotions and playfully experiment with a range of materials in forms of visual arts (rangoli, drawing, painting, textile arts, puppetry, sculpture, pottery etc).*

By the Middle Stage, ***schools must prioritise recruiting at least one exclusively assigned art teacher*** *who can teach either the visual arts or performing arts or both. A Teacher for the Middle Stage should have the capacity to provide appropriate encouragement and inputs to nurture the individual creativity of all students and expand their range of artistic expression.*

In the Secondary Stage, schools need to ideally ***recruit one Teacher for the visual arts and one Teacher for the performing arts*** *who have adequate knowledge of the arts, as well as education perspectives that are required for teaching the arts at the Secondary Stage. Until these ideal scenarios become achievable, schools could collaborate with arts organisations and the local art communities to fulfil the arts education needs of the curriculum.*

School libraries often have very little material on the Arts. They should ***include a wide range of books and audio-visual resources.*** *These could be museum/exhibition catalogues with images of artworks, books on artists, art magazines/periodicals related to the visual and performing arts, children's literature with artistic illustrations and so on. Songbooks with musical notations or literature for drama could also become important reference material for students and Teachers.*

Section 6.5
Learning Standards

The Learning Standards in this section are for the visual arts, theatre, music, and dance and movement. All schools must aim to provide maximum opportunities for students to explore any form of visual arts AND any form of performing arts (music, theatre, dance, and movement) across all the Stages. The art forms that are chosen by the school should be appropriate and accessible to all students and have relevance in their contexts. Based on the art forms that a school chooses, the relevant Learning Standards specific to the visual art form or performing art form can be applied. Teachers need to understand the importance of process in all art forms and ensure that students develop the necessary Competencies by the end of every Stage.

A 'Nested' Design of Learning Standards: Giving due consideration to the time schools might require in the implementation of Arts Education as a full-fledged subject across the Stages (for example appointment of teachers, acquisition of resources), this document contains **'Nested Learning Standards'** for Arts Education, wherein Learning Standards have two subsets which have been detailed. The first subset called Learning Standards 1 is nested within Learning Standards 2. Thus, **'Learning Standards 1' should be accomplished by all schools from the very initiation of the implementation of this NCF, and Learning Standards 2 should be accomplished as soon as schools add the required resources for Arts Education.**

The table below illustrates how can implement this.

Table B-6.5-i

School context	Preparatory	Middle	Secondary (9th and 10th Grade
Has no visual arts teacher or performing arts Teacher	Learning Standards-1 in one form of visual art AND one form of performing art		
Has one visual art Teacher	Learning Standards-2 in visual art AND Learning Standards-1 in performing art		
Has one performing art Teacher (music/ dance/ theatre)	Learning Standards-2 in performing art (in the particular form that the Teacher is familiar with) and Learning Standards 1 in visual art		
Has one visual art teacher and one performing art teacher	Learning Standards-2 in both visual art and performing art		

6.5.1 Preparatory Stage

6.5.1.1 Learning Standards – 1

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

CG-1 Develops an enjoyment for the arts and exercises their creativity and imagination in visual and performing arts activities	C-1.1 Creates and presents a variety of artworks to communicate their ideas and emotions in any of the visual and performing art forms (emphasis on variety in music, painting, drawing, crafts, drama, dance and movement, and local art forms) C-1.2 Describes the varied materials, tools, and processes used in the visual and performing arts and demonstrates familiarity with some of these in their own artworks e.g., identifies and names some musical instruments and demonstrates simple beats on a dholak, khanjira, bells, utensils or one's own body (clapping, tapping, making different sounds using mouth and voice) C-1.3 Creates artworks collaboratively and shares own thoughts and feelings while responding to arts and culture in their surroundings

6.5.1.2 Learning Standards – 2

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

a. Visual Arts

CG-1 Develops confidence to explore, depict, and celebrate human experience through the arts	C-1.1 Expresses enthusiasm to create a variety of images that depict their everyday life, emotions, and imaginations C-1.2 Shares a variety of ideas and responses while working collaboratively in the visual arts
CG-2 Exercises their imagination and creativity freely in the arts	C-2.1 Creatively uses different combinations of visual elements (line, form, colour, space, texture) while depicting their everyday observations, personal experiences, and feelings C-2.2 Compares and contrasts the visual elements, themes, and expressions of artworks shared in the classroom

CG-3 Explores basic processes, materials, and techniques in the arts	C-3.1 Makes choices while working with materials, tools, and techniques used in the visual arts C-3.2 Practices steps of planning, executing, and presenting while creating visual artworks individually and collaboratively
CG-4 Explores beauty in their surroundings, and develops an interest in a variety of local art forms and cultural practices	C-4.1 Recognises visual elements in nature and describes their artistic qualities C-4.2 Demonstrates curiosity towards local art forms and culture

b. Theatre

CG-1 Develops confidence to explore, depict, and celebrate human experience through the arts	C-1.1 Expresses enthusiasm to depict a variety of objects, people, situations, and experiences in drama activities C-1.2 Shares ideas and responses while working collaboratively in the dramatic arts
CG-2 Exercises their imagination and creativity freely in the arts	C-2.1 Creates and performs drama in the classroom based on everyday events, through various combinations of characters, movements, gestures, expressions, postures, and basic props C-2.2 Compares and contrasts elements of drama, themes, and related artistic expressions created in the classroom
CG-3 Explores basic processes, materials, and techniques in the arts	C-3.1 Makes choices while working with materials, tools, and techniques used in the dramatic arts C-3.2 Practices steps of planning, executing, and presenting while creating dramatic artworks individually and collaboratively
CG-4 Explores beauty in their surroundings, and develops an interest in a variety of local art forms and cultural practices	C-4.1 Recognises elements of drama and movement in nature and describes their artistic qualities C-4.2 Demonstrates curiosity towards local art forms and culture

c. Music

CG-1 Develops confidence to explore, depict, and celebrate human experience through the arts	C-1.1 Expresses enthusiasm to create and perform a variety of music that is familiar to them C-1.2 Shares ideas and responses while working collaboratively in music
CG-2 Exercises their imagination and creativity freely in the arts	C-2.1 Creates and practices songs and rhythms in a variety of musical arrangements (arrangement of vocal, instrumental, solo, duet, ensemble/group) C-2.2 Compares and contrasts musical elements (*laya, taala, sur, bhaava*), lyrics, and expressions in a variety of musical styles introduced in the classroom
CG-3 Explores basic processes, materials, and techniques in the arts	C-3.1 Makes choices while working with voices, instruments, and arrangements used in music C-3.2 Selects a variety of music during collaborative practice and participates in rehearsals for a performance
CG-4 Explores beauty in their surroundings, and develops an interest in a variety of local art forms and cultural practices	C-4.1 Recognises musical elements in nature and describes their artistic qualities C-4.2 Demonstrates curiosity towards local art forms and culture

d. Dance and Movement

CG-1 Develops confidence to explore, depict, and celebrate human experience through the arts	C-1.1 Expresses enthusiasm to create and perform a variety of dance and movement that is familiar to them C-1.2 Shares ideas and responses while working collaboratively in dance and movement

CG-2 Exercises their imagination and creativity freely in the arts	C-2.1 Creates and practices dance, and movement sequences based on everyday actions and personal experiences C-2.2 Compares and contrasts movements, rhythms, postures, themes, and expressions in a variety of dance and movement styles introduced in the classroom
CG-3 Explores basic processes, materials, and techniques in the arts	C-3.1 Makes choices while working with movement steps, instruments, costumes, and arrangements used in dance and movement C-3.2 Selects a variety of dance and movement sequences during collaborative practice and participates in rehearsals for a performance
CG-4 Explores beauty in their surroundings, and develops an interest in a variety of local art forms and cultural practices	C-4.1 Recognises elements of dance and movement in nature and describes their artistic qualities C-4.2 Demonstrates curiosity towards local art forms and culture

6.5.2 Middle Stage

6.5.2.1 Learning Standards – 1

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

CG-1 Develops knowledge about various art forms of the region/state and develops artistic methods and skills in some of the art forms that they are exposed to	C-1.1 Demonstrates basic skills in the arts that they are exposed to, and creates own variations e.g., *Mandana/ alpana/kolam/aipan*, narrating stories from the Panchatantra using local forms of puppetry, performing folk songs/dances of their region C-1.2 Describes the different materials, tools, and techniques used in local art forms in their region/state, and uses them with care while creating their own artworks e.g., describes the process of natural dyeing used in Kalamkari, and experiments with creating artworks using colours sourced from natural materials around them like plants, vegetables, charcoal, soil, brick, etc. C-1.3 Recognises multiple viewpoints and shares own thoughts and feelings while responding to a variety of arts and cultural practices from their region/state e.g., watches a traditional folk-dance performance specific to their state/region either live or online, shares their responses and interprets meanings and emotions conveyed by different movements, and rhythms.

6.5.2.2 Learning Standards – 2

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

a. Visual Arts

CG-1 Develops openness to explore and express themselves through various art forms	C-1.1 Expresses confidently their personal and everyday life experiences through various visual art forms C-1.2 Demonstrates flexibility in the process of collaborating and developing visual arts practice
CG-2 Applies their imagination and creativity to explore alternative ideas through the arts	C-2.1 Creates visual artworks based on situations/stories that challenge stereotypes observed in their surroundings (e.g., gender roles) C-2.2 Connects visual imagery, symbols, and visual metaphors with personal experiences, emotions, and imaginations
CG-3 Understands and applies artistic elements, processes, and techniques	C-3.1 Demonstrates care and makes informed choices while using various materials, tools, and techniques in the visual arts C-3.2 Refines ideas and techniques of visual expression from the stage of planning to the final presentation, and reviews the entire process
CG-4 Acquaints themselves with a range of aesthetic sensibilities in regional arts and cultural practices	C-4.1 Demonstrates familiarity with various local and regional forms of art C-4.2 Describes the life and work of a few visual artists in their region and across India

b. Theatre

CG-1 Develops openness to explore and express themselves through various art forms	C-1.1 Expresses confidently their personal and everyday life experiences through various drama activities C-1.2 Demonstrates flexibility in the process of collaborating and developing drama work

CG-2 Applies their imagination and creativity to explore alternative ideas through the arts	C-2.1 Creates and performs drama based on situations/stories that challenge stereotypes observed in their surroundings (e.g., gender roles) C-2.2 Connects elements of drama, themes and symbols with personal experiences, emotions, and imaginations
CG-3 Understands and applies artistic elements, processes, and techniques	C-3.1 Demonstrates care and basic stage etiquette; and makes informed choices while using various materials, tools and techniques of dramatic arts C-3.2 Refines ideas and techniques from the stage of planning to the final presentation in drama for external audiences, and reviews the entire process
CG-4 Acquaints themselves with a range of aesthetic sensibilities in regional arts and cultural practices	C-4.1 Demonstrates familiarity with various local and regional forms of theatre C-4.2 Describes the life and work of a few theatre artists and performers in their region and across India

c. Music

CG-1 Develops openness to explore and express themselves through various art forms	C-1.1 Expresses enthusiasm to create and perform a variety of music that is familiar to them C-1.2 Demonstrates flexibility in the process of collaborating and developing practices in music
CG-2 Applies their imagination and creativity to explore alternative ideas through the arts	C-2.1 Creates and performs songs and musical compositions that challenge stereotypes observed in their surroundings (e.g., gender roles) C-2.2 Connects elements of music (lyrics, raagas and rhythms) with personal experiences, emotions and imaginations
CG-3 Understands and applies artistic elements, processes, and techniques	C-3.1 Demonstrates stage etiquette and care for musical instruments and makes informed choices while using resources and techniques in music C-3.2 Refines ideas and methods of musical expression from the stage of planning to the final performance, and reviews the entire process

CG-4 Acquaints themselves with a range of aesthetic sensibilities in regional arts and cultural practices	C-4.1 Demonstrates familiarity with various local and regional forms of music C-4.2 Describes the life and work of a few local musicians and performers in their region and across India

d. Dance and Movement

CG-1 Develops openness to explore and express themselves through various art forms	C-1.1 Expresses confidently their personal and everyday life experiences through a variety of dance and movement activities C-1.2 Demonstrates flexibility in the process of collaborating and developing dance and movement practice
CG-2 Applies their imagination and creativity to explore alternative ideas through the arts	C-2.1 Creates and performs dance and movement sequences that challenge stereotypes observed in their surroundings (e.g., gender roles) C-2.2 Connects elements of dance and movement (*mudras*, gestures, and postures) with personal experiences, emotions, and imaginations
CG-3 Understands and applies artistic elements, processes, and techniques	C-3.1 Demonstrates stage etiquette and care for stage equipment, props, and costumes, and makes informed choices while using dance and movement techniques C-3.2 Reworks ideas and methods of expression used in dance and movement from the stage of planning to the final performance and reviews the entire process
CG-4 Acquaints themselves with a range of aesthetic sensibilities in regional arts and cultural practices	C-4.1 Demonstrates familiarity with various local and regional forms of dance and movement C-4.2 Describes the life and work of a few local dancers and movement artists in their region and across India

6.5.3 Secondary Stage

6.5.3.1 Learning Standards – 1

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

CG-1 Develops capacities in any one form of visual or performing arts and develops an appreciation for diverse art practices and traditions in India	C-1.1 Demonstrates rigour and regularity in art-making processes, rehearsals, and performance/displays at the school level and inter-school events e.g., regularly practices drama or music and rehearses specific pieces for performance at an event, allocates a few hours a week to practice vocal/instrumental techniques, and rehearses group song with peers C-1.2 Imaginatively applies artistic techniques, tools and materials to express their ideas and feelings while working in the visual or performing arts e.g., experiments with a variety of threads, needles and stitch patterns in embroidery; experiments with found materials to create musical instruments C-1.3 Appreciates diverse forms of artistic expression on the basis of artistic qualities and social context. e.g., appreciates the different forms of classical dance practiced in India

6.5.3.2 Learning Standards – 2

a. Visual Arts

CG-1 Develops an understanding of one's interest and aptitude in the arts	C-1.1 Evaluates own interest in visual art forms by considering its scope of applications (fine arts, crafts, applied arts/ design, arts research and management) C-1.2 Initiates discussions and takes steps to find more information and resources to pursue their interest in the visual arts
CG-2 Extends creative practices and artistic expression in different aspects of their life	C-2.1 Applies the elements and principles of visual arts into their artworks and incorporates these into their routine life C-2.2 Recognises the development of visual expression across a series of works

CG-3 Develops own art practice through the knowledge of diverse Indian art forms	C-3.1 Extends explorations and refines techniques in the visual arts through regular practice C-3.2 Incorporates ideas and elements from various genres of Indian visual arts (traditional, popular, contemporary) into their artwork
CG-4 Appreciates the diverse aesthetic sensibilities across various Indian art practices and cultures	C-4.1 Analyses commonalities and differences among diverse forms of Indian visual arts, cultures, and their aesthetic sensibilities C-4.2 Evaluates artwork based on creative expression, artistry and social context

b. Theatre

CG-1 Develops an understanding of one's interest and aptitude in the arts	C-1.1 Evaluates own interest in dramatic arts by considering its scope of application (acting, direction and design, story/ playwriting, backstage, research and stage management) C-1.2 Initiates discussions and takes steps to find more information and resources for pursuing their interest in dramatic arts
CG-2 Extends creative practices and artistic expression in different aspects of their life	C-2.1 Applies the elements and principles of drama into their process and performances while considering external audiences and incorporates these into their routine life C-2.2 Recognizes the development of drama work towards performance across a series of scene works
CG-3 Understands and applies artistic elements, processes, and techniques	C-3.1 Extends explorations and refines techniques in drama through regular practice and rehearsals C-3.2 Incorporates ideas and elements from various genres of Indian dramatic arts (traditional, popular, contemporary) into their own drama work
CG-4 Appreciates the diverse aesthetic sensibilities across various Indian art practices and cultures	C-4.1 Analyses commonalities and differences among diverse forms of Indian theatre, cultures, and their aesthetic sensibilities

c. Evaluates artwork based on creative expression, artistry and social context- Music

CG-1 Develops an understanding of one's interest and aptitude in the arts	C-1.1 Evaluates own interest in music by considering its scope of application (performance, composing, production, sound arts and design, recording, music research and management) C-1.2 Initiates discussions and takes steps to find more information and resources to pursue their interest in music

CG-2 Extends creative practices and artistic expression in different aspects of their life	C-2.1 Applies the elements and principles of music into their musical works and incorporates these into their routine life C-2.2 Recognises the development of musical expression across a series of musical projects
CG-3 Develops own art practice through the knowledge of diverse Indian art forms	C-3.1 Extends explorations and refines techniques in music through regular practice and rehearsals C-3.2 Incorporates ideas and elements from various genres of Indian music (traditional, popular, contemporary) into their own musical work
CG-4 Appreciates the diverse aesthetic sensibilities across various Indian art practices and cultures	C-4.1 Analyses commonalities and differences among diverse forms of Indian music, cultures, and their aesthetic sensibilities C-4.2 Evaluates musical work based on creative expression, artistry and social context

d. Dance and Movement

CG-1 Develops an understanding of one's interest and aptitude in the arts	C-1.1 Evaluates own interest in forms of dance and movement by considering its scope of application (performance, choreography, production, recording, dance and movement research and management) C-1.2 Initiates discussions and takes steps to find more information and resources to pursue their interest in dance and movement
CG-2 Extends creative practices and artistic expression in different aspects of their life	C-2.1 Applies the elements and principles of dance and movement into their performance work, and incorporates these into their routine life C-2.2 Recognises the development of expression in dance and movement work across a series of movement projects

CG-3 Develops own art practice through the knowledge of diverse Indian art forms	C-3.1 Extends explorations and refines techniques in dance and movement through regular practice and rehearsals C-3.2 Incorporates ideas and elements from various genres of Indian dance and movement (traditional, popular, contemporary) into their own artwork
CG-4 Appreciates the diverse aesthetic sensibilities across various Indian art practices and cultures	C-4.1 Analyses commonalities and differences among diverse forms of Indian dance and movement, cultures, and their aesthetic sensibilities C-4.2 Evaluates dance/movement work based on creative expression, artistry as well as social context

6.5.4 Illustrative Learning Outcomes

In this section, one curricular goal (CG) and a corresponding competency under the same goal have been further elaborated as illustrative learning outcomes.

One sample from the Visual Arts is provided at each Stage to guide how Learning Outcomes can be articulated.

6.5.4.1 Preparatory Stage

Curricular Goal (CG-3): Explores basic processes, materials, and techniques in the arts

Competency (C-3.2): Practices steps of planning, executing, and presenting while creating visual artwork individually and collaboratively

Visual Arts

Table B-6.5-ii

	A	B	C
	C-3.2: Practices steps of planning, executing, and presenting while creating visual artwork individually and collaboratively		
	Grades 3 to 5		
1	Discusses theme/ content of the work with peers or teachers before execution *e.g., shares an idea of wanting to draw a tractor. Peers or the teacher may have a conversation about what other imagery can be included... perhaps a driver or passengers, or the road or a field.*	Makes one preparatory sketch for artwork. *e.g., creates a sketch for a birthday greeting that shows the different elements that will be included*	Attempts more than one iteration of visual artwork based on feedback from peers *e.g., creates two or more variations for a poster on Sports Day celebration*
2	Presents completed artwork in the classroom *e.g., completes artwork individually or with peers and presents it formally in the classroom.*	Makes edits in artworks based on discussion with peers before presenting completed artworks *e.g., makes edits based on discussion with peers regarding colours, decorative elements (creating patterns, textures), adding or changing text (what they would write), and other such aspects before completion*	Considers different contexts for presenting visual artworks and plans work accordingly *e.g. Discusses sizes of the poster based on where it will be displayed and identifies appropriate places for displaying the poster; considers text content, size of text, type of images, background colours, spatial divisions, margins, etc.;*

6.5.4.2 Middle Stage

Curricular Goal (CG-2): Applies their imagination and creativity to explore alternative ideas through the arts

Competency (C-2.2): Connects visual imagery, symbols and metaphors with personal experiences, emotions, and imaginations

Visual Arts

Table B-6.5-iii

	A	B	C
	C-2.2: Connects visual imagery, symbols and metaphors with personal experiences, emotions, and imaginations		
	Grades 6 to 8		
1	Closely observes objects, nature, and own body, and uses appropriate visual elements to depict them from their viewpoints *e.g., creates a self-portrait by touching and feeling different parts of the head, hair, face, and neck and modelling it in a small three-dimensional clay sculpture*	Creates own visual symbols and metaphors to communicate personalised meanings in their artwork *e.g., uses two contrasting textures in a sculpture to represent positive and negative emotions*	Explains the connections between visual elements used in artwork and the meanings generated *e.g., explains the connection between the motifs used in traditional Indian textiles and the meanings they might symbolise; and creates personal symbols in own artworks*

6.5.4.3 Secondary Stage

Curricular Goal (CG-3): Develops own arts practice through the knowledge of diverse Indian art forms

Competency (C-3.1): Extends explorations and refines techniques in the visual arts through regular practice

Visual Arts

Table B-6.5-iv

	A	B
	C-3.1: Extends explorations and refines techniques in the visual arts through regular practice	
	Grades 9 to 10	
1	Demonstrates familiarity and practises refining handcrafting techniques in the visual arts *e.g., woodcarving, hand embroidery, painting, basketry, pottery, sculpture, etc.*	Demonstrates familiarity and practises refining machine-assisted visual arts techniques *e.g., machine embroidery, wheel-pottery, weaving, photography, film, new media etc.*

Section 6.6
Content

6.6.1 Principles for Content Selection

Students are exposed to a variety of art forms through their local culture and traditions, as well as entertainment channels in the media and the internet. Therefore, Arts Education must consider what students already know and are exposed to and provide opportunities to discuss and reflect on emerging trends and practices in the cultural space. The selection of content for arts education would take into consideration the following principles:

a. **Consider age-appropriate themes:** The themes and topics that are chosen, as well as physical capacities/technical skills that are required for the chosen arts activities, should consider students' age group, developmental stage, and diverse learning abilities.

b. **Include a diversity of context, resources, and artistic genres:** Starting with the familiar and local in the younger age groups, content could gradually expand to examine the diversity in regional, linguistic, national and international contexts. As the content progresses in the different Stages, it must cover a breadth of genres which include classical, folk, tribal, popular, and contemporary forms of art. Materials and resources that are locally or naturally available must be prioritised.

c. **Uphold the dignity of all types of work:** Content should not reflect any hierarchies among arts processes. It must give equal importance and value to all kinds of physical, intellectual, and emotional work. Similarly, the content should present a wide scope of skills ranging from simple to complex, and in roles ranging from minor to major.

d. **Encourage questioning and critical reflection:** Although the arts are subjective in nature, artistic expression and discussion should encourage students to reason their choices, compare and analyse the processes, and connect them with their aesthetic preferences. Dialogues around art and aesthetics must aim to develop multiple perspectives and respect diverse viewpoints.

e. **Uphold values:** The chosen content must teach students an appreciation for multicultural diversity and inclusion, concern for democratic values, respect and compassion for a variety of artistic expressions, and an interest in working towards justice through creative modes, peaceful dialogue, and cooperation.

6.6.2 Organisation of Content

6.6.2.1 Elements and Principles of Art

Ancient Indian texts like the *Natyashastra, Abhinaya Darpanam, Shilpashastra, Vaastushastra,* and *Chitrasutra* have codified and structured the elements, methods, and aesthetic principles of the arts. The arts of India are one of the most diverse, rich, and expansive in the world, and contemporary art practices combine the knowledge of Indian arts and traditions with knowledge of arts from different parts of the world. All the arts have certain elements and principles that provide a framework to create and evaluate artworks. While some of these (e.g., *bhaava* or emotion)

may be common across different art forms, some elements are specific to the visual arts and others to the performing arts. Students need to develop knowledge of these elements and principles and a vocabulary of the arts used to describe and discuss artworks and their processes.

The following table is a suggested illustration of the elements and principles of the visual and performing arts, which could be introduced at every Stage. This is informed by the developmental stages that occur in students. Elements introduced in the early years will continue to be applicable in the later years, with a gradually increasing level of complexity.

Table B-6.6-i

	A	B	C
	Progression of Elements and Principles across the Stages		
	Visual Arts		
	Preparatory	**Middle**	**Secondary**
1	Space, Line, Shape, Form, Colour, Texture, Pattern, Focus, Emphasis, Balance, Emotion, Narrative	Light, Shadow, Contrast, Value, Perspective, Likeness, Form and Function, Symbols, Icons, Metaphors	Ratio and Proportion, Compositional structure, Visual Aesthetics
	Music and Dance		
	Naada (Sound and volume) *Shruti/ Sur* (Pitch) *Swara/ Swar* (note) *Laya/ lay* *Taala/ taal* (tempo, rhythm) *Gaayan* (vocals) *Vaadan* (instrumentals) *Nritya* (dance and movement) *Alankaara* (Elaboration, melodic variations)*Saahitya* (Lyrics or literature) *Bhaava* (emotion) *Mudra* (hand gestures, symbols)	*Laya/ Lay* (tempo) in the commonly performed speeds of *Vilambit/ Vilamba-kaala* and *dhrut/ madhyama-kaala* or *gati* in dance *Mātra, Bol, Theka, Aavartam* in *Taala/taal* *Raaga* (basic raagas used in the musical forms of the region) *Sāhitya* (Literature) Composition *Abhinaya* (action, movement, and expression) *Tatkar/ Adavu/ Chāli* (fundamental movement steps in classical dance)	*Gamak, Meend* in musical compositions *Samay of Raaga* *Navarasa* (Nine Aesthetic experiences) *Rasika* (audience/connoisseur) Choreography *Nritta* (pure abstract movement in dance) *Naatya* (abstract movement and *abhinaya*), Harmony

6.6.2.2 Materials, Tools, and Techniques

Materials, tools, and techniques play a critical role in every art form and even shape traditions, styles and genres. An age-appropriate introduction to materials, tools, and techniques must be followed across all Stages. A premature introduction to advanced tools or an overemphasis on technique alone can result in blocking exploration and innovation or might prevent a student from enjoying the process of creating artwork. It must be remembered that the focus of arts education is to provide wide exposure to a range of materials, techniques, and tools before developing excellence in any one art form or process.

a. Materials

Materials could be chosen based on the school's geographical location (weather conditions, native flora/fauna), local culture, and locally available resources. Schools can, like many traditional art practices, conscientiously source materials and tools from nature. It is recommended that all schools minimise the purchase of paper, plastic, styrofoam and thermocol as materials and instead recycle the same from other sources like packaging materials. Processes like paper mache can be introduced as sustainable alternatives to recycling paper for creative use in the arts.

Examples of materials that are sourced from nature

Natural elements like water, air, and light play an important role in many material transformations and processes. Other natural materials could be soil, sand, mud, clay, pebbles, rocks, stone, minerals and metals, sticks, dried logs, wood, brick, charcoal, seeds, seed pods, leaves, stems, flowers, fruits, vegetables, natural rubber, natural gum, grains and their powder, shells, feathers, and natural fibres (cotton, jute, palm, wool).

Teacher's Voice B-6.6-i(To be edited)

Art from natural materials

The students in Grade 5 know and tell many stories, and they have even written and created their own illustrated stories. This time, I decided to assign a task that is related to story illustrations but would not be on paper or in the form of a book. In fact, it would be impermanent. They had to work in groups and create outdoor artworks in which they used only natural materials or found objects sourced from the school campus. Of course, they were also given the condition that they could not harm plants by plucking flowers and had to source from what had fallen on the ground.

During the activity, each group selected a story and decided on a scene that they would depict in their artwork. Once outdoors, they quickly got to work as they picked stones, pebbles, twigs, leaves, flower petals, and so on. They busily

discussed their ideas as every material triggered their imagination to improvise on the spot, make changes in their visual, and even come up with their own stories. The students had to think differently and be creative to find the objects to convey the shapes, forms, colours, and ideas they had in mind. One group decided to use a drinking-water tumbler with a little water to become a well in their artwork. The time-limit to complete their work in one period also made them be mindful of their plan, and they worked energetically and efficiently. Some groups borrowed ideas from others as they saw them using different materials. When all groups completed their artwork, each group presented their story along with the artwork and the others responded to their artworks by telling them what they found interesting in their use of materials, how their compositions conveyed different ideas and stories and what they each learnt from the process. The groups also reflected on the collaborative experiences within their groups.

Examples of materials that are available in stores

Chalk, crayons, pastels, paints (watercolour, poster colour, tempera, acrylics), inks, rangoli powder, a variety of fibres and threads for textile arts (cotton, nylon, wool, silk, etc.), gums and adhesives, paper and cardboard in various sizes and thickness, fabric in a variety of textures, prints, and patterns; rubber, wooden boards and blocks in smooth, textured and carved variants, plates and sheets of different metals varying in lustre and thickness, beads, wires, straws, and rods made of different materials.

b. Tools

While selecting tools and instruments across the arts, the student age group, their prior knowledge, and exposure to various tools and instruments need to be considered. Students learn the knowledge of:

i. Appropriate selection of tools and instruments
ii. Grasping, holding, and operating tools and instruments
iii. Safety precautions in using the tools and instruments
iv. Care for the tools and instruments.

Examples of tools and instruments used in the Visual Arts

Pencils, pens, markers, brushes, rollers; erasers, sponges, palettes, sharpeners, scissors, cutters, scrapers knives, needles, pliers, punch, potter's wheel, wooden modelling tools, spoons, spatula, palette knives, carving tools, hammer/mallet, chisels, files, saw, hand drill, measuring instruments like measuring tape, scales, compass, protractors, weighing scales, recording equipment like cameras, digital software and applications, sewing machines can be introduced at the Secondary Stage.

Examples of tools and instruments used in the Performing Arts

Natural materials, pitch pipes, tuners, traditional, electronic or digital forms of *surpeti/shruti*-box, *tanpura/tambura, m*etronome, tabla and other *taala* aids, *ektara*, a variety of percussion instruments, selected string instruments, wind instruments, string instruments, harmonium, keyboards, bells, *ghungroos*, lighting equipment for stage, sound equipment like microphones, amplifiers, mixers, speakers, recording equipment for video and audio, costumes, jewellery, make-up, stage props, and sets**.**

c. Techniques

All art forms can be introduced to children across the stages with age-appropriate techniques and relevant adaptations in materials and tools. Teachers must choose techniques and processes that are suitable for students based on their age, attention span, interest, prior knowledge and experience, and also consider knowledge, skills, and dispositions that are desirable at every Stage. For example, the technique of working on a potter's wheel requires a variety of motor skills and strength, which may be more appropriate for students in the Middle or Secondary Stages. At the Preparatory Stage, students can be introduced to pottery techniques that don't require a wheel like pinch-pottery or coil-pottery techniques. As a precursor to the technique of weaving, students in the Preparatory Stage can be introduced to the techniques of braiding, using palm fronds or thick jute ropes. In the Middle and Secondary Stages, students can learn to make simple hand-held looms and weave with wool, and jute, and try basket weaving too.

Examples of techniques and Processes used in the Visual Arts

Drawing, sketching, journaling, painting, dyeing, printing, pottery and ceramics, photography, film and video, animation, collage, assemblage, construction, building, modelling, carving, engraving, etching, embossing, digital fabrication, braiding, weaving and knitting, cutting, sewing and embroidery.

Examples of techniques and Processes used in the Performing Arts

Warm-up games, exercises and activities for voice, instruments and body movement, brainstorming, mind mapping, noting and visualising ideas on the board, drama games, image making or tableaux (motionless individuals making a still scene), improvisations and their different variations, scene work, stagecraft, rehearsal techniques, run-throughs, techniques for ensemble/group performance, solo performance, movement choreography, composing music, reading and writing poems, stories, scripts, and musical notation.

6.6.2.3 Artists and their Practice

An insight into the lives of artists, their practices, and the environment that supports their practice helps students develop an appreciation for the arts and enhances their cultural sensibilities. Exposure to lecture demonstrations by various artists (men, women, and transgender) who are known locally, regionally, nationally and internationally across different periods would inspire students to engage with art forms.

6.6.2.4 Arts Etiquette and Ethics

Students of all stages must be introduced to arts etiquette and ethics, e.g., conventions of salutation, bowing to the audience, acknowledging all the people involved in the production, including credits of sources and resources that were used during production, habits of cleaning and caring for tools and instruments. In the Secondary Stage, students could also be introduced to intellectual property rights, fair use, and the laws that relate to creative ideation, production, and dissemination.

6.6.2.5 Familiar Themes

Familiar themes make the thinking, making, and appreciation of art more accessible to students. Themes like life and work of people, traditions and cultures, characteristics and arrangements of objects, living beings in the natural environment, stories, folk tales, myths, legends, poetry and other forms of literature, values like love, friendship, equality, justice, and concepts like war, peace, education, and health give some direction to creative thinking and expression.

6.6.2.6 Interdisciplinary Practice

The social sciences and the arts are closely interlinked. History, arts, archaeology, architecture, conservation, contemporary crafts traditions and contemporary arts practices can all be explored through the lens of examining the social, economic and cultural lives of people. Similarly, language, literature and arts are to be viewed as different forms of cultural expression and human communication. Concepts like symmetry can be explored through the language of visual arts, crafts, dance, movement, and mathematics. Sound and its properties can be studied through music, drama, physics, biology, and language. Colour can be explored through visual arts and craft practices such as natural dyeing, geography, chemistry, physics, biology, and political science (issues of race and colour). More such content can be chosen for arts integration practices.

6.6.2.7 Content Packages for Students and Handbooks for Teachers

Arts Education will require thoughtful designing of content that encourages multisensorial exploration and learning. A conventional form of a textbook may not be suitable or adequate for effective arts learning and it will need workbooks and instructional manuals. All of the arts would require a well-organised **archive of resources** (online and offline versions) that contain good quality images, audio, videos, and multimedia resources adequately supported by text/audio information to describe the artworks in the archives. Content in the archives must represent the artistic and cultural richness of every region in the country from past to contemporary. Such archives could be used in designing modules for each art form while allowing room for the local arts too.

Content packages for students must include exploratory activities that encourage them to interpret artworks, experiment with materials and tools, exercise their imagination, and express their ideas and feelings openly. All content should be inclusive and made accessible to students

with disabilities. Active student exploration, engagement, guided and independent practice, reflection, reattempting expression, and building aesthetic capacities across age groups are the spirit and vision of arts education. Content packages must reflect these demands.

A well-designed **handbook for Teachers** of every Stage would help the Teachers understand the Aims, Learning Standards, and appropriate Content and Pedagogy for arts education through illustrative classroom examples. These handbooks must have suggested lesson plans and assessment frameworks for hands-on activities with the time required for these. Pre-service training and in-service training can teach Teachers to meaningfully use the content and methods suggested in the handbooks.

Section 6.7
Pedagogy

Knowing how students learn the arts is important to plan for effective pedagogical strategies in Arts Education. The following are some things to keep in mind in this regard.

Developmental stages in children also directly correlate to their aesthetic development. Recent research has found that very young children make free associations with art based on their own experiences without much external influence. As they grow, they develop a preference towards realism, they appreciate the artists' technique, skill, patience, and hard work. In their adolescent years, they begin to value originality, emotional expression, and creativity. These phases of artistic development can be observed across the visual and performing arts too. The ages are not absolute and valid for each student, as some may skip individual phases in the development of their artistic expressions, or at times fall back on an earlier one. A balance of guided exploration and free play is necessary for students to appreciate art. They should learn to think reflectively about the arts, practice making artwork, and incorporate ideas and methods into the personal art-making process progressively.

All students regardless of their differing abilities can engage in arts activities. They must be encouraged to openly exchange ideas and express themselves. Art classes must foster peer learning and an appreciation of diversity. Exploring and building on capacities must be the essence of art classes.

Arts Education not only develops skills/craft of making/performance but also parallelly develops creative thinking capacities, expression of emotions and aesthetic sensibilities. An arts Teacher needs to have a deep knowledge of the arts and an approach to teaching the arts that is not necessarily driving students to become artists themselves.

Content and processes can be effective when they are Stage-specific. For example, in the Preparatory Stage, the emphasis would be on expression and communication, whereas by the time they reach the Middle and Secondary Stages, they would be introduced to more specific frameworks in the thinking, making and responding processes. Given below are some common underlying pedagogic principles that will be applicable across all Stages of school education

Box B-6.7-i

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Skills Required for Arts Teaching

*An **Arts Teacher in the Preparatory stage** must have a clear understanding of the aims of education and arts education, a familiarity with the stage-wise curricular goals, grade-wise competencies, and related learning outcomes described in NCF for arts education, a basic understanding of the nature of art forms as areas of knowledge, and a high inclination towards continuous self-study in arts.*

*Added to the expectations mentioned for teaching in the Preparatory Stage, an **Arts Teacher for the Middle stage** must have an awareness of local art and cultural practices, the ability to make connections between local art and cultural practices with the Stage-wise competencies of arts education, and help children in developing respect towards multiple arts and cultural practices from their region/state.*

*A **Secondary Stage Arts Teacher** must have disciplinary specialisation and a rigorous understanding of the arts. They must be able to develop an interest amongst students in any one form of visual or performing arts and develop an appreciation for diverse art practices and traditions in India. They must demonstrate rigour and regularity in art-teaching processes (rehearsals, performances, making/displays at the school level and inter-school events), be able to motivate students to imaginatively apply learned artistic methods, create an environment of respect for multiple viewpoints and a variety of arts and cultural practices from different parts of India, and spend their time with students looking at and engaging with many forms of artworks from across the country and the world.*

Based on the above features of how students learn the arts the following are some principles of Arts Education pedagogy.

a. **Arts Education must be process focussed:** The products of art and performances are organic consequences of the various artistic processes that are in themselves enjoyable and instances of learning achievement. A Teacher would therefore need to closely observe every student's involvement in the processes of thinking, making, responding and appreciating the artwork.

b. **Pedagogy must be driven by students' experience and collaboration:** When students' expressions become the starting point in art classes, they would be able to connect arts concepts more meaningfully, and this provokes them to discover new ways of understanding their own experiences. All arts activities need to encourage dialogue, and collaborative work, where the sharing of ideas nurtures care and concern for multiple viewpoints and expressions. For example, when a teacher discusses the variety of organic and geometric shapes that can be observed in various examples of local forms of visual arts, the chances of discovering and identifying different types of triangles, circles, and amoeboid shapes would be much greater, than if the Teacher were to begin by drawing a triangle on the board and telling students to use it in their artworks.

c. **Variety, variations, and interdisciplinary practice must be encouraged:** The arts are all about variety, perceiving and creating variations even while repeating or reproducing tasks. The focus of the arts is to discover newness even in the most familiar experiences. Arts pedagogy should therefore encourage students to stretch their imagination to find multiple ways of expressing their ideas and emotions in arts and other subjects. Drama and theatre by nature are composite art forms that include knowledge and processes of visual arts, crafts, design, literature, music, dance and movement. It is important for students to not only gain embodied experiences through the arts, but also discover and articulate the connections across disciplines, and how they are experienced through different art forms. Teachers need to identify concepts and themes that interlink the knowledge of different disciplines and explore interdisciplinary pedagogies through projects, Teacher collaborations, and by inviting artists and experts from other fields.

Teacher's Voice B-6.7-i (To be edited)

Music and Movement

Rhythm is an important element in music, dance, and movement. All students instinctively respond to rhythms. In the music classroom, we often begin with warm-up activities that are guided by rhythm.

I either play the dholak or play one of the pre-set rhythms on the keyboard we have in school. I give the students names of animals or vehicles or objects as prompts, which they interpret on their own through rhythm and movement. There are two objectives of this activity. The first is that they listen to the rhythm and move their body according to its tempo. The second is that they get comfortable with moving their bodies freely and gradually overcome any self-consciousness. We first ensure that there is enough space for free movement, and no one gets hurt. When I say 'Jalebi- slow', they start moving different parts of their body to mimic the squiggly shape of a Jalebi. Each child moves differently according to their own imagination and their comfort with their own body. They observe and mimic one another too. When I say 'Jalebi-medium', they continue their on-the-spot-improvisations and increase the tempo. When I say 'Jalebi-fast', they really speed up the movement with great energy and excitement.

This helps students imagine and move freely and develop a sense of rhythm.

d. Local resources, arts, and culture must be emphasised: The appreciation of local culture in arts pedagogy could provide the needed variation in perspective to popular culture when it also makes room for questioning, analysis, and critical appreciation. As students progress through higher Grades, critical examination and appreciation of the arts need to be encouraged. NEP 2020 suggests "the hiring of outstanding local artists, writers, crafts persons, and other experts as master instructors in various subjects of local expertise; accurate inclusion of traditional Indian knowledge including tribal and other local knowledge throughout the curriculum, across humanities, sciences, arts, crafts, and sports, whenever relevant".

Schools could invite local artists, crafts persons, and performers as well as archaeologists, museum employees and other relevant arts administrators to share their work through lecture-demonstration workshops, and art melas in schools supported and mediated by the Arts Teacher.

Teacher's Voice B-6.7-ii (To be edited)

Folk art

Maandana is the folk art of Rajasthan, Malwa and Nimar. This art form is primarily practiced by women, where they paint patterns on the floor and walls of their homes. They first prepare a base on the ground or wall using cow dung and clay/brick, after that painting is done on it with the help of chalk. Cotton or a clump of hair is affixed to the end of date twigs to serve as a brush with which they draw and fill colour.

This year in school, we decided to introduce students to Maandana since it is the local art form of this region. We invited a few local artists for a workshop with our students in Grade 6 to familiarize them with the processes involved in this art form. Before doing this activity, we also showed some videos to the students which featured well-known national award-winning artists who have specialised in Maandana over many decades. This helped students understand how the knowledge and techniques of this art form is passed on through the generations, and how a simple art form like this enhances the beauty of all homes in this region. Through this workshop, students were able to experiment with the materials and processes used in this art form. It also gave them an opportunity to work collaboratively in groups.

An interesting incident that occurred on that day was that when parents of other children came to pick them up from school found that a Maandana workshop was being conducted, they too got interested and joined in to create their own Maandanas. Many of our non-teaching staff also created Maandanas that helped students observe and learn from multiple people. The event organically brought people together and students enjoyed learning from their local community.

e. Many opportunities for arts exposure and aesthetic appreciation must be made: The larger aim of developing aesthetic sensibilities and cultural literacy can only be achieved when students are given sufficient exposure to good examples of visual and performing arts from different parts of India and the world across genres, and adequate focus on contemporary art practices. Within the school, students could be shown appropriate examples of film, video, animation, photography and images of original works of visual arts and the performing arts, and these could be discussed after viewing. In higher Grades, students can be

encouraged to write art reviews and include them in the Deewar Patrika (Wall Newspaper) or a monthly school magazine. Assemblies and cultural events must also be seen as opportunities for constructively reviewing performances and the aesthetic arrangements and experiences through the events. Whenever possible, besides classroom teaching, other modes for exposing students to the arts are workshops, projects, exhibitions, visits to museums, and local arts centres would be very valuable learning modes for students. Visits to archaeological sites, monuments, performances of music, food festivals, local folk dances, theatre performances, exhibitions, museums, and art galleries could include specifically planned activities and learning projects both on-site and after returning.

f. **Students with Disabilities must be included:** Students with disabilities must be given equal opportunities and access to participate in all art activities. Their participation and engagement will depend on the level and severity of the disability. Their independent working with a focus on what they "can do" rather than what they "cannot do" would empower them as learners. They should be given the choice of mediums and levels at which they can engage with the activity with adequate encouragement and support from the Teacher. For example, some suitable visual arts activities for them might include clay work to build dexterity, dabbling with paints, blending to create new colours, cutting shapes and pieces out of different materials to glue and form abstract patterns, stencils used to trace outside as tracing inside within the confined space might be difficult for them, they can be made to paint with fingers if holding the brush is a problem. Some suitable performing arts activities could include listening to different kinds of music that they are interested in, playing musical instruments like any kind of drums, or encouraging them to create free-form dance and movement to music. Students with disabilities must be included in all art processes including discussions. Their responses could be verbal or non-verbal, and these must be acknowledged, appreciated, and included in the pool of responses and opinions in the classroom.

g. **The physical space, materials, and resources must be prepared before class:** Teachers need to ensure that the materials and the space where arts activities are conducted are prepared and safe for all students. For example, in the visual arts, clay may need to be prepared in advance so that it can be shaped or modelled into different forms. The Teacher can either choose to prepare this themselves or in the case of Middle and Secondary Stages, teach the students to prepare. In schools where there may be limited space for performing arts, the Teacher could think of moving furniture around to make space for movement activities. Time must also be allocated for students to clear the space, clean the used tools, and put away their materials after work.

h. **Teachers must prepare with the knowledge of effective pedagogic processes and strategies:** Being a good artist cannot automatically imply being good at teaching art and it is very essential to be an effective arts facilitator for teaching arts. A Teacher who may not have specific art skills *can* facilitate interesting and effective art sessions for students if they have the required knowledge of art pedagogy and the relevant pedagogic skills. Arts pedagogy must include teaching processes like making lesson plans keeping in mind learning goals, choosing appropriate content and instructional design, and relevant assessment strategies. In the class, strategies such as warm-up activities, exploratory games/exercises, brainstorming, mind mapping, discussing, individually conversing, assigning projects and homework, going on exposure visits, field trips, planning for a question and answer session, and using the board to jot down and consolidate ideas, reflections, and responses would all be useful.

Pedagogic Illustration

E.g., Theatre

Improvisation is a method used in the dramatic arts that involve spontaneous unscripted action or role play based on any given location or situation during practice. This illustration shows how this method can be introduced and practised with students at different Stages. The corresponding Curricular Goals, Competencies, and Learning Outcomes are also indicated to map the pedagogy. The pedagogic approach across all Stages would follow the common core principles of learning by doing and reflecting, carefully guided by the teacher.

Table B-6.7-i

	A	B	C
	Curricular Goals		
	Preparatory	**Middle**	**Secondary**
1	CG -3 Explores basic processes, materials, and techniques in the arts	CG-3 Understands and applies artistic elements, processes, and techniques	CG -3 Develops own art practice through the knowledge of diverse Indian art forms
	Competencies		
2	C-3.1 Makes choices while working with materials, tools, and techniques used in the dramatic arts	C-3.1 Demonstrates care and basic stage etiquette; and makes informed choices while using various materials, tools and techniques of dramatic arts	C-3.1 Extends experimentation in dramatic arts and refines rehearsal techniques through regular practice
	Learning Outcomes		
3	Participates in individual and group drama games/exercises and identifies their application and purpose for drama works ahead	Practices and presents scene work based on ideas/ stories/themes using various elements, and rehearsal techniques	Experiments with rehearsal techniques and run-throughs (e.g., Run-through focusing only on gestures and postures, speech patterns, etc.)
	Content Progression		
4	Introduction to Improvisation	Improvisation	Improvisation on idioms

	Pedagogic Activity		
5	On-the-spot improvisation for group role play and situation-building based on given locations	Create a situation of conflict through improvisation based on the list of characters provided by the Teachers	Create a short situation/scene/play based on some Idiom/ sayings (muhavar) and relate it to everyday situations
	Specific Objectives		
6	To understand roles and characters in different situations for drama work	To understand the idea of conflict amongst characters in drama work	To understand the idea of symbolic representation/ dramatic metaphor and its connection with the audience in drama work
	Considerations at each stage while assigning tasks		
7	**Developmental stage of students –** their improved capacity to imagine and role play characters according to given situations **Group size –** 5 to 7 students per group **Time –** 10 counts, as facilitated by the teacher **Elements of drama being explored –** Character and situation **Orientation of exploration** towards peer groups in the classroom	**Developmental stage of students –** their improved capacity to sustain the roles and position of the characters **Group size –** 7 to 9 students per group **Time –** 10 minutes of preparation time **Elements of drama being explored –** Character and conflict **Orientation of exploration** towards an external audience	**Developmental stage of students –** their improved capacity to retrieve previous experiences, sustain the role and position of the characters/ situations; and represent their ideas through various symbols **Group size –** 9 – 11 students per group **Time –** 20 minutes of preparation time **Elements of drama being explored –** Symbolisation and dramatic metaphor **Orientation towards performance** for an external audience

Activity Process followed at the Preparatory Stage

Step one (Stage consideration- Group size)

The Teacher divides the whole class into 6 sub-groups of 5 students each

Step two (Stage consideration- Time)

One by one, each group comes to the area marked as the performing space in the classroom.

Step three (Stage consideration- elements of drama being explored)

The teacher assigns three locations to each group for them to imagine and develop a situation/ scene involving different characters and actions through role play. Locations could be home, railway station, *sabzi mandi* (vegetable market), Principal's room, hospital, Panchayat Bhawan, playground and so on.

Step four (Stage consideration- orientation of exploration)

In 10 counts given by the teacher, the students discuss the characters, fix their roles and start playing the situation immediately, spontaneously. The students have to go on playing until the Teacher says "freeze" to stop the role play.

Step five (Stage consideration- developmental stage of students)

After the presentation of each group, the Teacher can lead the session for reviewing the exercise with the following suggested questions:

- What did you do in this exercise?
- What did you like in this exercise?
- What did you achieve through the exercise, as a team and as an individual?
- How did you decide about the characters and situation?
- What were the challenges you faced while discussing and playing the situation?

The review can be done by the teacher from two points of view i.e., own review of the performing groups and other groups as an audience.

Step six

The Teacher writes the reflection of the students on the board while also introducing details of the technique of role play and situation building.

Section 6.8
Assessment

Assessment in the arts would help Teachers, students, and families of the students understand the learning achievements of students, giving a clear description of the strengths, challenges, and interests of every student, and where support can be offered or taken for growth. In the arts, care must be taken to see that assessment does not place too much focus on a singular judgement, rather it should be a collaborative process of feedback between Teachers and students over multiple instances. Given that the arts celebrate individual expression and creativity, as well as the fact that the arts rely on individual subjectivity, assessment in the arts must distribute its focus across the students' thinking, making, and appreciating capacities.

6.8.1 Principles of Assessment in the Arts

a. Assessment requires both Teachers and students to be aware of the Learning Standards that need to be achieved. This also implies that students can clarify what they are expected to do and openly share their difficulties in meeting those expectations.

b. Assessment must be approached with the fundamental belief that all students can be creative.

c. Assessment of learning in the arts needs to be based on evidence that includes their engagement and participation beyond that which is observed in the art classroom and school premises.

a. Assessment in the arts is most effective when it includes processes of self-assessment, peer assessment, and assessment by the Teacher, as these correlate with the responding and appreciating processes carried out in arts activities.

6.8.2 Guidelines for Assessment in the Arts

a. Criteria for assessment in the arts need to be framed around the art processes of Making, Thinking, and Appreciating. The criteria must be communicated and discussed with students so that they are aware of the learning expectations.

   i. **Making capacities** can be assessed by observing the students' physical and psychomotor skills while using a variety of materials, tools, instruments, and techniques (steady and firm grip while holding tools, clarity in visual elements); their ability to generate a variety in expressions (e.g., variety of visual effects, variety of musical sounds, variety of body movements, variety of speech intonations); their ability to present their works (e.g., communication of ideas and visual presentation in front of an audience); and their ability to work individually and collaboratively (e.g., cooperation with peers, seeking and offering help).

   ii. **Thinking capacities** can be assessed by observing the students' cognitive skills like ideation, creativity, imagination, organisation, comparing, analysing, reflection, exploration, experimentation, persistence, criticality, and communication. For example, if a student in Middle Stage chooses to copy imagery from a photograph, their creativity can be assessed by the tools they use to replicate it. Using the technique of using a grid

may be more creative than directly tracing from a photograph. If a student chooses to use a grid despite knowing that tracing may be easier, it reflects their persistence to challenge themselves. Adding one's own elements, or modifying the images copied from another source would reflect a student's imaginative capacities.

i. **Appreciating capacities** can be assessed by observing students' ability to observe and respond to works of art with sensitivity and attention to detail; their use of art vocabulary, their ability to express aesthetic preferences, empathy, and respect for diverse and multiple viewpoints (e.g., a student may respond to the texture of an artwork by saying 'its texture is prickly and makes me feel a little uncomfortable'. Another student may respond differently to the same work and express that the prickly sensation conveys a sense of danger)

b. Consider the students' learning and performance across a longer period, taking into account the various artistic processes, and not limit the assessment to only a few examples of artworks or performance

c. Consider the inputs gathered from peer assessment and self-assessment processes, as well as informal conversations with students and their family members.

d. Include observations of student participation in community arts practices in their homes or larger cultural events

e. Encourage students to develop and maintain a personal art portfolio in both visual and performing arts

Teacher's Voice B-6.8-i (To be edited)

Art portfolio

All students in our school have an individual folder in which they store their artworks that are in the form of drawings, collages, paintings, and fabric artworks. I also take photos of their three-dimensional artworks in clay and paper and have a digital folder on the school computer. At the end of every term, I devote one or two classes for students to manage and consolidate their folder of drawings. They check that the artworks are properly dated and have their name. In case they have forgotten to write the date, they check with their peers and write it down. While they do this, I have individual conversations with some of the students to review their works and reflect on the changes that they observe over time. I have found that most students are able to self-assess and express what they have learnt and what they can do better. I take notes during this process. In the higher Grades, students are asked to select artworks from their folder to present in an informal classroom exhibition. They also include any artworks of pottery, sculpture, textile arts, story illustrations, posters, and so on that they have created during the term. Some students also write about their art and art processes. If possible, we invite students and Teachers from other Grades to view the exhibition and provide their feedback. The students enjoy the process since they don't see it as an 'exam' and are enthusiastic to exhibit their artworks and share it with a larger audience.

6.8.2.1 Formative Assessment

Formative assessment should be continuous and comprehensive, where multiple contexts are considered as sources and sites for art assessment. Within the art classroom, assessment could be carried out through class discussions, class presentations and reviews, individual conversations with students about their artistic processes, and by the Teacher's systematic note-taking practice that records students' participation in the arts and their progress in the development of skills and capacities.

6.8.2.2 Summative Assessment

Summative Assessment in the arts could be conducted **twice a year** across all Stages. These should not be events conducted over a couple of hours on just one day. Instead, these could be in the format of projects or week-long events. Some ways of achieving this format could be as follows:

a. Project work that is based on the different exercises and activities that students are introduced to during regular art classes.

b. Presentation of artworks in the mode of an informal display/exhibition/performance, followed by a peer review process. At the Preparatory Stage, this could be done at the class level, in the Middle Stage this could be done during school assemblies over a week or in the form of a *Mela* at the Stage level, and at the Secondary Stage, this could be imagined in the form of larger events that involve the entire school and an external audience.

c. Portfolio of artworks in the visual and performing arts

Summative assessment can have the option of using multimedia resources in both the visual and performing arts to view artworks and respond through written or spoken modes. Care must be taken to retain the artistic and aesthetic nature of the subject, leading to enjoyable experiences in the assessment processes as well.

Box B-6.8-i

An Illustrative Assessment Scheme for Visual Arts, Middle Stage

Formative Assessment:

CG 1: Develops openness to explore and express themselves through various art forms

C-1.1 Expresses confidently their personal and everyday life experiences through various visual art forms

Learning Outcome in Grade 6:

Openly shares feelings and personal challenges through visual art forms (Feelings can relate to worry, fear, surprise, joy, guilt, anger, humour, sorrow, disgust and all their variations)

Indicators for Assessment:

1. The following can be observed during discussions in the classroom, during individual conversations with students, and informal interactions outside the classroom:

a. Talks about the feelings they experience in everyday situations at home and in school

b. Discusses their challenges (issues they have with friends and family, issues related to their own appearance or abilities) with peers and Teachers

2. The following can be observed during the process of creating artworks, and after the completion of several artworks:

a. Depicts their emotional experiences and personal challenges in their visual artworks through recognisable images e.g., creates the figure of a person in a hunched posture to express despair or disappointment

b. Depicts their emotional experiences and personal challenges in visual artworks through symbols and abstraction e.g., Expresses their emotions through sizes of forms, textures, and colours

Summative Assessment:

After completion of 8 or 10 pieces made by every student, including studies, sketches, and a few finalised completed iterations. The learning indicators need to be assessed across these artworks and consolidate the self-assessment, peer assessment, and Teacher's assessment. The consolidation can be reflected as given in the table below.

Emerging	Developing	Proficient
Student very rarely demonstrates learning indicators. They require a lot of support from the Teacher	Student sometimes demonstrates learning indicators. They require a few prompts from the Teacher.	Student always demonstrates learning indicators. They can take cues from the work of their peers, or their own previous work.

Chapter 7

Interdisciplinary Areas

[To be edited]

NEP commits to:

a. Education about the environment and related urgent issues such as climate change; and the development of moral and ethical capacities

b. Multidisciplinary education that fosters interdisciplinary learning. Interdisciplinary approach uses knowledge and process capacities from more than one discipline to examine a central theme, situation, event, issue, or concept.

The NCF leverages the inherent synergy of these two commitments – good education about the environment, and development of moral and ethical capacities requires an interdisciplinary approach.

Accurate, valid, nuanced, and comprehensive understanding of the world is by nature interdisciplinary. Thus, interdisciplinary learning is invaluable to understanding the world, to grapple with its issues, to act, and to develop further knowledge.

The NCF approaches these two NEP commitments in the following manner:

a. In all curricular areas and subjects within them, opportunities exist and have been developed for interdisciplinary learning by appropriately integrating concepts, content, and methods from other subjects (disciplines),

b. Subjects at appropriate school stages have been designed for Environmental Education, and the development of moral and ethical capacities in an interdisciplinary manner. In addition, other relevant interdisciplinary subjects will be offered to students

At each of the school stages, the two approaches lead to:

a. At the Foundational Stage, Curricular Goals are organised around the domains of development, and not specific curricular areas/subjects. Therefore, interdisciplinarity is inherent at this stage; in-fact at this stage, the notion of disciplinary methods and content is not even introduced, and so even the interdisciplinarity is implicit.

b. At the Preparatory Stage, Curricular Goals are organised into five curricular areas/subjects – Language, Mathematics, Arts Education, Physical Education, and World Around Us.

    i. World Around Us, in particular, is designed as an interdisciplinary area, specifically meant to help students observe and understand their immediate social and natural environment.

    ii. At this stage, all subjects will methodically bring in methods and concepts from other subjects, for example, Mathematics in Language, and vice versa.

c. At the Middle Stage, Science and Social Science are introduced. These curricular areas introduce disciplinary methods and understanding. Interdisciplinary learning, including about the environment, is developed through interdisciplinary goals and competencies in the learning standards, and all related curricular actions to achieving those – from content, and pedagogy, to assessment.

a. In the Secondary Stage there are eight curricular areas - Mathematics & Computing, Science, Social Science, Humanities, Vocational Education, Physical Education, Arts Education, and specifically designed Interdisciplinary subjects, some of which directly address Environmental Education, and ethical and moral capacities. The seven discipline/field based subject areas will adopt the same approach as in the Middle Stage for interdisciplinary learning. In the Interdisciplinary Areas:

   i. In Grades 9 and 10, the following subjects will be learnt:

      1) Individuals in Society in Grade 9.

      2) Environmental Education in Grade 10.

   ii. In Grades 11 and 12, Interdisciplinary Areas, can include a range of subjects, illustratively, Sustainability and Climate Change, Public and Community Health, Media and Journalism, Legal Studies, Commerce, Family and Community Sciences, Legal Studies, Knowledge of India/Indian Knowledge, Traditions and Practices/Indian Knowledge Systems. The list and offering of subjects would depend on other practical considerations such as availability of teachers.

The specific aims of each Interdisciplinary Area Subject would be to develop an integrated understanding of the chosen subject matter, while developing interdisciplinary capacities.

Box B-7-i

This document is divided into three sections which do not follow the progression of the school stages. These sections detail, first, the approach to Environmental Education throughout the school curriculum (Section 11.1), second, the subject Individuals in Society in Grade 9 to develop specific capacities related to ethical and moral reasoning and engagement with current affairs (Section 11.2), and finally, the choice-based courses offered in Grades 11 and 12 (Section 11.3).

Section 7.1
Environmental Education

Nature has been an integral part of Indian life and traditions - the lives of communities and the environment around them are unconditionally interconnected. The environment includes both – *Prakriti* or nature and *Samaj* or socio-cultural life of individuals and the community. As humans are a part of this environment, the society we live in also becomes an integral part of the environment.

Box B-7.1-i

Indian tradition looks upon man and nature as 'waves of the same river.' Life, at its core, is a process of interchange between the environment and human existence. This process is explained by a term Yantraruda, which means a wheel fitted with buckets for the irrigation of fields. The constant efforts of humans to preserve the environment, and in turn be preserved by it, is in the form of a cyclical process, with balance and harmony between the environment and humans.

A balance and harmony between human societies and nature has been maintained over the centuries. The Constitution of India emphasizes this connect – among the fundamental duties in the Constitution of India, citizens must 'protect and improve the natural environment, including forests, lakes, rivers and wildlife and to have compassion for living creatures.'

However, as human society changed over the centuries, the dependence of humans on nature for individual sustenance has decreased. Additionally, the growing need for roads, and polluting transport and industries has degraded the environment in various ways. This has led to an imbalance that has impacted not only the environment but also the well-being of human societies at various levels. Concern for this situation has been expressed by several sections of society, including by the Supreme Court. Recently, Mission Lifestyle for Environment (LiFE) was launched to enable individual action.

Box B-7.1-ii

At the 2021 UN Climate Change Conference (UNFCCC COP26), the Prime Minister of India announced Mission LiFE – Lifestyle for Environment.

LiFE is meant to support replacement of the current 'use-and-dispose' economy with mindful and deliberate utilization. Individuals will be encouraged to take up simple activities that can contribute significantly to climate change when taken up worldwide.

LiFE plans to create and nurture a global network of individuals, namely 'Pro-Planet People' (P3) who will have a shared commitment to adopt and promote environmentally friendly lifestyles. Through the P3 community, the Mission seeks to create an ecosystem that will reinforce and enable sustainable environmentally friendly behaviours.

7.1.1 Preparatory Stage: World Around Us

Students are naturally inclined to observe their natural and social (which includes physical aspects that are connected with humans[1]) environments. They participate in several interactions – social, with nature, living and non-living things, and relationships within families and communities. They experience emotions related to these experiences. Further, personal and cultural identities are often tied to the local environment. Thus, there is an essential need, especially for young students, to understand their environment.

World Around Us uses the natural curiosity and creativity of students to move towards developing an understanding of their environment. It helps students move from concrete understanding to conceptual understanding. This lays the basis for movement towards more abstract concepts at the end of the Middle Stage, and in later stages, while preparing them to engage with the larger world.

At this Stage, students learn best by doing. One way of helping them engage with their environment is to give them materials to work with, and to help them create simple artefacts. Therefore, prevocational capacities are integrated naturally into this subject.

As children engage with their environment, they represent and express their understanding in different ways. This enables the use of Competencies related to other curricular areas as well. World Around Us thus enables the development of Competencies related not only to the environment, but also arts, language, and mathematics.

7.1.1.1 Aims of World Around Us

World Around Us lays the basis for environmental literacy through helping students formalise their informal understanding of the environment. They develop an appreciation of their immediate environment and sensitivity towards their own needs as well as the needs of others. Students also develop process capacities and learn about tools to make sense of their environment.

The aims of World Around Us in the school curriculum are to enable students to do the following:

a. **Engage with social and natural environments:** Students become aware of different components of their natural and social environments, as well as their interdependence. They develop capacities to explore their immediate environment.

b. **Sensitivity and taking action:** Students develop sensitivity towards the components of the environment, and develop values and dispositions mentioned in the NEP 2020. They understand the role they can play in improving their immediate environment. They develop a basic understanding of actions they can take to help themselves and others.

c. **Love and appreciation for natural and social environment:** Students see the beauty in form, colour, shape, structure in the natural environment, and in social processes that strengthen values and dispositions, and nurture individuals and society.

1 Humanmade environment comprises roads, buildings, cities, waste, etc

7.1.1.2 Approach

The approach will be to focus on the immediate environment of students, with gradual progression of some aspects beyond the city/town/village at the end of the Preparatory Stage. The interdisciplinary approach taken will reflect the lives of children. This will also ensure that students develop a holistic view of the world, with an understanding of relationships and interdependencies.

Knowledge, values, and dispositions will be developed through various sources from the locality, region, and country. Focus will be on stories, poems, narratives, folklore, histories, and games from diverse sources.

Vocational Education will be integrated in World Around Us through the development of prevocational capacities. Capacities related to understanding the occupations around them, observing, and engaging with animals and plants, and creating simple objects lay the foundation for development of vocational capacities in the Middle Stage. The pedagogy at this stage will lend itself to the development of prevocational capacities, for example, maintaining flowerpots/kitchen gardens, clay modelling, and dialogue with shopkeepers during visits to the local markets.

7.1.1.3 Nature of Knowledge

Knowledge in World Around Us is concrete, not abstract, and related to the real world. It is developed through exploration, discovery, dialogue with peers and adults, visits and excursions, observations, and creating artefacts. It is also developed through stories, poems, folklore, and other forms of arts and literature.

a. World Around Us brings together the understanding of different aspects to derive generalised concepts related to students' immediate environment. These concepts are largely around patterns, processes (social and natural), and interconnections between the environment and human society.
b. World Around Us provides process capacities and provide tools to make sense of and to interact with their immediate environment.
c. World Around Us develops environmental values and dispositions – aesthetic values, appreciation of diversity, love and respect for all beings, acceptance of multiple points of view, sensitivity towards the use of resources, concern for dignity, justice, and rights of all beings.

7.1.1.4 Subject-Specific Challenges

At present, Teachers do not have specific expertise to teach World Around Us. Generally, Teachers who take up Environmental Science (EVS) in Grades 3-5 have a degree in Science or Social Science. Generally, Social Science Teachers teach EVS, since there are multiple vacancies for Science Teachers. As there is no formal structure to prepare Teachers for EVS, often the focus tends to be of the subject they are comfortable with.

Activities indicated in the current syllabus of EVS are generally done in isolation. Their continuity with learning is missing. For example, if students go on a visit, there is no discussion related to concepts once they return.

Content related to the natural environment is managed easily by Teachers but where the social environment is concerned, Teachers are unable to drive discussions, despite the content providing sufficient opportunities. So, activities are once again done in isolation.

A major issue is that societal practices and observations are often the opposite of what is taught and discussed in schools – this defeats the basic purpose of this subject. If Teachers are not reflective, these practices appear in their practice, and may contradict what is in the textbook.

7.1.1.5 Learning Standards

The Curricular Goals and Competencies for World Around Us indicate the expectations from students related to understanding of the environment at this Stage. A structured exploration of the environment develops understanding, as well as the capacities to deepen and extend this understanding.

7.1.1.5.1 Curricular Goals & Competencies

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

CG-1 Explores the natural and social environment in their surroundings	C-1.1 Observes and identifies the natural (insects, plants, birds, animals, geographical features, sun and moon, soil) and social (houses, relationships) components in their immediate environment C-1.2 Describes structures, relationships, and traditions in the family and community C-1.3 Asks questions and makes predictions about simple patterns (season change, food chain, rituals, celebrations) observed in the immediate environment C-1.4 Explains the functioning of local institutions (family, school, bank/post office, market, and panchayat) in different forms (story, drawing, tabulating data, noting discussion), and analyses their role C-1.5 Creates simple objects (family tree, envelopes, origami animals) on their own using local materials
CG-2 Understands the interdependence in their environment through observation and experiences	C-2.1 Identifies natural and humanmade systems that support their lives (water supply, water cycle, river flow system, life cycle of plants and animals, food, household items, transport, communication, electricity in the home) C-2.2 Describes the relationship between the natural environment and cultural practices in their immediate environment (nature of work, food, traditions) C-2.3 Expresses the changes in the lives of their family and community as communicated by elders and through local stories (changes in occupation, food habits, resources, celebrations, communication)

CG-3 Explains how to ensure the safety of self and others in different situations	C-3.1 Describes the basic safety needs and protection (health and hygiene, food, water, shelter, precautions, awareness of emergency situations) of humans, birds, and animals C-3.2 Discusses how to prepare for emergency situations (pandemic, floods, landslide, unseasonal rains) based on discussions with family and community, or personal experiences C-3.3 Develops simple labels, slogans, and participates in roleplay on safety and protection in the local environment to be displayed/done in school and locality
CG-4 Develops sensitivity towards social and natural environment	C-4.1 Observes and describes diversity among plants, birds, and animals in their immediate environment (shape, sounds, food habits, growth, habitat) C-4.2 Observes and describes cultural diversity in their immediate environment (food, clothing, games, different seasons, festivals related to harvest and sowing) C-4.3 Observes and describes natural resources in their immediate environment, and their use C-4.4 Discusses how natural resources can be shared and maintained (growing vegetables in flowerpots/ kitchen gardens, use of rainwater) C-4.5 Identifies needs of plants, birds, and animals, and how they can be supported (water, soil, food, care) C-4.6 Identifies the needs of people in different situations – access to resources, equal opportunities, work distribution, shelter
CG-5 Develops the ability to read and interpret simple maps	C-5.1 Explains a mental map of their school, village, and ward C-5.2 Reads simple maps of city, State, and country to identify natural and humanmade features (well, lake, post office, school, hospital, etc.) with reference to symbols and directions C-5.3 Draws a sketch of their school, village and ward using symbols and directions
CG-6 Uses data and information from various sources to investigate questions related to their immediate environment	C-6.1 Performs simple investigations related to specific questions independently or in groups C-6.2 Presents observations and findings through different creative modes (drawing, diagram, poem, play, skit, through oral and written expression)

7.1.1.5.2 Illustrative Learning Outcomes

Curricular Goal (CG-4): Develops sensitivity towards natural and social environment

Competency (C-4.3): Observes and describes natural resources in their immediate environment, and their use

Table B-7.1-iii

	A	B	C
	Competency: Observes and describes natural resources in their immediate environment, and their use		
	Grade 3	**Grade 4**	**Grade 5**
1	Lists various natural resources in their locality	Explains how water reaches different households, plants, and animals	Analyses whether all households have the same water sources
2	Lists the material used in construction of houses around them	Explains how unclean water causes diseases	Establishes linkages of resources with cultural life, climate, and terrain based on its access and usage
3	Observes and discusses available water resources and who they cater to within the locality	Identifies the different kinds of soil found around them	
4		Collects and presents data through visits on any one of the water resources	

7.1.1.6 Content

7.1.1.6.1 Principles of Content Selection

The following principles will inform the selection of content for World Around Us.

a. Content selected should help sharpen competencies through enabling task-oriented activities that are thoughtfully planned and connected to concepts. It must enable essential process capacities (observation, data collection and analysis, discussion, etc). For example,

   i. Assign tasks based on the natural curiosity of specific questions/ assumptions of students – they could be asked to observe and record the growth of plants from seeds under different conditions (in different kinds of soil, under different amount of sunlight).

   ii. Extend this experience to students' own lives and ask them to describe their observations on how crops grow/ plants grow in pots. They can discuss the various uses of plants.

iii. Organise visits to local markets, fairs, museum, local mandi, monuments, etc, and share observations and experiences throughout the processes using different modes.

b. Content selected should enable maximum possible social interaction, and interaction with the natural environment. For example,

i. Identity and relationships within family and community; Plants and animals; Own body; Geographical features; Transportation and communication; Institutions; Migration of families; Different habits in different communities (food, practices, traditions); Food habits and shelter of animals; Various local traditional art forms; Festivals and celebrations; Community eating and marriage celebration; Day and night - patterns; Sun, moon, and stars; etc.

c. Content selected should reflect diversity, and must be inclusive while developing sensitivity. For example,

i. Geographical, flora, fauna diversity around them

ii. Impact of hot weather or excessive rain on plants and animals

iii. Practices related to work especially with reference to gender - division of labour at home, food distribution in families, understanding context of migrant labourers.

d. Content must cater to different communities, languages, and different kinds of people.

e. Content of Environmental Education should be contextual and related to the immediate environment. At the same time, exposure to different contexts is also important – multiple geographies, genders, communities, etc. For example,

i. If the concept of 'Transport' has to be discussed, content can include the pictures in the textbook, discussion of modes of transport in the community, sharing of narratives of travel by students, local news reports related to transportation, instances of use of these roads by the local community, videos of modes of transport that are not available in the locality (e.g., train in remote school in the upper Himalayas).

ii. Communication is seen primarily through the mobile phone (occasionally landline) and electronic mail. In rural areas, the predominant form is mobile phones. However, it is useful to give all students an idea of snail mail. This will help students experience the excitement of the movement of a physical artefact across space. It will also help them understand the concept of communication through a concrete process, while appreciating the diversity of communication that still exists in our communities.

iii. In an urban context, bullock cart is an unfamiliar sight while in a rural context, metro railway is unfamiliar. Therefore, both can be included in the content.

f. Content selected should be such that it can be presented in multiple ways, which go beyond the textbook. For example, students should have the opportunity to explore the same content in various modes as indicated below -

i. Case studies

ii. Visual representation through pictures, simple maps, etc

iii. Using ICT based resources – video to give evidence for discussions and/or support discussion on specific issues

iv. Poems, stories, plays, games, news stories

v. Folklore, folk songs, oral histories, and oral narratives

g. Environmental values and dispositions must be integrated in the content, and should enable pedagogy that is not didactic/prescriptive but provide a rationale. For example,
   i. Judicious use of water
   ii. Dignity of all living beings
   iii. Impact of humans on the environment
   iv. Needs of plants and animals

h. Content must incorporate Indian knowledge and local culture. For example,
   i. Food preservation
   ii. Processes to conserve resources, including local wells, stepwells, *bawdis*
   iii. Local literature – alignment with contemporary knowledge, natural disasters, and human-nature conflicts

7.1.1.6.2 Illustrative Grade-Wise Content

Content should help meet Curricular Goals through task-oriented activities, social interaction, and exploration of the environment.

Table B-7.1-iv

Content Area	Grade-wise Content		
	Grade 3	**Grade 4**	**Grade 5**
1. Home and family	• Understanding of self, body, and behaviour • Relationships in their family and extended family • Daily practices • Interdependence between animals and humans • Changes in materials in their household • Family tree	• Characteristics of nuclear and joint families • Work and processes in home during sunset and sunrise • Work done by members of the household during different seasons • Role and responsibilities of family members and school staff	• Interdependence between humans and plants and animals • Changes in family compositions
2. Birds and animals	• Interdependence between birds, animals, and humans • Lifecycle of an insect	• Behaviour of birds and animals at sunrise and sunset • Group behaviour in animals and birds • Uses of insects around us • Role and importance of animals in nature and human life	• Role and importance of different animals in nature and human life • Senses and unusual features of animals and their responses • Human interferences in the life of birds and animals • Endangered birds and animals

3. Plants and geography	• Characteristics and classification of plants as per their shape, size, and growth • Patterns in sunrise/sunset • Patterns in leaves and flowers • Process of seed germination • Protection of forests • Maintaining kitchen garden	• Plants around us; • similarities and dissimilarities • Differentiating plants based on the parts of plants • Function and types of roots • Different kinds of soil around us • Geographical features in the immediate environment • Flowers and their characteristics (e.g., smell, place of growth, time of bloom)	• Types of soil • Position of sun and moon • Impact of weather changes in nature and society • Challenges of different species in different geographical conditions • Uses of plants in our daily life and practices
4. Culture and traditions	• Traditional clothing habits • Appreciation of cultural diversity in terms of food, clothing, and language • Changes in local celebrations • Local games	• Traditional practices in the community • Celebrations and festivals in the community • Festivals associated with the sun, moon, and harvest • Similarities among rituals and practices of different communities • Types of clothing, handlooms, handiwork, etc. in the region • Diverse cultural practices and festivals related to natural resources	• Diversity in occupations • Changes in lifestyles due to weather and season change • Changes in clothing and occupations in the community • Appreciation of cultural diversity • Traditional methods of making clothes • Linkages of resources with cultural life, climate, and terrain
5. Caring for self and others	• Good and bad touch • Healthy practices • Sensitivity towards plants, birds, and animals • Emergency situations such as heavy rainfall, fire, etc. • Knowledge on safety and protection • Sensitivity towards plants, birds, and animals • Sensitivity and care towards people in need	• Good practices on personal hygiene and cleanliness in the neighbourhood • Basic safety protocols during travel • Safety protocols in case of emergency situations	• Basic safety practices during flood and emergency • Government schemes for groups of people in need • Gender and social discrimination • Equal opportunities and fair work distribution

6. Food	• Difference between fresh food and rotten food • Appreciation of cultural diversity in food • Changes in eating habits • Food chain	• Different parts of plants that can be consumed • Indigenous knowledge on food preservation • Process of food reaching kitchen from farm • Food and shelter of birds and animals • Ways for hygienic and economic usage of food • Lifestyles of community members during weather and season change (cloth, food etc.) • Relationship between food and lifestyles of people in different regions • Work distribution for food and water in the household and community • Role of farmers in food production • Basic needs for safety and protection of human and other species in the neighbourhood	• Food habits and food chain • Food consumption and food web • Agricultural and cropping patterns • Seed to plant process • Linkages of varied food to climate and geography • Necessary factors for crop production • Role of animals, birds, insects and humans in spreading seeds • Indigenous knowledge of forest sources • Food for all
7. Water	• Uses of water • Utensils for storage of water • Water bodies around us • Natural resources around us • Access and availability of water resources	• Interdependence among plants and animals in terms of food and water • Local sources and uses of water • Indigenous knowledge on water storage and purification • Basic needs for safety and protection of human and other species in the neighbourhood • Access to water for humans, plants, birds, and animals • Water-borne diseases • Management and protection of water	• Major sources of water • Indigenous knowledge on water conservation • Water safety and cleanliness • Accessibility of water resources • Usage of water in crop fields • Impact of human actions on nature • Water management system

8. Shelter	• Types of shelter • Materials used in construction	• Shelter in the village and town • Shelter of birds and animals around us • Traditional and modern materials in construction of houses • Basic needs for safety and protection • Basic safety practices for persons with disabilities, children and older people in the household and neighbourhood	• Importance of shelter • Changes in shelter patterns • Geographical conditions and types of houses • Materials and processes for building houses • Materials used in house to ensure safety • Types of safety measures in shelter in different regions
9. Travel and communication	• Simple messages for communication • Types of transportation • Types of occupations related to travel and communication • Mental map • Symbols for locations • Drawings of locations • Sketching a route map	• Modes of transport in the locality • Purpose of travel • Occupations of the community related to travel and community • Changes in access to travel • Symbols, mental maps, and locating places around us • Simple maps of house, school, neighbourhood, and village	• Landmarks and familiar locations in the surrounding • Geographical features in the region and state • Purpose of travel • Reading maps of state and country
10. Local Institutions	• Functions of family and school • Occupations in the family	• Local institutions (market, post office, panchayat, Anganwadi, etc.) • Institutions responsible for maintenance of safety during emergency situations	• Role and importance of local institutions • Communication with local institutions in different forms to highlight issues, needs, and grievances • Occupations and work distribution in community • Mock drills for emergency situations

11. Creating Things	• Identifying materials for making different things • Leaf art and collages of birds, animals, and insects • Stick puppets to present dialogues between birds, animals, and humans • Paper crafts such as cap, boat, greeting cards, and envelopes • Presentation of data and analysis from any investigation	• Stone art of birds, animals, and insects • Simple origami of birds and animals • Drawings, stories, and poems related to the sun and moon • Simple slogans around safety and protection within the local environment • Sock puppets to narrate simple stories • Water pots and seed hangers • Questions for investigations • Simple letters to communicate with distant relatives or friends	• Skits on safety and protection practices • Models of different types of shelter • Working models of modes of transport • Handmade maps of the locality

7.1.1.7 Pedagogy

Environment, for students at the Preparatory Stage, is what is immediately around them and affects their life. Students learn about the environment through structured interaction with their natural and social environment, exploration, discussion of experiences and observations, interaction with adults and peers, exemplars, task-oriented activities, structured observations, and visits.

This engagement with the immediate environment provides a base for moving into exploring larger systems (from locality to district to region to state to nation to world), broader issues (from home to community to larger society), and an expanding understanding of concerns, connections, and consequences. Thus, students' engagement with their immediate environment leads them to an understanding of distant environments – they are able to apply their understanding from 'near' to 'far' and vice versa.

Values and dispositions related to the environment are best developed if they are demonstrated – e.g., collaboration, respect for diversity, inclusion, sensitivity towards the environment – by adults in the school. Students must also get the opportunity to practise them in their interactions.

7.1.1.7.1 Pedagogical Approaches

Students' questions and experiences – related to the social and physical environment, and of social processes around them (including schools and family) – must be given space. This establishes a level of trust and empathy between the Teacher and students.

Instead of facts, Teachers need to help students develop a deep understanding. This implies that sufficient time for exploration and discussion must be provided. Time will also enable development of the ability for critical thinking through the use of different modes and methods, that are interactive, and through observation and dialogues, and the communication of ideas. Visits to institutions, excursions (including within the school campus) also play an important role in learning

Task-oriented work, wherein they take up some small tasks, helps students connect learning to doing. Through the creation of simple models, toys, etc, they can communicate their understanding and make learning concrete in the process. Allowing students to take the lead in material development, through a variety of modes like art and craft, story, drama, etc., provides space for them to be involved in several small and large-scale assignments and projects.

Teachers must also be aware of values and dispositions that can be developed through activities, and plan deliberately to offer students experiences to engage with and develop values and dispositions. They should also make them explicit for students by drawing attention to specific values and dispositions (e.g., collaborative learning, working in diverse groups, analysis of work distribution at home, food habits).

The table below details how specific pedagogical aspects can be implemented.

Table B-7.1-v

	Aspect	Pedagogical Suggestion
1	**Exploring the world around us through observation**	Observation as a pedagogical approach starts with the immediate environment (home and school). Students observe things around them, their processes, characteristics, utilization, and patterns. To observe is to provide an opportunity for students to engage all their senses and have students base their understanding of the environment on these sensations. The process of observation needs to happen in a frequent, continuous, and consistent manner as the skill of observation develops over time and the area of observation expands. For example, initially, students process all sensations as one, and recognise some details (colours, sounds, and patterns). Consistent and planned observation of one's surroundings develops familiarity, and adds depth to their knowledge, like becoming capable of identifying and expressing minor details, e.g. the texture of leaves and insects, a leaf providing shelter to a caterpillar during rain. Exploration is a more detailed process of observation, with comparison, differentiation, classification, data collection, and analysis. Students can explore the immediate surroundings, i.e., home, school, and neighbourhood for different objects/flowers/plants/animals/birds for their simple observable physical features (diversity, appearance, movement, places of living, food habits, needs, nesting, group behaviour, etc.). Exploration leads to curiosity, developing simple questions about the immediate environment. Responses to these questions should come from various sources – from within the environment, discussions on books, stories, games, etc. An important part of exploration are visits. Physical visits in the field are essential for exploration and must be planned accordingly. However, certain visits that cannot be done in physical mode can be done through alternate modes like videos, images, stories, etc. For example, in a remote mountain village, there are no trains, but these can be understood through videos or stories. Whatever the mode of visits, Teachers must discuss the purpose of the visit, a simple framework for observation, etc. Teachers must also allow space for students' narratives about their visits during holidays.

2	**Discussion**	All processes need to be followed by or rooted in discussion. Discussions should happen among students, students and Teachers, a student and her family members, students, and members of the community, and also include conversations a student might have with oneself. Discussions should become a process where observation-based ideas are shared. There should be a gradual development in articulation by beginning with simple descriptions and to sharing reflections. Discussions can be around a single theme, which involves thinking, analysis, reflection and integrating multiple points of view. While observing one's locality, and expanding the scope of exploration towards the region, State, or nation, students can have various thoughts and opinions. Discussions can explore various lines of thought such as analysing scenarios to decide what is acceptable or should be avoided. For example, students have found that garbage water runs across streets in the village used by everyone. The discussion should not be about resolving what is right or wrong – it should be about assessing the cause, its impact on everyone in the village, and what could be the action. An open space for discussion to express all opinions should be created so that students go through the process of thinking, analysing, reflecting, and integrating multiple points of view.
3	**Expression**	Students can express themselves through various modes as: oral, written, drawings, craft such as models, simple case studies, maps, roleplays, etc. Visual representations also help students develop their understanding of various things around them, e.g., graphs, diagrams, sketch, and simple maps. Narration is also a unique form of expression as the focus is not on the details, but covers the context, analysis, and concluding aspects that the student has landed on. For example, a student can share the event of a minor bike accident in their village by including their relationship with the injured person, a previous incident, next steps, and so on. This narration does not necessarily focus on the accident but captures the child's relationship with the injured and opinion about a particular mode of transportation. Students can also 'create' to express their thoughts in visual form. For example, they can express their understanding that bus is a means of transportation by creating a simple model of a bus with its route. Students can also get objects and describe them as part of 'show and tell'. The focus must be to streamline the expression so that students portray their own experiences and understanding. This practice should be evolved by setting a context through sharing small anecdotes related to the surroundings, and encouraging them to share their understanding and similar experiences. For example, Teachers might mention what they saw on their way to schools to create curiosity and set the context for students to share their own thoughts. This will set the context for further discussion of concepts. **Illustration of roleplay based on discussion:** Roleplay can be used so that students can play, explore, and comprehend experiences from their lives. The theme/topic for the roleplay can be derived from the content being covered. For example, if shelter is the content area, a discussion can be initiated around the kind of houses in the neighbourhood. Students will share what kind of houses they live in, their experience during particular seasons, or even during a natural disaster. The group can arrive at a consensus on which story or incident will be used. Students can create their own dialogues, including deciding what expressions should be played to represent the emotion in the scene. Discussion is what ties in the blend of doing and thinking. In the process of the roleplay or afterwards, there can be a discussion on certain issues (e.g., challenges among people in marginalised communities, etc.)

4	**Questioning**	Asking questions to students at various intervals supports them to express what they have observed, and also focus on particular details. For example, a Teacher can support students to express what they have observed by asking questions like, do all leaves on a tree have the same colour? Is the pattern of all the leaves the same? Do the trees around have the same leaves? Students can be encouraged to add more to these questions. Students will ask questions by imitating the kind of questions Teachers usually ask them. Thus, exposing students to a wide variety of questions in a core strategy to enrich students' expression, and develop the skill of questioning among students. The process of formulating questions itself is an important part of pedagogy. Questioning involves sharp observation and a basic understanding of concepts. Making questions involves thinking in multiple directions. For example, does the tree have flowers or fruits, how does it make food? Is it used in our daily life? The process of creating questions also involves identification of sources that can answer these questions - can elders provide the answer? Can observation over a period answer these questions? This process also leads to increased curiosity, and develops prediction, estimation, analysis. The process of seeking answers also leads to the ability of refining questions and which questions can be asked from other persons (e.g., which are personal, which may hurt the other person). Care should be taken to ensure all students ask questions and each one gets a response.
5	**Using various modes**	Modes such as field visits, exposure visits, roleplays, projects, data collection, melas, art and crafting, gardening, film screenings, story narration, games, poems and songs, map making, and interactions with locals and artisans will be planned and initiated. A variety of modes are essential as students cannot develop their understanding only through books and readings. It needs to be balanced with opportunities to have direct interactions with the environmental issues and aspects so that they can think, explore, start questioning, analyse and reflect their understanding in a constructive manner. Pedagogy must be such that it results in curiosity about natural and social phenomenon. This can be done through direct interaction, and experiences should be facilitated with the natural and human environment. In this process, both Teacher and students can identify questions to be explored. Group at this stage stimulates students to realise the importance of and processes for working in groups. They must appreciate the exchange of ideas, support for each other, providing space for others, not isolating oneself or others. This lays the foundation for collaborative work in later stages.

6	**Preparation by the Teacher**	It is essential for Teachers to maintain clarity while responding to students' questions. Their responses should be grounded in facts, and presented in a way that students can comprehend it. As most of students' learning is expected to occur in an activity-based mode, the process and parts of the learning experience must be clear to the Teacher. For example, Instead of going in an 'event' mode, the Teacher should align with the Curricular Goal/ Learning Outcome, processes. For example, making a collage is a simple activity, but it can be made meaningful through identification of specific themes, categorization of pictures, placement in a meaningful manner, etc followed by a discussion of what the collage depicts. Every student should get the space to participate actively in all the learning processes. While the challenge of managing these processes for all children is a reality, certain deliberate strategies need to be in place. For example, the Teacher will be responsible for the overall process, but students will be divided into smaller, manageable groups. The Teacher may not be able to reach every group within the duration of one Grade but will ensure that her interaction is balanced among children in all groups over a fixed period. Grouping of students for different activities should address most, if not all the diversity that exists in the classroom. For example, one activity cannot provide the space for all students to work with one another. However, a series of activities should be planned so that students' grouping changes and students get a chance to work with each other in 1-2 of a set of 6 selected activities in a month. Safety and security of students should also be planned ahead in time by the Teacher, especially for processes outside the classroom. Materials used and developed by the Teacher and students must be organised in a classroom (e.g., as part of the learning corner). This display should be dynamic, relevant to the ongoing classroom process, and organised in a manner that students understand and integrate the setup into their learning process. Documenting students' work for fixed periods of time integrates the learning expectations, classroom process, and assessment process. The onus of this documentation need not fall on the Teacher alone – the setup can be initiated by the Teacher, while the responsibility of maintaining it can lie with the students. For example, the Teacher can create a file for a students' portfolio, while the responsibility of attaching the work attested by the Teacher lies with the student.

Teacher's Voice B-7.1-i [To be Edited]

Field Visits

I organised a visit to different shopping regions for my Grade 4 children in three groups to a grocery shop, a local shop, and the weekly market. Although we were visiting different places, they each had to collect the same data by talking to the shopkeepers: items available, daily income, and how they attract customers. They also had to make a list of at least 20 items that are sold at the shop and write the quantity and price. As each group visited a different kind of shop/market, the process of analysing and sharing the data they had collected was very interesting. First, a child from each group read the list of items they had noted down. Then, we wrote the daily income of each of these shops on the blackboard. Underneath this, we began to add the points they had collected on what strategies the shops use to attract customers. We noticed that the local grocery store and shop did not have a 'strategy' that we could write down. I rephrased the question – why do you visit the grocery store, local shop, or the weekly market? Which place is most exciting for you? This brought new energy to children's responses. The points they shared were scattered, but I was able to write them down in this way:

Grocery store	***Local shop***	***Weekly market***
We go daily	*Father or uncle go sometimes* *Mother also goes while coming back from work*	*We go with mother, aunt, and grandmother*
We buy many things: sweets, murukkus, toothpaste, shampoo, eggs, masala...	*Rice, daal, flour, sugar, tea powder...*	*Vegetables, new clothes, lollipops, ice cream, bread, fan, bulb...*

After listing these items, it was clear that the children were most excited about going to the weekly market as they purchased many things from there. Some children got to visit the local shop as well, but they did not get to buy anything for themselves except some chocolate. Almost every child went to the grocery store in their street every day and spent 1-5 rupees on eatables. Once this was clear, I was able to extend the discussion to the marketing strategies we wanted to find out. I asked if their local shopkeeper always had murukku and eggs. All the children immediately agreed that the man always had all the snacks they wanted in stock. They also pointed out that the shopkeeper was the 'ajja' of a girl in our class itself. The girl told everyone that her ajja always went to the city to purchase things for the shop on every Thursday. Before going, her ajja would call a man in the city so that he could collect all the items quickly. I used this point to bring up that the marketing strategy for the grocery shop is then to have all the things the people would want urgently (including children's favourite snacks). We continued the discussion for the next two days to find out the marketing strategies of the other two groups. We also went on to write our analysis as noted on the blackboard on drawing sheets and displayed them in the classroom.

7.1.1.8 Assessment

7.1.1.8.1 Formative Assessment

Formative assessment and pedagogical processes are strongly interlinked. The pedagogy itself must include opportunities for formative assessment. This is particularly true for process capacities. Continuous assessment of processes – involvement of students, participation, etc – will be as much a part of assessment as end products created by students. For example, the process of creating a class newspaper (*Bal Akhbaar*) or doing a project will be assessed as will the product itself. Case studies, imaginary situations, unfinished stories also lend themselves to assessment, while creating excitement among students. Task oriented assessments (e.g., plantation, kitchen garden) enable action on students' part as well as assessment of their understanding and process capacities. Methods like holding discussions, excursions and visits, simple projects, participation in the class, group activities, also present opportunities for formative assessments.

Rubrics are an important way of assessing learning outcomes, particularly those related to the pedagogical approaches mentioned above. They are a way to make assessment more objective and remove possible bias. Therefore, criteria and indicators for assessment need to be developed for assessment of group and project work. For example,

a. Content: what kind of content is being presented; what kind of data/ information has been collected and how has it been analysed; how effectively is the content being presented
b. Sensitivity: do student listen to peers' responses; do they collaborate with others
c. Learning: what have they learnt with reference to the Competencies/Learning Outcomes

Formative assessment of approaches like project work (whether individual or collaborative) will require assessment of the process through active engagement of the Teacher in the process as well as assessment of the end project.

Recording of formative assessment can be done in various ways. The approach should be to minimize the load on the Teacher while maintaining records. For example, self-assessment with Teacher's comments, student portfolio, checklists indicating attainment of Learning Outcomes, products of students' creative work.

Box B-7.1-vi

Formative Assessment: Illustrative Questions

Throughout the process of formative assessment, the Teacher should focus and record their observations about student's learning level using a few indicators. For example,

a. Students can understand instructions and questions
b. Students can express their experiences in class
c. Students are engaged actively in group work, cooperating with others, and taking support from others

d. Students can apply knowledge in their day-to-day tasks

e. Students are connecting concepts with their experiences and being empathetic towards others

f. Students are asking questions and listening to others' responses

***Imaginary situations**- The Teacher will start the discussion from sharing her recent experiences while travelling, such as – 'I was travelling back home and saw a cow that was trying to drink water from a handpump. Suddenly, I stopped to think about what I could do to help the cow. What would you do if you were in my situation?'*

7.1.1.8.2 Summative Assessment

Teachers must do periodic analysis of students' records – how learning is progressing and what kind of scaffolding is required. Summative assessment is useful for this; while not part of the regular routine of the classroom, summative assessment must also be aligned to pedagogy and learning outcomes.

Design of summative assessment must be such that it assesses the range of concepts and process capacities, and will be used to improve the development process, and not for labelling.

Box B-7.1-vii

Summative Assessment: Illustrative Questions

a. Why do we need a house?

b. Mamta lives in a village of Bihar where floods occur annually due to heavy rainfall. Which type of house should be constructed in such a village?

c. Which type of material should be used to build a large structure

i. *Bricks, Cement, sand, iron road*

ii. *Mud, Stone, Bamboo, Plastic*

iii.*Steel, Glass, Mud, Grass*

iv. *Plastic, Glass, Bamboo*

d. Make a model of house for your pet animals.

7.1.1.9 Teachers

We need Teachers who have specific capacities; illustratively, pedagogical approaches informed by understanding of context, of students' ability to evolve understanding among learners through discussion, ability to use multiple methods; capacities like observation, experimentation; to connect beyond specific themes; environmental awareness and sensitivity; and so on.

Until pre-service programmes prepare Teachers with these competencies in the context of World Around Us, Teachers of Science and Social Science must undergo in-service modules for the teaching of 'World Around Us'. Either can then take up this subject at the Preparatory Stage.

Teacher's Voice B-7.1-ii [To be Edited]

Worksheets on Work Distribution

While schools were running regularly, I would use worksheets with students based on need. However, during monsoons, I could only engage with my students a few times a week, and that too for only 1-2 hours. During this time, I began to design and use different types of worksheets. Although I created worksheets for language and mathematics as well, I noticed that my Grade 5 students enjoyed the EVS worksheets the most. I also noticed that the reason for this was that at this time, I was meeting the students in their village, in their own mohallas. All the topics we usually covered inside the classroom, like listing the types of animals, or discussing the types of crops grown in different seasons – all of this was right there, around us. One such worksheet I developed was for the theme 'Home and Family' to understand the division of labour in our family:

Family member	*What work do they do?*
Grandfather	*Lies down, goes to roam around, comes back home, eats food, goes to the farm, comes back, sleeps, looks after the house*
Grandmother	*Stays at home, looks after the house, sleeps*
Father	*Wakes up, goes to work in the fields, comes back, eats food, goes outside*
Mother	*Wakes up, sweeps outside the house, washes clothes, takes bath, cooks food, serves food, goes to work in the fields, comes home, cuts vegetables, cooks food, serves everyone, washes the vessels, sleeps*
Uncle	*Wakes up, goes to work in the fields, comes back, eats food, goes outside, goes to the market*
Aunt	*Wakes up, sweeps outside the house with mother, washes vessels, takes bath, serves food with mother, goes to work in the fields*
Elder brother	*Goes to study, comes back, goes to play, studies at home*
Elder sister	*Helps mother with chores, carries drinking water, takes care of little sister, goes to school*
Younger brother	*Goes to school, goes to play*
Younger sister	*Stays at home, goes to play*

Students filled the worksheet within 10 minutes. After this, we held a discussion where I asked questions around who they thought did the most amount of work in their house. Most of the students' initial response was 'father'. Using their responses on this worksheet, we were able to carry the discussion further to identify that the mother in each family is responsible for most of the chores inside the house. The additional advantage was that this discussion was happening in their mohallas where several students' mothers were performing the tasks they had written down. I observed and took note of how students also noticed this and changed their responses.

7.1.2 Middle Stage: Integration of Environmental Education with Science and Social Science

At this Stage, concepts related to Environmental Education are integrated into Science and Social Science. This is to ensure adequate focus on the development of key concepts related to Environmental Education.

Competencies leading to the attainment of the following Curricular Goals in **Science** cater to the development of concepts related to Environmental Education –

CG-3 Explores the living world around us, and its interaction with the inanimate world in scientific terms

CG-6 Explores the nature and processes of science through engaging with the evolution of scientific knowledge and conducting scientific inquiry

Competencies leading to the attainment of the following Curricular Goals in **Social Science** cater to the development of concepts related to Environmental Education –

CG-5 Understands the spatial distribution of resources (from local to global), their conservation and the interdependence between natural phenomena and human life

CG-9 Understands the process of economic activities (production, trade, and commerce) and its impact on shaping an individual's life as well as its influence on any country's history and geography

7.1.3 Secondary Stage: Grades 9 and 10

Students in the Secondary Stage must be able to (i) synthesise their understanding of concepts related to Environmental Education from Science and Social Science to develop a holistic understanding; (ii) be able to examine concepts and issues related to Environmental Education from multiple perspectives; (iii) view Environmental Education from the perspective of a social-ecological system framework, as opposed to a pure science perspective; (iv) examine ethical and moral questions that arise from this perspective; and (v) be able to engage with authentic and updated information and news related to environmental issues and concerns.

Box B-7.1-viii

Social-ecological system framework: *A social-ecological system framework provides a useful conceptual frame for understanding the interlinkages between society and nature that have implications for sustainability. The framework lays emphasis on interdisciplinarity, integrating conceptual frameworks and methods from the natural and social sciences for a holistic understanding of sustainability challenges. Central to the social-ecological system framework are ideas of equity, environmental justice, and human well-being, fundamental to the development of sustainable societies.*

7.1.3.1 Grade 9: Individuals in Society, and Integration with Science and Social Science

The Interdisciplinary Areas in Grade 9 will include Individuals in Society, which will, among other things, help students develop the capacity for ethical and moral reasoning, to identify authentic sources, take a position based on logic, reason and evidence, and communicate this position. These capacities are critical, given the growing realization that issues and concerns related to the environment are not simply matters of science, but require taking ethical and moral positions based on understanding that must be constantly renewed.

The school curriculum through all stages aims to develop values and dispositions mentioned in the NEP 2020. While their development is critical, it is equally important that they inform the thinking and actions of students. Therefore, students will develop ethical and moral reasoning, through engaging with socio-cultural, economic political and environmental issues/events in the context of current affairs.

At the same time, students will continue to develop their understanding of concepts related to Environmental Education in Science and Social Science in the Secondary Stage.

Competencies related to Environmental Education in **Science** are developed through the Curricular Goal for Grades 9 and 10.

CG-4 Explores interconnectedness between organisms and their environment

Competencies related to Environmental Education in **Social Science** are developed through the Curricular Goals for Grades 9 and 10.

CG-3 Develops an understanding of the inter-relationship between human beings and their physical environment and how that influences the livelihoods, cultural diversity, and biodiversity of the region

7.1.3.2 Grade 10: Environmental Education

In Grade 10, students will engage with Environmental Education as a separate subject. They will focus on a holistic understanding of key concerns and issues related to Environmental Education through drawing upon their understanding across areas, and the capacities developed in Grade 9.

At this Stage, students will deepen their environmental knowledge, assess issues, and analyse their causes across various areas, make informed judgements on statements and debates in media and society, and use a range of techniques developed in earlier grades to investigate, analyse, synthesize, question, critique, and draw their own conclusions. They will use multiple perspectives to develop an integrated understanding, and advocate actions at multiple levels.

While it is important at this stage that students acquire a conceptual understanding of environmental issues and challenges, as well as an appreciation of the magnitude of the problem, it is equally important to ensure they do not get discouraged or despair for their future. The intent is not to scare students or pinpoint responsibility on them to respond to this crisis. Therefore, the presentation of alternatives through examples of actions taken to reverse or at least contain environmental damage must be ensured. At the same time, it is important to emphasize that the

onus for mitigation is not on the individual but on communities of individuals.

7.1.3.2.1 Aims of Environmental Education

It is critical for all students to be prepared to engage with environmental issues in adult life – they must have an understanding of basic issues, and a framework related to how to approach these issues. Therefore, at the Secondary Stage, relevant concepts must be brought together to enable students to develop this understanding as well as develop a personal framework to respond to emerging environmental issues.

The aims of Environmental Education are:

a. Environmental literacy: Students develop environmental values, dispositions, and capacities to investigate the environment, and make intelligent, informed decisions about individual and collective work towards solutions of current problems and the prevention of new ones. Students are motivated and committed to transforming lives and society by acquiring the necessary knowledge, values and dispositions, attitudes, commitment, and capacities.

b. Social-ecological connect: Students develop awareness of and concern about interdependence between the natural and humanmade environments and the various dimensions[2] of human societies. They also appreciate the need for balance between the environment and human society.

7.1.3.2.2 Nature of Knowledge

Current environmental problems must be seen as comprising many aspects. They involve issues of public health, social justice, behaviour towards nature, and ignorance about matters of science, policy, rights, and ethics – they must therefore be examined through the lens of multiple disciplines and perspectives.

a. The knowledge base for Environmental Education comes from both research and practice. Environmental Education draws from many different fields such as biology, ecology, geography, chemistry, geology, physics, economics, sociology, natural resources, agriculture, management, law, and politics.

b. Environmental Education critically addresses both social and natural concerns. Social concerns include issues of gender and marginalization, equity, justice and respect for human dignity and rights. It also encourages students to develop knowledge about indigenous practices for prevention of environmental degradation. Natural concerns include issues related to survival of animal species and sustainable use of resources, like forests, rivers, etc. Therefore, Environmental Education enables in students a well-developed set of environmental values as well as the capacity to participate and initiate actions in order to remediate or prevent further environmental issues and sustainability.

2 Economic, socio-cultural, political, historical, ethical, and aesthetic dimensions

Box B-7.1-ix

Environmental values include but are not limited to aesthetic appreciation of beauty of surroundings including diversity of physical and socio-cultural environment; sensitivity towards social, political, economic, cultural, and natural environment and phenomena; ability and motivation to identify and raise questions related to human dignity, justice, and rights.

c. Environmental Education helps imagine a sustainable future for all wherein environmental and social responsibility drive individual and group choices. It goes beyond resource conservation and habitat preservation to focus on environmental literacy. It also examines how economic growth and environmental protection should go side by side.

Box B-7.1-x

Environmental literacy prepares students for active participation in dealing with environmental issues. An environmentally literate person is someone who, individually and together with others, makes informed decisions concerning the environment; is willing to act on these decisions to improve the well-being of other individuals, societies, and the global environment; and participates in civic life. Environmentally literate individuals possess the knowledge and understanding of a wide range of environmental concepts, problems, and issues; along with the cognitive capacities and abilities as well as dispositions and values that enable environmentally responsible behavioural strategies to apply such knowledge and understanding in order to make sound and effective decisions in a range of environmental contexts. It requires going beyond fragmented thinking about the environment and thinking in terms of interaction of human and natural systems. The production of environmentally literate citizens through formal education will enable the knowledge, cognitive capacities, and attitudes acquired in the classroom, to be transferred to the decision-making process of students throughout their lives.

d. Environmental Education examines the natural world and human societies as systems with complex realities that constantly interact with each other. It explores causes for imbalance across these systems through the interdependence among the components of the system comprising the natural and human environment and the various dimensions of human society.

e. Environmental Education provides the opportunity to critically explore and analyse the co-existence of multiple truths and realities. It offers multiple interpretations of any situation or event which must converge into equitable, just, and sustainable solutions. For example, the tensions created by the need for development, and for preservation of the environment.

7.1.3.2.3 Subject-Specific Challenges

So far, Environmental Education, integrated with Science and Social Science, has been focused on facts. Students have been able to examine concepts related to the environment from either the lens of Science or Social Science. They have not been able to get a holistic view of environmental concerns. Another challenge is that till now, environmental literacy has not been the focus – which is the need of the hour.

At the Secondary Stage, Environmental Education will be offered as a separate subject for the first time. Till it is offered as a specialization in Teacher education programmes, the greatest challenge will be to identify Teachers.

In the interim, capacity building of these Teachers will also require academic support institutions to develop their own capacity in the subject.

7.1.3.2.4 Learning Standards

All students must to be aware of what is happening around them related to Environmental Education, to be able to advocate and participate in necessary action. These Learning Standards are intended to develop the environmental understanding necessary in all citizens, as well as the methods and capacities they must employ as ordinary citizens (e.g., problem identification, causes, future impact visualization, prediction, policy actions and society actions as well as actions at the level of individuals, ability to critique systemic actions, and so on).

a. Curricular Goals & Competencies

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

CG-1 Understands key issues and challenges related to climate change, pollution, and biodiversity collapse	C-1.1 Explains how climate change, pollution and biodiversity collapse affect human well-being (economic activity, migration, cultural practices), and the well-being of plant, animal, and bird species C-1.2 Illustrates connections between pollution, climate change and biodiversity collapse

CG-2 Appreciates the need for balance and harmony between human society and nature	C-2.1 Describes the place of humans within ecosystems, and illustrate how human society and natural ecosystems must co-exist C-2.2 Illustrates actions at the local, community, national and international level towards mitigation of issues related to environmental damage C-2.3 Identifies actions that can be taken at the level of the school or local community to counter environment-related concerns

b. Illustrative Learning Outcomes

Table B-7.1-vi

Curricular Goal 1: Understands key issues and challenges related to climate change, pollution, and biodiversity collapse
Competency 1.1: Explains how climate change, pollution and biodiversity collapse affect human well-being (economic activity, migration, cultural practices), and the well-being of plant, animal, and bird species
• Learning Outcomes • Identifies instances of climate change at the local and global level • Identifies various factors related to pollution at the local and global level • Understands the dimensions of biodiversity collapse at the local and global level • Describes the impact of climate change, pollution, and biodiversity collapse on the well-being of plants, animals, and bird species • Describes the impact of climate change, pollution, and biodiversity collapse on human well-being in terms of accessibility of resources, migration, and cultural practices • Analyses the impact of environmental damage on livelihood • Illustrates instances of the impact of environmental damage on local resources, and the people living in those regions • Shares views on how climate change, pollution and biodiversity have affected their own life

7.1.3.2.5 Content

a. Principles of Content Selection

The following principles must inform content selection for Environmental Education at the Secondary Stage.

i. Content must reflect global perspectives, and reflect actions of nations, individuals, bodies/institutions; it must develop the belief that collaborative and sustained global solutions are needed. For example,

1) Scientific basis of climate system and climate change; causes for and effect of biodiversity collapse; causes and impact of pollution; interrelationship between them

2) Vulnerability of socio-economic and natural systems to climate change, consequences of climate change and options for adapting to it

3) Use of natural resources like petrol across the globe and how it has affected economies and cultures; loss of glacial ice; climate change – rising sea levels; flooding due to heavy rains; soil erosion in islands; shrinking of rivers

4) Measures taken to address these changes and sustainable practices

5) Global efforts towards mitigation of/adaptation to climate change – United Nations Framework Convention on Climate Change; Kyoto Protocol (carbon credits, Emissions Reduction Purchase Agreement); Conferences of Parties; Cancun Agreement, Durban Platform for Enhanced Action

ii. Content must present strong qualitative case studies and quantitative data that indicate the impact of events and phenomenon, and enable analysis of contemporary impact. They should enable a holistic study, through offering multiple perspectives, and include stories of successful transformations. These case studies should be local – which can be selected by the State curriculum developers or even Teachers, national and international For example,

1) Jal Jeevan and projects to clean rivers, Swachchta Abhiyaan

2) Sustainable homes with natural materials and cooling/heating systems in India

3) Astrotourism for sustainable rural development in Ladakh and Africa

4) Developmental needs versus conservation of environment

5) Disposal of e-waste, biowaste, medical waste (including radioactive materials)

6) Case studies of work and impact of grassroots individuals and organisations

iii. Content should represent inter- and intra-nation ethical dilemmas and conflicts related to environment and cultures/ countries, as well as indicate how these have been/can be resolved. For example,

1) Sharing of river waters

2) Carbon credits/offsets

3) Displacement, environment refugees

4) Benefits for privileged groups versus vulnerable groups

5) Shrinking space for animals, leading to human-animal conflict

iv. Content should incorporate Indian and local knowledge. It must engage the student with indigenous knowledge, and enable them to present their analysis and findings through different mediums. For example,

1) Cropping patterns

2) Reviving lost crops

3) Sustainable practices that have both evolved historically and been lost in the country such as drainage, cooling, water systems; cultural traditions related to agriculture, forests, flora, and fauna

4) Baolis, sacred groves, etc

5) Organic agriculture

v. Content must enable school-based actions. It should enable advocacy at different levels and through different means. For example,

1) Use of creative media that can enable recording of environmental issues, challenges, and positive actions and stories (e.g. videos)

2) Development of materials (newsletter, scripts for motivation, articles), etc. for dissemination in the community

vi. Content must enable informed and well-researched group discussions and debate. Debates that are topical and pertinent should be included – particularly around balancing development with preservation of the environment. For example,

1) Older and contemporary environmental debates; development versus environmental preservation; movement from cities for sustainable living

Teacher's Voice B-7.1-iii[To be Edited]

Content

When I think about what I want students to learn about the environment, I realise the question is difficult. They must be aware of the danger the world is in because of environmental degradation. However, the future seems so dismal that I don't want them to think that their lives hold no hope. My responsibility deepens because of this dilemma.

I plan to share the realities of the triple planetary crisis with them but also provide them with details of initiatives taken by individuals and communities to make small changes that have positive impacts on the environment. I also want to help them develop a sense of how to respond as members of a community to decisions and policies made by governments related to the environment.

I think the best way to achieve these goals is to give them detailed case studies to read. These case studies must help students understand not only the context and specific issues, but also actions taken to address these issues. There are several instances in our country of people who have revived traditional practices of conservation or used simple technology to devise solutions and alternatives. Reading these case studies will help students to not only adopt a positive, solution-oriented attitude, it will also help them see how communities can take action at a local level.

b. Recommended approach

Students will take up specific issues and examine their impact using an interdisciplinary lens. They will discuss impact and mitigation of these environmental issues. While the approach can be varied, it is recommended that the triple planetary crisis – biodiversity collapse, pollution, climate change – comprise the themes to be taken up during the Secondary stage.

To ensure a holistic understanding of all aspects with the required depth, it is recommended that experiential leaning be enabled through using case studies, site exploration, projects, guided readings, and other similar approaches. Whichever approach is taken, students should be able to examine the issue locally, and then extend their understanding into regional, national, and international concerns and actions. The underlying principle is to provide evidence-based understanding of both the crisis and its mitigation. Another principle is to ensure a holistic understanding as opposed to a fragmented understanding of perspectives from science, social science, human rights, politics, ethics, and justice. This

principle is operationalised through approaching the content using a social-ecological systems framework.

The three selected themes – biodiversity collapse, pollution, climate change – are central to the current planetary crisis and provide a comprehensive understanding of issues as well as mitigation. It may be important to highlight other issues as well. However, it is strongly recommended that the approach given below is followed. This approach balances all aspects while providing a comprehensive understanding of local and regional issues.

i. Students should be able to gain an understanding of the key issues related to each of the three themes though case studies, guided readings, site explorations, projects, and similar approaches.

ii. Preferably, the content should be contextual (located in the community, region or State the school is located in). If this is not possible, it must be ensured that at least a part of content students engage with is contextual.

iii. Content being used should offer rigour while being simple. Teachers should refer to similar issues (which can be included in the textbook) to ensure a broader understanding.

Table B-7.1-vii

#	Grade 10
1	Bringing together concepts related to science and social science from the Middle stage and Grade 9 to highlight three themes – pollution, biodiversity collapse, climate change Triple planetary crisis – causes, impact and interrelationship between pollution, biodiversity collapse, climate change
2	Social-ecological systems framework – connectedness between the natural and social environments
3	Examination of quantitative and qualitative data related to specific examples of the three cases using the following pointers: a. Relationships between society and the environmental issue b. Influence of commercial interests c. Differential impact on different communities d. Similar instances at the local, regional, national, and international level e. Actions at the level of individuals, community, government, market, and technology The approach could be through using case studies, assigning projects, using guided readings, taking students for site visits – these can be chosen as per the convenience of the school and Teacher.
4	Identifying actions that can take place at the school level, and developing a plan for implementation.

7.1.3.2.6 Pedagogy

As students move into the Secondary Stage, their ability for logical and abstract thinking develops further. They can independently deepen their environmental knowledge, assess, and analyse issues comprehensively. They make informed judgements on statements and debates in media and society, and use a wide range of techniques to investigate, analyse, synthesize, question, critique, and draw their own conclusions.

Using the essential knowledge and capacities developed in earlier stages, they are able to use theories, models, and ideas to develop explanations and advocate actions for certain environmental phenomena.

Students show initiative, creativity, perseverance, and problem-solving capacities for environmental action. They start becoming familiar with valid, reliable sources of information. At this stage, students can also critique existing policies and practices.

Box B-7.1-xi

> Case studies are stories or narratives that are used as a teaching tool. They typically present a real-world scenario, provide supporting data and documents, and present the central problem in an open-ended manner. Using case studies supports participatory, discussion-based way of learning where students gain capacities in critical thinking, communication, and group dynamics. It is a type of problem-based learning where students have the opportunity to understand the available data and explore multiple perspectives. It is a way for students to move beyond having to find a single solution, while focusing on developing ideas for possible action at different levels.

Students must examine environmental issues not only from a scientific/technological lens but also from the lens of the social sciences and humanities. They must examine how the actions of individuals, communities, and nations – both historical and contemporary – can have far-reaching consequences. Pedagogy must, therefore, be informed by the following:

a. Teacher must deliberately plan for the development of environmental values and dispositions. They should be made explicit for students by drawing attention to environmental values embedded in case studies, narratives, etc.
b. Debates around historical and contemporary issues in education enable the development of a critical individual with the ability to take actions through critical engagement with theory and practice. These abilities must be developed through investigation, analysis and problem solving, and similar strategies, that are relevant to their own communities.
c. Students must identify how they can express their understanding in the community, whether through advocacy or simply through dialogue.
d. Students must get as much exposure as possible at this stage – through books, media, films, dialogue among peers and elders, interaction with peers from other schools, video conferencing through experts and peers outside the State or country.
e. Teachers must not consider self and textbook as the only source but enable interaction with other persons and/or media to expand their learning. Teachers must have a resource pool of persons who can support learning of students.

f. A significant platform must be provided to students to share their experiences, findings, and reflections (school newsletter, seminars, publications, TV interviews, social media, etc).

g. For continued learning throughout the year, students can take up a project or participate in an ongoing project (cleaning rivers, community projects, sustainable school practices, green school).

h. Students must be encouraged to read materials on the environment, and present synthesis of readings; reviews of relevant books and films, videos, programmes, and reflections can also be shared.

7.1.3.2.7 Assessment

a. Formative Assessment

The following principles must inform assessment:

i. Since environmental issues have multiple interpretations, assessment should be open ended, to evaluate the ability of the student to argue logically and take a stand.

ii. Another principle governing assessment will be to test for students' knowledge and understanding of local history, resources, and government along with its connection to national/global context.

iii. As students' engagement with more abstract ideas and the larger world increases, assessment of change in students' understanding as reflected in their writing, day-to-day activities, planning, etc. must be included in assessment.

iv. At this stage, debates, discussion, dialogue, case studies are a part of pedagogy. Hence, formative assessment must be done through observation of students, review of their work, and analysis of their contributions to discussions.

v. This will be possible through the use of clearly stated criteria and rubrics. These must be shared with students beforehand, so they are clear of the expectations from them.

Box B-7.1-xii

Illustration of formative assessment using case studies

Case study: *Due to human pressure and excessive exploitation, forests are shrinking rapidly. While trees are being cut indiscriminately for the projects being made for development, there are some people across the country who are making serious efforts to save and increase their forests. Due to their efforts, greenery is returning to the earth even in a very limited area.*

Jagat Singh Janglee, a resident of Kotmalla village of Rudraprayag, Uttarakhand, is one example of such efforts by working on mixed forests for four decades. There are more than five lakh trees of more than 70 species like Deodar, Kail, Kafal, Oak, Thuner, Chir in the mixed forest prepared in an area of more than 3 hectares. Apart from this, he has grown many rare species of plants like Kedar Patti, Cardamom, Brahmi.

Jagat Singh Janglee believes that we have to place continuous efforts to generate moisture. For this, instead of trees of only one species, we need to make a mixed forest with mixed species of trees, creepers, tubers etc. Such efforts will bring local and global advantages. At the local level, fodder, wood and essential forest material will be available. At a global level, the rising temperatures on earth due to global warming will get access to clean air and moisture. Such efforts will also bring additional improvements such as maintaining the ground water level.

Table B-7.2-viii

Criteria for assessment and method of assessment	
Content	Content can be assessed based on the student's understanding of the given case study through various questions: a. What kind of forest has Jagat Singh Janglee developed? b. What would be the benefit of developing such a forest?
Process	Process can be assessed based on group tasks, discussions, and presentations with a few questions, such as: a. Collect information about people around you/find out about people who are making similar efforts and record how their efforts are helping in environmental protection.
Expression	Expression of what the student has learnt from the content and process will be articulated in written and oral form, such as: a. Write a case study around an instance of sustainable development by an individual or community known to you. b. Can we develop a mixed forest in the school by planting a variety of local plants in the flowerbed of our school? c. Debate what type of policy recommendations can be made based on the impact of such efforts to counter biodiversity collapse
Views	a. Do you think a single person's efforts are adequate to prevent biodiversity collapse? Why? Why not?

b. Summative Assessment

i. Summative assessment will be done on the completion of projects, reports on experiences, etc.

ii. Students could be asked to write essays on environmental issues. Broad-based questions that assess the understanding of students based on the social-ecological system framework should be used to provide students anchors for writing these essays.

iii. In case of paper-pencil tests, it is recommended that questions largely be based on case studies, and analysis of documents. While some MCQs can be included, short essays assessed through rubrics shared with students will allow for a comprehensive assessment.

7.1.3.2.8 Teachers

Currently, there are hardly any courses on environmental education, and none that prepare Teachers. In the current scenario, it would be difficult to expect that a separate set of Teachers will be recruited for environmental education. However, this will change once departments of education begin to offer specialization in Environmental Education during pre-service Teacher education.

Until then, it is entirely possible to develop some of the critical capacities in both pre-and in-service Teacher education programmes.

The following must be done in the interim:

a. Preferably, Teachers of Science will undergo in-service modules for the teaching of Environmental Education at the Secondary Stage. In case a Science Teacher is not available for some reasons, Teachers of Social Science will have to be prepared for teaching Environmental Education.

b. The pre-service curriculum must have Environmental Education as a compulsory component. Student Teachers can also undertake projects and small research studies related to Environmental Education aligned to those expected from school students.

c. Guidelines for modules and courses will be included in the National Curriculum Framework for Teacher Education

Box B-7.1-xiii

At the Secondary Stage, the Science Teacher should handle Environmental Education, as content at this Stage would suit the understanding a Science Teacher has. If the Science Teacher is not available, the Social Science Teacher can take up this subject. However, both the Science and Social Science Teacher should prioritize attainment of the Competencies for the subject as given for the Secondary Stage. The Teacher should be cautious to not place overemphasis on content or capacities that are more aligned to their subject of specialization. The Teacher of Environmental Education should combine relevant understanding of both Science and Social Science at the school level, and be able to draw linkages between the two in the context of the subject.

Section 7.2
Individuals in Society (Grade 9)

Ethical and moral reasoning involves thinking about fundamental questions related to everyday events – What is right or wrong? Can right or wrong be identified? What actions are justified? What is the 'right' thing to do? What are the reasons that justify the 'right' thing? This kind of reasoning is necessary for responding rationally to situations, instead of impulsively or instinctively.

For example, the instinctive reaction to a dangerous situation is to safeguard oneself. But the process of ethical and moral reasoning enables determining the right actions, not only for oneself but also for others in the same situation. These questions are equally applicable across common instances we encounter in real life. For example, will a road bring prosperity to a village or will it degrade the natural environment, and bring undesirable elements into the community? Will tourism alleviate poverty in a region or will it permanently change the area and its inhabitants? Can a war be just if it fought to protect the interests of the disadvantaged?

The response to these questions requires systematic reasoning.

a. First of all, it requires an awareness of events – the context, the factors affecting it, people involved.
b. Second, it requires identification of ethical and moral questions – whether there is violation of basic human and Constitutional values or any danger of the well-being and/or rights of any individual or community being affected.
c. Third, identify arguments for and against possible actions.
d. Fourth, deciding what the 'right' thing to do, what is the evidence for making this claim, and how the action(s) be carried out.
e. Finally, identifying possible consequences of the proposed actions, and what other steps can be taken to counter these.

These capacities cannot be developed in a vacuum. While students encounter such ethical and moral questions in other curricular areas, socio-cultural, economic and political issues, and current affairs are best suited to meet the aim of developing them.

Ethical and moral reasoning in the context of socio-cultural, economic and political issues, and current affairs requires the application of understanding gained from multiple subjects, as well as the moral and ethical values that are developed as a part of other curricular areas. Therefore, this subject is a part of the Interdisciplinary Areas.

7.2.1 Aims of Individuals in Society

Engagement with current affairs is an end in itself. To quote the DNEP 2019, '*The knowledge that schools impart to students is not an end in itself, but a means to a better and more meaningful and purposeful life in the future. In particular, since possible future endeavours and occupations to be taken up after school or university are dictated by the realities of the evolving world around us, we must encourage a constant connect between the classroom and the real world, and not isolate the two.*' (Introduction to Section 4.6.10).

The aim of this subject is to enable students to:

a. **Use ethical and moral reasoning to engage with issues/events:** Students identify key ethical and moral questions based on a comprehensive understanding of an issue or events. They take an informed position based on evidence and reason and advocate suitable action in a democratic manner.

b. **Develop an interest in and ability to engage with current affairs:** Students develop the habit of keeping abreast with current affairs at the local, district, state, national and international level. They use understanding from across disciplinary areas, and ethical and moral reasoning to examine current affairs. They take informed positions based on evidence and reason and advocate suitable action in a democratic manner.

7.2.2 Nature of Knowledge

The knowledge base of Individuals in Society is interdisciplinary, and rooted in understanding, and values and dispositions developed across curricular areas.

a. A comprehensive understanding is required to be able to decide what is ethical and moral, and to evaluate actions. This also requires being able to apply **understanding, and values and dispositions from other disciplinary areas,** to understand issues and events comprehensively. An understanding of events in the local community, state, nation and world in terms of priorities and concerns, as well along multiple dimensions – social, moral, ethical, political, economic – comprises this comprehensive understanding.

b. This comprehensive understanding enables individuals to **take a view or position,** and/or recommend and participate in a set of actions that will bring positive change. It also enables recognition of what can be done through **actions as a group** within the community and being able to identify what is in the purview of policy and governance.

c. There are **no fixed answers** – different interpretations and actions are correct when seen from different perspectives, or when placed in different contexts.

7.2.3 Current Challenges

The major challenge is systemic readiness – our teachers have no prior experience or expertise, nor is there a pre-existing body of knowledge related to the area. The following are the concerns that must be kept in mind:

a. **Teachers must have a high degree of awareness** related to current affairs, and they must be able to guide students through the process of learning how to engage with issues and events from an ethical-moral lens.

b. **Content of Individuals in Society must be dynamic** – current affairs are changing and influenced by multiple factors.

c. **Some questions are likely to remain 'open'** – there may not be any conclusive solutions or even agreement because of the nature of the subject.

d. **Pupil-teacher ratio** needs to be reasonable for transaction of this subject since it requires students to be very active, and for teachers to scaffold them.

e. **Teachers may avoid taking up certain issues and events** they feel are 'sensitive', particularly if they are local. This may lead to the exclusion specifically of issues like caste, class, gender.

7.2.4 Learning Standards

Curricular goals are intended to help student develop the ability to use ethical and moral reasoning in the context of current affairs.

7.2.4.1 Curricular Goals & Competencies

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

CG-1 Develops ethical and moral reasoning	C-1.1 Examines an issue/event from multiple perspectives – socio-cultural, economic, political, and environmental C-1.2 Articulates ethical and moral questions in an issue/event C-1.3 Identifies different positions related to an issue/event, and provides arguments supported by rationale for each
CG-2 Develops capacity to analyse current affairs from multiple perspectives	C-2.1 Uses authentic sources of news, views and opinions to develop understanding of current affairs C-2.2 Communicates and advocates opinions and alternatives through a variety of modes (writing, speaking, debates, discussions)
CG-3 Applies ethical and moral reasoning to engage with wide-reaching impact on the local community and the world	C-3.1 Identifies and explores issues/events within the community from multiple perspectives (historical, social, cultural, economic) C-3.2 Discusses issues/events at the district, state, national and international level

7.2.4.2 Illustrative Learning Outcomes

Table B-7.2-i

Curricular Goal 1: Develops ethical and moral reasoning
Competency 1.1: Examines a wider issue/event from multiple perspectives – socio-cultural, economic, political, and environmental
Learning Outcomes 1. Describes the present context of an issue/event based on data and readings 2. Describes socio-cultural, political, economic, and environmental factors affecting an issue/event 3. Describes how governments, communities and individuals have responded to the issue/event and its impact 4. Shares resources detailing lesser-known aspects of the issue/event 5. Compares implications of the issue/event over different time periods (decades/centuries) 6. Analyses the differential implications of the issue/event from economic, socio-cultural, political, and environmental perspectives 7. Evaluates the issue/event in the light of Constitutional and human values *For example, for examining Women's Participation in Science* 1. *Describes the presence of women in science based on given data and readings* 2. *Describes socio-cultural, political, economic, and environmental factors affecting women's participation in science* 3. *Describes efforts at the levels of governments, scientist communities, and individuals to ensure more women work as scientists* 4. *Shares narratives around the treatment of women in science through looking up websites and publications, and (if possible) speaking to persons who have worked in the area of science* 5. *Compares implications for women scientists in India in different time periods – 19th, 20th and 21st centuries* 6. *Analyses the different implications for women aspiring to be scientists from economic, socio-cultural, political, and environmental perspectives* 7. *Evaluates opportunities for women to participate in scientific work in the light of Constitutional and human values*

7.2.5 Content

To meet the curricular goals, the content must draw from all the important domains of individual participation in larger society. While these domains can be categorised as socio-cultural, economic, and political, specific focus on the environment is also necessary. Therefore, students must gain adequate exposure to issues/events within all the following domains:

a. Socio-cultural domain

b. Economic domain

c. Political domain

d. Environment

All issues/events will fall primarily within these domains. At the same time, these domains are not watertight – some issues/events may have dimensions falling within one or more of the domains.

7.2.5.1 Principles of Content Selection

Two sets of content will be required for this subject.

a. Content to develop capacity to examine current affairs

The purpose of the first set will be to help students engage with specific issues/events that reflect larger concerns, which may have been persisting for a long time (even centuries), through case studies, short films, documents, etc.

The reason for the inclusion of this content is to simulate the process of exploring multiple perspectives, identifying issues/events that are core, the debates that arose, and how they were resolved or remain yet to be resolved. Students will be able to understand the long-term consequences of these events, and appreciate the importance of taking moral and ethical positions. This content will help them strengthen their own values and principles, and also help them experience the process of reasoning that is necessary for taking an informed position.

The principles that will inform the selection of this content are:

i. **Multidimensional and well-documented issue/event:** Sufficient content should be available, with information, opinion pieces, data, debates, news reports, and similar material, to enable an understanding of multiple perspectives.

ii. **Concerning several moral and ethical questions:** The content should make these moral and ethical questions explicit, and offer well rounded arguments based on evidence and reasoning for responding to each of these questions.

iii. **Persisting over a long period, with efforts for change:** There should be a sufficient record of actions, and their consequences, of positive changes. There should be scope to examine different perspectives for change, and the consequences of these changes.

iv. **Recent but critical, hence multiple efforts ongoing:** Even if the matter under discussion is not recent, there should be sufficient material to make ethical and moral questions, and how they have been addressed explicit (e.g. concerns related to the environment).

Illustratively, gender inequality, caste, unequal access to resources, debates related to role science and technology, political participation, environmental concerns could be some areas around which materials could be made available.

b. Current affairs

The second set of content is related to current affairs. This set will be dynamic – it will be selected by the teacher and students based on their interest in current affairs. This content will integrate the learning of students in several curricular areas, and help them apply the capacities developed through engaging with the first set of content. It will comprise two kinds of content – (i) news reports, articles, clippings of TV news, YouTube videos, data, etc,

and (ii) interviews with community members, reports of surveys within the community, etc. The reason for inclusion of this content is to develop among students the interest and understanding to engage with current affairs.

The following set of principles will inform this choice:

i. **Cover all four domains:** Content should be related to all four domains. Illustratively,
   1) Content from the socio-cultural domain could be around gender, caste, class, sports, media.
   2) Content from the economic domain could be around public investment, poverty, employment, schemes.
   3) Content from the political domain could be around rights and duties, civic engagement, democratic processes, public crime, safety and security.
   4) Content from the environment domain could be around health and hygiene, climate change, pollution, biodiversity.

ii. **Multiple dimensions:** Content should enable students to engage with different dimensions. This kind of content allows greater scope for ethical and moral reasoning. Illustratively,
   1) Whether the decision of road construction in a village will lead to better economic opportunities or bring undesirable changes to the lifestyle of the community.

iii. **Students can relate to the issue/event:** Content should be close to the students' life and experiences, and current learning across disciplines. Illustratively,
   1) Students may find it difficult to relate to mass shootings in other countries. On the other hand, effect of long-term use of chemical fertilizers can be taken up easily in a rural setting, and rich-poor divide in urban settings.

iv. **Content should not ignite extreme views or passions:** Content selected should not lead to confrontation among students or lead to backlash from the community. Illustratively,
   2) Content that touches religious sentiment.
   3) Content related to an area that has already polarised communities, and is likely to excite passions.

v. **Content should be of various kinds:** digital, text, readings, opinion piece, newspaper reports, Parliamentary debates, research reports, data, as well as discussion with community members.

vi. **Authenticity of content must be confirmed:** In this age of information overload, and fake news, it must be ensured the material is from a reliable and valid source. Illustratively, content must be from
   1) Reliable magazines and newspapers/their websites
   2) Videos of acknowledged experts in the field
   3) Websites of reliable agencies or government departments or institutions/ universities

7.2.5.2 Illustrative Content

Table B-7.2-ii

Content to develop capacity to examine current affairs

a. Is entertainment on digital media wiping out local art?
b. Treating disability from a disease perspective versus a human rights-based approach
c. Priority for investment – agriculture, defence, education?
d. Was British rule beneficial in some ways for India?
e. Was the Green Revolution good for our country?
f. Women's participation in science
g. Prevention of child labour
h. Role models in advertising
i. Organic farming
j. Preservation of traditional occupations related to arts, crafts and textiles
k. Women's reservation
l. Seasonal migration for work
m. Growing millets
n. Hereditary occupations
o. Women's participation in the workforce
p. Single-use plastic

Content Related to Current Affairs

a. **Socio-cultural domain**
   i. Social media and its impact on our society
   ii. Team sports and their role in social harmony
   iii. How to save youth from drug addiction and depression
   iv. Education, employment and women's upliftment in our society
   v. English language and India – boon or bane
   vi. Is there less caste-based discrimination in urban areas compared to rural areas?
   vii. Should all roads in a city have a bicycle lane?

b. **Economic domain**
   i. Does NREGA contribute to poverty alleviation?
   ii. Banks and its value for common man today?
   iii. Will technology and automation lead to unemployment?
   iv. Should government invest in old age homes?
   v. Should India invest in space science or malnutrition?
   vi. What is healthy food for people in different contexts?

c. **Political domain**
   i. Should public voting be introduced for decisions on bills that are introduced in the Parliament?
   ii. To what extent have we progressed towards the vision of India as expressed during the freedom struggle?
   iii. Should friendly nations opt for a common army to save money?
   iv. Should India have two party system and presidential mode of governance like the US?
   v. Should Globalization allow people to freely move across countries
   vi. Should government legalize unauthorized slum settlements?

d. **Environment**
   a. Tourism as a source of income versus environmental cost
   b. Is it good for animals to be in zoos?
   c. What is causing unpredictable weather and extremes of heat, cold, rainfall?
   d. Why there hasn't been much advancement in the field of solar energy?
   e. Plastic – can we get rid of it?

7.2.6 Pedagogy

The curricular goals of this area will be best met through giving students the opportunity to engage with different content in different ways.

To this end, the pedagogical principles should be:

a. Model process of ethical and moral reasoning: Students must be supported through the process of engaging with an issue/event before they work independently. This must be done through a set of questions and ongoing discussions to help them examine content from different perspectives. The process itself – how students engaged with content, how they identified what was important, how it made them feel, what were the questions they felt the need to reflect on/discuss, how they looked for answers to these questions, were they satisfied with the answers, how did they choose a view/opinion and why – must be discussed.

b. Encourage students to look for additional information: Students must be encouraged to look for information to answer any questions they may have, or for supplementary materials. Illustratively, they can ask community members, teachers, any experts they know, or they can visit the local library, search the Internet.

c. Independent and group tasks: Students should engage with as much content as possible, and different kinds of content. They should explore this content independently or in groups.

d. Communication of learning and opinions: Students must present not only learning but also their opinions on what they have read. For example, if they have read a case study on biodiversity collapse, they must present both what they have learnt, and also their opinions on how this collapse can be managed in their locality.

e. Opportunities for debate and discussions: Students must have the opportunity to present opinions that may differ, and learn the process of listening to each other, put forth well thought-through arguments, and be able to 'agree to disagree'.

Teacher's Voice B-7.2-i [To be Edited]

Mission to Mars

One of my students brought a newspaper clipping on a manned mission to Mars to class. I asked her to read it out to the other students. There was a lot of excitement – I have tried to capture the conversation below.

Student A: 'I don't think humans can live on Mars! In our science class, Madam was saying that the conditions on Mars are not alright for human life.'

Student B: 'They will not be able to live like we do on Earth! They will have to live inside something like tents. But how will the tents be kept cool? How will they get water? How will they get electricity?'

Student C: 'The report says it will take 7 months to reach Mars. What is an astronaut gets sick on the way? Will they come back? Even if doctors are on board, what if they need specialised equipment?'

Student A: 'The report says the trip will cost billions of dollars. That is many 100 crores of rupees!'

Student D: 'Don't we have many other things to spend the money on? And the astronauts will be in danger. And what will they do in Mars?'

Student E: 'But going to Mars is like travelling on the seas was for ancient travellers! If they had thought about dangers and stayed at home, imagine what the world would be like! Maybe we wouldn't have invented airplanes because everyone was happy to stay at home.'

At this point, I thought this would be a good area to explore. I asked students – 'What if we try to answer the question: Is a manned mission to Mars important for mankind?'

The students were excited about the idea. I asked them to think about the following questions, and any other they can think of –

a. *What is the manned mission to Mars? Who has planned it? Why has it been planned? Who is paying for it? Who will be going on this mission? When is it expected to take off? What are the challenges? Any other questions?*

b. *Do you see any challenges related to the well-being of the astronauts? How will they and their families deal with the separation? Will their sacrifice be worth it? Can the money being spent on this mission be used elsewhere to improve human existence? We have seen that human entry into space has created space debris – has space exploration affected the environment in any other way? Any other questions?*

c. *What are the arguments for and against a manned mission to Mars? Any other questions?*

d. *What do you think in the right thing to do? Why do you feel this is the right thing? Any other questions?*

e. *What will happen if your position is accepted? What will be the results? Are there any other steps that can be taken? Any other questions?*

7.2.6.1 Recommended Approach

The following approach is recommended for Individuals in Society. The table below indicates the approach and the key expected outcomes, as well as the recommended pedagogy.

Table B-7.2-iii

	Approach	***Pedagogy***
1.	Discussing larger socio-cultural, economic and political issues/events to simulate the process of engaging with current affairs, and using ethical and moral reasoning. Key outcomes: (i) an understanding of how to approach an event/issue, (ii) an agreement on the key questions related to an issue/event, (iii) steps involved in building a position, (iv) ability to put forth a position, and debate in a democratic manner.	Students engage with the materials and respond to a set of questions; illustratively, What is the context of the event/key questions? What are the central issues? What are the arguments for and against these key issues? What is your view? Why do you think this way? How did you reach this conclusion? What did you learn in school that is connected to this event/issue? Which actions do you think are justifiable, and why? What actions would you recommend?
2	Taking up small projects related to local issues/events of current interest. Illustratively, seasonal migration from villages and its impact; how construction of road in village changed socio-cultural and economic changes; where does all the garbage go (in cities)? Key outcomes: (i) identification of primary sources of information; (ii) application of learning around moral and ethical reasoning to a real-life experience.	Teachers support students develop a framework to engage with community members or officials, as required. Students bring in information, and Teacher facilitates discussion around a few key questions. Students could run a monthly newsletter or find a similar platform (morning assembly once a month, special time set aside monthly) to communicate their understanding of local affairs in various modes.
Illustrations of issues/events students can explore in the local community: • Political domain- local elections, local administration, local self-governance • Socio-cultural domain- local educational provisions, local arts and crafts, relationships in the community • Economic domain– local occupations, employment opportunities, migration for work, agricultural practices and markets • Environment domain – biodiversity, conservation efforts, development in the area and its impact on nature		

3	Discussing current affairs sourced through newspapers, electronic and social media. Key outcomes: (i) understanding of current affairs; (ii) application of learning around ethical and moral reasoning; (iii) ability to communicate in a democratic manner; (iv) ability to identify reliable and valid sources of information	Students are divided into groups. One group identifies a theme related to current affairs at the international level, and starts collecting materials. Preferably, this theme should have been discussed over the previous month, so that there is sufficient material, and it is still current. The other groups collect related materials at the national and state levels. Inputs are taken from community members, where relevant. The materials used are reviewed and discussed, to determine authenticity. Issues/events are discussed, and then students communicate their positions. They debate these positions, share their views.
The first step in the teaching of Individuals in Society will be to engage with larger issues/events. These issues/events can be detailed out in the textbooks. *Once one set of a larger issue/event has been completed, students will engage with local affairs for actually experiencing the process of gathering information, and processing it. Once this project is over, they will start identifying current affairs from newspapers and the media, and apply the processes learnt to this activity.* *Finally, all three processes will continue, with two periods a week devoted to larger issues/events, and one period to current affairs.* *Schools must develop a library that students can refer to, and subscribe to relevant local and national newspapers and periodicals. A list of websites that students can access for further exploration of current affairs will have to be maintained in the library. Access to the Internet, with guidelines to ensure online safety, will be required.*		

Teacher's Voice B-7.2-ii [To be Edited]

Content and pedagogy

One of my students, Archana, came into class very disturbed. Before I could ask what the matter was, she burst out, "The world is ending! What is the point of living!" The other students also got agitated, and I had to raise my voice to force them to quieten. I asked Archana what the matter was. She pushed a printout from towards me. I read:

Giant asteroid possibly on collision course with Earth

By Marcus575 | Posted 21 hours ago | Pasadena, California

Share on Facebook 22K

If astronomers are right, all life on this planet could be extinguished in less than 30 years from now. Scientists at NASA's Jet Propulsion Laboratory have detected a large object the size of Manhattan possibly on a collision course with Earth. Using their Near-Earth Object Wide-field Infrared Survey Explorer (NEOWISE), the 10-mile wide object was found approximately 51 million miles from Earth. Scientists believe that during a close encounter with Mars, the asteroid was nudged slightly off its usual orbit and may currently be on a high speed collision course with our fragile planet.

The asteroid is calculated to have a potentially lethal encounter with the Earth on March 35, 2041. Astronomers have placed the odds of an impact at 1 in 2.04, which is by far the most unprecedented risk ever faced to humanity, let alone from asteroids. Such an impact could potentially end civilization as we know it.

More information will be posted here as the story develops...

Source: https://nasawatch.com/news/cnn-says-its-the-end-of-the-world-as-we-know-it/

"This is from the CNN website, so it must be true!"

I was taken aback – this was a reputed website. But I had not read the news anywhere. I asked the other students if they had heard anything – they all said they had not.

Nimrat said, "But it must be true if it is in the news! Everything on TV and newspapers is true!"

I reassured Archana and Abdul, "We must not believe everything we read – especially if we don't witness such things. Let's discuss how to get more information".

Jagmohan suggests, "Let's look at different websites related to science. But we must look at proper websites".

Archana: "Which websites?"

Jagmohan: "ISRO website, RRI website, Vigyan Prasar, Indian Institute of Astrophysics. They have the equipment to get accurate data. They are also responsible institutes, so will carry accurate news".

Abdul: "We should not look at only one website, but multiple websites as well as other sources. We must look at other sources like newspapers, and science journals. We can look for research papers."

In the meantime, Archana was examining the printout. Suddenly, she said, "Look! There is a statement at the corner of the image – Not Vetted by CNN. We need to find out more. I have an Aunt who is a scientist – I will ask her".

I said, "When any news or information comes to us, we listen to it. If someone sends a picture or video to us, we see it. We never think that news or information can be biased or untrue, and pictures and videos doctored".

Jagmohan responded, "That is true! We must always explore further".

I agreed and proposed the children research the news further in the next few days, so we could discuss it in the next class.

7.2.7 Assessment

7.2.7.1 Formative Assessment

Assessment of ethical and moral reasoning requires teachers to carefully observe students. Assessment of current affairs requires providing students different opportunities to demonstrate this understanding.

Various tools and approaches could be used for assessment, like essay writing on the issue discussed; case study-based question papers with MCQs and short answer responses; group project work where a new topic is given, and students produce a short 2500 word paper on the topic.

Space must be provided for multiple interpretations and views. Therefore, formative assessment must focus not on what students are communicating, but the process by which they have reached their conclusions. Illustratively, a rubric could focus on:

a. Sources that students have referred to – are they of different kinds, how has the authenticity been ensured?

b. Identification of key ethical and moral questions – does the student have a rationale for why these questions have been identified?

c. Accepting of different positions – does the student listen to other points of view, is the student able to maintain cordial conversation after a disagreement?

d. Taking a position – is the student able to explain the reasons for taking a specific position, are the reasons substantiated with learning across curricular areas, and are human and Constitutional values referred to?

e. Interest in current affairs – does the student initiate discussion related to local news or news heard on media, does the student ask questions about issues/events?

f. Communication – is the identification of key issues clear, are they briefly described, can the student communicate orally in a dispassionate manner?

Students must not be provided any marks/grades, but a checklist can be maintained. Self and peer assessment are recommended, including providing constructive feedback. Teachers must provide students with specific feedback on how to improve.

Students can be asked to prepare a reflective journal based on classes with weekly entries and submit it at the end of every month. Teachers and students must jointly review the entries.

Teacher's Voice B-7.2-iii [To be Edited]

Assessment

We have had two celebrations on women's contribution in science this year. It has piqued students' interest, but we haven't considered it into our classroom discussions so far. During last week's morning assembly, students of Grade 9 had read out a related news story of a statement by a Minister. In continuation with this, I decided to organize a debate: 'Women's participation in science is women-led development, not women's development'. Students were divided into groups to argue for and against the statement and given a week to prepare. I find that while organizing a debate, my presence and observation is important during both, the students' preparation and during the debate. For this, I have developed simple indicators to use during each debate to understand their progress across learning outcomes.

Sl. No.	Student Name	Identifies an original line of argument	Has done relevant background research to explore the topic of debate	Can cite multiple sources to support their arguments	Presents their argument in a structured and coherent manner	Offers a rebuttal by referring to the opposing party's ideas and sources	Accepts opposing arguments and maintains debate protocols
1.	Bejoy	2	4	3 – not citing many during argument	3	1	4
2.	Chekrovolu	5	5	4	4	4	4
3.	Tzeroum	1	2	2	2	1	4
4.	Mary	3	3	2	3	4	4

The students arguing for the statement had identified several women scientists in history and during recent periods. One student who had done a detailed research had identified a wonderful point on how women scientists may have received limited or no recognition due to a common misconception that advancements in science are always big, Eureka moments. She focused on how the nature of science is such that each discovery matters. She had then used examples of male scientists who had easily received recognition as 'game-changers', which has had sociocultural and economic implications on supporting women in science. While sharing that this student had won the debate, I was able to articulate to the class that while several students had done well on each of the parameters, this student had done particularly well in the first parameter. Almost all the students do well on parameter 2, 3, and 4 as it is related to research and writing the debate. I noticed that some students struggle with parameter 5, as rebutting requires them to use their argument and their opponent's. There are 3 students who struggle with parameter 6 and can get quite nervous or upset during their presentation. So, these rubrics give me a concrete understanding of what needs to be improved. Discussing the results of the debate with the students using these rubrics also helps students see for themselves which areas they can improve on. It also establishes a sense of fairness and gives equal weightage to different aspects that form a good debate.

7.2.7.2 Summative Assessment

Summative assessment will be done periodically, again on the basis of rubrics. Illustratively, students will be given a small case study or video and asked to make explicit the process of ethical and moral reasoning. Assessment of the project related to engagement with local issues will be done both throughout and at the end of the project.

Assessment of engagement with current affairs must never be on the basis only of knowledge. Again, the process must be assessed using a rubric aligned to that for summative assessment.

After six months of the academic year, for summative assessment, students can be asked to pick up one of the topics of current affairs and do individual research on it; they will write an essay and list sources/references. Teacher may provide probing questions to ensure students are aware of expectations from them.

7.2.8 Teachers

There will be a need for Teachers who are aware of issues/events in the four domains that must be covered. Teachers of Social Science will be best placed for teaching Individuals in Society.

a. While ethical and moral reasoning requires a sequence, it demands a sound ethical and moral framework, and an interdisciplinary understanding. Teachers must undergo training modules before they can take up this subject. These modules will focus not only on the content but will also require Teachers to examine their personal moral and ethical framework.

b. Training modules will be insufficient for Teachers to meet the demands of students. Hence, Teachers within the school must meet regularly to discuss current affairs, and strengthen their own capacity for discussion and debate, and the application of ethical and moral reasoning, and applying interdisciplinary understanding. This will also help ensure inclusion of different perspectives, and subject-related expertise.

Chapter 8

Physical Education

The aim of physical education in school is to help students learn to lead a physically active, vigorous, and healthy life. Physical education consists of **movements, drills, exercises, yoga, games, sports,** and other activities that promote mind-body wellness**.** Physical education should provide a wide range of age- and level-appropriate physical activities that develop knowledge of the body, and of games and sports, together with an attitude of **perseverance, teamwork,** and **sportspersonship**.

The Draft National Education Policy (DNEP) 2019 states the role of physical education thus:

"Physical education is important for both physical and mental health and development. It helps improve a ***child's muscular and cardiovascular strength, flexibility, endurance, motor skills, and mind-body connection and wellness****. It gives students the opportunity to set and strive for personal and achievable goals. Moreover, playing sports also helps students develop the* ***qualities of teamwork, cooperation, problem-solving, discipline, perseverance, and responsibility****. In general, physical activity is well established to be among the* ***best releases for tension and anxiety*** *and facilitates emotional stability and resilience. All these qualities and benefits are also relevant to success in the classroom; studies show that* ***students who stay physically active are more successful with other schoolwork as well.*** *Finally, people who are physically active as young people tend to stay more fit as adults as well, leading them* ***to lead longer, healthier, and more productive lives."***

Section 8.1
Aims

Physical activity is integral to human life and therefore integral to the school curriculum. For the individual student, sports and physical activities teach important motor skills, practices of physical fitness, socio-emotional awareness, and regulation, associated cognitive abilities, as well as the values of hard work, teamwork, and a gracious acceptance of one's strengths and vulnerabilities.

Various forms of physical engagement and physical activities have been an inseparable part of many cultures. They have unified people across the globe over shared common interests and spirit. People who are not active participants themselves unite to watch and support individuals and teams play with each other, irrespective of class, gender, geography, and background. Individual physical practices/activities from different parts of the globe are shared and practised around the world for leading a healthy and balanced life. Sports that were once practised in small local areas have spread around the world, bringing people together in playing them. The practices of yoga have now spread around the world. Sports, games, yoga, and other such rigorous physical activities have allowed humanity to enjoy shared experiences, emotions, and excitement.

Just within our subcontinent, there is a very rich heritage of games and physical activities that developed across civilizations and centuries. For example, yoga, water sports, wrestling, *malkhamb*, archery, chariot racing, bullock racing, polo, different forms of martial arts, dance forms, dice games, hide and seek, and innumerable other forms physical activity, games, and sports have been practised across the nation over centuries.

A good physical education program is therefore considered important for everyone, regardless of the field of interest one wants to pursue in life. It prepares students to live a happy, fulfilling, and healthy life, as helps to build values, skills, dispositions, and cultural awareness and literacy.

The aim of Physical Education in the school curriculum is to help the student:

a. Develop a love for physical activity/sports, and value it for health, enjoyment, expression, self-reflection, and social interaction.
b. Develop knowledge and capacity to execute different kinds of skills and movements of the human body, and to participate in and enjoy a variety of activities, games, and sports.
c. Develop resilience, tenacity, and an interest in the pursuit for excellence.
d. Nurture empathy, cooperation, fair play, and fraternity, which are relevant throughout one's life to be a good human being and a contributing member of society, and learn to meet both winning and losing with grace.

Box B-8.1-i

Yoga

The origin of all forms of yoga practised today is in the Yoga Sutras, a collection of aphorisms written over 2,000 years ago by the sage Patanjali. The tradition has been passed on through generations and is in the form we see today.

Yoga is not just a physical practice of Asanas (postures) but is much more than that. Patanjali enumerates 8 limbs of yoga (Ashtanga yoga). They are Yama (universal moral commandments), Niyama (self-purification by discipline), Asana (Posture), Pranayama (rhythmic control of breath), Pratyahara (withdrawal and emancipation of the mind from the domination of the senses and external objects), Dharana (concentration), Dhyana (meditation), and Samadhi (a state of super consciousness brought about by profound meditation).

Yama, Niyama, and Asana are the 3 stages of outward quests (bahiranga sadhana). Yama and Niyamas aim to control the student's passions and emotions to stay in harmony with fellow human beings. Through the practice of Asanas, the student keeps the body and mind healthy, strong, and in harmony with nature.

These are largely the same aims as that of physical education in our school curriculum. We want students to be healthy, strong individuals who are in harmony with their surroundings and are contributing members of the community. Thus, the teaching of yoga is an integral part of the physical education program. Yoga Asanas and practices like pranayama appear at multiple points in this document.

Source: Light on Yoga by BKS, Iyengar

Section 8.2
Guidelines for the Curriculum

A few crucial principles in the designing of the PE curriculum in schools are as follows:

a. All students must play. They must engage in physical activities to whatever extent they are able to all through their lives.

b. Students must explore varied kinds of sports, games, and physical activities.

c. There must be rigour and regimen in teaching PE at schools based on students' age and capacities.

a. Physical Education is equally important in the overall education of a student.

The following considerations detail how these core ideas can be implemented in schools.

8.2.1 Students Receive Equal Opportunity in PE

a. Students of all levels of interest, inclination, and ability must engage with PE. Like all other curricular areas, some students may be more inclined towards physical education and playing sports than others. This curriculum therefore suggests two modes for imparting physical education:

i. **The Compulsory Physical Education Class:** All students must attend the common regular physical education classes on the timetable. Activities in this class can be different for various groups based on capacity and level appropriateness. All students in schools will be part of this class and receive equal attention and support for learning, which means equal access to physical education teacher time, equipment, and opportunities to play.

ii. **The Optional PE after-school programme:** Those students who wish to engage with physical activity and sports on a deeper level can be part of this programme. Schools may organize special skill-building classes, provide physical education teacher support, and access to equipment before or/and after school hours. Such an arrangement must be considered as part of the curriculum and not as preferential treatment as this opportunity should be available for all students who show interest.

b. Students of all genders should regularly play together across all age groups, keeping in mind safety considerations. Schools can make choices about having mixed teams in contact sports like *kabaddi* based on the socio-cultural climate and acceptance levels of such grouping in their locality/region. Students become accustomed to playing together and grow in their maturity to play comfortably in mixed-gender groups over time. So, this approach is best introduced as early as possible right from the Foundational stage.

c. Schools must ensure the participation of students with disabilities in physical education to the extent that is possible for them. This requires adapting play conditions and thoughtful accommodation or modification to enable them to participate. For example, accommodation can be done through adapting time for learning or task completion like

increasing time to finish a run, and/or adapting the skill level or rules like a one-hand dribble in one place. Similarly, modifications can be made by creating rules like playing cooperatively with differently-skilled students and/or planning a different game/sport altogether like students pushing a wheelchair instead of running.

8.2.2 Students Learn Cooperation and Teamwork

Cooperation in sports means working together as a team on playing well and on areas of improvement using each other's strengths related to the game/sport. This cooperation is facilitated through dialogue (especially while strategizing before a game or reviewing after a game) based on questions such as – 'How did I behave when my competitor got injured?', 'How do we construct teams when we know different team members have got different abilities and each one is better than the others in one or two aspects?', 'Why are some abilities seen as more important?', 'How does one feel when they lose?', 'How must we react in such situations?', 'What were the few crucial moments of the game when the team was competing and lost the advantage?' etc.

8.2.3 Schools Must have PE for all Stages

Students in the Preparatory Stage enjoy *free play* and want to participate in most games. We should encourage free play, creative manipulation of rules, and local games at this stage. In the Middle Stage, students should continue to play local games but should get oriented towards more widely-practiced games. They should also actively participate in competitive sports events of other schools. Students at the Secondary Stage should be encouraged to choose one sport/game/activity and develop proficiency to compete at a high level. All students across the Stages must have a compulsory PE class as part of their timetable. In instances where certain students at a very young age become interested in participating in different interschool, local, State, national, and international competitions, schools must make reasonable accommodations so that they can pursue their interests. The optional PE after-school programme should be used for this.

8.2.4 Resources Must be Made Available for PE

In case schools have no playground, they must ensure access to nearby public grounds/spaces for students. In instances where this is not possible, schools must develop ways to conduct physical activities that do not require much space such as yoga, static exercises/movements, table tennis, etc.

Similarly, until a physical education teacher is appointed, other teachers must be educated to conduct physical activity under the guidance of any PE teacher available in the school complex/school cluster/nearby schools.

In case of limited equipment availability, the choice of games/sports/physical activity must be made accordingly. Non-availability of a playground, physical education teachers, or use-worthy equipment cannot be sustained limiting factors in the education and engagement of students in physical activities.

8.2.5 PE must be given Equal Importance and Status

Health and Physical Education in schools have received lower importance, even a partial treatment, as compared to other curricular subjects. NEP 2020 recognizes this and emphasises that it be given equal importance and treatment in the curriculum. Physical Education is equally important for all students, and we must create enabling conditions for it in our curriculum, infrastructure, and school operations including appropriate time in the school calendar and teacher preparation.

8.2.6 Competition can be a Means to Excellence

Physical Education curriculum aims to nurture empathy, cooperation, fair play, and fraternity. A bad approach to competing makes competitions unhealthy and harmful. Competition in the context of PE needs to be viewed impartially and as a means to enable the growth and holistic development of students. Students must be taught to compete without compromising the values of sportspersonship and positive regard for others. They must be encouraged to pursue excellence and perfection in practice and performance for their own sake rather than defeat and overpower peers. The key is to challenge oneself to grow into the next level of competence. There are several implications for this position.

a. Students must be grouped very carefully, such that it does not develop feelings of inferiority or superiority as both have serious negative consequences.

b. Values such as empathy, cooperation, fair play, and fraternity must be promoted and celebrated each time there is a competitive event,

c. Use winning or losing a game as an opportunity for critical reflection of feelings of undue pride or embarrassment/distress, the effectiveness of the strategy, etc.

d. Selection of students for interschool competitions must be fair and transparent.

Section 8.3
Nature of Knowledge

a. **To do is to know:** Physical activity squarely falls under the category of practical knowledge where "to know" is acquired only by doing the activity. One cannot claim to know swimming without doing it. Once an individual has performed the activity, they can reflect, observe, and explain how the activity is done. But it is not useful to reverse the sequence of this progression.

b. **Requires regular progressive practice and layered learning:** Physical activities are learnt over a period. To do an activity well, one must perform it multiple times before gaining basic proficiency in it. For example, to do Tadasana properly, toes should be spread out evenly, weight should be balanced equally between the right feet, left feet, forefoot and heel, the tailbone should be tucked in, and the shoulders should be pushed back. It might take weeks of training to get these aspects right before moving on to others. It will involve a large element of muscle memory - where the body aligns itself without a neural command from the brain - so that after a few weeks, these aspects are almost automatic. The instructor can then move on to other aspects of Tadasana.

c. **Requires awareness and capacity to manipulate space and equipment:** Awareness and manipulation of space are an integral part of many physical activities. This awareness is built by bringing about peripheral vision, occasional glances, and a lot of practice together. Along with awareness, a player needs to build anticipation skills and play a scenario in their head to strategize the next few moves. Practitioners learn to be positionally aware within the boundaries of the space of that sport. In judo, getting your opponent out of bounds is a way of scoring points. In cricket the bowler bowls to the field, and the batsmen find gaps in the field to hit their shots. In team sports like football and hockey, the players train in spatial patterns so that they know where their teammates are without looking.

d. **Learning is remembered for a very long time:** Another aspect of physical activity is that once learnt the knowledge stays with an individual for a long time and is like second nature. It is difficult to forget completely how to swim or hit a topspin shot with a table tennis racket once you have mastered it. One might be out of touch with these activities for years but can restart with some practice. In some sense, the knowledge of physical practice is embodied and stays with us.

e. **Learning about oneself and learning how to grow:** This aspect of the nature of physical activity can be categorised into three components.

    i. **Knowledge of physical self and capacities:** A person who is regularly engaged in physical activities will have a better understanding of the body's capability and limitations. For example, someone who lifts weights regularly will know how much weight they can lift in a real-world scenario (a sack of rice) against someone who does not. People who engage with physical activities regularly are likely to be more sensitive to changes in their body in the short term (need for rest or sleep, knowing when they are overeating, etc.) and in the long term (improving their appetite, changing sleep cycle etc.).

ii. **Knowledge of mental and emotional capacities:** Through regular participation (and reflection) in sports a person also learns about how they feel and react under different circumstances. For example, one learns about how assertive they are, how they perform under pressure, how strongly they feel about an unfair situation and how they react to it and so on.

iii. **Knowledge of social surroundings and how to work with them:** Team sports requires all the individuals in the team to understand each other, communicate at different levels (before, during and after play), build common strategies and play different roles required within the team teaching social and working together skills.

Section 8.4
Practical Challenges at the Current Time

a. **Status of Physical Education in Schools and Community:** Physical education in schools is mostly considered as a subject to engage students during leisure time, recess, or when a subject teacher takes leave. Playing too much (sports, games, or other physical activities) is feared to badly impact students' `education'. Unlike other subjects, schools lack an understanding of teaching and learning the subject. Whatever body of knowledge exists so far is more about the rules of games, playground dimensions, physiology of the body and nutritional requirements only.

b. **Lack of Infrastructure and Resources:** Physical education teaching requires open spaces, indoor facilities, specific exercises, and enough sports equipment's to provide a better quality of learning. The lack of adequate infrastructure and resources is a huge challenge in most schools.

c. **Lack of availability of Physical Education Teachers in Schools:** In a vast education system like India, the availability of teachers has always been a challenge. Particularly in subjects such as arts, physical education, and vocational education. The situation in subjects like physical education seems even more demanding. Currently, we have very few good education institutions providing education programmes and training for teachers and teacher educators.

d. **Inadequate Scholarly Interest in Physical Education:** "What do we know?', and "How do we know?' are perennial questions in the field of Physical Education. The lack of sufficient regional studies, research, and academic literature in Physical Education is not helpful for young scholars and researchers to pursue this area further. In India, we have depended heavily on foreign research and academic work. This gives us a glimpse into various discourses on the subject but fails to relate it to the context of the schools in the subcontinent.

e. **Absence of school-wide Physical Education Curriculum:** In the absence of a well-defined curriculum till Grade 10 with specific learning outcomes and even lesser clarity on assessment possibilities, Physical Education has faced a serious pedagogical challenge. In schools, students are taken outside the classroom, to perform activities, or to engage in playtime without structured and progressive guidance or learning standards.

f. **Inadequate Nutrition for Physical Activities & Sports:** For many students across India, the Mid-day Meal is the only decent meal available for the day. This means their nutritional needs are grossly unfulfilled and this often compromises their ability to participate in many planned and rigorous physical activities.

Section 8.5
Learning Standards

A 'Nested' Design of Learning Standards: Giving due consideration to the time schools might require in the implementation of Physical Education as a full-fledged subject across the Stages (for example appointment of teachers, acquisition of resources), this document contains '**Nested Learning Standards'** for Physical Education, wherein Learning Standards have two subsets which have been detailed. The first subset called Learning Standards 1 is nested within Learning Standards 2. Thus, **'Learning Standards 1' should be accomplished by all schools from the very initiation of the implementation of this NCF and Learning Standards 2 should be accomplished as soon as schools add the required resources for Physical Education.**

8.5.1 Preparatory Stage

By the end of the Foundational stage, most students would be able to demonstrate basic movements, motor skills, awareness of rules, and participation in activities/games. By this Stage, the hand-eye coordination of a student is improving, and children are learning to maintain balance while doing different activities. The emphasis in the Preparatory stage would be on refining skills and combining them into movement forms.

Therefore, opportunities should be provided to develop manipulation skills such as rolling, throwing, catching, dribbling, kicking, and striking. The focus should remain on basic skills, the joy of playing, and the ability to display appropriate behaviours and attitudes during activity. Students should recognize the value of rules, fair play, safety, and respect for others. It is strongly recommended that at this stage local games must be preferred and encouraged.

8.5.1.1 The Preparatory Stage: LS-1

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

CG-1 Students learn the use of basic skills (Running, Jumping, Catching, Throwing, Hitting and Kicking) to participate in different physical activities/games/sports.	C-1.1 Applies a combination of movement, motor skills, and manipulative skills like kicking/hitting a ball towards a target while moving (E.g., focusing on visual cues to hit the target). C-1.2 Moves purposefully your body to a beat/rhythm/music. C-1.3 Demonstrates coordinative abilities with a partner and objects. Example- Being able to move in coordination with a partner (Three-legged race), Hand-eye coordination while bowling, throwing etc. C-1.4 Demonstrates and describes some critical features of movement form like techniques of catching, throwing, kicking/hitting the ball, or transferring the body weight for lifting the object safely.

CG-2 Students exhibit awareness of personal and social behaviour towards themselves and others.	C-2.1 Demonstrates ability to play games and activities which require and emphasize teamwork, cooperation, personal responsibility, and communication of ideas and feelings before, during and after the game. C-2.2 Creates group norms and rules of the game/activity before playing and reviews these regularly. C-2.3 Exhibits sensitivity to injuries of others and acts empathetically when the other player is physically injured, emotionally stressed, and feeling unwell. C-2.4 Practices sensitivity and responsibility towards the physical activity material, playground, and facilities. C-2.5 Identifies characteristics of good touch/bad touch in the context of physical activity and describes ways of reporting it
CG-3 Students demonstrate mental engagement in physical activity/game situations.	C-3.1 Expresses one's own emotions and thinking process during the game. C-3.2 Listens attentively and follows instructions
CG-4 Students understand the need to develop themselves and self-assess progress.	C-4.1 Sets simple personal goals and targets (E.g., throwing a ball at 25 m, then 30m, then 40 m, Jumping 1, 2, 3 feet high/long etc.) C-4.2 Records progress against targets (E.g., Ball throws in meters on day 1, day 5, and day 10).

8.5.1.2 The Preparatory Stage: LS-2

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

CG-1 Students demonstrate the use of basic skills (Running, Jumping, Catching, Throwing, Hitting and Kicking) to participate in different physical activities/ games/sports	C-1.1 Developing a combination of movement, motor skills and manipulative skills like Catching/Throwing/ Kicking/ Hitting a ball towards a target while moving. Focusing on visual cues to hit the target C-1.2 Moves purposefully their body to a beat/rhythm/music. C-1.3 Demonstrates coordination abilities with a partner and objects (E.g., Being able to move in coordination with a partner (Three-legged race), Hand-eye coordination while bowling, throwing etc.) C-1.4 Demonstrates basic warm-up exercises and stretching to develop strength and flexibility in the body.

CG-2 Students develop an awareness of their personal and social behaviour towards themselves and others.	C-2.1 Demonstrates the ability to play games and activities which require and emphasize teamwork, cooperation, personal responsibility, and communication of ideas and feelings before, during and after the game. C-2.2 Creates group norms and rules of the game/activity before playing and reviews them regularly. C-2.3 Exhibits sensitivity to injuries of others and acts empathetically when the other player is physically injured, emotionally stressed, and feeling unwell. C-2.4 Practices sensitivity and responsibility towards the physical activity material, playground, and facilities. C-2.5 Identifies characteristics of good touch/bad touch in the context of physical activity and describes ways of reporting it.
CG-3 Demonstrating mental engagement in physical activity/game situation	C-3.1 Understanding concept of some games, their rules, playing positions, and basic moves. C-3.2 Designs a basic strategy and play the game accordingly. C-3.3 Expresses one's own emotions and thinking process during the game
CG-4 Students develop an understanding of the need to develop themselves and self-assess their progress.	C-4.1 Sets simple personal goals and targets (E.g., throwing a ball at 25 m, then 30 m, then 40 m, Jumping 1, 2, 3 feet high/long etc.) C-4.2 Records progress against targets (E.g., Ball throws in meters on day 1, day 5, and day 10).

8.5.1.3 Illustrative Learning Outcomes for the Preparatory Stage

In this section, one curricular goal (CG) and correspondingly one competency under the same goal has been further elaborated into learning outcomes which are illustrative.

Curricular Goal (CG-1): Students demonstrate the use of basic skills (Running, Jumping, Catching, Throwing, Hitting and Kicking) to participate in different physical activities/games/sport

Competency (C-1.1): Developing a combination of movement, motor skills and manipulative skills like Catching/Throwing/ Kicking/Hitting a ball towards a target while moving. Focusing on visual cues to hit the target

Table B-8.5-i

Grades	Grade 3	Grade 4	Grade 5
Competency	C-1.1: Developing a combination of movement, motor skills and manipulative skills like Catching/ Throwing/ Kicking/Hitting a ball towards a target while moving. Focusing on visual cues to hit the target		
Age group	← Ages 9 - 11 →		
L1	Throwing a ball – develop a sense of force	Throwing a ball – develop a sense of force required for desired movement	Throwing a ball - develop range for the ball to travel far as per requirements of the activity
L2	kicking a ball – develop a sense of force	Kicking a ball – develop a sense of force required for desired movement	Kicking, or hitting a ball and develop range for the ball to travel far as per requirements of the activity
L3	Hitting a ball with apparatus – develop a sense of force and impact	Hitting a ball with apparatus – develop a sense of force required for desired movement	Hitting a ball with apparatus - develop range for the ball to travel far as per requirements of the activity
L4	Throwing, Kicking, hitting a ball into desired space or a goal (with or without apparatus) Gets it right 5 out of 10 times	Throwing, Kicking, hitting a ball in to desired space while looking/focusing on the target (with or without apparatus) Gets it right 7 out to 10 times	Throwing, kicking, hitting a ball into a desired space or goal while the ball is in motion (with or without apparatus) Gets it right 7 out of 10 times
L5	Catching the ball – Develop sense of force while catching	Catching the ball while stationary with consistency (7 out of 10 times)	Catching the ball by while moving in a predetermined direction with consistency (7 out of 10 times)
L6	Demonstrates ability to run/cycle for up to 10 mins.	Demonstrates ability to run easy for more than 15 mins. Can do short sprints with good arm action.	Demonstrates ability to run easy for upto 20 mins easily. Can do short sprint repeats of 50m X 2 times with over 2 min breaks
L7	Demonstrates ability to do basic hops (single leg and both legs) and jumps in games like hopscotch	Demonstrates ability to take part in sack race, jumping ropes and short hurdle runs	Demonstrates ability to do single leg hops, vertical jumps, and broad jumps well. Is able to jump at least half the personal height in distance.

8.5.2 The Middle Stage

In this Stage, students are in their adolescence, and differences in physical appearance, weight, height, and gender-related experiences become pronounced. Preoccupation with appearance and self provides teachers with opportunities to talk about health and the need for physical activity. Participation in physical activity is important for the social, psychological, and emotional development of adolescents. Physical Education classes provide an ideal setting for adolescents to learn and practice skills of social and personal responsibility while following rules, regulations, and safety procedures. It provides ground for students to perform, gain and give respect, and build self-confidence. Cooperation is an important social skill for this age group, including cooperation with opponents in a game setting and accepting responsibility for one's behaviour.

For this age group winning becomes important, so teachers would need to emphasize that participation and playing well with the group as the most important. Students also learn to refine, combine, and apply a variety of movement and motor skills in different physical activity settings. Games that promote boys and girls playing together should be encouraged. It is recommended that children continue to play local games at this stage and at the same time get introduced to popular competitive games/sports.

8.5.2.1 The Middle Stage: LS-1

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

CG-1 Students demonstrate Intermediate body movements and motor skills to participate in different physical activities/games/sports and develop their understanding.	C-1.1 Demonstrates basic rhythmic movement skills which include locomotor, non-locomotor, and manipulative skills like striking a moving an object with another object, smoothly moving, balancing, and transferring weight with intentional changes in direction, speed, tempo, and flow. C-1.2 Performs two or more fundamental movements at the same time like receiving and passing the ball against a defender. C-1.3 Describes mechanics of movement with reference to air and water resistance, spin and rebound, gravity, friction, and projectile motion of an object. C-1.4 Plans and executes working on your strength, endurance, flexibility and agility through exercising and training with and without apparatus.
CG-2 Students develop sensitivity in their personal and social behaviour towards themselves and others.	C-2.1 Reflects on your own personal reactions during an interaction/activity with others. C-2.2 Describes the importance of supportive behaviour in helping others emotionally and mentally as well as in improving performance (by analysing the behaviour of students when someone was emotionally or physically hurt). C-2.3 Creates and teaches the rules of the game to others. C-2.4 Creates and applies safety rules and protocols for physical activity and thinks about how they can be applied outside physical activity. C-2.5 Puts the larger interest of the team first, treats individuals as equals, makes ethical decisions, and takes responsibility for your mistakes. C-2.6 Identifies characteristics of sexual harassment and describes the protocol for reporting it to the right person

CG-3 Students learn about physical movements, motor skills, social sensitivity, and mental engagement in physical activity/game situations.	C-3.1 Demonstrates skills in a dynamic environment against another thinking team. C-3.2 Demonstrates calmness and courage in difficult situations. C-3.3 Expresses one's own and other's emotions and thinking processes during the game.
CG-4 Students plan and achieve personal physical fitness goals with little help from teachers.	C-4.1 Identifies physical activity and fitness goals like improving a shot or breaking their own 100-meter record etc. C-4.2 Monitors their actions to achieve goals and analyses challenges and works towards them. C-4.3 Assesses their progress in terms of efforts, processes, and outcomes.
CG-5 Students learn about the connection between physical activity with health, enjoyment, challenge, expression, and social interaction.	C-5.1 Discusses activities that bring personal satisfaction. C-5.2 Groups different cultures with special reference to dance, physical activity, local games, and spaces to interact. C-5.3 Identifies the relationship between rhythmic movement and its aesthetic value. C-5.4 Executes one personally challenging physical activity or goal
CG-6 Students learn to assess their body, its needs and its relationship with physical activity.	C-6.1 Classifies the common injuries of bones and muscles and the protocol for seeking medical help.
CG-7 Students learn about tournaments at the National, State, District and Block Levels.	C-7.1 Lists the various tournaments at the National, State, District, and Block Levels. C-7.2 Describes the participation criterion and rules. C-7.3 Summarises the support structure or organizational structure to participate. C-7.4 Explains the different forms and procedures for participating.

8.5.2.2 The Middle Stage: LS-2

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

CG-1 Students demonstrate Intermediate body movements and motor skills to participate in different physical activities/games/sports and develop their understanding..	C-1.1 Developing power, speed, strength, balance, flexibility, judgement, and reflexes in motor movements like: Running and jumping with various speeds and in various directions, rolling, zigzag movements, catching a moving object coming with speed or throwing/hitting a ball far with precision. C-1.2 Demonstrates rhythmic movement skills (locomotor, and non-locomotor) like smoothly moving, balancing, and transferring weight with intentional changes in direction, speed, tempo, and flow. C-1.3 Performs two or more fundamental movements at the same time like receiving and passing the ball against a defender. C-1.4 Exhibits manipulation of space and equipment in the context of a game. C-1.5 Recognises correct warm up and cool down exercises to avoid injuries and long-term effects. C-1.6 Works on strength, endurance, flexibility and agility through exercising and training with and without apparatus.
CG-2 Students exhibit sensitivity in their personal and social behaviour towards themselves and others.	C-2.1 Reflects on your own personal reactions during an interaction/activity with others. C-2.2 Describes the importance of supportive behaviour in helping others emotionally and mentally as well as in improving performance (by analysing the behaviour of children when someone was emotionally or physically hurt). C-2.3 Creates and teaches the rules of the game to others. C-2.4 Creates and applies safety rules and protocols for physical activity. C-2.5 Put the larger interest of the team first, treat individuals as equals, make ethical decisions, and take responsibility for your mistakes. C-2.6 Identifies characteristics of sexual harassment and describes the protocol to report it to the right person. C-2.7 Identifies characteristics of sexual harassment and describes the protocol for reporting it to the right person

CG-3 Students demonstrate and practice physical movements, motor skills, social sensitivity, and mental engagement in physical activity/ game situations.	C-3.1 Demonstrates skills in a dynamic environment against another thinking team. C-3.2 Designs multiple strategies for the game and is able to choose your strategy according to the context. C-3.3 Expresses their own and other's emotions and thinking process during the game. C-3.4 Demonstrates calmness and courage in difficult situations.
CG-4 Students plan and achieve personal physical fitness goals with little help from teachers.	C-4.1 Identifies physical activity and fitness goals like improving a shot or breaking their own 100-meter record etc. C-4.2 Assesses their progress in terms of efforts, processes, and outcomes
CG-5 Students learn the connection between physical activity with health, enjoyment, challenge, expression, and social interaction.	C-5.1 Discusses activities that bring personal satisfaction. C-5.2 Groups different cultures with special reference to dance, physical activity, local games, and spaces to interact. C-5.3 Identifies the relationship between rhythmic movement and its aesthetic value. C-5.4 Executes one personally challenging physical activity or goal
CG-6 Students learn to assess their body, its needs and its relationship with physical activity.	C-6.1 Discusses activities that bring personal satisfaction. C-6.2 Groups different cultures with special reference to dance, physical activity, local games, and spaces to interact. C-6.3 Identifies the relationship between rhythmic movement and their aesthetic value.

8.5.2.3 Illustrative Learning Outcomes for the Middle Stage

Curricular Goal (CG-2): Students exhibit sensitivity in their personal and social behaviour towards themselves and others.

Competency (C-2.1): Reflects on your own personal reactions during an interaction/activity with others.

Table B-8.5-i

Grades	Grade 6	Grade 7	Grade 8
Competency	C-2.1: Reflects on your own personal reactions during an interaction/activity with others.		
Age group	← Ages 12 - 14 →		
L1	Demonstrates ability to relook at behavioural pattern after the game and shows keenness to learn from it. E.g. - Some untoward reaction or outburst during a game or getting disappointed by others' actions and reacting in different ways.	Demonstrates ability to change pattern of behaviour during a game. E.g. - Regulating anger or disappointment, showing resilience while losing a game.	Demonstrates ability to bring about a positive attitude in oneself and the team in the face of disappointment or tough situations on the field
L2	Describes reflected/observed emotional situation during the game and how it affected on field play	Describes reflected/ observed emotional situations during play and how they managed to regulate or not regulate	Describes reflected/observed emotional situation during play and how they managed to regulate/not regulate and how did that affect others.
L3	Describes how others emotional distress or injury or any set back effected oneself and team	Reflect and describe the emotional state of entire group in a team sport and how they can work together to bring the team up	Reflect and describe situations where entire team managed to bounce back from a difficult situation

8.5.3 The Secondary Stage (Grades 9 &10)

The developmental range of students at this Stage is diverse. Students experience numerous physical and physiological changes during these years. Boys typically experience a period of rapid growth around grade nine or until about fourteen or fifteen years of age. On the other hand, by grade nine, girls experience a slower rate of growth. Overall, by tenth or higher grades, most students start experiencing a relatively slower rate of growth. This slowdown in growth rate, along with increases in the length and breadth of muscles, produces a higher level of motor ability and fitness. Students' increasing knowledge and experience during this stage gives them the ability to select activities they would like to pursue. By this stage children should be able to identify one sport/game in which she would like to excel and build proficiency to participate at high level.

8.5.3.1 The Secondary Stage: LS-1

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

CG-1 Students demonstrate a good level of competence in the understanding of movement concepts, strategies and principles while engaging and performing in physical activities including sports and dance.	C-1.1 Exhibits proficiency in all movement and motor skills required to participate and excel in at least 1 sport. C-1.2 Exhibits power, speed, strength, balance, flexibility, judgement, and reflexes in motor movements like running and jumping at various speeds and in various directions, rolling, zigzag movements, catching a moving object coming with speed or throwing/hitting a ball far with precision. C-1.3 Demonstrates motor skills and describes their critical features within a context of a game/sport like a tennis serve, volleyball smash, batting within the context of a game etc.
CG-2 Students exhibit sensitivity and learn to manipulate their personal and social behaviour towards themselves and others.	C-2.1 Reflects upon their own and others' behaviour before, during and after the physical activity in long term. This may include different but related behaviour including emotional state of mind, physical fitness, fatigue, fair play, biases, personal interests etc. C-2.2 Articulates the importance of emotional and mental support to others as well as improving performance and encouraging others to do so (by analysing the behaviour of children when someone was emotionally or physically hurt and how their support may improve the performance of the other). C-2.3 Creates and applies safety rules and protocols for physical activity and visualizing how they can be applied outside the field as well. C-2.4 Demonstrates courage and ability to hold larger democratic values in tough context and situations. C-2.5 Exhibits modesty after an exceptional performance, accept defeat gracefully and enjoy the game. C-2.6 Describes what sexual harassment is and demonstrates sensitivity to other genders and describes characteristics of harassing events and conditions.

CG-3 Students demonstrate and practice physical movements, motor skills, social sensitivity, and mental engagement in physical activity/game situation.	C-3.1 Demonstrates skills in dynamic environment against another thinking team during a tournament. C-3.2 Demonstrates calmness and courage in difficult situations and being able to keep the calm of their teammates. C-3.3 Expresses their own and others' emotions and thinking processes during the game.
CG-4 Students plan personal physical fitness goals independently and monitoring it.	C-4.1 Sets multiple physical activity and fitness goals like improving multiple shots or their overall match performance. C-4.2 Prepares their own exercises and warm up plans and scheduling it appropriately to reap maximum benefits. C-4.3 Assesses their progress in terms of efforts, processes, and outcomes.
CG-5 Students describe the value of physical activity for health, enjoyment, challenge, expression, and social interaction.	C-5.1 Illustrates the role of physical education for positive social interaction while discussing physical activity throughout history and culture. C-5.2 Examines the role of physical activity in improving self-confidence and self-esteem. C-5.3 Expresses self through dance, gymnastics, or any physical activity. C-5.4 Appreciates the aesthetic appeal of a performance like someone's classy straight drive, a beautiful freekick, effortless smashing of the ball, speedy smash etc.
CG-6 Students assess their own growth and development.	C-6.1 Examines the role of different factors which affects growth and development like Heredity, Immediate Environment, Diet, Diseases, State of Mind, physical activity etc. C-6.2 Analyses the relationship of nutrition, physical activity and mental health with skeletal health, muscles, strength, endurance, flexibility, and agility. C-6.3 Classifies the common injuries of bones and muscles and describes how to seek medical help and help others in that situation (like providing first aid in such situations). C-6.4 Outlines and challenges the societal beliefs and taboos associated with different aspects of growth and development at adolescent age.

CG-7 Students learn about tournaments at the International, National, State, district, and Block Levels.	C-7.1 Lists the various tournaments at the International, National, State, District and Block Level. C-7.2 Describes the participation criteria and rules. C-7.3 Summarises the support structure or organizational structure to participate. C-7.4 Explains about the different forms and procedures for participating.

8.5.3.2 The Secondary Stage LS-2

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

CG-1 Students demonstrate high level of competence in the understanding of movement concepts, strategies and principles while engaging and performing in physical activities including sports and dance.	C-1.1 Exhibits all movement and motor skills required to participate and excel in at least 1 sport. C-1.2 Demonstrates new skills in at least 1 physical activity from Team Sport, Dual Sport, Individual Sport, Dance, Yoga, Gymnastics, Outdoor pursuits (scout and guide), and Self - Defence. C-1.3 Exhibits the ability to use complex movement concepts and principles to develop and refine one's own game/ sports skills. C-1.4 Exhibits and can explain manipulation of space and equipment in the context of a game. C-1.5 Applies knowledge and understanding of movements and skills to develop their own physical activity plan, follow a routine and assess independently. C-1.6 Demonstrates an advanced motor skill and describes their critical features within a context of a game/sport like a tennis serve, volleyball smash, batting within a context of a game etc.

CG-2 Students exhibit sensitivity and learn to manipulate their personal and social behaviour towards themselves and others.	C-2.1 Reflects upon their own and other's behaviour before, during and after the physical activity in the long term. This may include different but related behaviour including emotional state of mind, physical fitness, fatigue, fair play, biases, personal interests etc. C-2.2 Articulates the importance of emotional and mental support to others as well as improving performance and encouraging others to do so (by analysing the behaviour of children when someone was emotionally or physically hurt and how their support may improve the others performance). C-2.3 Modifies/create new games and rules which are more inclusive in nature. C-2.4 Creates and applies safety rules and protocols for physical activity and visualizes how they can be applied outside the field as well. C-2.5 Demonstrates courage and ability to hold larger democratic values in tough contexts and situations. C-2.6 Exhibits modesty after an exceptional performance and accepts defeat gracefully and enjoys the game.
CG-3 Students demonstrate and practice physical movements, motor skills, social sensitivity, and mental engagement in physical activity/game situations.	C-3.1 Demonstrates skills in a dynamic environment against another thinking team during a tournament. C-3.2 Designs and uses multiple strategies in the game and the ability to make new strategic moves in challenging game situations (E.g., a student's plan A and both failed. They strategize a plan C during the game). C-3.3 Expresses their own and others' emotions and the thinking process during the game. C-3.4 Demonstrates calmness and courage in difficult situations and is able to keep the calm of their teammates.
CG-4 Students plan personal physical fitness goals independently and monitor it.	C-4.1 Sets multiple physical activity and fitness goals like improving multiple shots or their overall match performance. C-4.2 Assesses their progress in terms of efforts, processes, and outcomes. C-4.3 Prepares their own exercises and warm up plans and schedules it appropriately to take maximum benefits.

CG-5 Students learn about the value of physical activity for health, enjoyment, challenge, expression, and social interaction.	C-5.1 Illustrates the role of physical education for positive social interaction while discussing physical activity throughout history and culture. C-5.2 Examines the role of physical activity in improving self-confidence and self-esteem. C-5.3 Appreciates the aesthetic appeal of a performance like someone's classy straight drive, a beautiful freekick, effortless smashing of the ball, speedy smash etc. C-5.4 Expresses self through dance, gymnastics, or any physical activity.
CG-6 Students assess their own growth and development.	C-6.1 Examines the role of different factors which affect growth and development like Heredity, Immediate Environment, Diet, Diseases, State of Mind, and physical activity etc. C-6.2 Examines the role of different factors which affect growth and development like Heredity, Immediate Environment, Diet, Diseases, State of Mind, and physical activity etc. C-6.3 Analyses the relationship of nutrition, physical activity and mental health with skeletal health, muscles, strength, endurance, flexibility, and agility. C-6.4 Classifies the common injuries of bones and muscles and describes protocol for seeking medical help for themselves and others in that situation like providing first aid in such situations. C-6.5 Outlines and challenges the societal beliefs and taboos associated with different aspects of growth and development at adolescent age.
CG-7 Students learn about tournaments at the International, National, State, district, and Block Levels.	C-7.1 Charts the various tournaments at International, National, State, District and Block Level. C-7.2 Describes the participation criteria and rules. C-7.3 Summarises the support structure or organizational structure to participate. C-7.4 Explains the different forms and procedures for participating

8.5.3.3 Illustrative Learning Outcomes for the Secondary Stage

Curricular Goal (CG-3): Students demonstrate and practice physical movements, motor skills, social sensitivity, and mental engagement in physical activity/game situation

Competency (C-3.4): Demonstrates calmness and courage in difficult situations and is able to calm their teammates

Table B-8.5-ii

Grades	Grade 9	Grade 10
Competency	C-3.4: Demonstrates calmness and courage in difficult situations and is able to calm their teammates	
Age group	← Ages 15 - 16 →	
L1	Demonstrates ability to be calm under stressful situations and think clearly. Is able to communicate properly and doesn't allow the situation to escalate within the team	Demonstrates ability to be calm and get team mates and peers to be calm too. Is capable of effecting the mood of the team and rallies them into a good emotional position

Section 8.6
Content

Illustrative content for a competency in the Preparatory Stage

Table B-8.6-i

Grades	Grade 3	Grade 4	Grade 5
Competency	C-1.1: Students develop a combination of movement, motor skills and manipulative skills like Kicking/Hitting a ball towards a target while moving, focusing on visual cue to hit the target		
Age group	← Ages 9 - 11 →		
L1	Throwing, kicking, hitting a ball – develop a sense of force required for movement	Throwing, kicking, or hitting a ball and develop range for the ball to travel far	Nuanced throws, deft kicks or glancing hits with the bat – develop the delicate use of force
Physical Activities for L1	Short and long Kickball French cricket		
L2	Throwing, Kicking, hitting a ball with a bat into desired space or a goal	Throwing, Kicking, hitting a ball with a bat while looking/focusing on the target	Throwing, kicking, hitting a ball with a bat into a desired pace or goal while the ball is in motion
Physical Activities for L2	Wall target Slam kick Roll, roll, roll the ball Penalty kicks		
L3	Catching the ball – Develop sense of force while catching	Catching the ball while running	Catching the ball while running, diving, and rolling
Physical activities for L3	Bounce catches Caterpillar catches Running on high catches		

Note – LOs related to non-physical aspects to be achieved through pedagogy

8.6.1 Pedagogical Approach

Several research studies confirm how students learn physical education. The following key points of understanding are useful to know how to teach the subject.

a. **Physical Education follows the same teaching-learning principles that promote a student's learning in other subjects**. Giving space to students' context, respecting students as individuals, providing them opportunities, connecting to their life, giving them level-appropriate tasks, deciding content based on learning outcomes, understanding the learning levels of students, and periodic assessment and feedback are effective teaching-learning practices in physical education too.

b. **PE requires teachers to demonstrate** so that students can observe, practice those skills/moves and learn. This is because physical activities fall under the category of practical knowledge where "to know" is acquired only by doing the activity.

c. **Providing time for interactions before and after the activity** improves the development of cognitive concepts, values, and dispositions. Such interactions must be moderated by teachers and students should be encouraged to voice their opinions freely.

d. **Students learn best when they have a diverse set of activities** to choose from and equal opportunities. The practice of motor skills in diverse ways is fundamental to fitness and mastery of movement in physical education. This means designing a range of activities and sports for all students including those with disability.

e. **Encouraging sportspersonship, avoiding personal comparisons, and focusing on skill acquisition will make physical education effective**. Teachers should implement methods to define skill attainment in terms of proficiency rather than comparison to others. A motivating environment and focus on personal improvement rather than personal comparing of students provide students with a positive and satisfying learning experience.

Box B-8.6-i

PE class in tough and extreme weather conditions

Physical education classes could be particularly very challenging in tough or extreme weather conditions. India has very diverse weather conditions. Extreme cold, hot and rain are witnessed in several regions. The following suggestions can help in such cases.

Timetabling: *Areas which witness tough (not extreme) hot and cold weather conditions can consider working on rearranging their timetable. For example, in hot climates, the Preparatory and the Middle Stage students play in the morning and the Secondary stage students play in the afternoon. In cold weather, the reverse can be done.*

Indoor PE Activities: *In extreme weather when playing outside is not possible at all, Indoor PE classes must be organized. Physical activities like yoga, static movements, dance, theatre, High-intensity interval training (HIIT) and Medium-intensity intermittent training (MIIT) workouts can be considered. To enable more space per student, schools should make provision for access to a big hall in the school or in the vicinity which can enable these activities.*

8.6.2 Guidelines for Pedagogy

Other than modifying activities for practice and to suit differing needs and abilities, and including a diverse range of physical activities, the following guidelines will be useful.

a. Planning and instructions: Concrete planning of the Physical Education class is the key to your instructions. Some aspects of planning to consider while planning the sessions follow.

i. Planning to avoid injuries through warm-up and cool down activities and ensuring safety of equipment and space

ii. Planning to be effective through teacher demonstrations and modelling

iii. Planning for the right levels of challenge for different groups of students

iv. Planning to be focused on the learning outcomes that need to be achieved

b. Participation and inclusion: Participation of students in all activities is the responsibility of the teacher. Students tend to be overenthusiastic about playing, and the teacher must ensure that all student gets their turn to participate. Games and activities must be chosen so that students of all gender and abilities can participate.

c. Motivation: Not all students will be enthusiastic about taking part in sports, particularly if they fear that they will not be good. Students may be kept motivated by Teachers themselves demonstrating excitement and enthusiasm in the Physical Education sessions. Teachers must encourage active involvement, support students to acquire skills, acknowledge and appreciate growth and improvement rather than mere outcomes, instruct clearly, give everyone a chance to participate, be sensitive to students' feelings of pressure or anxiety, and treat every student fairly. All this would go a long way in motivating students to give their full participation in the classes.

d. Safety: A safe environment in Physical Education has two components: the physical and the psychological. The physical refers to the need to ensure students do not get injured, that facilities and equipment are safe, Teacher-preparedness to handle emergencies with access to a doctor, proper supervision of all physical activities etc. The psychological component refers to the need to ensure that students feel emotionally and socially safe, and receive respectful treatment, encouragement, support, and fair redressal of grievances during a Physical Education class.

Box B-8.6-ii

Students must also be educated to identify forms of sexually demeaning and harassing behaviours and empowered to report them to their Teachers and the Principal.

8.6.3 Stage-Specific Variations

Below are the stage-specific variations that a teacher needs to keep in mind in the practice of the physical education curriculum.

Table B-8.6-ii

Variation Parameters	Preparatory	Middle	Secondary
Type of Physical Activity	Teachers should encourage free play and organize activities using games and sports. Students at this age get bored very easily so a variety of activities/games/sports should be used to build a skill or to develop a specific group of muscles. Drills should be discouraged but can be gamified to include element of fun. E.g., Instead of doing a drill on developing the throw one can divide the students into two teams and play a match of throws where each team scores on hitting the stump.	Demonstrates ability to change pattern of behaviour during a game. E.g. - Regulating anger or disappointment, showing resilience while losing a game.	Demonstrates ability to bring about a positive attitude in oneself and the team in the face of disappointment or tough situations on the field
Duration and Intensity	Duration and intensity must be kept low. It must not be more than 1 hour during school hours as students tend to fatigue and dehydrate easily. Their rehydration discipline has not yet formed, and dehydration will have a temporary effect on their cognitive abilities to participate in other academic activities conducted on the same day. The choice must be made of many short activities of small durations instead of playing a long game.	Duration and intensity must be kept moderate. It can go up to 90 minutes at least on 2 days in a week. By this time students would be more aware about rehydration discipline and can cope up with it. They continue to prefer many short activities of small durations. Long duration games/ sports can be played twice a week.	Duration and intensity can be high. It can go up to 1 hour during school hour for all the students and another 1 hour for interested students who wants to pursue sports further. By this time, students would be more aware about rehydration discipline and their bodies can cope.
Responsibility of participation and Inclusion	Participation of all students in all activities is the responsibility of the teacher.	Students will partly start to take responsibility of inclusion, but teachers' responsibility does not deteriorate	Students will share the responsibility with teachers to work on inclusion of all participate.

Box B-8.6-iii

Physical activity integration with other subjects

There are opportunities for teachers to incorporate physical activity while teaching other subjects. Some strategies for this are:

Incorporating material from other subject areas into daily physical activity. For example, creating spatial awareness (movement concepts and skills) during a language class using verbs, adverbs, and prepositions.

Incorporating physical activity to help reinforce numeracy skills. For example, teaching estimation/measurement on the sports ground in the math class.

In science class, teaching food and nutrition, hydration, body parts and systems and connecting them to the experiences on the games field.

Teacher's Voice B-8.7-i (To be edited)

To be added.

Section 8.7
Assessment

It is important to clearly specify the principles of assessment as this will guide schools and instructors across the different Stages. Some crucial principles are as follows.

a. **Assessment needs to reflect student achievement beyond physical attributes.** We are not looking at Physical Education as a space to only learn physical skills. Our curricular goals bring out aspects of behaviours, understanding of rules, emotional regulation, social skills and building a good temperament using physical activity. This needs to reflect even in our assessment parameters.

b. **Observation-based assessments are very valuable.** A large part of the assessment load will be based on observation of students while they are playing games, the way they behave on/off the field and how they reflect on their actions. Observation must be a key skill for the instructor and there must be a fair amount of time allocated to observation for all assessments in physical education.

c. **Assessment must be an objective process through clear Stage-wise rubrics.** Through different Stages, physical growth and the development of certain skills are expected. Since a lot of assessments are based on the observation of the instructor, it is important to create clear rubrics to define what the teacher is looking for when they observe and have standard documentation formats to keep track of it. This ensures that observations are objective and not coloured by instructors' beliefs and biases.

d. **Continuous assessments must be done and shared with students.** Across different Stages, the curricular goals and competencies are designed such that the physical, mental, or emotional changes occur in the student gradually and non-linearly. There needs to be some form of tracking of development and growth across stage-specific parameters throughout the term. The end of the term can be used to collate the development of students across these different parameters.

8.7.1 Types of assessments

Assessments are done based on Stag-wise learning goals and need to be broken down into simpler units to aid the process of learning. Through observation of these criteria amongst students' assessment is carried out to understand where individuals stand against the learning goals that are expected. These observations can be broadly used in two different ways:

8.7.1.1 Formative Assessments

Observations that are used to understand and guide the learning process, are formative in nature. For example, the instructor asks students to play a game of cricket and observes that an understanding of the rules is lacking, a lot of difficult catches are successfully taken, and tempers flare too much during the game. The instructor without sharing his observations develops next

lesson plan where catching drills are reduced and more time is spent on rules and reflecting on their own behaviour. Self or peer assessment is also a formative assessment as it aids in the students learning process in multiple ways

8.7.1.1.1 Illustrative Rubrics

Table B-8.7-i

Learning Outcome - Rubric for throwing with good force and direction					
Dimension	**Learning Objective**	**Always**	**Regularly**	**Sometimes**	**Not ready**
Mechanics	Getting into the right stance, with a proper hold of the ball, good transfer of weight and good throwing action	Able to consistently throw with the right mechanics - 8 throws out of 10	Able to throw most of the time with the right mechanics - 6-8 throws out of 10	Able to throw a few times with the right mechanics - 3- 5 throws out of 10	Not able to throw with the right mechanics - Less than 2 throws
Force	Able to throw far - at least 20 meters long.	Able to consistently throw over 20 meters - At least 8 throws out of 10	Able to consistently throw over 20 meters - 6 - 8 throws out of 10	Able to consistently throw over 20 meters - 3- 5 throws out of 10	Not able to throw over 20 meters more than 2 times out of 10
Direction	Able to aim the throws to target	Able to consistently throw the ball into a target of 5 feet X 5 feet - 8 throws out of 10	Able to consistently throw the ball into a target of 5 feet X 5 feet - 6 - 8 throws out of 10	Able to consistently throw the ball into a target of 5 feet X 5 feet - 3 - 5 throws out of 10	Not able to hit the 5 feet X 5 feet target more than 2 times out of 10 throws

8.7.1.1.2 Illustrative Assessment Record

Table B-8.7-ii

#	Learning Outcome		Student 1	Student 2	Student 3	Student 4	Student 5	Student 6
1	**Throwing with good force and direction**	**Throwing mechanics**	A	S	R	S	R	R
2		**Force of throw**	N	R	N	N	N	S
3		**Direction of throw**	S	S	R	N	S	S

8.7.1.1.3 Next Lesson Plan Needs

Spend more time on force generation and target hitting. Students 2 and 4 will need special attention on stance

8.7.1.2 Summative Assessments

Observations that are used to measure or evaluate the degree of success the student has demonstrated in their learning are summative in nature. For example, the instructor at the end of the course puts together a report of observable skills a student has demonstrated. This information is used for grading purposes. The key difference here from formative assessments is therefore how observations are used. In formative assessment the observation data is used to further direct the learning process but in summative assessment, the observation is used to grade or report. The summative assessment at the end of the term can be activities or actions that test different skills. These activities or actions should have been performed and taught multiple times during the term.

The written components of assessments can be limited to student reflection and observations, rules knowledge in sports, and understanding of human bodily systems. The written components should also be part of a continuous assessment scheme. There can also be a written exam at the end of the term, but it should not carry a substantial weightage in the grading.

8.7.1.2.1 Illustrative Rubrics

Table B-8.7-iii

Rubric for summative assessment for C1.1 for grade 3					
	Always	**Regularly**	**Sometimes**	**Not ready**	**Not ready**
Throwing, kicking, hitting a ball – develop a sense of force required for movement	Able to consistently throw, kick and hit a ball with good mechanics - 8 out of 10 times	Able to consistently throw, kick and hit a ball with good mechanics - 6 - 8 times out of 10	Able to consistently throw, kick and hit a ball with good mechanics - 3- 5 times out of 10	Not able to throw, kick or hit a ball with the right mechanics more than 2 times out of 10	Not able to throw with the right mechanics - Less than 2 throws
Throwing, Kicking, hitting a ball with a bat into desired space or a goal	Able to consistently throw, kick and hit a ball into desired space or a goal - 8 out of 10 times	Able to consistently throw, kick and hit a ball into desired space or a goal - 6 - 8 times out of 10	Able to consistently throw, kick and hit a ball into desired space or a goal - 3- 5 times out of 10	Not able to throw, kick or hit a ball into desired space or a goal more than 2 times out of 10 times	Not able to throw over 20 meters more than 2 times out of 10
Catching the ball – Develop sense of force while catching	Able to consistently catch a ball with good mechanics - 8 out of 10 times	Able to consistently catch a ball with good mechanics - 6 - 8 times out of 10	Able to consistently catch a ball with good mechanics - 3- 5 times out of 10	Not able to hit the 5 feet X 5 feet target more than 2 times out of 10 throws	Not able to hit the 5 feet X 5 feet target more than 2 times out of 10 throws

8.7.1.2.2 Illustrative Assessment Record

Table B-8.7-iv

Rubric for summative assessment for C1.1 for grade 3								
#	**Competencies**	**Learning Outcome**	**Student 1**	**Student 2**	**Student 3**	**Student 4**	**Student 5**	**Student 6**
1	C - 1.1 - Throwing, kicking, hitting a ball – develop a sense of force required for movement	Throwing, kicking, hitting a ball – develop a sense of force required for movement	A	S	R	N	R	N
2		Throwing, Kicking, hitting a ball with a bat into desired space or a goal	N	R	N	S	S	A
3		Catching the ball – Develop sense of force while catching	S	S	A	A	S	R

Annexure
Physical Activity as Mentioned in the Content Table

a. Kickball

For this game, you need some space, a pitch, a ball, and markers to define boundaries.

Set up – create a pitch in the centre (with or without wickets) and boundaries for hitting 4s and 6s.

Game play - This is a team game where each team has 5-6 players. The game is like playing cricket but with a football. A toss decides which team is fielding and which team is kicking. The fielding team will have bowler who rolls the football on the ground and the kicker must kick the ball to score runs. If the kicker misses the ball 3 times, she is out and the next kicker from the kicking team will replace her. Kicking team gets 5-6 overs (1 over per player) to score runs, after which second innings follow.

b. Wall Target

For this game, you need some space, a wall, a ball, and some chalk to mark the wall

Set up -Prepare the game by drawing several circles on the wall. We can draw a mix of small and large circles. Circles can be at different heights from the ground. Write a number inside each circle and that is the number of points you will gain if you hit in that circle. Larger circles can be lower value than the smaller circles.

Game play – Each player will get a certain number of chances to kick/throw the ball at different circles to gain points. The students can be encouraged to add up the points as and when they hit the circle.

c. Short and long

For this game you need open space, a ball, and several objects as targets (it can be buckets, stones, twigs anything that is easily visible).

Set up - To play the game, a place is assigned to kick/throw from and at different points the targets are kept. The targets can be different distances from the kicking/throwing place and based on the distance can carry different points for scoring.

Gameplay - Each player will get a certain number of chances to kick/throw at the target of their choice to score points. Depending on the age and skill of the students, the targets can be adjusted.

d. Roll, roll, roll the ball

For this game we need open space, cricket bat and multiple balls (ideally soft tennis balls) and cones for boundaries

Set up – There is a central circle where a student will stand with a bat and others will stand some distance away from the central player (depending on age and skill, distance can be changed)

Gameplay – One player will stand in the middle with a bat. Bowler will roll the ball and batter will hit to score only in boundaries.

e. French Cricket

For this game we need open space, cricket bat and a soft ball

Set up – Create a large circle for the bowlers to stand and the batter stands at the centre

Gameplay – Students stand in a circle around a single batter at the centre. The batter must use the bat to protect her legs while other students try to 'tag' this area with the softball. The batter is out if they get hit below the knees or if a fielding player catches the ball after they have returned it with the bat. As a student gets out, we can give each student in the circle a chance to be the batter.

f. Slam kick

For this game you need a football, a wall, markers for setting up a goal

Set up – Use chalk to draw a goal on the wall itself so that whenever anyone kicks towards the goal, ball rebounds and comes back.

Gameplay – This game is played by 2 players at a time. Each player gets 3 lives, the player with the ball will attempt to kick the ball into the goal and as the ball rebounds the other player needs to kick the ball back into goal before the ball stops moving. This continues till one of the players don't manage to kick the ball into goal

g. Bounce catches

For this game you need a marker to mark a circle on the ground/wall

Set up – Draw a circle on the ground/wall where the ball needs to be bounced

Gameplay – This game is played by 2 players at a time. The player with the ball will bounce the ball in the circle and the other player needs to catch it and throw it back into the circle for the first player to catch. To make it difficult, play it on wall.

h. Caterpillar catches

For this game you need a softball and cones

Set up – Just draw 2 parallel lines on the ground

Gameplay – Divide the students into 2 equal teams and get them to stand in 2 parallel lines (Line A and Line B) so that each student has another corresponding player standing across in the other line. To start the game the first student in line A throws the ball to the first student

in line B, If the other student catches, the thrower will run and stand at the end of line A. Now the catcher from line B becomes the thrower and will throw the ball to the second student in line A, if this student catches, the thrower from line B will run to the end of his line. This will continue till it goes through the whole line. The distance between the 2 lines can be short to start with and to make the game tougher you can increase the distance.

i. Running on to high catches

For this game we need softball and cones and space

Set up – Three cones placed in a triangle format (distance between the cones depending on skill level and age)

Gameplay – This is a catching drill for students to learn how to move/run to catch and how to throw to a moving target. Player 1 is standing near a cone and the rest of the students are in a queue near a second cone. The first player in the queue (let us call her player 2) runs towards the 3rd cone and player 1 throws the ball towards cone 3. Player 2 needs to catch the ball near the 3rd cone and replace player 1. Player 1 can now join the end of the queue. Now the next player in the queue (player 3) will run towards the 3rd cone and player 2 will throw the ball towards the 3rd cone. This game can continue, and the group needs to get the greatest number of consecutive catches.

Chapter 9

Vocational Education

"To find out what one is fitted to do, and to secure an opportunity to do it, is the key to happiness."

--John Dewey

Vocational Education prepares students for different kinds of 'work'. It enables the learning of specific knowledge, capacities, and values through independent subjects, or integrated within other subjects, such that the student is ready to work upon leaving school, in one vocation or another, and to deal with the day-to-day practicalities of life. Despite this readiness, students may choose to pursue higher education, or specific training, before joining the world of work.

In the Foundational and Preparatory Stages, multiple capacities will be developed through play and other activities, which will be subsequently useful in vocations. These capacities will be called prevocational capacities.

In the Middle Stage, exposure to a wide range of work will be given to students. This will equip them to achieve skills in a vocation of their choice in the Secondary Stage and help them progress into gainful employment.

Section 9.1
Aims

Work is an important part of life. It prepares individuals to deal with practical things related to daily life, and for economic participation. Vocational Education enables students to explore different kinds of work, so as to identify what they would like to pursue in order to lead a find meaningful and fulfilling life. It also equips them to deal with home-based work.

The Draft National Education Policy (DNEP) 2019 states that "Vocational education is extremely vital for our country to run efficiently and properly, and thus it is beneficial to increasingly incorporate elements of vocational education into the school curriculum. Indeed, some exposure to practical vocational-style training is always fun for young students, and for many students it may offer a glimpse of future professions while for others it would at the very least help teach and reinforce the dignity of all labour." [DNEP 2019, Para 4.6.6]

With this background, the following aims of Vocational Education will be achieved by all students:

a. **Developing an understanding and basic capacities for different forms of work**: Students will develop a broad-based understanding of different forms of work, which will equip them to successfully manage their personal affairs. This will also equip them to identify, create and initiate business, work, and community opportunities.

b. **Preparation for specific vocations:** Students will develop capacities to be gainfully employed in one or more specific vocations after leaving school.

c. **Respect for dignity of labour and all vocations:** Students will develop respect for the dignity of labour through the acquisition of values related to work and the workplace

d. **Developing values and dispositions related to work**: Students will develop persistence and focus, curiosity and creativity, empathy and sensitivity, collaboration, and teamwork. They will be willing to do physical work and will pay keen attention to details.

Section 9.2
Approach to Vocational Education

Vocational Education will prepare students for meaningful and productive participation in the world of work by learning hands-on abilities and skills (i.e., 'physically doing'), developing equal respect for head-hands-heart, valuing the dignity of labour, and understanding vocational choices for the future. Therefore, schools must provide students a broad but experiential introduction to different kinds of work, and a deep exposure to and a defined set of practical competencies in least one area of work.

Vocational Education draws from and builds on the competencies developed in other curricular areas. For example, Mathematics for calculations and estimations, Social Science to understand the place of work in society and production chains, Science to understand how things work and how their functioning can be improved. Thus, it is complementary to and builds on other curricular areas, and not an isolated area.

9.2.1 Some important considerations

Along with choice of vocations to be offered, the resources and materials required, pedagogical and assessment approaches, the following are some important considerations for the Vocational Education curriculum.

a. **Age-appropriate:** The approach to Vocational Education will be age-appropriate. It will start from developing general capacities for work (or prevocational capacities) and move to more specific capacities for particular kinds of work. To elaborate, in the Foundational Stage, students will experience immersion in work through 'doing' and 'creating'. In the Preparatory Stage, this approach will continue but students will also become familiar with local occupations, and factors related to participation and equality. In the Middle Stage, this understanding will become formalised with the introduction of a separate curricular area. At this Stage, students will receive a broad exposure to different kinds of 'work'. This is meant to provide a holistic exposure and learning experiences across vocations for all students. At the Secondary Stage, students will choose one or more than one vocation to specialise in.

b. **As localised as possible**: As far as possible, vocations offered must be available in the local community or region, so that students can be gainfully employed.

c. **Aspirational:** At the same time, students' aspirations must also be met through helping students learn vocations beyond those currently available in their village/town/city and/or offering vocations that are available in other towns/cities. This would require a range of vocations to be offered.

d. **Exposure to different kinds of work**: Students must be deliberately exposed to all kinds of work (e.g., schools must ensure that students from families with 'white-collar' professions must have a deep exposure to working with their hands on land). Schools must also take into account the work that students do at home and ensure that they get exposure to other kinds of work (e.g., if a student works on land at home, the school must ensure that she spends most of her time on manufacturing and services).

e. **Equity considerations:** Existing social inequities must be deliberately broken. Students from particular communities must not be slotted into particular kinds of work (e.g., it must not be assumed that students from potter communities will be good at craft, so they do a certain kind of manufacturing and nothing else.). Students from particular genders must not be slotted (e.g., boys and girls should have equal opportunities across working on land, manufacturing and services).

f. **Value for working with hands:** Vocational Education offers an opportunity for all students to learn how to 'do' something with their hands and learn to value it. Education is incomplete without this experience and understanding. So far, opting for a vocational course has meant that the student is either 'poor' or a 'poor performer' in school. This will change with this NCF – with all students participating in Vocational Education, school education will act as an equaliser, and not a multiplier of inequity.

9.2.2 Foundational and Preparatory Stages – Developing Prevocational Capacities

In the Foundational and Preparatory Stages, vocations themselves are not themselves important. The focus in these Stages should be on developing prevocational capacities.

9.2.2.1 Foundational Stage

a. In this Stage, an integrated approach has been taken where 'work skills' (e.g., children learn to complete their tasks, children learn to take care of the material they use) are learnt through the regular classroom process.

b. .The focus on physical development and motor skills through movement and exercise, working and completing a task and play-based education enables the development of age-appropriate prevocational capacities in the Preparatory Stage.

c. One of the important Curricular Goals at this Stage is also for children to develop a positive attitude towards productive work and service or Seva.

9.2.2.2 Preparatory Stage

a. An integrated approach often works best at this Stage.

b. .Vocational Education is integrated into 'World Around Us' through the inclusion of prevocational capacities. Competencies related to students' understanding of occupations around them, observing, and engaging with animals and plants, and creating simple objects lay the foundation for development of vocational capacities in the Middle Stage.

c. The pedagogy at this stage also lends itself to the development of prevocational skills, for example, maintaining flowerpots/kitchen gardens, clay modelling, and dialogue with shopkeepers during visits to the local markets.

d. Work allocation' in school will also be a part of preparing ground for Vocational Education in the next Stage (e.g., taking care of the plants in class, putting away books, helping with cleaning after the mid-day meal). All students must be allocated responsibilities equally for all tasks.

Box B-9.2-i

Vocations and Professions

There is no categorical difference between 'vocations' and 'professions'. While the general usage of the two words in India tends to give 'higher social status' to 'professions' and 'professional education', it is 'vocation' that has the connotation of 'higher calling'. The NCF does not differentiate between vocations and professions.

9.2.3 Middle and Secondary Stages - Developing Vocational Capacities

In the Middle and Secondary Stages, students begin a formal engagement with vocations. In the Middle Stage, students get a wide exposure to many different kinds of vocations in form of projects, while in the Secondary Stage, students are exposed to Multi-skill foundation courses to cultivate variety of skills and broaden their sense of self and vocational interests.

Given the wide range of vocations, there is a need to organise the curriculum so that students receive adequate exposure while schools are able to manage within their constraints.

The NCF will address this concern by identifying three forms of work that include a wide range of vocations with some commonalities within them.

9.2.3.1 Forms of work

The nature of different vocations differs. Most vocations (e.g., agriculture, textiles, commercial art) have a history of practice and utilize a variety of skills, and values and dispositions to create a specific work product or offer a specific service (e.g., dexterous handling of materials, book-keeping). Therefore, vocations can be categorised into diverse forms of work in the world, which differ in terms of operations, history of practices, and potential jobs.

Three broad forms of work that are very different from each other, yet prevalent and economically productive in our country and across the world, are the Agricultural, Manufacturing and Services sectors. These three sectors can be represented in the school curriculum in a simplified form through allowing students to experience forms of work related to growing plants and rearing animals, using tools and machines to create products, and working with people.

These forms of work will ensure all students experience work in varied contexts. For example, students in rural areas are exposed to the vocation of agricultural practices much more than students in urban areas, while those in rural areas may not be adequately exposed to the services sector.

In the school curriculum, these forms of work will be called: Engaging with Life and Nature, Engaging with Machines and Materials, and Engaging with Human Beings. They will be part of the Vocational Education curriculum for the Middle and Secondary Stages. These forms of work are described below.

Providing opportunities for all students to learn across all categories of 'forms of work' will ensure equality of status and opportunity for all forms of work. Specific vocations within these forms of work will be as contextualised as possible. This categorization can be easily aligned to the National Skills Qualifications Framework (NSQF).

9.2.3.1.1 Engaging with Life and Nature

Engaging with Life and Nature involves understanding the worldwide importance of life and the natural environment around us, how they function together and individually, what is the lifecycle of a plant or an animal, what happens in the farming of plants and rearing of animals, what are the agricultural, climatic, and natural requirements to take care of them. Approaching Vocational Education through this form of work will enable students to develop interest in nature and allied areas, and become conscious of their environment, and the significant changes happening around them. Illustratively, a school could choose developing a vegetable garden or developing a chicken coop as part of this category in the Middle Stage, and floriculture, dairy farming, and sugarcane cultivation in the Secondary Stage.

9.2.3.1.2 Engaging with Machines and Materials

Engaging with Machines and Materials involves comprehending how any machine or tool works. It incorporates the processes and tasks that lead to tangible outputs. Students can be involved in this form of work by introducing handicraft work using various materials such as paper, wood, clay, and fabric. A student inclined to the work of tailoring uses basic tools such as scissors, cutters, thread, pins, and machines, including the sewing machine, to sew cloth in a predetermined design. Student will be able to develop manual skills, attention to detail and persistence to be able to create high quality products. Illustratively, a school could choose to offer tailoring, carpentry and pottery in the Middle Stage, and welding along with advanced courses in carpentry and tailoring in the Secondary Stage.

9.2.3.1.3 Engaging with Human Beings

Engaging with Human Beings involves interaction with people to understand their needs and requirements. It deals with the capacities to communicate well, and understand the processes and resources involved in providing a particular service. So, a person inclined to work in a nursing home should be well informed about procedures, and ways of communication with patients so as to deliver service. Through this form of work, students develop the essential interpersonal skills and compassion for other fellow beings and acquire the basic knowledge and standards of service to be provided. Illustratively, a school could choose helping in a nursing home or working in a shop as part of this category in the Middle Stage. In the Secondary Stage, courses could, illustratively, be offered in housekeeping, and beauty culture.

9.2.3.2 Middle Stage

a. In the Middle Stage, the approach is to provide relevant exposure to students to as many vocations as possible in form of projects.

b. In each Grade, 3 projects, one from each form of work will be implemented in schools. Thus, students, by the end of this Stage, will be able to work on nine projects.

c. States/Schools will choose vocations, in form of projects, within the three 'forms of work.' The selection of projects must consider the context of school, locality, and age-appropriateness of students.

d. Some of the projects which are in alignment with the concepts of Science or Social Science will be supported by the respective subject teachers through revised teaching plans.

e. Students will develop basic skills and knowledge in all the three 'forms of work' through relevant internships as well - Engaging with Life and Nature (poultry, dairy farms, pest control units, nursery, etc.), Engaging with Machine and Material (local mechanic workshops, carpentry workplaces, tailoring units, etc.), and Engaging with People (hotels, restaurant, hospitals, gyms, old age homes, beauty salons, etc.)

f. Towards end of the academic year, all the students will organise a kaushal mela in the school to demonstrate their projects to the school, community members and other stakeholders. This will include a presentation of the project work, key learnings, and reflections and use of learnt skills in home

9.2.3.3 Secondary Stage

g. In the Secondary Stage, Students will be provided exposure with Multi-Skill Foundation Courses.

h. This course will aim at improving student employability, cultivating vocational skills, improving attitudes towards school, encouraging community service and labour, and changes in gender role perceptions.

i. Pedagogy will include apprentice learning under the supervision of a resource teacher, and frequent school-based workshops

Section 9.3
Subject-Specific Challenges

There are a few challenges with the implementation of Vocational Education that need to be addressed on priority:

a. Vocational Education is often considered the 'last resort' for students who are not able to pursue higher academic education. This social status hierarchy will have to be overcome.

b. Vocational Education has been facing curricular and resource-based constraints for over two decades. For instance, with schools in remote or rural locations, resources related to industrial setup are hard to access, thereby restricting the opportunity to give exposure to those students. This has only widened the gap between advantaged and disadvantaged students.

c. With the lack of proper infrastructure, it becomes a struggle to let students undergo practical exposure. Most of the schools that consist of relevant equipment (if any) such as computers and materials of home science are outdated or broken with no fund to repair or buy new ones.

d. There is a lack of understanding about assessments, especially given the emphasis on practical, hands-on learning.

e. There are no formal linkages with the world of work. As per NEP 2020, students passing out from Grades 11-12 with Vocational Education often do not have well defined pathways with their chosen vocation in higher education. With such unclear directions, it is highly challenging to make connect with the job search in market.

f. There is no teacher education programme for the preparation of Teachers for Vocational Education.

Section 9.4
Nature of Knowledge

a. Vocational knowledge is significantly procedural and intended to accomplish specific tasks. This procedural knowledge enables further work-focussed activities, both in the world of work and in daily life.

b. This procedural knowledge is enabled through propositional knowledge from other areas. Therefore, knowledge from other curricular areas, including Science, Mathematics, Language, and Social Science, is used, where relevant, to support the development of vocational knowledge.

c. Vocational knowledge also includes propositional knowledge specific to vocations and also to the context within which the vocation is practised. For example, rules and regulations, safety concerns, markets, transportation, etc.

d. Vocational knowledge includes knowing how to work with people in teams, and in organisations. It develops sensitivity towards the environment, collaboration, integrity, waste management, and other values mentioned in the NEP 2020.

Section 9.5
Learning Standards

As already discussed in the Approach to Vocational Education, vocations offered in the curriculum will be organised in three forms of work: Engaging with Life and Nature, with Machine and Materials, and with Human Beings in the Middle and Secondary Stages. Each form of work will have a Home Curricular Goal, which will include the competencies students develop to be able to contribute to home-based tasks. This Curricular Goal is essential for students to manage their personal life and resources more productively and meaningfully. It equips students with essential capacities to manage their day-to-day life better and establish them as competent and productive members of the family and society.

Competencies are to be attained at the end of the stage. Therefore, interim markers of learning achievements are needed so that Teachers can observe and track learning, and respond to the needs of learners continually. These interim markers are Learning Outcomes. Thus, Learning Outcomes are granular milestones of learning and usually progress in a sequence leading to attainment of a Competency.

However, vocational education is different from other curricular areas in terms of content and approach. While in most other curricular areas, it is possible to mark a clear progression in Learning Outcomes as students move towards attaining a competency, this is not possible in Vocational Education.

The progression across grades in Vocational Education is in terms of exposure to different vocations, and the development of skills in these vocations. In each grade, students are exposed to different vocations through projects in the Middle Stage, and a Multi-skill foundational course in the secondary Stage. To see progression across different vocations as students move through grades is, therefore, difficult. Hence, the Learning Outcomes must be articulated in terms of learning a vocation in a single grade. This implies that the learning outcomes will be the same for all grades for most competencies. For example, let us assume students do a project on horticulture related to Life and Nature in Grade 6, on poultry in Grade 7, and animal husbandry in Grade 8. It will be impossible to map progression in Learning Outcomes across these Grades since students will have to learn similar things related to basic knowledge, tools, place in the world of work, and so on. Therefore, Learning Outcomes will be the same across grades.

At the same time, students will be a mixed group, with varying levels of exposure and capacities. A majority of students will be doing some sort of work at home and may already have the skills others do not. Hence, articulating Learning Outcomes in terms of progression of skills will not be correct since some students will already have attained the Learning Outcomes of a higher grade. For example, some students may already be maintaining, and handling equipment related to Life and Nature, and Machine and Materials, while others may have capacities related to Human Beings by virtue of supporting ageing grandparents or helping parents run a shop.

Learning Outcomes, in any curricular area do not come with rigid grade-specific boundaries. They are enabling guidelines for Teachers to plan their content, pedagogy, and assessment towards achieving specific Competencies. In case of Vocational Education, the context is key to

content, pedagogy and assessment. For example, a Grade 6 student will be as capable of handling an agricultural tool in a rural setup as a Grade 7 student, or even more so. On the other hand, students from an urban background may not have worked with their hands in fields. Therefore, it will be a challenge to assign specific learning outcomes for each Grade for each Competency.

In the secondary stage the focus will be to further expose students to some core vocational areas through the Multi Skill Foundation Course. This covers areas like Workshop & Engineering Techniques, Energy & Environment, Gardening, Nursery and Agriculture Techniques, Food Processing Techniques (9th class) / Personal Health & Hygiene (10th class). This course aims at improving student employability, cultivating vocational skills, improving attitudes towards school, encouraging community service and labor, and changes gender role perceptions through multi-skills courses which broadens students' sense of self and future career interests and prospects.

The four core areas represent all the three forms of work. The Engineering (material-joining, shaping and otherwise fabricating into usable articles, including housing) and Energy-Environment (application of electricity, non-conventional energy and systems, processes, and tools-computers, management techniques). It also covers basics of engineering and project management. Home-Health (related to human life), and Agriculture (Plant and animal kingdom) give the skills related to clothing food and health of human beings. Agriculture covers the skill needed for production and preservation of food of both plant and animal origin, including care of plants/ crops.

In the Secondary Stage, students will need to be given advanced on-site exposure in industrial/ agricultural spaces to broadly understand the functioning of vocations in the world of work. Schools must develop linkages with local industries, farms, service centres, cooperatives, relevant NGOs, state transport corporations, cottage industries, printing presses, call centres, software design companies, mobile operating companies, law companies, local water/electricity boards, etc to enable students to spend part of their time gaining work/ practical experience at these facilities as apprentices while they are still in school.

9.5.1 Curricular Goals & Competencies

Curricular Goals, Competencies and Illustrative LOs will be further fine tuned

9.5.1.1 Middle Stage

In the Middle Stage, there are four Curricular Goals for any of the forms of work. Each Curricular Goal deals with an overarching component:

CG-1 Involves the acquiring of Knowledge and Skills in the work

CG-2 Involves the application of chosen form of work in the world of work

CG-3 Involves the values inculcated while working (Since they are not always measurable, they need to be observed in students' practices)

CG-4 Involves the application of Knowledge and Skills (learned through engaging in different forms of work) in home-based tasks

Following are the competencies to be developed for any of the forms of work

CG-1 Develops basic skills and allied knowledge of work and associated materials/procedures	C-1.1 Identifies and uses tools for practice C-1.2 Approaches tasks in a planned and systematic manner C-1.3 Maintains and handles materials/equipment for the required activity
CG-2 Understands the place and usefulness of vocational skills and vocations in the world of work	C-2.1 Describes the contribution of vocation in the world of work C-2.2 Applies skills and knowledge learned in the area C-2.3 Evaluates and quantifies the associated products/materials
CG-3 Develops essential values while working across areask	C-3.1 Develops the following values while engaging in work: • Attention to detail • Persistence and focus • Curiosity and Creativity • Empathy and sensitivity • Collaboration and teamwork • Willingness to do physical work
CG-4 Develops basic skills and allied knowledge to run and contribute to the home	C-4.1 Applies the acquired vocational skills and knowledge in home setting

9.5.1.2 Secondary Stage

In the Secondary Stage, there are three Curricular Goals for any of the forms of work. Each Curricular Goal deals with an overarching component:

CG-5 Involves the use of Knowledge and Skills in the work

CG-6 Involves the values inculcated while working (Since they are not always measurable, they need to be observed in students' practices)

CG-7 Involves the Knowledge and Skills in home-based tasks

Following are the competencies to be developed for any of the forms of work

CG-1 Develops in-depth basic skills and allied knowledge of work and their associated materials/procedures	C-1.1 Identifies and uses tools for practice C-1.2 Approaches tasks in a planned and systematic manner C-1.3 Maintains and handles materials/equipment for the required activity
CG-2 Develops essential values while working in a specific vocation	C-2.1 Develops the following values while engaging in work: • Attention to detail • Persistence and focus • Curiosity and Creativity • Empathy and sensitivity • Collaboration and teamwork • Willingness to do physical work
CG-3 Develops basic skills and allied knowledge to run and contribute to the home	C-3.1 Applies the acquired vocational skills and knowledge in home settings

Box B-9.5-i

Mastery of the Subject

Each Curricular Area comes with at least one expectation of making the learner attain mastery in the work. Be it becoming proficient to read with comprehension or to be skilled at balancing a bicycle while riding it. This expected competency certainly becomes an important outcome as it then helps the learner to apply learnt skills to more cognitively challenging tasks (e.g., by learning to balance the bicycle, the learner can then learn to regulate the speed of riding). This mastery is important; to quote Dewey, "It is a common-

place that the mastery of skill in the form of established habits frees the mind for a higher order of thinking."
However, attaining mastery in any work is a subjective phenomenon, as it depends on the expectation that we set for learners to accomplish, depending on the learning standards. Attaining mastery at something can also be visualized as climbing a stairway where, at each step, students acquire the skills to become competent to learn new skills at the next step (different levels of mastery). It is noteworthy to mention that the skills learnt alone can hardly be utilized without deepening knowledge and making appropriate judgements about how to use of skills in new situations.

Thus, in the Middle Stage, mastery in the context of Vocational Education means that students are able to understand the different forms of work, and how each connects to the larger functioning of the world. Mastery is the attainment of the basic skills and knowledge of the vocation, and their application in day-to-day tasks or at times of need. For example, if students learn the skill of cooking, they wouldn't need to be dependent on others to cook for them late at night when they feel hungry.

Mastery by the end of the Secondary Stage is associated with the deepening of knowledge, and a higher level of proficiency. By this Stage, students should be able to comprehend and create products or services with indicated quality parameters. Mastery is also in the form of engaging in collaborative and productive work of utility. Last but not the least, the efforts should result in not just skilled people but capable and cultivated human beings.

9.5.2 Illustrative Learning Outcomes

In this section, Illustrative Learning Outcomes (LOs) of a specific Competency (C) given under a Curricular Goal (CG) will be presented to gain a comprehensive picture of the progression of learning which will take place in students across Stages and Grades.

Further zooming in, the Curricular Goal is selected from a specific form of work and for a specific vocation for a better clarity.

9.5.2.1 Middle Stage

Form of Work: Engaging with Machines and Materials

Curricular Goal 1 (CG-1): Develop basic skills and allied knowledge of work and their associated materials/procedures

Competency 2 (C-1.2): Approaches tasks in a planned and systematic manner

Table B-9.5-i

	A	B	C
	Competency: Approaches tasks in a planned and systematic manner		
	Grade 6	**Grade 7**	**Grade 8**
1	Demonstrates appropriate stepwise process for completing the given task	Demonstrates appropriate stepwise process for completing the given task	Attempts to predict resulting colour when two colours are mixed (e.g., blue and yellow makes green, or red and white makes pink)
2	Develops time-based plan for completion of task	Develops time-based plan for completion of task	Develops time-based plan for completion of task
	Engaging with Machine and Materials		
	Project: Wood Carving	**Project**: Tailoring a Uniform	**Project**: Let's (de)assemble!
	• Demonstrates appropriate stepwise process for carving a wooden spoon using relevant tools • Develops time-based plan for each sub-task of woodcarving	• Demonstrates stepwise process of stitching and tailoring a shirt • Develops time-based plan for each sub-task of tailoring	• Demonstrates stepwise process of assembling bicycle parts • Develops time-based plan for each sub-task of assembling bicycle parts

9.5.2.2 Secondary Stage

Form of Work: Engaging with Machines and Materials

Curricular Goal 1 (CG-1): Develop in-depth basic skills and allied knowledge of work and their associated materials/procedures

Competency 2 (C-1.1): Perform procedures competently through required tools/equipment

Table B-9.5-ii

	A	B
	Competency: Perform procedures competently through required tools/equipment	
	Grade 9	**Grade 10**
1	Describes what needs to be done to complete the task	Describes what needs to be done to complete the task
2	Develops detailed stepwise plan to complete the task	Develops detailed stepwise plan to complete the task
3	Identifies the tools/equipment required to complete the task	Identifies the tools/equipment required to complete the task
4	Demonstrates familiarity in usage of relevant tools/equipment	Demonstrates familiarity in usage of relevant tools/equipment
5	Completes the task according to plan	Completes the task according to plan
6	Demonstrates the task at the site of work	Demonstrates the task at the site of work
	Engaging with Machine and Materials	
	e.g., Demonstrate to cut and weld given material for making the object as per the design and specification *e.g., Demonstrate how to arrange bricks in different bonds (Stretcher bond, English bond, Flemish bond, Header bond, Stack bond). The bricks are arranged in the required formation uniformly for each of the bond up to 1 meter* *e.g., Demonstrate maintenance of lead battery and measuring of specific gravity*	

Section 9.6
Content

Content for Vocational Education will be selected at two levels. At the first level, a selection will have to be made of vocations within the forms of work (please refer to Section 13.2.3.1). At the second level, a selection will have to be made related to the specific tasks and understanding students will have to engage with.

9.6.1 Principles of Selection of Content within Forms of Work

The following principles are intended to inform content selection at the level of forms of work, that is, related to the vocations to be offered by the school.

a. **Content selected must be as locally as relevant as far as possible:** Students will better connect to the locally contextualised work and will be able to utilise the acquired skills and knowledge in their daily lives. Resource persons and sites for practice will also be easily available. They will have greater chances of local employment. For example, is a rural setup, for the different forms of work, (i) agriculture and livestock rearing, forest-related jobs; (ii) handling and repair of farm machinery, driving heavy vehicles for transport; and (iii) catering to primary health needs of community members, automotive services can be offered. In an urban setup, for the different forms of work, (i) floriculture, nursery management; (ii) handicraft work, welding, and casting; and (iii) hospitality and tourism, automotive services can be offered.

b. **Content should cater to students' aspirations:** Content must also enable exposure to vocations not practised locally and cater to their aspirations for potential employment in jobs other than available at that point in time. For example, students living in an urban setup are often not exposed to hands-on agricultural and livestock rearing activities, while students in rural contexts do not have much practical experience of Information and Communication Technology (ICT). The content selected should keep in mind the balancing act of exposure to different forms of work, while ensuring sufficient depth due to availability of certain workplaces close to the school.

c. **Content must be aligned to the expectations outlined in the NSQF:** Alignment to the NSQF will allow them to pursue further engagement with the vocation of their choice later in life, while offering recognition for employment. To enable this, chosen content in Grades 9 and 10 should progress into advanced offerings in Grades 11 and 12. For example, a student selecting livestock rearing in Middle and Secondary Stages must be able to pursue the vocation of livestock management. Similarly, a student studying beauty treatment should be able to progress into specialisations in makeup and hairstyling.

9.6.2 Principles of Selection of Content within Vocations

The following principles are intended to inform content selection at the levels of specific tasks and understanding that students will have to engage with.

a. **Content must be age-appropriate:** This will ensure that students acquire the required competencies as per their developmental stage and learning in other curricular areas. For example, a student of early Middle Stage cannot start working with building circuit boards before working with simple circuits.

b. **Content should be interesting and meaningful:** Content selected should allow for varied activities, with scope to critically observe processes, and offer challenges within the capability of students. For example, while students must follow the standard stepwise processes involved in farming, they must be able to enjoy and appreciate the process of a plant growing, observe significant changes that happen to a plant, and the natural and man-made factors affecting the growth of a plant. They must have a sense of achievement once the plant is ready for use.

c. **Content must instil respect for dignity of labour**: No particular work can be considered as a 'high level' work if each and every form of work is looked upon with equal respect and honour. The chosen content should also deal with the notions and beliefs associated with them, so as to give students a chance to explore different perspective as well. For example, they must realise the critical role each individual plays in any workplace – from the manager of a restaurant to a chef to the person who cleans the kitchen.

d. **Content must enable exposure to different aspects of vocations**: Students must get a comprehensive exposure of different kinds of work. For example, sometimes students do not need any exposure since they are already working (either with family members or through relatives and contacts) but need specific capacities in that work to be developed. For example, a student might know the use of digital media, but should also develop the capacity of gathering relevant information to improve processes. Another example is of a student who is working on the family farm; this student must understand the process through which produce from the farm reaches the market.

e. **Content must enable exposure to the ecosystem within which the vocation is placed:** Each vocation operates within its own ecosystem. This ecosystem is local, and also extends beyond a small geography. It also includes intangibles like relationship with clients, informal and formal codes of conduct, technical language, opportunities for improvement. For example, a tailor operates in an ecosystem comprising local suppliers of materials, technicians to help with machines, helpers to sew hems, etc, and clients. The larger ecosystem comprises farmers producing cotton, weavers, cloth mills, transportation, producers of design catalogues, websites offering technical advice, professional associations. Students must learn about both the local and larger ecosystems.

f. **Content must encourage students to develop and pursue specific interests**: Students should be encouraged to not just learn the skills of any work, but to develop curiosity to know how the work takes place in different contexts, why and how tools and machines work, what will happen in the absence of these tools and machines, etc. Such exposure helps students select from the forms of work available to them. Once the preferred interest of vocation is chosen by the students, the selected content should educate them on the gainful employment opportunities to contribute to the economy of the country as well. For example, student choosing to be in the automotive services should be aware about the place of this service in the world of work (such as in local shops, transport business, vehicle service centres).

g. **Content must provide hands-on exposure:** The essence of Vocational Education lies in the work being done practically. The relevant content, when it exposes students to multiple modes of hand-on tasks, enables them to attain mastery. For example, a student with no or minimal hands-on exposure to the work of carpentry will not be able to evaluate the quality of a finished product.

9.6.3 9.6.3 Illustrative Content, Materials and Tools

9.6.3.1 Content for Different Forms of Work across Stages

The content indicated for each Forms of Work in the Table below is illustrative.

Table B-9.6-i

	A	B	C
	Progression of Illustrative Content in Different Forms of Work across the Middle and Secondary Stage		
	Forms of work	**Middle**	**Secondary**
1	Life and Nature	• Soil Management and basic earth work • Different Agricultural/Horticultural practices	• Nature friendly farming • Nature Conservation/ Restoration • Nursery Management • Livestock rearing
2	Machine and Materials	• Handicraft work using materials like paper, wood, clay, fabric, paints, inks etc.	• Tailoring • Carpentry • Welding and casting • Pottery • Local arts
3	Human Beings	• Aptitude to communicate • well and work in teams • Basics of Healthcare and Hospitality • Basic ICT and Technological skills	• Healthcare • Electrical work • Automotive service • Sales and Marketing • Hospitality and Tourism • Intermediate ICT and Technological skills

9.6.3.2 Materials and Tools

Illustrative materials and tools can be used for different forms of work. Some are easily available in the local community, while some are hard to reach, thus requiring external support. The Table below indicates materials and tools segregated as per the forms of work.

Table B-9.6-ii

	A	B	C
	Illustrative Materials and Tools used in Different Forms of Work		
	Forms of work	**Materials**	**Tools**
1	Life and Nature	Naturally sourced Materials: Soil, manure, water, fodder, plants etc. Other Materials: Chemical fertilizers, pesticides, etc.	Axe, shovel, hand cultivator, spade, tag applicators, watering troughs, feeding troughs, etc.
2	Machine and Materials	Tailoring: Thread, needle, fabric, scissors, cutters, marker chalk, tape, paper etc. Carpentry: Wood, nails, screws, glue, sand sealer, plywood, etc.	Tailoring: Sewing and stitching machine Carpentry: Saws, grinders and chisels, hand planer, grinding machine, moulders, etc.
3	Human Beings	Healthcare: Medical instruments, scrubs, medicine list, health record, etc. Hospitality &tourism: Hotels, food, beverages, vehicles, etc. Sale & Marketing: Brochures, websites, catalogues, videos, etc. Electrical work: Electrical wire, cables, switches, connectors, etc. Automotive service: Steel, aluminium, copper fibres, rubber, etc. ICT: Hardware materials such as motherboard, CPU, mouse, etc. Software materials: Electronic storage media, Informative tools such as internet, drive, etc., Constructive tool such as MS Word, PowerPoint, etc.	The intrinsic tool to interact, empathise, show humility, serve, repair, and follow procedures to utilise the materials effectively.

Section 9.7
Pedagogy

Knowledge, capacities, and values related to Vocational Education are acquired through consistent practice of doing and exposure to on-site work. Students must be able to experience actual workplaces and meet people in these workplaces. They must have opportunities to discuss their experiences and reflect on their own learning.

9.7.1 Principles of Pedagogy

The following pedagogic principles need to be considered across the Middle and Secondary Stages:

a. Pedagogical approaches must include a mix, with focus primarily on inquiry, hands-on experiential learning, group work and the didactic approach (instructions and demonstration).

b. Students must engage with both theory and practice.

c. Learning should take place in the context of real life as much as possible.

d. Pedagogical approaches must be inclusive.

9.7.2 Pedagogical Principles in Action

9.7.2.1 Pedagogical Approaches

A combination of inquiry, hands-on and didactic (instructions and demonstration) approaches will primarily be used for Vocational Education.

Students should be able to inquire into work-related processes and factors affecting them. The Teacher could ask students to explore questions that relate to their context. For example, in the Middle Stage, students could be asked "Which plants in your surroundings needs the highest amount of sunlight and water intake (Engaging with Life and Nature)?" or "Have you observed how the doctors and nurses behave with patients and their attendants, and why do you think they behave like that (Engaging with Human Beings)?" These questions could progress to more complex work-related questions at the Secondary Stage. For example, students could be asked to compare alternative ways of performing a task such as irrigation or the reasons for differences in payment to the farmer and cost to a customer for farm produce.

Teachers must ensure that these inquiry-based tasks lead to a productive discussion so that students develop interest in the selected content and develop curiosity to further explore that vocation.

Group-based activities are useful for all forms of work. For example, students exploring the forms of work related to Engaging with Human Beings can be given group-based activities as it helps in better understanding and awareness of the nature of people and quality of services. For students exploring the forms of work related to for Engaging with Nature and Life, and Machine and Ma-

terials, some tasks require multiple types of activities. Working together helps students learn how to coordinate and use each other's strengths. Teachers must think carefully about the size of groups formed and the competencies they want their students to develop. Care must be taken that all students are included for participation, and no one based on genders or disabilities should be excluded.

The demonstration of tasks plays a significant role in Vocational Education. Students can observe how tasks can be done. They can discuss alternative ways of doing the task and come up with an explanation of why the task was done in a specific manner.

The crucial part for all pedagogical approaches is that the Teacher must give students time for trial and error, and for finding the optimum approach to tasks.

Another important aspect is to provide opportunities for consistent practice, to enable students to find the way they are able to work efficiently.

9.7.2.2 Mix of Practice and Theory

The Teacher must plan a judicious mix of theory and practice – the proportion of hands-on work must be higher than that for theoretical understanding. As far as possible, learning from other curricular areas should be referred to while developing a theoretical understanding. For example, conceptual understanding from Environmental Education in the Secondary Stage can be taken to sensitise students of the environment and life forms around them, which will eventually help the students in field of practice engaging with livestock and agriculture.

In the Middle Stage, focus will be on not just the knowledge of the selected vocation but also the broader knowledge of the domain (e.g., if students are preparing to work as a Nursing Assistant, then the domain will be healthcare), and its place in the world of work.

Students must be able to apply basic skills related to the vocation, while being under consistent supervision. They could take up internships at carefully selected workplaces.

In the Secondary Stage, the proportion spent on practical application must be greater. Students must also build an in-depth understanding of the place of the vocation in the world. At this Stage, apprenticeships can be offered to students, under the guidance of Resource Teachers/Master Instructors in nearby facilities where the chosen work is practised.

9.7.2.3 Learning as Close to Real Life as Possible

Pedagogy of vocational education will require different sites to ensure opportunities to learn in real life contexts. While this is not always possible, pedagogical approaches in the classroom must also align to real life.

9.7.2.3.1 In the classroom

Teachers must ensure learning experiences are as authentic as possible. Real life-based case studies on human interaction, behaviour and the provision of services can be used. Videos/films can be used to understand work in areas different from the one the school is situated in. For example, while students in a rural school can collaborate with the nearby PHCs, students in urban schools can be given exposure to the audio-visual contents showing the functioning of PHC healthcare workers. The reverse can be done to show rural students how big city hospitals work.

9.7.2.3.2 Exposure visits and follow up

Exposure visits to nearby hospitals to understand the roles and responsibilities of nurses and healthcare workers, or to nearby factories, cottage industries can be organised with specific objectives in mind. Students must get an opportunity to engage with persons in these workplaces, and Teachers could organise follow-up visits as well as visits from Resource Persons to reinforce learning.

9.7.2.3.3 Workshop setups in schools

The forms of work in the curriculum all require space with a workshop-based setup. For example, for a basic tailoring session, a workshop can be set up in the schools in collaboration with the community tailors; ICT training can be given by a qualified computer graduate in the school premise provided basic computers and Internet connectivity are available.

In the Middle Stage, such a set-up can be created within the school premises for selected work forms, even if it is not as comprehensive as in an actual place of work. For example, a food processing unit, a computer laboratory, a fabric unit, a machinery unit could be setup depending on the local context, and support from relevant stakeholders, including members of the community who will act as Resource Persons.

Teacher's Voice B-9.7-i [To be edited]

Woodcarving

Objective: Carving a square on a piece of wood

Skills: Holding a chisel (feather-hold and full-fist hold), using a chisel at different angles to the wood, and using a mallet

Materials: Piece of carving-worthy wood (here – recycled construction material, Burma teak), sharp flat chisel, wooden mallet

Description of activity:

It was a regular morning with the sun beaming into the woodwork shed. 11-year-old voices and footsteps drew closer and scrambled quickly into the large workspace through the shed's short corridor.

Bright expectant pairs of eyes shone from ten heads, six girls and four boys. Some began scanning all the tools and waste wood material in the room. Finally, they laid their eyes on the small square pieces of recycled teak wood, chisels, and mallets placed before them. These were arranged at a two-plus feet distance around the large central table and on two other smaller tables in the corners of the shed.

"Hi. Welcome to your first woodwork class!" I beamed with enthusiasm. "Are you all excited and looking forward?"

Some nodded a yes vigorously and others replied with a resounding "Yaa!"

"Let us get to working immediately then. First, let us think of five rules of safety before we start with woodcarving".

"We cannot touch any tools" was the fastest reply.

"... and can't run around in the shed"

"We can't play with materials and must treat them properly"

"We can't hit each other with the hammer!" (The whole group broke out into giggles)

"Yes, please! Do not hit each other with anything for that matter!" I grinned back. "What else?"

"We can't work here without you being around?" was the last. Some general silence followed.

"Good. So let us agree to the following five basic rules:

No running around in the shed

No playing with the tools, but you are allowed to observe and touch them

For now, you can come to work in the shed only when I am around

You will all learn to set up and put away materials for every class

You will keep your footwear on and be alert when you are moving around in the shed

And most importantly, observe closely, listen carefully, and follow instructions obediently!"

Muffled giggles, "That is six rules!"

"Yes, and we will have many more along the way..." I smirked.

"First let us start with the most basic tools we will use for the next few classes in woodcarving. This is a handle-less flat chisel, this is a semi-curved chisel, and this is a wooden mallet. This is a clamp to hold the wood down to the table, and this is a piece of wood you will start working with."

"What wood is this? It smells dusty" a curious face checked in.

"This is Burmese teak that was once used as part of a village house around here. We are recycling. I got the salvaged wood cut to small squares at the local sawmill."

I continued, "We are first going to practise the action of holding a chisel and a mallet. Please pick up the flat chisel with your non-dominant hand and the mallet with your dominant hand."

"Now, there are two ways you will try holding the flat chisel. Let us call the first hold the full-fist hold like this... (demonstrated) and let us call the second hold the feather hold, like this... (demonstrated)" I gave them five minutes to experiment with the holds. They were quite engrossed.

"Try using the wooden mallet and strike gently on the head of the chisel, like this... (demonstrated). You will learn how much force you will apply while striking along the way."

"Yeah...otherwise the wood will break!" one of the girls surmised.

"You are right..." I acknowledged. Also remember, you must explore the angles at which you will hold the chisel against the wood. A ninety-degree angle will push the chisel deep, like this...(demonstrated), and a less-than-ninety-degree angle of the chisel to the wood will drive the chisel diagonally, like this...(demonstrated), and a very low degree, say ten-degree angle, will do something different which you shall find out..."

They all looked in silence, rather attentively.

"For today we will explore how to carve out a small square in the wood in front of you. You will have to use many angles of the chisel to the wood and different amounts of force in your mallet striking."

"When you feel that your chisel is stuck or is digging into the wood in a way you did not intend, stop and call out to me. I will show you what the 'grain' of wood means and what happens when you go against the grain."

"Please approach your pieces of wood and show me how you will start working with the chisel and the mallet without actually doing it first." They all follow instructions and mime the action of holding the chisel at ninety degrees off-centre on the square piece of wood, with a fist-hold and mallet striking a couple of times.

"You may start now, but slowly. Don't be in a hurry, please…" I declare.
"But what about the semi-curved chisel?!" asked an exasperated boy.

9.7.2.3.4 Internships

In the Middle Stage, students can actually participate in real workplaces. For example, students can spend a few days as interns in institutions near the school, such as hospital, restaurant, police station, post office, industries, local gym, beauty salon, local poultry or dairy farm, local nursery, parks, and shops. They could spend a few hours in small groups over a period of a few days. Teachers must be closely involved and ensure detailed discussion on all aspects of student experiences.

Box B-9.7-i

Internship

Internship is a short duration placement in a workplace to learn about a specific job role. NEP 2020 emphasises the importance of internship, 'All students will participate in a 10-day bagless period during Grades 6-8 where they intern with local vocational experts, such as carpenters, gardeners, potters, artists, etc. Similar internship opportunities to learn vocational subjects may be made available to students throughout Grades 6- 12, including holiday periods'. (Para 4.26)

Internship enables students to experience a workplace environment that cannot be simulated in a classroom. They can observe and put forward questions to adults who are working at different jobs. This 'real' experience provides students to explore and decide whether they would like to take up the related vocation for further study. It also helps them identify the values and dispositions relevant in the workplace.

Students must have opportunities to engage with work that is aligned to their current capacities. A comprehensive orientation of both students, and the individuals at the workplace will be required, with regular follow up discussions. Members of the workplace will have to be sensitised to ensure safety of students – physical and emotional.

Specific examples of workplaces where this internship can take place are:

- *Engaging with Life and Nature – poultry, dairy farms, pest control units, nursery.*
- *Engaging with Machines and Materials – local mechanic workshops, carpentry workplaces, tailoring units.*
- *Engaging with Human Being – hotels, restaurant, hospitals, gyms, old age homes, beauty salons.*

Assessment could be in the form of a reflective note, and/or presentation at the end of the internship. Students could also do a short project during the duration of the internship.

9.7.2.3.5 Apprenticeships

In the Secondary Stage, students will need to be given advanced on-site exposure in industrial/ agricultural spaces to broadly understand the functioning of vocations in the world of work. Schools must develop linkages with local industries, farms, service centres, cooperatives, relevant NGOs, state transport corporations, cottage industries, printing presses, call centres, software design companies, mobile operating companies, law companies, local water/electricity boards, etc to enable students to spend part of their time gaining work/ practical experience at these facilities as apprentices while they are still in school.

Box B-9.7-ii

Apprenticeship

Apprenticeship involves on-site work experience over a long-term period to gain experiential skills and knowledge under the supervision of a mentor. Apprenticeship in the Secondary Stage will enable students to gain capacities to enter the workplace after completion of schooling, or help them decide whether they would like to pursue a specific vocation.

Apprenticeship enables hands-on practice at on-site locations. Students develop an understanding of the culture, values and dispositions, and vocabulary of the workplace, and factors that affect functioning. They can develop a portfolio of their work to demonstrate their readiness for gainful employment.

Mentors will be experienced workers, with the ability to engage with students. They will need to undergo a short course offered at the DIET/BITE that will prepare them to be effective mentors.

A detailed design for the apprenticeship will have to be put in place. Modes could include apprenticeship of about a month and a half during the summer vacation. Alternatively, students could spend 2 hours after school hours a few days a week.

Assessment could be through demonstration of work by students, or a portfolio maintained during the apprenticeship. This should also include observations of students by the mentor.

9.7.2.4 Inclusive Pedagogy

One of the fundamental principles mentioned in NEP 2020 is equity and inclusion to ensure that all students are able to thrive in the education system. In Vocational Education, all students should be given equal access in terms of working with tools and resources. Care has to be taken with tools and materials that are to be carefully used, such as scissors, needles, etc. The level of working and supervision will depend on the learning needs of students. The Teacher will have to ensure the comfort of the students, to ensure all students participate.

Teachers must ensure no discrimination takes place towards students having disabilities or towards students from specific genders or socio-economic backgrounds, not only in the school premise but also at external workplaces by other students, external trainers, or associated stakeholders.

Schools must coordinate with Resource Centres having special educators to meet the rehabilitation educational needs of learners with severe or multiple disabilities. An understanding of how to teach students with specific disabilities (including learning disabilities) must be an integral part of all Teacher education programmes.

Rigid gender roles still exist in society. Awareness must be built among stakeholders that the capacity for doing any work is independent of gender. Training modules for Teachers as well as Resource Persons/Master Instructors will need to address this aspect. For example, a boy is capable of working as a nurse, and a girl is capable of working as a welder.

Section 9.8
Assessment

9.8.1 Overall approach

a. Formative assessment at this Stage will be done by the Teacher as well as a Resource Teacher/Master Instructor or mentor in case of apprenticeship or internship; coordination will be necessary between them and Teachers to ensure valid and reliable assessments as well as to ensure the results are used meaningfully

b. Summative assessment will need to be done periodically. For example, at the end of a short period spent doing a specific task or at the end of a specific interval of time.

c. Maintenance of a portfolio of work (for examples, products, photographs of products, reflective notes) as well as an exhibition of student work can also be approaches for formative and summative assessment, respectively.

d. Weightage of 75% could be given to performance of tasks and 25% to evaluation of theoretical understanding in a summative assessment.

9.8.2 Formative Assessments

a. Formative assessment at this Stage will be done by the Teacher as well as a Resource Teacher/Master Instructor or mentor in case of apprenticeship or internship; coordination will be necessary between them and Teachers to ensure valid and reliable assessments as well as to ensure the results are used meaningfully.

b. Maintenance of a portfolio of work (for examples, products, photographs of products, reflective notes) can be used for formative assessment.

9.8.3 Summative Assessments

a. Summative assessment will need to be done periodically. For example, at the end of a short period spent doing a specific task or at the end of a specific interval of time.

b. An exhibition of student work can also be used for summative assessment.

c. Weightage of 75% could be given to performance of tasks and 25% to evaluation of theoretical understanding in a summative assessment.

Section 9.9
Enabling Conditions

9.9.1 Teachers, and Master Instructors/Resource Persons

While schools offering Vocational Education have successfully employed professionals, formal structures, and processes for preparing teachers for all grades and vocations are still to be put in place.

Therefore, till such time these programmes are available, Teachers of other subjects will have to teach Vocational Education in the Middle Stage, with support from Resource Teachers, also referred to as Master Instructors in NEP 2020. For instance, women from the Madhubani District of Mithila region in Bihar can be invited to schools to help students learn about and to create Madhubani paintings. However, the Secondary Stage will demand specialisation in specific vocations.

NEP 2020 proposes that *"Special shorter local teacher education programmes will also be available at BITEs, DIETs, or at school complexes themselves for eminent local persons who can be hired to teach at schools or school complexes as 'master instructors', for the purpose of promoting local professions, knowledge, and skills, e.g., local art, music, agriculture, business, sports, carpentry, and other vocational crafts" (Para 5.25).* Therefore, guidelines for preparing these Resource Persons/ Master Instructors will have to be developed by SCERTs, and appropriate modules developed by DIETs/BITEs.

The content of these short-term training courses must orient them not only to school pedagogy but the need for sensitivity and inclusion while interacting with students; they must also be aware of legal provisions related to school education.

It follows that the first step would be to create a pool of 'Master Instructors' locally on priority. These 'Master Instructors' have a very important role to play, since they will supplement the expertise of the regular teachers. These Master Instructors maybe artisans (rural and urban), health practitioners, mechanics, technicians, farmers, folk artists, local entrepreneurs, persons involved in poultry farming or fishing, persons retired from the defence services, IT professionals, beauticians, etc They can be brought in as guest faculty, and can either impart knowledge of both theory and practice in their respective vocations or provide only practical training, as the case may be. In cases where specialised practical training is being provided to students outside schools, external instructors can also be brought in to teach the theoretical aspects along with mentors at the workplace.

Student internships and apprenticeships must take place in the workplace these Resource Persons/Master Instructors are associated with.

Schools must assist these Master Instructors to become comfortable in an academic environment, to handle students, and to comply with broader definitions of curricular and assessment frameworks in their work, through the short-term training courses provided at the DIETs/BITEs or the school/ school complex itself.

9.9.2 Conducive Space and Resources

The support of the community can also be taken to borrow materials and tools for use in schools. For example, agricultural or nursery tools can be taken from the local farmers or nurseries for a brief period of time to grow plants in the school grounds.

Relevant exposure of machines and equipment will also be required for students to apply the skills and knowledge acquired. Collaboration with the local shops and industries (e.g., art galleries, carpentry and automotive shops), nearby farms and nurseries, hospitals, and tours and travels businesses (e.g., healthcare, tourism and hospitality, automotive service) will help provide necessary exposure and learning to understand the relevance of the vocation in the world of work.

A skill lab can be set up in schools to provide a 'real work' environment for students to work at. These skill labs can also be accessible for nearby schools to utilise. By channelling the investment of governments and CSRs, conducive spaces can be formed, even at remote locations.

9.9.3 Safety Considerations

Safety considerations related to Vocational Education involve both the physical and emotional safety of students.

Physical safety relates to the use of equipment that has the potential to harm students, as well as the need to move out of school to experience real life work. Emotional safety relates to protecting them from exposure to sights that may distress them, as well as the sensitising persons who will interact with them within and outside the school.

Forms of work involving the use of materials and complex tools need to be first instructed and demonstrated by the Teacher. The Teacher must indicate the necessary precautionary steps. Correctly holding the tools (e.g., while using shovel, needle, cutters) while performing a task can prevent injury, and also help create efficient products. Students should also be encouraged to take care of the tools and materials, and not use them for fun or to tease fellow students with. Teachers will have to be very observant of students' practices with the tools and materials so as to guide them appropriately.

Exposure visits, internships and apprenticeships will have to be carefully planned in consultation with parents/guardians to ensure safe transit between school, home and workplace. Preferably, a Teacher should accompany students of the Middle Stage when they go for internship; if not possible, then a volunteer from the community can accompany the students. It is even possible for Secondary Stage students to be apprentices at the same place to assist Middle School students.

All Resource Persons/Master Instructors as well as other employees must be sensitised and be aware of legal provisions related to safety of students. Teachers must be in regular contact with them to discuss any challenges they may be facing related to students. DIETs/BITEs must also develop follow-up modules for Resource Persons/Master Instructors based on an analysis of their needs.

9.9.4 Conducive space for students with disabilities

Assistive devices and appropriate technology-based tools must be made available to help students with disabilities integrate more easily into classrooms and engage with Teachers and their peers, in addition to textbooks and manuals in Braille or audio-visual formats.

Collaboration with specialised agencies like the National Association for the Blind (NAB), National Institute for Visually Handicapped (NIVH), and other institutions to design and customise vocational education courses across stages for school education can be ensured by NCERT. A similar approach can be done for placing students for employment.

9.9.5 Textbooks and Manuals

Textbooks and manuals will have to be developed for the Middle and Secondary Stages. These textbooks and manuals, written in the language of instruction with comprehensible text and pictures, must be contextualised to locally prevalent vocations. They must detail the conceptual and procedural knowledge of the vocation. References to the theoretical concepts from other curricular areas, where and when needed, must be added.

These textbooks and manuals must be available in Braille, along with audio-visual and online content for maximum accessibility and inclusion of students. Development of textbooks and manuals will have to be done by the SCERT, assisted by the Pandit Sunderlal Sharma Central Institute of Vocational Education (PSSCIVE).

9.9.6 Time

Vocational Education in the Middle Stage should be given at least 2.5 hours per week of time while it can be increased to 3 hours per week in the Secondary Stage. This time should be available in blocks, especially since Resource Teachers/Master Instructors can spend specific time periods with students, to be followed up by Teachers of other subjects. Additional periods during Grades 9 and 10 can be utilised for student who want to follow a special interest.

Chapter 10

Secondary Stage – Grades 11 and 12

Section 10.1
Introduction

By the time students reach Grade 11 in schools, this NCF would have provided to all students breadth of learning across curricular areas.

These curricular areas are expected to give students a well-grounded understanding of the world and develop their capacities to use this understanding to make well-informed choices and act upon them.

This breadth of exposure to all students enables them to decide on the disciplines they would like to study deeper in class 11 and 12.

The NCF requires students to study deeper in a minimum of four disciplines spread across a minimum of three curricular areas to graduate from school. The choice of these disciplines would depend on the preliminary understanding of the discipline, students' interests, and their career choices. The minimum of three curricular areas ensures that the students at the school level do not make very narrow choices that result in premature hyper-specialization without a fuller understanding of different forms of knowledge.

Each discipline is expected to offer four courses which together have adequate depth to give the students an introduction to the discipline in terms of the key questions and concerns addressed by the discipline and the methods of inquiry specific to the discipline. With these introductions, students can make informed decisions about their choices in higher education and working life.

The richness of the all disciplines is such that such a '4 course deep introduction' can be designed in many ways, each equally valid and appropriate. This chapter gives designs of the four courses in a few disciplines in each curricular area.

This chapter does not cover all disciplines. Curriculum developers would need to choose the disciplines that would be offered in the relevant schools, which would have to take in to account practical considerations such as availability of teachers.

Then the (minimum) of 4 courses would have be developed on the basis of:

a. Giving adequate breadth of key conceptual structures that are fundamental to the discipline. These have to be chosen based on the contemporary paradigms of the discipline. For e.g., rather than looking at biology as not merely a descriptive and observational study of botany, zoology, and physiology, shifting to a more analytical study of molecules, organisms, and ecologies would be more appropriate.
b. Giving appropriate depth into the methods of inquiry that are specific to the discipline.
c. And, in the case of interdisciplinary areas, vocational education, arts, and physical, a set of four courses which would introduce a particular domain within these areas with adequate breadth and depth.

Section 10.2
Humanities

In the Humanities curricular area, programmes for Philosophy, and English Literature have been illustrated.

10.2.1 Philosophy

10.2.1.1 Principles for Course Design

Philosophy is commonly thought of as a discipline that requires students to memorise the thoughts and ideas of people who lived in centuries past. However, such an approach fails to deliver crucial learning outcomes such as critical thinking and problem-solving. The focus, of this programme of study, is the acquisition of tools and skills that can then be used in a variety of contexts, both academic and extra-academic. The set of four courses together aims to create independent thinkers who have a clear understanding of and grounding in the local context and are able to, at the same time, apply abstract ideas to a range of concrete contexts, locally and globally. The philosophical toolbox offers tools that allow for lifelong learning.

Each of the courses below takes a comparative approach, rooted in Indian thought and the Indian context but also encouraging dialogue between different traditions and time periods. These courses will allow students to see how ancient ideas can shed light on current problems. They will also be able to see how solutions from one context can address problems from another context. Such an approach requires not only thinking critically but thinking creatively, imaginatively and innovatively.

The pedagogy for each of these courses will be inquiry-driven and learner-oriented and will require students to constantly apply the ideas they are being introduced to. These courses are also best taught through a dialogical approach which will help students learn to cooperate with one another as well as to have a more active and critical approach to the material that is being introduced to them.

The focus on Indian philosophy is important for students to understand and appreciate the rich traditions of Indian philosophical thought, something which Western world has only recently started to become cognizant of. The ideas found in these ancient texts, many of which have still not even been translated, are also still under debate in contemporary philosophy the world over. We will study classical Indian philosophy not only for its own sake but also because it can often shed new light on contemporary issues. Our focus will also not be limited to classical Indian philosophy but will include important modern Indian thinkers from the 20th century, many of whom themselves attempt to synthesize ancient Indian and later Western ideas.

Such a programme of study should prepare them well for higher education as well as, eventually, for a range of careers. The focus is, furthermore, not only on cognitive capacities but also on the development of an ethos that will allow our students to become better citizens. Courses like ethics and environmental philosophy are crucial for the development of this sensibility.

There will be three compulsory courses followed by a choice between three electives for the fourth one. The choice of the fourth course will depend on the students' interest as well as other courses they may be taking in other disciplinary areas.

10.2.1.2 Illustrative Courses

Course 1: Reasoning

This course will introduce students to the philosophical toolbox that they can then use in a range of other subjects as well as in their everyday lives. The focus will be on different kinds of reasoning, both formal and informal. We will draw on the rich tradition of Indian logic using ideas from texts such as the *Vaiśeṣika-sūtra, Vārṣagaṇya's Ṣaṣṭi-tantra,* and *Akṣapāda's Nyāya-sūtra.*

Students will learn to identify, reconstruct and evaluate arguments. They will learn different techniques for responding to arguments and, in so doing, will also learn how to participate cooperatively and constructively in debates. These are not the kinds of competitive debates that students are usually exposed to in schools but are, rather, based on the classical Indian model of vaada: rigorous debate but with a focus on cooperation rather than competition.

Students will be introduced to formal (deductive) reasoning through propositional calculus. This will help them learn, e.g., what is wrong with this argument: Students will pass the course only if they study hard; Anand studied hard; therefore, he'll pass the course. They will also be introduced to probabilistic reasoning and learn how the probability of the premises of an argument being true constrains the probability of the conclusion being true.

Finally, they will study inductive reasoning with a focus on arguments from analogy and inference to the best explanation. Inferential arguments are used not only in the modern sciences but are also found in works such as the *Yogācāra-bhūmi-śāstr*a. Arguments from analogy are very common in everyday reasoning and students will learn about these both from examples taken from their own lives as well as from texts such as Nagarjuna's *Mūla-madhyamaka-kārikā* which abound with arguments from analogy.

Course 2: Knowledge and Scepticism

This course will be based on the classical Indian theory of knowledge, *pramāṇa-śāstra*, which is concerned with the idea of *pramāṇa* – how we come to have knowledge. We will explore the three main candidates for pramā□a put forward by these ancient thinkers – perception, inference, and testimony – by putting them into dialogue with later voices in Western philosophy as well as contemporary issues. The focus will be on perception and testimony since inference will already be covered in the course on Reasoning. This course will show how ancient ideas can help us think better about current problems.

How do we come to know anything at all? And how can we be certain of what we know? We live in an age where it seems that knowledge can be accessed by anyone with a smartphone – but is this real knowledge? The course will begin with the sceptical challenge to knowledge put forward by *Advaita Vedānta, Cārvāka*, and Buddhist thinkers.

The puzzle about problems around perception will be explored. The main puzzle here is whether the objects of perceptions are internal to the perceiver, as *Yogācāra* subjectivism has it, or external to them, as *Kumārila Bhaṭṭa* argues in his commentary on the *Mīmāṃsā-sūtra*. Furthermore, how can we distinguish illusions from veridical perceptions? A lively debate between *Prābhākara Mīmāṃsā* and *Nyāya* will help in getting a firmer grasp on this problem.

The course will end by focusing on the problems of trust, testimony, and expert knowledge. How do we know whom to trust when even experts can't agree on a given issue? How can we trust some witnesses as believable and others as not in a court of law? On what grounds can we judge that a given website or news source is biased?

Course 3: Ethics

This course will introduce students to ethical reasoning as a way of thinking about moral issues that they face in day-to-day life. This will help students understand ethical dilemmas by showing them normative ways of thinking about these issues. The goal, as with all the philosophy courses, is to give students the ability to be practical problem solvers and to find ways to think rigorously about moral problems that they might encounter in their everyday lives. In addition, students will be encouraged to think about what it is to live an ethical and virtuous life themselves.

This will be done through an introduction to ethical writing from both Indian tradition (Buddhist thought, stories from *Panchatantra, Jataka, Hitopadesh, Puruṣārthasiddhyupāya*) and the Western tradition. The focus will be on helping students understand what the moral thing to do is in a given situation. Students will be introduced to these issues through everyday issues like cheating, violence, plagiarism, littering, tolerance, equality, and empathy. Students will be expected to apply the tools introduced during the unit to these issues and analyse the relevant ethical dimensions. The focus of the course will also be on understanding different points of view on any given issue and how to understand and respond to different positions that can be held with regard to the problem. This will enable students to take a multi-perspective approach to ethical reasoning, where they will be encouraged to develop their ethical views on these issues in cooperation with each other.

The expected effect of this course will be to imbibe lifelong ethical thinking in students which should enable them to consider the ethical dimensions of various issues. A particular focus will also be to enable students to think about traditional Indian values, and values enshrined in the Constitution (such as *seva, ahimsa, swachchhata, satya, nishkam karma, shanti*, sacrifice, tolerance, diversity, pluralism, righteous conduct, gender sensitivity, respect for elders, respect for all people and their inherent capabilities regardless of background, respect for the environment, helpfulness, courtesy, patience, forgiveness, empathy, compassion, patriotism, democratic outlook, integrity, responsibility, justice, liberty, equality, and fraternity) from an ethical point of view.

Course 4: Elective

The three core courses on reasoning, knowledge, and ethics develop the basic foundations for philosophical thinking. With this foundation, students can apply their philosophical thinking to specific problems in philosophy. Students can choose one of the many electives that can be offered to focus on one of these specific problems.

Elective 1: Philosophy of Mind

What exactly are we? What is the nature of the ātman? This was, along with questions about knowledge-acquisition, one of the most divisive questions in classical Indian philosophy. On the one hand, we have substance dualism, represented in the Upani□ads and in the texts of the

Nyaya-Vaiśe□ika Darśana, according to which the self is an eternal immaterial substance. On the other hand, we have materialists, such as the Lokāyata Darśana, according to whom the self is no more than a conscious body. Some Buddhists deny that there even is such a thing as the self and argue that this illusory belief in ātman is the source of all suffering. In the contemporary context, these debates about the self end up being debates about personhood, the mind, and the brain. In this course, we will, once again, see how these ancient debates about the self can help us think about current issues around the mind, consciousness, and artificial intelligence.

We'll look at a range of arguments for various positions on what the mind is: something immaterial existing separately from our bodies, a very sophisticated computer software, etc. We will then look at the question of whether individuals other than human beings have minds. Possible candidates for this are not only sophisticated computers and robots but also non-human living beings like animals. The Jainas believed that there were many kinds of jīva much as some philosophers today argue that it is not only humans who have minds. What are the implications of such a view? How might cyborgs (persons enhanced by artificial body parts) fit into the picture? Given how intertwined human lives are with technology, might it make sense to think of ourselves as cyborgs already? Throughout, we will focus on arguments for and against each of these views as well as thinking about the social and ethical implications of these various stances on the nature of the mind or self.

Elective 2: Environmental Philosophy

Who is to blame for climate change? What exactly is the loss of biodiversity, and why is it bad? Is damage to the environment bad only because of its effects on humans, or does ethics reach beyond humanity? How should we change our political systems to take into account the rights of non-human animals? Is a carbon tax unfair to developing countries? The goal of this course is to use concrete case studies in order to think abstractly about these broader environmental issues. By the end of this course, students should have an idea of potential families of solutions and answers as well as an understanding of how to adjudicate between these.

A significant part of the course will be dedicated to the understanding of Indian and western philosophical perspectives on the environment. Students will be introduced to classical Indian environmental ideas from *Vedas, Upanishads, Charak Samhita, Matsya Purana, Panchtantra, and Jataka*. This will be supplemented by the modern Indian environmental philosophy of Gandhi, and Amartya Sen, as well as a close study of grassroots environmental movements like the Chipko Movement, Green Revolution, *Navdanya*.

While the study will be grounded in these local ideas and movements, abstract concepts will be used to get clarity on terms that are often used and sometimes misused by climate activists, scientists, and policymakers. For example, the course would attempt to get clarity on what exactly 'climate justice' entails. While acknowledging the importance of sustainability, protecting biodiversity can be at odds with something like green energy and, if so, what are possible solutions to this problem?

These different conceptualisations and their analysis will enable students to answer questions about the rights and status of non-human living beings, the status of ecosystems, the

sustainability of the environment, how to deal with the crisis of climate change, and whose responsibility it is to mitigate the effects of climate change. The problems and questions that this course addresses are at the foundations of environmental science and environmental economics and also draw on environmental history. This course will be well suited to students with a broader interest in environmental issues.

10.2.2 English Literature

10.2.2.1 Principles for Course Design

The English Literature discipline hopes to foster in students both critical and creative skills, and a deep love for literature in all its variety. Keeping in mind the challenges of studying English in the Indian context, students will encounter a breadth of literary texts from across India, many of them translated from Indian languages. Literature is the material means, the 'subject-matter content', for fluent oral and written communication. Immersion in the English language is an important focus of the Literature discipline.

The courses will primarily be transacted through activities, encouraging students to engage with literature in a variety of ways. Students will learn to exercise their critical skills in listening, speaking, reading, and writing. These exercises will build up capacities by increasing in depth and complexity over the four semesters. Writing will be a crucial component, used to help students engage with and understand the language and the formal aspects of the texts; it will also be used as a tool for creativity and self-expression. All courses will have a significant project component, where students will learn to apply different capabilities in their study of literature, including reporting, conducting interviews and surveys, and writing reviews. While the courses in the discipline focus primarily on written texts, students choosing English Literature will be able to extend their critical and creative skills to other textual forms.

The courses will offer reading selections grouped around possible themes of interest to secondary school students, including young adult and school life, environment, magic and wonder, science fiction, and nature.

10.2.2.2 Intended Learning Outcomes:

a. Read literary texts closely.

b. Identify the formal features of literary texts.

c. Demonstrate the ability to interpret texts.

d. Acquire creative and critical writing skills.

e. Cultivate a literary sensibility by engaging with a range of texts from diverse contexts.

f. Appreciate the richness and diversity of India through literary and cultural texts.

10.2.2.3 Pedagogical Approaches

Classes will be centred on reading, speaking and writing activities. Students will be invited to bring to class texts they find interesting and speak about them. These will include texts originally written in languages other than English.

The pedagogy will be a mix of teacher-led and active-learning approaches. It will be mindful that engaging with literary works in the classroom serves multiple functions besides analysis, appreciation, and exam-readiness. To that end, reading, writing, listening, speaking, and other study skills (such as reference, note-making, note-taking, mind maps) will be folded in with activities such as reading aloud, quizzes, pre-reading comprehension, freewriting, imaginative world-building, re-writing and parsing, vocabulary games, skits, journaling.

10.2.2.4 Illustrative Courses

The courses listed here will introduce students to a range of literary forms, and acquaint them with texts from India and abroad, both in English and in translation. All the courses will have project components and writing activities. Students who complete four Literature courses will have a portfolio of writing in different forms and styles. The fourth course outlines a deeper critical and creative writing engagement with one of the forms

Course 1: Reading Literature

Reading Literature is the first course in the English Literature discipline. Like the other courses in English Literature, this course trains students to interpret texts and communicate their understanding orally and in writing. The course begins by alerting students to the variety of written forms that are a part of our world—ranging from classical literary texts to newspapers and WhatsApp messages. Students are then introduced to prose and poetry from different periods of time and diverse cultural contexts. They will learn to identify the formal features of texts and their thematic concerns.

The element of play is a key classroom practice. Individually and in groups, students will rewrite texts by changing words, settings, beginnings and endings to understand how meanings are produced.

At the end of this course students should be able to a) recognize the form of an 'unseen' written text and identify its features b) explain what its main themes are c) understand and use basic literary terms used in literary criticism.

Course 2: The Short Story and the Novel

At the end of this course, students should be able to:

a. Recognize the contours and conventions of a variety of narrative forms.
b. Demonstrate the ability to close read literary texts.
c. Demonstrate an understanding of the connectedness of literary forms.
d. Appreciate the richness and variety of non-western forms and the crucial role they have played in the development of the major western forms often emphasized in school syllabi.

The course will introduce students to the idea of human beings as fundamentally narrative creatures with an urge for "logical" conclusions and of storytellers as the first custodians of community histories. Students will read some examples of short story precursors like the jest, the anecdote, the parable and the exemplum as well as some of their non-western counterparts including the Indian katha and qissa. The class will then move on to folk and fairy tales and the fable in both western and eastern traditions. Students will proceed next to the short story in its modern avatar, examining how it has developed out of earlier forms and reading four or five examples

from various parts of the world. Among other questions, the class will inspect what fantasy means in the shorter genres, why realism came to take over the short story at a particular time, and why fantasy has made something of a comeback today. Students will then briefly learn about the history of the novel and read extracts from some early novels. Finally, the class will engage with a complete novel and analyze it in detail. Schools may choose between three or four title options.

Course 3: Introduction to Poetry and Drama

This course will focus on Poetry and Drama, aiming to:

a. Introduce students to key features of these genres and representative forms through a wide set of examples including works in translation;

b. Explore strategies of reading, understanding, and writing about poetry and drama, including an introduction to basic literary-critical/analytical vocabulary;

c. Help develop an appreciation of these forms in multiple cultures;

d. Enable deeper immersion into english language skills through literature;

e. Encourage students to express their ideas through their own written, spoken, sung and/or performed productions.

It is presumed that the students will have some experience working with literary texts in the classroom, including two preceding semesters of courses in literature. A direct engagement with the form, content and affect of the works themselves will be foregrounded over an author- and tradition-centric take on prescribed texts. Poetry-specific activities will direct students to note the relationships between words, sounds, affect, images and cultural contexts. Drama-centric activities will also include reflections on the continuity and differences between texts and performances, on performance traditions closer home, and on the many spaces of performance (theatre, radio, streets, marketplaces, religious spaces, festivities, television, film, performance art, sketches etc.) Apart from summative assignments based on course modules, students will also undertake group projects/performances.

Course 4: Reading and Writing: Poetry/Essay/Short Story/Drama

Occurring at the end of the student's school careers, this course will concentrate on one of four forms chosen by the instructor. These are forms that students would already have some familiarity with. Students who take this course will read more advanced texts in the form chosen and engage with them critically. Students will become familiar with the formal and structural elements of the chosen form, as well as with elements of its literary history and its adoption into different literary traditions in India and abroad. They will also engage in a series of writing exercises that will help them gain familiarity with the form on a practical basis and explore the possibilities it offers for their own self-expression. The course encourages students to take ownership of the chosen form and adapt it to suit their own contexts. The semester will culminate in a creative writing project where they will write their own stories, poems, essays, or plays.

Section 10.3
Social Science

10.3.1 History

10.3.1.1 Principles for Course Design

The primary objective of the History curriculum at the higher secondary level is to inculcate a historical sensibility about our past. While at the secondary level, students learn history as a part of the larger conglomerate of Social Science, they are not exposed to the disciplinary foundations, methodological tools, and comparative frameworks that mark a historical consciousness. This sequence of courses will ensure that students receive a strong grounding in the substantive content of Indian History while remaining aware of India's place in the world.

10.3.1.2 Illustrative Courses

Course 1: Ancient World

This course will take a comparative and methodological approach towards understanding the prehistory and early history of the Indian subcontinent in the context of other parts of the world. It will cover the earliest peopling of the Indian subcontinent, followed by the spread of agriculture in the fertile crescent and in South Asia, and the emergence of the earliest known cities and city-based civilizations in Mesopotamia, Egypt, and South Asia. The course will examine the ancient literary (mythological and religious) works produced in India, Greece, and Syria, as well as also cover the rise of new religions and philosophies in India and China. Methodologically, the course will introduce students to the basics of the archaeological and historical method and students will learn how to interpret early literary texts as well as material culture to produce a historical narrative.

Course 2: States and Empires in India

This course will introduce students to various kinds of large (and less large) and complex political formations (such as states and empires) in India from about the 5th century to the 16th century. The students will learn about the formation of more centralized state systems than those that existed in the previous periods, and critically examine the nature of these states, especially about the structures of power and levels of control over diverse geographies and communities. This course will also introduce students both to the widespread agricultural ecology and economy in India, as well as to the Indian Ocean trade networks as well as the overland trade routes such as the Silk Road to see how India was deeply connected to the rest of the world in these times.

Course 3: Towards Modernity

This course will introduce students to the emergence of modernity, both as a temporal period as well as a concept, especially in the context of Europe. The course will discuss the transformations to modern cultural, state, and economic institutions in Europe. In the cultural realm, Eu-

rope witnesses several key transformations, including the Renaissance and Reformation, the Scientific Revolution, Humanism, and the emergence of the nation-state. Economic aspects of modernity included the emergence of mercantilism and the concurrent search for the New World, the Industrial Revolution, and the spread of capitalism and colonialism. While the course will focus on key historical transformations in Europe, it will also consider the impact these transformations had on the rest of the world, especially in America, Africa, and Australia.

Course 4: Birth of the Nation

This course will chart the emergence of colonial rule in India, from the 16th century, when the first European joint stock trading company arrived in India, to the birth of the nation-state in 1947, extending the moment of this birth up to the integration of princely states and the adoption of the Constitution by our Republic in 1950. The course will familiarize students with the struggle between European colonial powers for control over various parts of India, and the various forms of Indian resistance, including peasant and Adivasi resistance movements. The course will also introduce students to the vast administrative, educational, and social and reforms that were effected during the colonial period. The final part of the course will discuss India's freedom struggle and will include not only its well-known figures but also some lesser-known figures of the struggle.

10.3.2 Sociology

10.3.2.1 Principles for Course Design

The courses on Sociology will help students to understand society as a form of reality. This is a level of human existence which exists both within and beyond the individual. The courses will enable students to better understand their own selves and the social institutions and structures which shape their lives. There will be an emphasis on doing Sociology rather than only reading it, through case-studies, projects, inquiry-based learning and so on, so that students begin to build their own understanding of their environment. The courses will offer reflexive, analytical and emancipatory ways of seeing their world. They will also enable students to grasp our shared humanity across all the variation which occur in different social locations. Understanding how gender, material conditions and social groups and identities shape our subjectivities permits one to start building greater intersubjectivities. The courses will emphasize a reflexive approach to Sociology, where students also become aware of different ways of seeing society, including from western and Indian perspectives and from different social locations within India. The courses are oriented towards connecting Sociological knowledge to understandings, actions, and strategies in the everyday world as well as in building strategies for structural change.

10.3.2.2 Illustrative Courses

Course 1: Introduction to Sociology

This course will introduce the Sociological perspective by exploring certain social patterns which are fundamental to life in the contemporary era. These would include institutions like the family, marriage, and kinship. They would also include the growth of capitalism, rationalization, indus-

trialism, and the state. Students would be introduced to sociological ways of understanding various forms of ethnicity and nationalism. Through these the basic concepts and methods of Sociology would be learned like roles, norms, social structures, culture and so on. Students would introduce to some basic research methods of Sociology and how Sociological knowledge is constructed. A "Sociological imagination" would thus be learned through which students will be able to see their selves within a broader changing social context.

Course 2: Social structure, identity, and self in India

Students would be introduced to the study of India's social structure and how to connect it with patterns of subjectivity like the formation of the self and identity. They would learn to look at these from functionalist, conflict, and interpretivist perspectives. Important aspects of India's social structures would be introduced, including the differences between rural and urban social life. The main body of the course would deal with social structures that can lead to social inequalities and/or diversities like gender, sexuality, class, caste, tribe and religion. Their historically changing contours would be studied along with the social forces changing them. The social construction of the self and various kinds of identities would be discussed along with the relation between the micro and the macro in social life. The ways in which agency operates to change social structure as well as the ways in which social structures affect our subjectivity would be discussed.

Course 3: Politics, state, and development in India

Politics is a way of a deciding between contending points of view and can be a way of reconciling them or asserting one over the other. Students would be introduced to the institutions and cultures involved in making decisions related to social life in India. They would also learn about various social forces that act to influence politics. The state is one of the major institutions which balances and decides between conflicting voices. Different approaches to the state would be introduced along with the challenges of bureaucratization. Democracy would be discussed as a way of connecting the state with different interest groups and social forces. Its trajectory in India would be explored along with challenges to it. Social movements would be discussed as a way of exerting pressure from outside the established system of power, which can provide an important corrective impulse.

The relation between politics, the state and the economy would be introduced. Students would learn the different ways in which humans adapt to their environment and to their systems of production, distribution, and consumption. Capitalism as the pre-eminent contemporary way of organizing this would be discussed, along with the challenges it poses. The changing and contested role of the state in guiding this would also be discussed, along with different views on privatization. The trajectories of development in India and its experience by different social groups would be studied. The impact of globalization on the state, culture and the economy would be traced.

Course 4: Sociology of Culture: mass media, education, and religion

This course would be about the importance of culture in human existence and the different institutions which shape and contest it. The major ways of understanding culture would be introduced, including culture as the entire way of life of a community and culture as a code of symbols and practices. The multi-layered and overlapping character of culture would be illustrated through different examples in the mass media, where there exist many voices at the same time. The politics of culture would be introduced through ideas of hegemony and counter-hegemony in the mass media. Cultural power and the assertion of particular interpretations as a method of domination would be explored through examples of communities, castes, religions, languages and so on. Status groups and their politics would be discussed. Connected with this would be the problem of social location and objectivity in knowledge.

The Sociological perspective on culture would be deepened through the study of education and religion. The functions of religion in social life would be introduced along with its contested relation with other social structures and processes like the family, gender and politics. The social and cultural processes changing religion would be explored. The functions of education along with interpretivist and conflict perspectives on education would be introduced through examples from India. A particular focus would be to understand differences in educational access and achievement in India.

Section 10.4
Science

10.4.1 Biology

10.4.1.1 Principles for Course Design

"The present volume is the first-time presentation of the integrated biology for the school level children. ... The integration achieved however, is partial and not complete. Hopefully along with changes in the teaching and learning context, to be brought out in the next few years, ***the next edition of this book will reveal more integration of botany, zoology and microbiology and truly reflect the true nature of biology"***

— Prof. K Muralidhar, A Note for the Teachers and Students, NCERT Class XI Biology Textbook (emphasis added)

In designing the curriculum for the biology discipline, the following general principles were adhered to:

a. **Greater integration and highlighting of interconnectedness**: In line with the quote mentioned above, an attempt has been made to accomplish greater integration of different fields of biology. In addition, the interconnections between different fields are explicitly highlighted along with the importance of having a multi-pronged approach to studying life sciences. This naturally leads to a balance between breadth and depth in covering different topics. Students will be able to explore biology at different scales, have an appreciation for the process of science and the progression of scientific ideas, and have the capacity to engage more deeply with any field of interest. They will also be aware of bioethical concerns that arise in biology today.

b. **Biology in context**: Biology has a reputation for being descriptive and students often have to remember many facts without having any context. This produces students who have a lot of factual knowledge but are ill-equipped to meet the challenges of modern life sciences. In order to align school education with current practices in life sciences, the content has been streamlined. Whenever description-heavy content is included, an attempt has been made to provide appropriate context. The reduction in content and the emphasis on context will allow more creative and immersive pedagogic practices as students can relate to what is being taught.

c. **Flexibility**: The biology curriculum is designed to be self-contained and does not assume that students will be taking courses in other science disciplines. This will allow students to have the flexibility envisaged by the choice-based system.

d. **Skill Enhancement**: The curriculum is designed to encourage students to go beyond bookish knowledge by promoting capacities for observation, documentation, and familiarity with quantitative reasoning and multi-disciplinary approaches. Assessments will also be designed to enhance higher cognitive skills and minimize the reliance on rote-learning.

e. **Future possibilities for students**: The curriculum makes a concerted effort to highlight diverse careers in the life sciences. Even if students do not go on to pursue careers in life sciences, the curriculum will engender a sensitivity to biological issues (environment, health, etc.) in their surroundings and create an awareness of how citizens can contribute to their local communities and to science.

Keeping these principles in mind some illustrative course descriptions have been outlined below.

10.4.1.2 Illustrative Courses

Course 1: Biodiversity and Biogeography of India

This course will begin with an overview of the scope of life sciences, the various length and time scales at which biological phenomena occur and the methods employed by scientists to investigate these phenomena. Students will be encouraged to think like a scientist using case studies from India. They will develop an appreciation for natural history and an understanding of biodiversity and the factors which affect the richness and diversity of life in different regions. A broad exposure to biodiversity in India will be complemented by a deeper exploration of biodiversity in their local region and an introduction to systematic practices of studying biodiversity through taxonomy and nomenclature. The course will conclude with units on the impact of climate change and the importance of conservation efforts. Through the theme of biodiversity and biogeography, students will develop general capacities for quantitative reasoning (interpretation of graphs, computation of summary statistics) as well as observation skills through activities requiring them to identify and classify species in their surroundings. Students will also be made aware of careers in ecology, sustainability and other allied fields and how citizens can contribute to scientific research.

Course 2: The Unity of Life

This course will highlight the common structures and processes that underpin all of biology. The Unity of Life will begin with a discussion of cell theory and our current understanding of cellular structures and processes. Subsequently, students will explore important classes of molecules that are constituents of cells and the functions they perform. In this context, students will learn about the identification of DNA as the genetic material. This will be followed by a historical account of genetics and how fundamental principles of heredity were identified by Mendel and rediscovered later. An essential aspect of this course will be a discussion of how evolutionary processes can provide a framework for investigating biological phenomena across scales. This will involve an overview of the development of the theory of evolution by natural selection through the work of Darwin and Wallace, a discussion of the modern synthesis, and an introduction to phylogenetics through the study of the tree of life. The course will conclude with an introduction to molecular biology (Central Dogma, Genetic code) and gene regulation. The Unity of Life will use case studies (e.g. antimicrobial resistance) to illustrate the importance of an integrated understanding of biological systems in modern life sciences. Through this course, students will become familiar with concepts that are essential to study any biological system. They will also appreciate that scientific theories and ideas take time to develop and that there is value in understanding the historical context of their origin.

Course 3: Organismal Biology (or) Agriculture and Animal Husbandry

The third course in Biology can be a choice between Organismal Biology and Agriculture and Animal Husbandry.

a. Organismal Biology

Organismal Biology will adopt an evolutionary framework to cover many aspects of the biology of non-human organisms (microbes, fungi, plants, animals). It will begin with representative examples of development and simple illustration of the genetics of body plans. Thereafter, the course will explore a small set of topics related to the physiology and anatomy of plants and animals. The major portion of the course will cover topics in ecology and the biology of food production. This includes population, community and behavioural ecology, energy flows, and the interaction between different species. A diverse set of examples (spanning the tree of life) will be used to illustrate concepts. With regard to food production, the course will focus on food security (including challenges of climate change and diseases, the role of biotechnology) and sustainability (resource use, environmental impact). Students will be encouraged to draw connections between food security challenges and physiological and ecological constraints. This course will allow students to appreciate how an evolutionary framework sheds light on different phenomena in organismal biology. It will also allow students to synthesize topics covered in the previous two courses.

b. Agriculture and Animal Husbandry

This course is designed to be an alternative to Organismal Biology and will cover the same topics from a perspective that will appeal to students whose family livelihoods depend on agriculture. Agriculture and Animal Husbandry will begin with an exploration of commercially important organisms along with some examples of the developmental biology, anatomy and physiology of these organisms. The role of breeding and biotechnology will be discussed followed by ecological and environmental constraints and challenges to food production. The course will conclude with the topic of disease management and the possibilities of biocontrol. Through this course, students will recognize why an understanding of physiology and an ecological sensibility is essential for sustainable food production. As with Organismal Biology, students will engage with topics in the previous two courses and their role in food production.

Course 4: Human Biology

The final course will appeal to the innate interest that most biology students have in understanding themselves. Human Biology will begin with a brief discussion of the evolutionary history of the genus Homo and the human genome project. Thereafter, it will cover major organ systems in a manner that connects with discussions of the genome and concepts of physiology and evolution covered in previous courses. A substantial portion of the course will be devoted to health and well-being. After discussions on the importance of diet and nutrition, an overview of communicable and non-communicable diseases will be provided. Coverage of diseases will be accompanied by methods of preventive care, diagnosis, biology behind administering medication and treatments, and the role of pharmaceutical companies. Given the age group, concerns of reproductive health, mental health, substance abuse, and addiction will be explored. Students will be made aware of many careers related to human health. The course will conclude with students exploring the connection between individual health and planetary health and why one must view health from a community perspective rather than just an individual one.

10.4.2 Chemistry

10.4.2.1 Principles for Course Design

The study of Chemistry should be more than learning and remembering the properties of chemicals. Equipping students with tools to begin understanding how chemistry works is more important than knowledge of the facts of chemistry. Courses at this level must deal with content at an appropriate level of rigor in order to develop the necessary conceptual foundations in students and, at the same time, equip students with an overview that is a sufficiently broad introduction to the subject.

The primary goal of the curriculum outlined here is to progressively build a clear framework that gives a coherent overview of chemistry as a subject, explains why it matters, and shows how different areas of content are connected. In order to impart a 'big picture' with adequate conceptual rigour the content of the curriculum is built around the core cross-cutting themes of Chemistry shown in Figure X; Structure, Analysis, Transformations, and Modelling.

Further, chemical phenomena can be understood and represented at three levels. At the macroscopic level, it is about the properties and transformations in substances that we can observe. Chemistry interprets these observations in terms of the rearrangements of atoms and electrons. This is the molecular level – the underlying structure of all matter that we cannot see directly. The third symbolic level of chemical symbols, formulae and reaction schema is what chemists use to describe chemical phenomena and link the macroscopic and molecular levels together. It is essential to build a certain amount of comfort with using all three levels of representation at this stage of education to enable both preparation for higher education as well as a transition from rote learning enumerated facts in a fragmented way to developing the skills necessary to begin to identify patterns and form connections that underlie all chemical phenomena. Curriculum content must ensure that students have, and recognize they have, appropriate intellectual resources and know how to connect these resources as they construct and revise explanations or predictions.

Photo B-10.4-i

The first course in the curriculum starts at the molecular level with a discussion of atomic structure and chemical bonding. Instead of structure in terms of abstract and intangible concepts only, the course relates structure to observable properties in the laboratory and in the real world.

The subsequent courses build on this foundational understanding to examine transformations of chemical substances. The final course uses the concepts built through the three courses and exposes students to some applied aspects of Chemistry.

At the end of the final course, students should recognize that chemists are uniquely qualified to contribute meaningfully to frontier research areas related to climate change, environmental issues, materials science, biology and medicine.

10.4.2.2 Illustrative Courses

Course 1: Structure, Bonding, and Properties in Chemistry

The insight chemistry gives to the student is one that unifies phenomena at the molecular scale to those of the astronomical. Structure, Bonding and Properties in Chemistry is the first of a series of 4 courses in the curriculum. The course develops a perspective that sees the universe as a collection of fundamental particles and their combinations. Eventually building on these to the realisation that properties of materials, compounds and molecules of life are all consequences of the fundamental principles that chemistry establishes.

Molecules are invisible to the eye. However, the effects of their existence are observable at the macroscale. The connection between the invisible molecules and the visible tangible consequences is not obvious to the learner. Through this course, the interconnectedness of structure to bonding patterns and thereby their influence on observable properties are elucidated. The connections are explicitly made and woven into the units as an integral part. As concepts are accumulated, the connections to the real world are progressively more comprehensive. This model fundamentally removes the inherent abstraction in chemistry via observations of the wonders of science that the student can see, smell, hear, taste and touch.

The course begins with the structure of the atom and its electronic distributions. The classification of elements in the periodic table and their periodic properties are elaborated. Building on these principles, the combination of elements to form compounds, the nature of these bonds and molecular geometry are detailed. To illustrate principles of structure and bonding hydrocarbons and their functional groups are introduced alongside their variations in connectivity and spatial arrangement via isomerism and the structure-property relationships in transition metal complexes are included.

Course 2 and 3: Principles of Reactivity – I and II

This series of two courses focus on the study of chemical systems; how and why the reactions occur- drawing upon the properties of elements, bonding and structure learned previously. The two courses focus on the application of submicroscopic models of matter and structure-property relationships to explain, predict, and control chemical behaviour. Students are introduced to

concepts regarding chemical thermodynamics, acid-base equilibria and chemical kinetics from the perspective of the transformation of matter and the underlying principles that govern the reactivity of chemical substances. These courses use reactions of both organic and inorganic compounds to illustrate the concepts of enthalpy, free energy, equilibrium and kinetics of reactions. They cover the patterns of reactivity in organic and inorganic systems, functional group chemistry, kinetics, mechanisms, and catalysis. They initiate the systematic study of the common classes of organic compounds, emphasising theories of structure and reactivity.

The course should enable the students to consider and measure the energies, and rates of the chemical reactions and to predict the products. At the end of the two courses, students should be able to connect observations of chemical reactivity at the macroscopic level with the changes at the molecular level and use principles studied in the courses to predict reactions and use these reactions to make modifications to small molecules.

Course 4: Modern Applications of Chemistry

Students choose Chemistry at a higher secondary stage with an aspiration to pursue basic, applied or professional courses after school. It is, therefore, essential to provide learners with meaningful contexts in their life and provide a 'big picture' of Chemistry. This course offers a space to integrate the essential concepts learned in previous courses with applications of chemistry, thereby enabling students to realize the interrelatedness of Chemistry, Society and Technology.

This course consists of four units covering modern applications of chemistry. The first unit is devoted to synthetic approaches, analytical methods, and structure-property relationships of some vital chemicals needed or used in our daily lives in addition to the analysis of their impact on the environment. This includes natural substances such as biological macromolecules as well as anthropogenic chemicals such as drugs, food substances, colourants and cosmetics. It also includes a structural understanding of inorganic and hybrid materials. The second unit looks into classification, preparation methods, applications and the environmental concerns of polymers. The third unit provides insight and information on fuels and energy and how chemistry contributes to sustainable energy technologies. The last unit focuses on the structure and behaviour of chemical compounds contributing to the biomedical and agricultural fields. The second part of this unit applies fundamental chemical principles studied in the second and third courses to industrial manufacturing processes.

10.4.3 Physics

10.4.3.1 Principles for Course Design

The teaching of Physics must integrate theory and experiment in equal measure. The experiments should be set up with materials that are easily accessible and must not require any sophisticated lab equipment. It is important that every physics student has experiential learning of the subject at the senior secondary level. The student should be able to relate their own experiences to what is transacted in the classroom. Ideally, a physics student will take a sufficient number of mathematics courses, since the description of the laws and phenomena of physics require mathematical formalism. This becomes even more important when solving problems in physics. However, the courses proposed below do not assume a knowledge of mathematics beyond what is

taught until tenth grade. Topics in mathematics such as calculus, vector analysis, and trigonometry are included as and when necessary in the courses. A good understanding of physics requires sufficient time to be spent by both the teacher and the student. Therefore, we propose that the core consists of 4 courses. Students who desire to take courses in physics beyond the required four have the choice of two electives. These electives will expose students to modern breakthroughs in physics that have led to the emergence of several technologies, many of which we encounter in our daily lives. The interdisciplinary nature of physics will also be emphasised in these elective courses.

The four core courses are *Mechanics, Electricity* and *Magnetism, Waves* and *Optics, and Thermodynamics* and *Properties of Matter*. They can be taken in the order listed below. Alternative sequences and some possible changes to the structure of the courses are listed at the end of this section.

10.4.3.2 Illustrative Courses

Course 1: Mechanics

This course in Mechanics is accessible to students who have done mathematics only up to the tenth grade. The course does not assume a knowledge of calculus and the necessary mathematical background is included as and when necessary through the concepts in physics. The content of the course will be kept simple and after an introduction to units and dimensions will focus on the essential concepts related to motion in one and two dimensions, force and mechanical work, various forms of energy, and the conservation of energy illustrated through various examples. Differential calculus will be taught as part of the unit on motion. Some notions of energy and length scales in matter will be discussed through examples in everyday life thus introducing them briefly to some of the modern ideas in condensed matter and biological physics. Applications of these concepts to other disciplines will be emphasized through various examples. Here the focus will be on giving a hands-on experience and relating this to the phenomena in everyday life.

Course 2: Electricity and Magnetism

'Electricity and Magnetism' seeks to give a broad overview of the main phenomena, including the historically significant experiments starting from Gilbert's work on static electricity and properties of magnets to Hertz's experiment confirming the existence of electromagnetic waves. Related theoretical ideas will also be covered, along with familiarising students with basic experimental techniques and relevant foundational mathematical concepts. For example, students will learn the techniques of basic integral calculus that is needed for understanding and applying Gauss' Law and Ampere's Law. The course will help students appreciate the links between all the above aspects and to understand certain everyday natural phenomena and technologies from the lens of the physical principles that it discusses. The course will take the approach of balancing discussion of content and opportunities for synthesis and application.

Course 3: Waves and Optics

This course builds on ideas developed in Mechanics, and Electricity and Magnetism. This will involve both building a connection between various topics in physics and also a bit of repetition of those topics, which will help students assimilate and appreciate various phenomena. Topics include the pendulum and spring-mass system as simple harmonic oscillators, basic acoustics, Doppler effect, ray optics and optical instruments, and finally ideas in wave optics including interference and diffraction.

Course 4: Thermodynamics and Properties of Matter

This course is a coherent and integrated handling of thermodynamics, properties of materials and some topics that would traditionally be covered in a "modern physics" course. These topics are essential core topics in the physics curriculum, but each need not take up the length of an entire course. This is the practical rationale for clubbing these areas together in a single course. The educational rationales are many:

a. These areas must be seen as the study of collections of particles and hence will build on the foundation of mechanics,

b. Basic gas laws such as the law of Avogadro are our first evidence of the existence of atoms, and

c. Thermodynamics predominantly deals with energy and energy transfer, which will also include radiation as a mode of energy transfer.

The course will include hydrostatics, motion of fluids, ideal gas laws, laws of thermodynamics, phase changes, modes of heat and energy transfer including blackbody radiation, and the photoelectric effect.

Section 10.5
Mathematics and Computing

The Mathematics and Computing curricular area would offer disciplinary choices in Core Mathematics, Business Mathematics, Statistics, Computer Science and so on. Here, an illustration of Core Mathematics is outlined.

10.5.1 Core Mathematics

10.5.1.1 Principles for Course Design

Core Mathematics Education Grades 11 and 12 play an important role in equipping students with the necessary skills for participating in society and the economy. It is also a preparation for students who go on to university, in terms of enabling the transition to abstract and applied mathematics, depending on the choice of discipline. This is a stage when students are becoming young adults, being called upon to make autonomous choices, and mathematics plays a critical role in being a requirement for many pathways ahead. In Indian reality, education provides the sole instrument for breaking out of poverty for a large section of society, and mathematical proficiency plays a significant role in this regard.

Thus, mathematics education takes on the responsibility of developing the resources of students towards developing the capacity to think logically and analytically, and at the same time, discover their own strengths and interests. Working autonomously and together with other students is important at this stage, and curricular opportunities are to be provided for such engagement.

The courses below attempt to provide a range of such educational experiences, keeping in mind the crucial equity considerations underlying the reality of Indian school education. The core principles around which these courses have been designed are:

a. While engaging with the content areas of mathematics such as algebra and geometry, engage students in mathematical processes such as reasoning, modelling, visualisation, problem solving and formal communication.

b. Develop an appreciation of the structure of mathematics as a discipline, making connections between areas of mathematics as well as with other disciplines of study. Introduce powerful ideas of mathematics such as infinite sums, limits and probability towards developing a deeper understanding of mathematics as a discipline.

c. Develop a healthy predisposition to formal problem solving as an opportunity to promote self-learning and reflection, as well as application of concept learning.

Over four semesters, students are exposed to a structure that centralises problem solving with concepts, skills, processes and metacognition supporting such a focus. They progress in the content areas of number systems, algebra, geometry and trigonometry, and are introduced to coordinate geometry, calculus and probability and statistics. New representations are learnt which help students make connections between algebra and geometry.

These courses offer exposure to a range of mathematical concepts while providing a set of essen-

tial analytical skills and an in-depth understanding of a few selected themes. Necessarily this involves selection and exclusion among possible topics.

All the courses offer formal problem-solving opportunities, and in fact, the foundation course can be entirely problem-based. The student is exposed to a range of problems in the courses, calling for different approaches and solution techniques. A detailed syllabus will need to consider opportunities for integrated and open-ended problems that help students use many content areas at the same time.

Modelling is not separately signalled in the curriculum, but all three courses from the second semester provide curricular opportunities for modelling, and it is hoped that the detailed syllabus utilises them to engage students in modelling exercises.

10.5.1.2 Illustrative Courses

Course 1: Mathematical Foundations

This course introduces the student to mathematical reasoning and enables the student to both understand the need for proof as well as what constitutes a proof. A powerful proof technique, the principle of mathematical induction, is introduced. Students learn the language of sets, functions and relations. A range of functions that students have already encountered (in algebra, geometry and trigonometry) are revisited, to understand domain and range in each case.

Course 2: Algebra and Geometry

Students learn to go back and forth between geometric objects on the plane and their algebraic expressions. Linear equations and their solutions are related to their geometric visualisation. Their representation by matrices provides a powerful tool for computation and helps the transition to three dimensions. Geometric objects such as parabolas, ellipses, circles and hyperbolas are studied as loci of points in motion.

Course 3: Calculus

An informal understanding of the notion of limit leads to a similar notion of continuity, which is adequate to understand the mathematics of motion, rate of change, etc. Students learn the gradient of a curve at a point, and the notion of second derivative, with its application to maxima minima problems. Integration is understood as the reverse process of differentiation. Students learn to evaluate definite integrals and use this to compute the area of a region bounded by a curve and lines parallel to the axes.

Course 4: Probability and Statistics

Students learn to select between ways of representing raw data (and explain why). They learn to use measures of central tendency and variation and use these to compare two sets of data. They learn permutations and combinations, and to use them in calculating probabilities of events. The notion of sample space is introduced and students learn to set up one. The basic laws of probability, independence of events and conditional probability are learnt.

Section 10.6
Arts

The art courses in Grades 11 and 12 aim to achieve more depth in a chosen art form, while also providing students flexibility to explore related areas of study. Syllabus developers can design course packages for Grades 11 and 12 based on the arts and culture of their region, and by considering the resources and infrastructure that can be set in place for these programmes to operate efficiently.

The choice of art courses offered can be spread across two categories:

a. **Courses in Arts Practice**: These courses could be for students who are interested in arts practice as well as those who wish to pursue arts practice in higher education or as a career. The design of all these courses in arts practice would continue to place importance on embodied and experiential learning through the making, thinking, and appreciation processes. Emphasis would be on rigorous practice in a chosen arts discipline. The content of the courses would also link practice to theory, art history, and contemporary issues that are relevant to each art form.

An illustrative set of courses for Arts Practice is given in the table below:

Table B-10.6-i

Arts Practice Courses				
	Visual Arts	**Theatre**	**Music**	**Dance and Movement**
1	Drawing	Theatre for Social Change	Indian Classical Vocal	Indian Classical Dance
2	Painting	Introduction to Acting	Indian Classical Instrumental	Indian Folk Dance
3	Sculpture and Ceramics	Theatre in Education	Indian Folk Music	Yoga and Indian Martial Arts
4	Textile Arts and Design	Participatory Theatre	Indian Light-classical and Film Music	Contemporary Dance and Movement
5	Indian Decorative Arts and Crafts Traditions	Indian Folk Theatre	Orchestra, bands, and ensembles	Costume and Stage design for Dance and Movement
6	Photography	Indian Classical Theatre	Recording, Editing, and Production	Dance and Movement choreography
7	Graphic design and New Media	Theatre Design and Stagecraft	Song-writing	Dance for physical fitness and wellbeing
8	Film, Video, Animation	Scriptwriting for Theatre	Music and New Media	Dance Drama

b. **Courses in Arts Appreciation and Management:** These could be suitable for students who may not be interested in art-making but are interested in arts appreciation, art history, conservation, curation and cultural event management. The courses in this category are structured so that students develop their knowledge of art history and aesthetics, while also refining their skills of interpretation, writing, documentation, community engagement and organisation thereby ensuring a meaningful appreciation for the arts.

An illustrative set of courses for Arts Appreciation and Management is given in the table below:

Table B-10.6-ii

Arts Appreciation and Management				
	Visual Arts	**Theatre**	**Music**	**Dance and Movement**
1	Visual Arts in India (Past to Contemporary)	Indian Classical Theatre and its theories	Indian Classical Music Theory	Indian Classical Dance and its Theories
2	Visual Art from around the World (Past to contemporary)	Theatre traditions from around the world	Musical traditions from around the world	Classical Dance traditions from around the World
3	Crafts traditions from India and the World	Indian Folk Theatre	Folk Music Traditions from India and the World	Folk Dance and Movement Traditions from India and the World
4	History of Visual Design and Communication	Theories of Acting	Study of Indian Musical Instruments	History and traditions of Yoga and Indian Martial Arts
	Common to all forms			
5	Indian Aesthetics and Rasa Theory			
6	Museums and Archives (Conservation and Documentation)			
7	Curation and Event Management in the Arts			
8	Portfolio Development (Particularly for students who wish to apply for higher education in the arts)			

10.6.1 Certification in the Arts

Students who choose Arts as one of their choice-based set of courses would need to decide whether they are specializing in a form (visual arts, theatre, music, dance and movement) and category (arts practice or arts appreciation). Based on this choice students have to choose a 'package' of four courses that has three courses in one category and the fourth course in another. This is to ensure that the student gain breadth in both arts appreciation and arts practice while allowing them to go deeper into one the categories.

An illustrated set of packages is outlined below.

10.6.2 Arts Practice in Visual Arts

Table B-10.6-iii

Arts Practice Package in the Visual Arts		
Category	**Courses**	***Other Related Courses**
Arts Practice	Course 1: Drawing	Indian Decorative Arts and Crafts Traditions Theatre Design and Stagecraft Film, Video, Animation Portfolio Development
Arts Practice	Course 2: Sculpture	
Arts Appreciation and Management	Course 3: Visual Arts in India (Past to Contemporary)	
Arts Practice (Elective)	Course 4: Textile Arts and Design (or Other Related Courses*)	

10.6.2.1 Illustrative Courses

Course 1: Drawing

Drawing serves as a foundation for a wide range of creative disciplines— painting, sculpture, architecture, visual communication, engineering, or fashion design. The ability to draw well contributes in developing effective communication skills. Through this course students would learning key skills and techniques across artistic mediums and applications.

Course 2: Sculpture

In this course, students would learn to develop their own artistic ideas and expression by creating sculptural objects. They would learn to refine their skills and techniques in any medium of their choice (clay, wood, fabric, mixed-media) through rigorous practice.

Course 3: Visual Arts in India (Past to Contemporary)

This course introduces students to the history of Indian Art through selective examples from pre-history to contemporary time. Every example would provide students an opportunity to study the aesthetic qualities of the artwork, as well as understand the social and cultural context of artists through history. Students would also have space to explore archives and find artwork or artefacts of importance on their own. Through this course, students would learn to interpret artworks, develop perspective and appreciate diverse artistic expressions.

Course 4: Textile Arts and Design

This course would introduce students to the world of textiles, and their diverse forms and functions in our lives. Students can experiment with various materials, fibres, and fabrics; understand their properties of colour, texture, insulation, opacity, longevity, etc., and explore their applications in multiple contexts (clothing, sports gear, safety gear, interior design, architecture, as a medium for artistic expression, etc.). Based on the local traditions, this course could introduce students to techniques of embroidery, knitting, weaving, applique, textile dyeing, and quilting.

10.6.3 Arts Appreciation in Music

Table B-10.6-iv

Arts Appreciation Package in Music		
Category	**Courses**	***Other Related Courses**
Arts Appreciation and Management	Course 1: Museums and Archives	Indian Aesthetics and Rasa Theory Curation and Arts Event Management
Arts Appreciation and Management	Course 2: Indian Classical Music Theory	
Arts Practice	Course 3: Indian Folk Music	
Arts Appreciation and Management (Elective)	Course 4: Portfolio Development (or Other Related Courses*)	

10.6.3.1 Illustrative Courses

Course 1: Museums and Archives

This course introduces students to the importance of museums and archives in preserving and promoting art and culture. The course would involve a study of museum collections and their resources through visits to local museums as well as online resources of museums across India and the world. Students would also learn about the various processes of maintenance, conservation, research, and outreach programmes that museums undertake. The course would require students to work on their own project in designing, visualising and presenting a collection of artefacts, objects, or documents in their own imagination of a museum.

Course 2: Indian Classical Music Theory

This course introduces students to the philosophy, canons, and compositional structure that characterise different aspects of Indian music. Students would learn about different srutis and scales, frequencies of notes, arrangements of notes in raagas, emotions and rasas evoked through raagas, taal patterns, their styles and combinations, as well as important composers, music theorists and developments that have occurred in Indian classical music through history.

Course 3: Indian Folk Music

This course introduces students to practice folk genres from different parts of India. Through an exploratory practice, students would develop an understanding of musical styles, themes, instruments and performance techniques that are used in folk music.

Course 4: Portfolio Development

This course is meant for students who wish to pursue higher education or a career in the arts. While all courses would need students to maintain their portfolio, this course would introduce students to the concept, design, and development of portfolios for the purpose of external viewership and in the context of college admissions and job applications. Students would be exposed to various samples of portfolios to analyse their design, structure, content, and effectiveness in representing an artist's work. Through such exercises, they would be guided to conceptualise their own portfolio, make selections from their existing portfolios, create new work to strengthen their portfolio, write about their own motivations and ideas for their artworks, and develop its visual consolidation and presentation.

Section 10.7
Vocational Education

(To be added)

Section 10.8
Physical Education

Physical education is a growing field in India and has the potential to grow a lot more. An increasing number of citizens are taking health and wellness seriously and a lot more needs to be done to create awareness and provide avenues for people from all corners of our country to benefit from it. Through our education system, we need to provide a sound foundation of knowledge in this field. There has always been a lot of interest in sports and fitness amongst children but with the right kind of courses and the creation of more educational avenues, we can give impetus to the wellness industry and thereby the health and well-being of the country.

In Grades 11 and 12 of the Secondary Stage, we aim to cater to three broad categories of students:

a. Students who want to continue sports and physical activity as a recreational activity and can also be nodal persons for physical educational knowledge for their community. These students might have pursued different activities up to the Secondary Stage but would not like to pursue a particular sport or take up different vocations of physical education. This group can be called **PE for Community Wellness.**

b. Students who are interested in taking up sports-based vocational opportunities in growing areas like sports education and fitness industry, sports management, sports analytics, sports psychology and even allied medical field like sports physiotherapy. This category can be called **PE as a Vocation.**

c. Students who are interested in taking up playing sports professionally or are interested in allied fields of professional sports. These are students who have already achieved some proficiency in a particular sport/game/practice like yoga or Tai chi at Secondary Stage. Such students will have the option to pursue it further, develop advanced skills and would like to compete at the highest level. This category can be called **PE for a Professional Sportsperson.**

10.8.1 PE for Community Wellness

These courses are for students who are looking at sports more from a recreational and wellness point of view. They don't want to pursue a particular sport or vocation of physical education. However, they do want to pursue physical education because of their interest and want to take it to the communities. The courses intend to build a foundation for understanding the different dimensions of physical education and wellness. The programme would also give an introduction to the domain, should the students wish to switch to playing a sport or any vocation of physical education in their higher education. The courses on offer will prepare the students to lead healthy and active life. These are the courses that will be on offer.

10.8.1.1 Illustrative Courses

Course 1: Sports and Fitness – An Introduction

This course would start with basic human anatomy and physiology and its connection with physical activity and fitness. In addition, aspects of nutrition, injury prevention, and basic first aid would also be included in this course.

Course 2: Community coaching (for a chosen sport)

This course prepares students to develop capacities for engaging in team sports for community development. Basic coaching skills relevant for the sport and the interconnection between developing life skills through team sports would be the focus of this course.

Course 3: Sports and Fitness Advanced Basics

This course would build on the first course to go deeper into the practices required for strength and conditioning training. Maintaining strength, endurance, and flexibility is necessary for any sports or physical activity and this course would go deep into giving students the understanding of how to develop these capacities in others. The course would include the use of practices like yoga for developing strength and flexibility.

Course 4: Sports Management (basic)

This course would introduce students to the different aspects of managing teams for participating in sporting events. These sporting events are often important aspects of building a community around sports. The course would focus on team management, event management, resource management (sourcing and maintaining equipment and playing areas), and some aspects of sports promotion – sponsorships, endorsements, and so on.

10.8.2 PE as a Vocation

These courses are for students who are interested in a vocation based on sports and fitness. Since this is a growing field, this could be one of the discipline options they take and can give students an introduction to various options available in sports, fitness and wellness domain. There are multiple growing areas in this domain so there will be a few elective options for students to take under this.

10.8.2.1 Illustrative Courses

[4 courses to be articulated]

10.8.3 PE for a Professional Sportsperson

These courses will be for students who are looking at becoming professionals under different sports or physical practices. Many of these students will already be undergoing coaching in their respective choice of sport and these courses will aid their development. Under this discipline again there will be 2 core courses and electives. The electives will be more specific to the sport or activity they have chosen.

10.8.3.1 Illustrative Courses

[4 courses to be articulated]

Section 10.9
Interdisciplinary Areas

10.9.1 Sustainability and Climate Change

10.9.1.1 Principles for Course Design

The interdisciplinary curriculum for Environmental education in the senior secondary stage (Class 11 & 12) will be called "Sustainability and Climate Change". The courses under this will allow students to specialise in environmental topics they have been exposed to in the secondary stage and wish to pursue owing to their interest in environmental studies. The goal will be to enable deeper engagement with environmental science and explore the interconnectedness with sustainability and climate change grounded in the Indian context.

Addressing environmental challenges requires an interdisciplinary perspective incorporating science, society, economy and politics. The curriculum for "Sustainability and Climate Change" will be developed using the social-environmental systems framework that conceptualises environmental issues as complex, non-linear in cause and impact, subject to shocks and with tipping points. Central to the framework is equity and environmental justice which will be emphasised throughout the curriculum.

The courses in the curriculum will range from environmental science, and linking science to society, policy and economy. The curriculum will engage with sustainability and climate change challenges at different scales. Students will learn both about the need for and limitations of individual versus systemic change and technological fix versus participatory action. They will also be involved in analysing case studies of successful interventions at different scales that have addressed environmental problems without being overwhelmed by the complexity of the challenge – an important learning for students.

The objective of the course is to enable students to:

a. Engage with complex environmental problems without being overwhelmed by it.
b. Describe and summarise environmental challenges linking society and environment.
c. Understand trade-offs and ethical dimensions of sustainability and climate change challenges.
d. Contribute to environmental literacy enabling students to engage in environmental action.

10.9.1.2 Illustrative Courses

The four courses proposed under the curriculum are:

Course 1: Environmental Science from a Social-Environmental Systems Perspective

Environmental challenges can no longer be addressed by traditional approaches where there was a clear separation of pure science and social science. As humans we are today an intrinsic part of our environment, and our actions are resulting in impacts on both environment and humanity. In this course, students will study about the threats to the earth, the interconnected nature of planetary boundaries, thresholds that are breached, and explore using the systems perspective the tipping points. The course will emphasise how environmental sustainability requires going beyond individual behavioural change to requiring interventions at a systemic level. It will also enable students to understand how the use of technology alone, via new approaches to waste management or energy production, cannot completely address sustainability objectives, which require working adaptively with people, culture, markets and policies.

Course 2: Environmental Pollution: Air

Air pollution is one of the major environmental challenges faced today with serious implications for human health. In this course students will be able to understand concepts around air pollution such as meteorology, composition (SPM, NOX, SOX etc) and sources (industrial, vehicular etc). They will examine the effects of air pollution on plants, animals, as well as human health and economic implications, and issues of pollution and environmental justice. They will also examine air pollution control measures from technological to behavioural.

Course 3: Biodiversity

In this course the students will start by refreshing concepts of biodiversity (ecosystems, species, natural landscapes etc), and why biodiversity is important for humans existence on this earth. They will then understand the threats to biodiversity and how this has affected the biodiversity at a global and national scale. The impacts of the loss of biodiversity linked to human dependence will also be included. The course will provide a context to the history of biodiversity conservation, with a focus on critique of Indian legislations (laws, protected areas, community conservation etc.) and the implications. Students will also learn a few methods of documenting local diversity using tools such as citizen science and people's biodiversity registers (PBRs).

Course 4: Climate Change

Climate change is reshaping the world's environment, with major implications for humanity in the coming decades. This course will introduce students to the science of the earth's climate system, and help students explore issues of climate justice. and changing weather patterns. This course will also introduce students to national and international agreements on climate change action, and to positive steps that can be taken for climate change adaptation and mitigation at different levels, from the national and international to the local level.

Section 10.10
Grades 11 and 12 and Higher Education

"The current nature of secondary school exams, including Board exams and entrance exams - and the resulting coaching culture of today - are doing much harm, especially at the secondary school level, replacing valuable time for true learning with excessive exam coaching and preparation. These exams also force students to learn a very narrow band of material in a single stream, rather than allowing the flexibility and choice that will be so important in the education system of the future." [NEP 2020, 4.36]

In recent decades in India, there has been an unfortunate trend to see Grades 11 and 12 as merely a means to gain admission into higher education. The curricular logic often gets twisted due to this instrumental thinking.

The curricular logic of the NCF is oriented towards realizing the aims and goals for school education. The learning standards, content, pedagogy, and most crucially the assessments are designed towards achieving these aims. It is a mistake to imagine the purpose of the Secondary Stage of schooling, particularly Grades 11 and 12, as a mechanism for selecting and sorting students for different programmes in higher education. This curricular logic is derived from the four fundamental principles articulated by NEP:

a. **Flexibility,** so that learners have the ability to choose their learning trajectories and programmes, and thereby choose their own paths in life according to their talents and interests;

b. **No hard separations** between arts and sciences, between curricular and extra-curricular activities, between vocational and academic streams, etc. In order to eliminate harmful hierarchies among, and silos between different areas of learning;

c. **Multidisciplinarity** and a **holistic** education across the sciences, social sciences, arts, humanities, and sports for a multidisciplinary world in order to ensure the unity and integrity of all knowledge;

d. **Emphasis on conceptual understanding** rather than rote learning and learning-for-exams;

The curriculum for Grades 11 and 12 is guided by these motivations, rather than as instrumental "preparation" for selection into higher education programmes.

The NEP 2020 has made a sincere attempt to delink the school education processes from the admissions processes of higher education.

"The National Testing Agency (NTA) will work to offer a high-quality common aptitude test, as well as specialized common subject exams in the sciences, humanities, languages, arts, and vocational subjects, at least twice every year. These exams shall test conceptual understanding and the ability to apply knowledge and shall aim to eliminate the need for taking coaching for these exams. Students will be able to choose the subjects for taking the test, and each university will be able to see each student's individual subject portfolio and admit students into their programmes based on individual interests and talents". [NEP 2020, 4.42]

It has to be emphasized here that the specialized common subject exams envisaged by NTA should be broad in terms of focusing on the key conceptual structures and methods of investigation in the discipline. If these subject exams test narrow content knowledge, it would be misaligned with the goals and approaches of the NCF.

Part C:
Cross-cutting Themes

Chapter 1

Values

(To be edited)

"The purpose of the education system is to develop good human beings capable of rational thought and action, possessing compassion and empathy, courage and resilience, scientific temper and creative imagination, with sound ethical moorings and values. It aims at producing engaged, productive, and contributing citizens for building an equitable, inclusive, and plural society as envisaged by our Constitution." [NEP 2020, Principles of this Policy]

"Students will be taught at a young age the importance of "doing what's right", and will be given a logical framework for making ethical decisions. In later years, this would then be expanded along themes of cheating, violence, plagiarism, littering, tolerance, equality, empathy, etc., with a view to enabling children to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. As consequences of such basic ethical reasoning, traditional Indian values and all basic human and Constitutional values (such as seva, ahimsa, swachchhata, satya, nishkam karma, shanti, sacrifice, tolerance, diversity, pluralism, righteous conduct, gender sensitivity, respect for elders, respect for all people and their inherent capabilities regardless of background, respect for environment, helpfulness, courtesy, patience, forgiveness, empathy, compassion, patriotism, democratic outlook, integrity, responsibility, justice, liberty, equality, and fraternity) will be developed in all students." [NEP 2020, 4.28]

"....ethics and human & Constitutional values like empathy, respect for others, cleanliness, courtesy, democratic spirit, spirit of service, respect for public property, scientific temper, liberty, responsibility, pluralism, equality, and justice" [NEP 2020, Principles of this Policy, p.5]

NEP 2020 makes an explicit commitment to the development of values. As stated in Part A, Chapter 1 on Aims and Curricular Areas of School Education in this NCF, developing values and dispositions are critical to attaining the aims of education.

Section 1.1
How does development of values happen in school?

Values are ethical positions. These reflect worldviews or ways of thinking. While there is overall consensus that education must develop values, there is equal recognition that this has been one of the hardest things to do systematically in formal educational settings.

One critical way in which values are developed in school is through school and classroom culture (e.g., sensitivity and respect for others is encouraged when opportunities are provided for all students to participate in activities and select students do not end up participating in all activities) and school and classroom practices (e.g., regular *bal sabhas* and *bal panchayats* help to build notions of democracy, justice and equality). *For more details, please see Part D, Chapter 1 on School Culture.*

In this NCF, the development of values is an integral part of the learning standards and pedagogical processes across all curricular areas. Illustratively, building resilience through learning to win and lose with grace in physical education or building scientific thinking through laboratory experiments and trials.

The development of values is influenced by these school and classroom processes in a differentiated manner as children grow, and therefore must be used appropriately at different Stages. Illustratively: At the Foundational Stage, playing together helps children learn to share. At the Preparatory Stage, the emphasis on completing given work and putting things away as a part of classroom practice helps good habit formation. At the Middle Stage, the emphasis on collaborative group work as part of classroom practice helps develop the ability to work in teams. At the Secondary Stage, the emphasis on giving critical feedback on work done would help develop the ability to handle criticism and praise, success and failure with equanimity.

It is also important to be conscious of the fact that each of these processes help to develop different kinds of values. Some values are developed better through particular processes. Illustratively, regular dialogue and discussion with active listening as part of classroom culture and processes helps develop democratic values like pluralism, equality, justice, fraternity. Curricular areas like Arts and Physical Education help build individual virtues like honesty and courage). Curricular areas like Science and Mathematics help build epistemic values like scientific temper and mathematical reasoning. Marking important days through community service as part of school culture and practices help build cultural values like *seva, ahimsa, shanti*). Regular practices at the school assembly help promote pride in India's cultural diversity.

Section 1.2
Three difficult but critical questions

1.2.1 Is Value Education as a separate subject/class effective?

This is a difficult question and has no direct, simple answer. Our experience so far across the country has been mixed. For most part, we have struggled to understand or execute it well in school. It has either become 'boring' or 'preaching' or an additional load on everybody resulting in very little impact. But we have not built a strong enough alternative approach either that can ensure that values have an important place in our everyday school processes.

In this NCF, development of values is fully integrated into learning standards, pedagogical processes and school and classroom culture. There is no separate time or class, or subject being proposed for value education at this point.

But it may be worthwhile for individual schools, school systems and States to consider and rigorously address the following questions:

a. Are there specific values that need specific attention and, therefore, specified time?

b. Should there be a different approach for different Stages? What would work best for each School Stage? E.g., Would children at the Secondary Stage benefit from a separate time for Values so that they are able to develop cognitive understanding and reasoning around these issues and learn to reflect better on their own behaviour?

c. Can we develop Teachers with the capability to handle such sessions in a rigorous manner that is open and encourages respectful questioning and discussion?

d. Can we develop interesting and rigorous material for teachers and children on this?

Besides these considerations, the response to this question depends on how a separate subject/class could be constructed, and what values are to be focused on for it.

1.2.2 What do we do about conflict in the lives of children presented by the values being aimed at in the school versus their violation or differences they see in their lives?

Again, this question does not have a simple answer.

Processes of dialogue and behavior which will demonstrate that conflicts and values are an integral part of human societies, and they need to be resolved through discussion and sustained effort will have to be built into classroom culture and practice.

Illustratively, when gender equality is encouraged in school, but children see the opposite within their families and communities, it would be critical for teachers to help children understand why there is a difference, support them to choose their actions and responses in a way that allows children to place their views before their families with reason and without disrespect and not give up easily.

School culture and processes must emphasize respectful conversations and discussions, especially listening actively with an open mind and helping children arrive at positive and useful responses to their situations.

1.2.3 Should development of values be assessed? If yes, how?

This is also a question with no simple answer.

Developing values is a continuous process and is mostly contingent on the environment supporting and encouraging such development. Putting the onus of developing values on the child could take away this responsibility from the school and its processes.

On the other hand, developing values is a critical part of the education process and it is important to understand children's development of values just as much as it is important to understand how much mathematics or language a child has learnt.

Careful and objective observation would be critical to assessment of developing values. One way to think about this is to focus the assessment on the 'behaviour' that demonstrates the value just like actually adding two numbers demonstrates that a child is able to 'do' addition. Illustratively, 'Child A helps other children when there is a problem' is a better way of articulating the learning rather than saying that a child has developed 'empathy' or 'sensitivity.'

Section 1.3
Values in the School Ecosystem

Development of perspectives and capacities of educational functionaries, school leaders and Teachers on values is equally critical – their understanding of these values and building them into school culture and practices is what will make this happen.

The culture of the education system must support the development of the same values otherwise there will be dissonance between what the system culture has and what is expected of the school. While these things are critical and will be alluded to in the NCF, they are matters outside the NCF - to the extent that some of these are relevant for the NCFTE, they will find a place.

Chapter 2

Inclusion

(To be edited)

"Education is the single greatest tool for achieving social justice and equality. Inclusive and equitable education - while indeed an essential goal in its own right - is also critical to achieving an inclusive and equitable society in which every citizen has the opportunity to dream, thrive, and contribute to the nation. The education system must aim to benefit India 's children so that no child loses any opportunity to learn and excel because of circumstances of birth or background. This Policy reaffirms that bridging the social category gaps in access, participation, and learning outcomes in school education" [NEP 2020, 6.1]

"Socio-Economically Disadvantaged Groups (SEDGs) can be broadly categorized based on gender identities (particularly female and transgender individuals), sociocultural identities (such as Scheduled Castes, Scheduled Tribes, OBCs, and minorities), geographical identities (such as students from villages, small towns, and aspirational districts), disabilities (including learning disabilities), and socio-economic conditions (such as migrant communities, low income households, children in vulnerable situations, victims of or children of victims of trafficking, orphans including child beggars in urban areas, and the urban poor)." [NEP 2020, 6.2]

"recognizing, identifying, and fostering the unique capabilities of each student, by sensitizing teachers as well as parents to promote each student's holistic development in both academic and non-academic spheres" [NEP 2020, Principles of this Policy, p.5]

Existing inequalities due to poverty, social bias, and exclusionary curricula create several roadblocks in the process of achieving inclusive and equitable education through all through stages of school. Studies show that a large percentage of students who either drop-out of elementary school or discontinue their education after school belong to Socio-Economically Disadvantaged groups (SEDGs), which include gender identities (particularly female and transgender individuals), socio-cultural identities (such as Scheduled Castes, Scheduled Tribes, OBCs, and minorities), geographical identities (such as students from villages, small towns, and aspirational districts), disabilities (including learning disabilities), and socio-economic conditions (such as migrant communities, low income households, children in vulnerable situations, victims of or children of victims of trafficking, orphans including child beggars in urban areas, and the urban poor). Many among these groups who manage to continue their education struggle to achieve learning outcomes due to a lack of adequate support, nutrition, or access to learning resources.

NEP 2020 also recognises the existing programmatic interventions that are in place, like providing scholarships, monetary incentives to parents to send children to school, and bicycles for students who face issues with transport. The extension of these mechanisms would be to practice inclusion and equity through everyday school process that would instill hope and bring change for those who continue to experience various forms of bias and discrimination. The experience of inclusion is critical to develop confidence and mutual cooperation among all students. Every

child must experience a sense of belonging and togetherness with the others in their peer-group, where differences are embraced with respect and dignity.

Section 2.1
Inclusion in the School Physical Environment

Accessibility is not only the proximity of schools for all children, but access to all the essential facilities required for learning. This includes ramps and barrier-free passages inside the school for People with Disabilities, and Children with Special Needs (CWSN). The lack of proper toilet and sanitation facilities are one of the reasons for the drop in school attendance, especially among adolescent girls. Schools must have well-maintained functional and safe toilets that are suitable for CWSN, separate toilets for boys and girls where the toilets for girls have a supply of menstrual hygiene products and dustbins for their safe and hygienic disposal. All common spaces and common property on the school campus that are meant for students and Teachers could be made accessible to all students and Teachers without discrimination. For example, furniture, stationery, plates used for meals, and glasses used for drinking water.

Section 2.2
Inclusion Addressed through Curriculum and Textbooks

Students learn best when they can connect their own lives and personal experiences with the content that is used in learning resources. This could be in terms of language and vocabulary used in the textbooks. As mentioned in NEP 2020, 'UNESCO has declared 197 Indian languages as 'endangered'. Various unscripted languages are particularly in danger of becoming extinct. When senior member(s) of a tribe or community that speak such languages pass away, these languages often perish with them; too often, no concerted actions or measures are taken to preserve or record these rich languages/expressions of culture.' Inclusion of various languages of the indigenous tribal minorities, as well as the languages and vocabularies that do not get used in the official and formal contexts of communication and dissemination, could be included in the school curriculum as these would be closer to the home languages and cultures that students are raised in. Similarly, examples used in textbooks, or in the content created by Teachers to support their classroom teaching could consciously include experiences from the lives of people and children from SEDGs. NEP also recommends that curriculums should be free of all forms of bias and stereotypes and 'more material will be included that is relevant and relatable to all communities.' Students of all backgrounds would feel included and build confidence when the examples they read about are close to home, giving them a sense of belonging, familiarity/ 'apnapan' with the expressions and cultures that are being represented.

Visual images have a powerful impact on young minds in shaping attitudes and behaviour. It is therefore extremely important that all backgrounds, genders, and abilities are represented in a manner that upholds their dignity and empowers them. Images of artworks created by well-known artists from SEDGs to support content in different subjects could be one way of including their imaginations, expressions, and cultures. Images and illustrations that are custom designed for illustrating concepts and stories could focus on visualising the values, behaviours and equitable social constructs that are envisioned through the curriculum, e.g., depicting a picture of a playground where children of different backgrounds, abilities, and genders are playing together.

Section 2.3
Inclusion Addressed through Pedagogy

Efforts need to be initiated to recognise and address discrimination and bias that occurs in the classroom. One way of doing this is through seating arrangements. All students must get a chance to sit with and work with different peer-groups through-out the year. The reasons behind children's non-participation and involvement in the classroom could stem from not having friends, being bullied, or being treated unkindly by the peer-group. Teachers could be alert to check if any student is excluded from the rest in informal settings, during breaks, play, or meal times. Teachers also need to ensure that children belonging to different genders, socio-economic groups, and with differential abilities interact with one another and develop meaningful bonds.

Discrimination and exclusion practiced by Teachers could take many forms. It starts with the belief that some students cannot learn because of their background, or ability and are labelled discriminatorily. Pre-service and in-service training programmes could address such issues and help teachers become aware of the biases and stereotypes that they may have, and how these are getting reinforced through their classroom practices. During classroom discussions, many children get excluded when the Teacher focuses their attention primarily on those who are quicker to respond, or students who are more vocal. On the other hand, when a Teacher asks all children to first think about what they want to say and practice it in their mind before raising their hands or responding, it would give many others a chance to take their time to respond. In addition to this, a Teacher could also keep a track of how many student's voices they have heard during the course of one lesson, or over a period of a week. This would give them insights into the students who are not able to participate actively or are having difficulty in expressing themselves and as a result, get excluded. Once a Teacher has this insight, they could work out strategies to encourage the quieter children to participate and share their views; and help them feel included.

Learning materials and resources used in the classroom could also be designed to cater to the needs of diverse learners, particularly CWSN, children with specific learning disabilities, and to suit multiple learning paces. Early identification and assessment of students who need special attention is a key factor in addressing inclusion. Children who exhibit difficulties with learning may require focused one-to-one attention or possess strengths that are not recognised. Teachers could take cognizance of the various reasons for the student's difficulties and have a compassionate approach while setting learning expectations or planning specific learning activities for them. Similar approaches would apply to curricular areas like physical education where schools could have specially designed games and sports that have modified rules to allow the inclusion and equal participation of CWSN. In such cases, the modification could increase the challenge for those who don't have disability by setting limits on their movements, rather than simplifying the game to accommodate those with disability. Such efforts would also develop empathy in the peer-group in understanding the challenges of disability through the game. Children of all genders could be encouraged to play sports together at all ages. There are several existing examples

of schools where girls and boys in Middle and Secondary schools practice *Kabaddi, kho-kho*, and martial arts together. Such practices not only develop a sense of trust, comfort, sensitivity and confidence in all genders, it also strengthens the conviction to challenge prevailing biases in other spheres.

It is important for school teams to assess if their approaches and methods are being inclusive, and not merely assume that they are. This can be done by frequently making space for discussions with students after the learning activities, for which the triggers could be like:

a. Did everyone get a chance to participate in the activity?

b. Did the teams/groups have representation of all genders that are present in the classroom?

c. Did anyone experience any discomfort during the class/activity?

d. Did anyone feel that they were treated unfairly during the class/activity?

Such discussions can provide a space for all children to express the difficulties they experience and draw support from others. This also generates love, empathy, and care towards all.

As with all school practices, inclusion and equity towards all needs to be a collective responsibility that is modelled by Teachers, Principal and all adult staff members, for students to observe and learn from.

Chapter 3

Information and Communication Technology

Technology is a broad term used for all types of tools, methods, and processes created by human beings to improve their lives. In this Chapter the reference is specific to Information and Communication Technology (ICT). ICT includes a wide range of software and hardware tools and technologies including devices like computers and mobile phones, networks like the internet, and software applications. These technologies enable us to store, process, and access information in digital form. This information can be stored in both textual and audio-visual forms. These technologies have also enabled us to communicate this information with each other effectively, efficiently, at scale, and at great distances. In the past few decades, ICT has transformed the way in which humanity engages with information.

Since education is fundamentally about knowledge and information, and communication of that knowledge to the next generation, it is inevitable that ICT would play a significant role in education in the coming years. The NEP 2020 recognizes this:

a. *"Appropriate integration of technology into all levels of education - to support teacher preparation and development; improve teaching, learning and evaluation processes; enhance educational access to disadvantaged groups; and streamline educational planning, administration and management." [DNEP 2019, Chapter 19, Objective]*

b. *"extensive use of technology in teaching and learning, removing language barriers, increasing access for Divyang students, and educational planning and management" [NEP 2020, Principles of this Policy, p.5]*

c. *"While education will play a critical role in this transformation (India's transformation into a digitally empowered society and knowledge economy), technology itself will play an important role in the improvement of educational processes and outcomes; thus, the relationship between technology and education at all levels is bi- directional." [NEP 2020, 23.1]*

In this Chapter we will explore the potential of ICT in school education, the possibilities of use of ICT in school education, the precautions of use and abuse of ICT in schools, and finally the principles of use of ICT in school contexts.

Section 3.1
The Potential of ICT in School Education

It is hard to differentiate the hype that any new technology generates in being the silver bullet for mass school education from the reality of schooling. Every generation has heard this promise, whether radio or television, that introduction of this technology would radically improve school education. The outcomes have always been sobering. It is abundantly clear that any technology cannot fix fundamental problems of resource provision, teachers' capacities and motivation, and students' readiness for schooling. The centrality of the presence of a motivated and capable teacher in every classroom in achieving educational goals needs continued emphasis. Any imagination of the use of technology in schools that is contradictory to this central principle needs to be abandoned at the earliest.

With this abundant caution, we will look at the potential of ICT in improving school education.

3.1.1 Access

While textbooks have been a necessity for schooling on a large scale, it is also well understood that learning should not be limited to what is presented in textbooks. ICT has made it possible for both students and teachers to have access to a wide variety of content. With the spreading network access to the internet and the ubiquity of digital devices that can connect to the internet, access to educationally valuable content has become more equitable and democratized.

3.1.1.1 For Students:

Direct access to digital content on the internet might not be appropriate for very young children. Access to digital content should be moderated and mediated by adults in this case.

a. Students can be encouraged to access and engage with relevant digital material that supplements the content in their textbook.
b. ICT can be used by students for additional practice and self-assessment.
c. Students can utilize technologies like peer forums and chatbots to clarify their doubts.

3.1.1.2 For Teachers:

More than the students, it is for the teachers the use of ICT becomes significantly enabling and empowering.

a. Teachers can use digital content available on the internet for supplementing the textbook material. Such content can enable different pedagogical approaches as well as provide different forms of engagement through audio-visual material. Textbook chapters, in the teachers' handbooks, can embed appropriate QR-codes which guide them to relevant supplementary content.
b. Resources for suggested and illustrative lesson plans for specific content areas and textbook chapters aid the teachers in preparing for classroom instruction.

c. Well-designed Pedagogical Content Knowledge packages for specific concepts can orient and prepare teachers conceptually for teaching.

d. Additional assessment tools and readily available worksheets can enable teachers to create formative assessments to understand the learning of the students.

e. More in-depth courses can allow teachers to deepen their perspectives of education as well as specific content areas. Teachers can enrol in these online courses and develop their capacities in their own pace and convenience.

3.1.2 Content Creation

ICT has not only democratized access to content. It has also democratized the creation of content. ICT has the potential to enable a wide variety of practitioners to create educationally valuable and relevant content.

a. Locally relevant content to be used in classrooms can be created with the assistance of ICT at the school cluster level by teachers and resource persons.

b. Teachers can create content dynamically, based on the specific needs of their classroom. They can access existing digitally available content and modify it to their specific needs.

c. ICT has made it possible for content to be created and presented in various forms. Videos, audio clippings, graphic simulations, animated presentations, all these forms of content can now be easily created by a motivated and capable teacher with the use of simple tools in ICT. These different forms allow for a variety in the content used in the teaching-learning process.

d. ICT also enables students to express themselves beyond a simple textual form. They can capture their educationally relevant understanding in various audio-visual forms for the teachers to assess.

e. With this NCF's emphasis on Arts, Physical, and Vocational Education, it is not hard to imagine the central role played by digital content. Instructional videos would be far more effective than textbook chapters for these Curricular Areas.

f. Generative AI technologies can be used by teachers to create content that is localised to their contexts and specific to their immediate pedagogical needs.

3.1.3 Individual Attention

The fundamental tension in school education is that learning happens at the individual level and teaching happens, usually, at the collective level. While attempts at individualized pedagogy and assessments have been imagined, ICT has an important role in mediating the teaching-learning process to bridge this gap.

a. ICT can enable the recording and tracking of the learning achievements of the students at a fine level of granularity. This information can assist the teacher in creating useful learning profiles of their students. These learning profiles can help teachers in creating individualized learning plans.

b. Students can engage with personalized content through personal digital devices, moderated by the teacher in the classroom. ICT can assist in personalizing this content by using the students' specific profile which includes their prior knowledge and tastes and preferences.

c. In higher grades students can access digital content that explains the concepts in different languages and multi-media formats. Students can engage with these materials at their own pace. Thus, slowly shifting the responsibility of learning to the students and making them independent learners.

d. Teachers too can receive individualized training plans based on their needs and performance.

3.1.4 Interactive Content

The use of ICT allows for the possibility of dynamic and interactive content that a textbook cannot manage. Such use of ICT might be appropriate from the Middle School Stage, where students engage with interactive content through digital devices.

a. In curricular areas like science and mathematics, digital simulations can make engagement with concepts more hands-on and dynamic, thus improving conceptual understanding.

b. With advanced voice recognition and natural language processing techniques, ICT can assist in oral language development through interactive software.

c. Digital textbooks can have assessments embedded in them and students can check their understanding immediately.

Section 3.2
Possible ICT Solutions for Education

The above section broadly outlines the potential of ICT to have a positive impact on school education. To fully achieve the potential of ICT in enabling the vision of NEP 2020, the National Digital Education Architecture (NDEAR) was launched in July 2021. *"The core idea of NDEAR is to facilitate achieving the goals laid out by NEP 2020, through a digital infrastructure for innovations by, through and in the education ecosystem."*

The NDEAR addresses the following aspects of ICT in education:

a. **2 Core Interactions** – Learning Interactions and Administrative Interactions
b. **3 Scenarios** – Learn, Help Learn, Manage Learn
c. **5 Key Personas** – Student (any learner), Parent (any caregiver), Teacher (anyone who provides formal/informal teaching), Administration (anyone who can help manage), and Community Member (anyone from society including market players)

NDEAR attempts to enable a standardized and open solution for the above by creating:

a. Open Standards and Principles that define a set of:
    i. Principles - e.g., technology and ecosystem
    ii. Standards and Specifications - e.g. technology and data
    iii. Guidelines - e.g., data process, ecosystem engagement
    iv. Policies - e.g., data, openness, inclusion, accessibility
b. A Federated Architecture that identifies the key building blocks needed to make the architecture blueprint a reality.
c. An ecosystem of:
    i. Actors to build, develop, innovate - interoperable building blocks
    ii. Applications/Innovations in the form of Solutions, platforms, tools, and assets to be developed and used.

Digital resources for learning and for use by the five different personas have a very important role to play.

3.2.1 Digital Books and Libraries

Textbooks, stories, novels articles, and non-fiction in various languages in digital form are very important resources for school education.

3.2.1.1 Relevance

Digital books would be relevant across all subjects including vocational training. One example is to address the issue of low literacy levels requires more resources for the development of language. Digital resources can aid in listening more, reading more, expanding vocabulary and

meaning-making. The class and home need to be print rich, but it is also essential to be PRINT RICH DIGITALLY and have access to diverse digital content in the form of stories, books for various levels of readers, audiobooks, read-along digital content, vocabulary builders, digital dictionaries, word games, video content, online courses to improve language in multiple languages and tools to get a sense of one's own learning levels in language.

3.2.1.2 Benefits of Digital Books

a. Overcomes physical barriers to access - Many books can be accessed by the individual even if they don't have access to physical books in their local environment.

b. Portable - They can be accessed from anywhere, anytime and across devices.

c. Extendable - Textbooks particularly can be extended, modified and updated quickly when in digital form.

d. Delays - Delivery delays can be overcome.

e. Inclusive - Digital books lend themselves to accessibility, size of the font, page colour, adding read-aloud, and audiobooks can be enabled.

3.2.1.3 Resources

There are several platforms and resources available that enable access to digital books. Pratham Books Story weaver is a platform to access stories in various Indian languages and across different reading levels. NCERT has made all its textbooks available online across various platforms SWAYAM, DIKSHA, and E-PATHSHALA among others. In addition, IIT-Kharagpur has the national digital library platform. Several private publishers are enabling access to digital versions of their publications be they fiction or non-fiction.

3.2.2 Videos, Animations and Audio

Digital material in the form of videos, animations and audio is useful to explain topics, and concepts, and demonstrate through "how to …" for both students and teachers.

3.2.2.1 Relevance

Across all subjects and domains ranging from an explanation and demo video for teacher (and student) on "how to teach/learn place value using sticks and stone" to "watching a video of force in action in a cricket game". Videos and animations are excellent learning aids for both students and teachers. The creation of contextual content is as relevant as the consumption of content in the teaching and learning process. This form of digital content is particularly relevant for the curricular areas of arts, physical education, and vocational education.

3.2.2.2 Benefits

a. Deepens understanding: helps understand the subject matter better by engaging multiple senses (seeing and hearing) of the learner and also enables visualisation of the topic or concept.

b. Connection: A video helps establish a human connection to the learning process unlike engaging only with text.

c. Shareable: the teacher can send a video to the parent via messaging and students can share with each other.

d. Independence: enables independent study by students and this becomes relevant as the learner evolves across stages.

e. Repeatability and pacing: Videos also give the teacher the opportunity to demonstrate an aspect or subject repeatedly. The student can go back to ideas and concepts they have not understood and watch and learn again, it helps a student "personalise" their pace of learning.

f. Builds on an existing habit: engagement with videos across various platforms is an integral part of evolving learning habits, be it watching a cooking video to learn how to make an unfamiliar dish or a teacher watching a video on how to teach place value using sticks.

g. Makes interdisciplinary learning easier: A well-crafted video on the topic can connect domains of learning in a shorter and more efficient way. For e.g., connecting topics of physics demonstrated through playing cricket or cooking to chemistry or carpentry to math.

3.2.2.3 Resources

Videos and animations are possible across several platforms. Television and OTT platforms and radio including community radio can play a big role - imagine being able to watch a movie or listen to a play based on a story in the language textbook.

Platforms such as SWAYAM and DIKSHA are regarded as well-curated spaces for curriculum-linked content, in addition to several private platforms. Using the curation as well as sourcing tools such as VidyaDaan available on these platforms, the quality of curriculum-linked content can be increased. The learning experiences from SWAYAM and DIKSHA can help evolve a body of knowledge of digital pedagogy which in turn can help craft a common set of guidelines that will enable the creation of better quality and relevant content.

3.2.3 Online Courses

These are micro-courses and courses with certification available online.

3.2.3.1 Relevance

The national curriculum framework will open up the need for training and capacity building of teachers and administrators across the country. A cascade approach or only an in-person method of training will not be sufficient. The NCF also focuses on new curricular areas such as vocational education and interdisciplinary areas. Neither students nor teachers should be limited by geographical barriers, language barriers or any other constraints in order to develop skills or explore interests outside of the school framework. Digital courses with or without credentials can enable exploration, skill and capability development.

3.2.3.2 Benefits

a. Anytime anywhere learning.

b. Choice of topics to learn and develop skills.

c. Digital credentials for both students and teachers enable them to build and showcase their abilities and body of knowledge.

d. Opportunities to revisit and relearn.

e. Micro-courses as a concept will provide just-in-time bite-sized learning. Examples – for teachers, "How to teach mathematics connecting to day-to-day living?", "How to read aloud stories to make it engaging", and "Tips on how to link sports and physics". While for students on "How to make pots" "How to build a wooden table" "how to build a biogas plant", "how to compost organic waste" "how to play a musical instrument" "How to develop the skills to be a sports person" "how to pursue a certain career e.g., police official" are useful educational resources.

3.2.3.3 Resources:

SWAYAM, DIKSHA, NISHATA platforms and several state training programs will be available for skill development and capacity building and issuance of verifiable credentials.

NCERTs and State SCERTs' experience in rolling out large-scale online training programs are available to be leveraged to evolve the digital pedagogy that will work for the context, scale and constraints of India.

Sourcing content by states or the centre for specific demands from the wider ecosystem through NDEAR Vidyadaan would enable the ecosystem to contribute.

3.2.4 QR Codes

3.2.4.1 Relevance

Across all curricular areas access to a wide range of digital resources is needed. These resources could be in the form of further explanation content, demonstration videos, worksheets, courses, assessments, experience etc. QR code act as the access point to the wider resources starting from a familiar learning resource - either a textbook or any physical teaching and learning material.

3.2.4.2 Benefits

a. Bridging: Bridges the physical and digital teaching-learning environments. For e.g., in a multi-lingual classroom children whose home language is not the medium of instruction may need access to some basic translation of content in their home language. QR-coded textbooks that connect the student to the explanation of key terms of each chapter in different languages, will help build vocabulary and better understanding.

b. Extendibility: QR code on the physical books makes it possible to "extend content" supplement in a seamless way.

c. Connection: Due to the limitation of physical space on the materials it is easier to make connections in the digital space – interdependent and interdisciplinary materials either through text, audio or video can be made available to teachers and learners.

d. Inclusive: Across all subjects QR code enables access to diverse content relevant to different learners making inclusive classrooms a reality - audio added to books helps print-impaired learners and can be accessed through the QR code, similarly access to ISL content can be made available.

3.2.4.3 Resources

Digital infrastructure available in the form of NDEAR-compliant DIKSHA DIAL code and content repository enables the generation of taxonomy-linked QR codes to be used on teaching and learning materials. In addition content repositories such as DIKSHA or any other NDEAR-compliant content repositories can be leveraged.

3.2.5 Virtual Labs and Simulations

ICT allows for democratising access to environments for experiential learning, especially in science and mathematics and makes scarce resources available for all through technology.

3.2.5.1 Relevance

Practical application of concepts and the ability to conduct experiments in a virtual environment will deepen learning in mathematics and the sciences.

3.2.5.2 Benefits

a. Access anytime anywhere: Students in remote locations get access to labs and enable anytime anywhere learning for all students.

b. Quality: Better quality of labs without being restricted to challenges of funding, procurement of materials and equipment.

c. Immersion: Visual aids to teach complex theoretical topics and concepts creates an immersive learning experience.

d. Safety: Ensures safety

e. Repeatability and flexibility: Time and space to repeat experiments and try new experiments without resource constraints.

f. Feedback loops: Faster feedback and learning loops where dependence on the teacher may be reduced.

g. Equitable: As a shared common resource virtual labs as a common infrastructure provide equitable access to a scarce resource and remove constraints that apply to physical access.

3.2.5.3 Resources

The virtual labs project of the Ministry of Education has participation from many institutes of repute from higher education. However, more labs need to be created with a focus on the requirements of school education, one such program is the Amrita virtual lab and can be accessed at https://vlab.amrita.edu/

Leveraging open-source tools and adapting them to the Indian context such as for instance the PhET Interactive Simulations project at the University of Colorado Boulder creates free interactive math and science simulations. These are based on extensive education research and engage students through an intuitive, game-like environment where students learn through exploration and discovery.

3.2.6 Content Creation Capabilities

ICT enables easy creation and sharing of educationally appropriate context for the local context.

3.2.6.1 Relevance

a. Across curricular areas, there is a need for the creation and distribution of contextual local content. Teachers and administrators are routinely creating and curating teaching and learning materials. This capability is demonstrated through the digital habit of teachers creating video content and sharing their work through messenger services.

b. Ideas on how to create and generate local content should be made available to all DIETS and teachers across the country. The social science curricular area requires 20% of the content to be locally specific to that panchayat or district. Such content should be created and made available through NDEAR-compliant platforms such as DIKSHA.

c. Local content creation can be implemented as a decentralized process throughout the year and uploaded onto SWAYAM, DIKSHA and other platforms including local TV and radio and made available to all teachers.

d. Micro-courses that guide content creation processes should be made available to teachers and other content creators.

e. The NDEAR ecosystem should enable community members to create relevant content, particularly in the areas of arts and vocational education.

3.2.6.2 Benefits

a. Democratising content creation and building local capabilities will ensure contextual content development.

b. Self-sufficiency in resource regeneration at various levels will result in a diversity of teaching and learning resources

c. Nuances such as addressing learning gaps and dealing with multi-lingual classrooms which are very specific can be addressed.

3.2.6.3 Resources

a. There are various digital content creation tools across various platforms for various purposes, and there are various content platforms. For open and easy access, the NDEAR guidelines should be followed by content creators.

b. DIKSHA provides the capability of multilingual content support and creation support at the local level.

c. NCERT guidelines for digital content creation and the creation of inclusive content are useful resources in this journey.

3.2.7 Assessments, Question Banks, and Practice Materials

Easy access to a portfolio of assessment tools, question banks and problem sets enables teachers to use them as appropriate in their classroom teaching.

3.2.7.1 Relevance

For achieving several competencies repeated practice becomes a necessity. At the same time, this practice work should not be routine and mechanical. To create a set of worksheets that allows for in-depth practice and at the same time sustain the learners' interest is not an easy task. ICT can enable teachers to easily create appropriate practice tasks keeping in mind the learning levels of the students and their local context.

Teachers need question banks and problem sets linked to the curriculum to be able to do formative assessments of their students. Students can take charge of their own learning if assessments are non-threatening quizzes.

Assessments and quizzes can be done in many different ways - online at scale, online at a local level and in an offline manner. Question banks and practice questions levelled for different types and levels of learners will be required across subjects and languages. To also accommodate student diversity assessments in many forms are to be facilitated e.g., paper-pencil tests, oral assessments, project work, and group assignments.

3.2.7.2 Benefits

a. Online assessments give teachers and administrators data instantly.

b. Teacher aide: Access to question banks to curate regular formative assessments will be a supportive teacher aide.

c. Student aide: Access to practice questions across levels and access to quizzes would be helpful to students to do independent practice.

d. Inclusion by levelling and enabling formats of assessments - curated levelling of questions in different languages and enabling various methods of assessment - oral, video and project work would allow the assessments to be within the zone of proximal development of the learners.

e. Digitisation of assessment responses can help determine gaps across regions and necessary remedial action to be taken. This needs to be done at the class and school level but is also necessary at scale if one needs to improve ASER or NAS.

3.2.7.3 Resources

Digital infrastructure may be leveraged to create question banks aligned to learning outcomes and curriculum goals. Tools for quiz creation can be leveraged from DIKSHA and also sourced from the ecosystem via NDEAR. NCERT has conducted several national-level quizzes on the DIKSHA platform for students, the same infrastructure can be used by teachers in a school or at the district level or at the state level.

Section 3.3
Precautions in the use of ICT in School Education

3.3.1 Safety

Students in schools have not reached adult age. Safety is thus paramount in any decision related to technology use. While students can be physically protected within the boundaries of the school, allowing them to access the internet during school hours creates avoidable risks. It is the responsibility of the school to protect children from predatory and abusive behaviour often found on the internet.

The effect of screen time and the use of digital devices on the well-being of young children is still not fully understood. This implies a cautious approach to the use of digital technology by students at least till the end of the Preparatory Stage.

3.3.2 Privacy

It is the responsibility of the school to protect the privacy of students when they are expected to use ICT for educational purposes.

3.3.3 Inappropriateness

Controlling access to all content available on the internet is not an easy task. Even inadvertent access to inappropriate content can cause serious harm to young minds. Schools should be extremely mindful of this possibility and access to the internet should be under adult supervision in schools. For students in the Secondary Stage norms of behaviour in the digital world should be explicit as the norms of behaviour in the school.

3.3.4 Distraction

Several large-scale studies have shown that digital technology can be as much as a distraction as a useful tool for learning. Schools and teachers should be very cognisant of this possibility. It should not be forgotten that the purpose of the use of ICT is for the achievement of learning standards and not for the general entertainment of students or teachers.

3.3.5 Commercialization

In recent years rampant commercialization of educational content has resulted in very predatory practices of commercial interests. These profit-seeking enterprises have preyed upon the anxieties of parents and are promoting ICT-based educational solutions with doubtful efficacy.

Section 3.4
Principles for use of ICT in School Education

ICT use should never be viewed as a replacement for classroom engagement. It should be seen only as a supplement to classroom interactions.

3.4.1 A Framework for Teachers and Education Administrators to Think of ICT in Education

Curriculum, syllabus, books and especially textbooks and other teaching and learning materials and resources are guides and tools for teachers and learners to create learning environments and navigate learning. Technology for learning and what it enables must be seen in the same way, as an enabler and a tool. It is really up to the user to make what they can and want to, the decision-making process is in the hands of the facilitators of learning namely teachers, administrators and parents.

One useful framework to consider when engaging with technology for learning is Substitution-Augmentation-Modification-Redefinition (SAMR) by Dr. Ruben Puentedura. Teachers have practices that they follow and are comfortable with. When a new idea or tool is introduced often the expectation is that the teacher will learn to use them and be effective. In reality, each person's level of comfort is different and their ability to engage with new ideas and tools takes time and further, it takes some even more time to get effective results from a change in practice or use of a tool.

The SAMR framework is not about how high-end the technology is or the sophisticated use of technology.

There are two main functions of the SAMR framework. The first is **enhancement** where traditional learning is enriched by technology (which is achieved through substitution and augmentation) and the second is **transformation**, where technology's integration has fundamentally changed the process of learning (achieved through modification and redefining).

a. **Substitution -** when technology is used as a substitute for traditional practices thereby enhancing learning and adding value. Technology acts as a direct tool substitute with no functional change. For e.g a writing task is replaced by typing using a computer with MS Word or Google Docs.

b. **Augmentation -** when technology adds something to the learning process beyond just convenience. It enhances by doing something that was not previously possible. Extending the same example - typing on google docs where with one click the document is shared with others so comments and feedback can be given by others.

c. **Modification -** when technology offers an opportunity the redesign of the task. The written document in the above example is posted online as a blog post for a wider audience to read and engage with. At this point it is not an essay, it becomes an article for a wider audience.

d. **Redefinition -** when technology allows for new tasks that were previously inconceivable. In this example of the writing, the document is written by collaborating with a wider audience and then published as collective work, this is then made in a video format and is shareable with an ever wider audience. The most sophisticated stage of SAMR, redefinition sees using technology to make entirely new learning opportunities possible. Redefining learning has the potential to connect learning with the real world and produce authentic outcomes. It also gives students strong technological soft skills such as digital collaboration, communication, technological literacy, and the ability to adapt to new systems and processes. It can also help create a more vibrant and engaged classroom.

3.4.1.1 Examples of Enhancement through Substitution

a. Students type their work instead of handwriting it. The option to type instead of write has been an accommodation for students with learning disabilities. But more and more as students have started to do project work, producing printed materials is becoming accepted practice.

b. Students are able to participate in online quizzes and programs instead of in person and through pen and paper. NCERT has used DIKSHA to conduct national-level quizzes on several topics. Instead of in-person quizzes; This has enabled wider student participation from across the country, it allowed students from remote areas the same opportunities as participating in an in-person quiz which was only possible for those who could not travel.

c. Students have access to digital worksheets - Teacher sharing a worksheet digitally in PDF for student access, as opposed to printing, and photocopying. Sending worksheets, videos, and images on WhatsApp to parents is now becoming a common practice in India.

3.4.1.2 Examples of Enhancement through Augmentation

a. Students having a QR-coded book that links digital resources to a physical book augments access to a wider range of digital resources beyond what is locally available to the student. It will connect students and teachers which gives them access to a video explaining the same topic. A video explaining a complex topic in a simple way clarifies a particular hard-to-explain concept. It might give students a clearer understanding of a complex topic or makes it engaging in a way that traditional methods can't. Not all learners engage with the same teaching process in the most optimum way, different kinds of learners need to be stimulated differently and they learn differently.

b. Students have access to audio and videos with subtitles - The QR code leads to an audio description of the topic, this would enable a learner with visual impairment to engage with the content. In addition to the explanations, there may be other related materials that the student could access.

c. Access to multilingual content - In India due to multilingual classrooms access to explanation content in the home language of the student would help deepen their understanding.

d. Access to practice content - Students can find practice and build mastery by doing more with access to content such as worksheets etc.

e. Tools to track the learning journey of self - Tools that help a student track their progress and see their learning away from the lens of a teacher or an adult. Linking this to the stages of learning of a student, technology can be used to augment the student's journey towards

independence. By using technology as a source of information, students can start actively learning without requiring constant teacher-led instruction. It allows for the introduction of more independent and student-centric learning.

f. Access to content - accessing digital materials where there are delays in access to or delivery of books and print materials. In addition, being able to manage resources due to lack of space or accessing resources promptly.

3.4.1.3 Examples of Transformation through Modification

a. Students produce a video or an audio recording summarizing a topic, which can then be accessed by other students as a revision resource.

b. Students create an informative video presentation in place of a standard oral presentation. They can use their voice alongside a broader variety of creative multimodal components.

c. Students use the virtual lab and conduct experiments and can share the same with the class, bringing to life a concept.

d. Student uses other tools such as digital manipulatives to understand abstract concepts in a hands-on, responsive way (e.g. voyaging on Google Earth to better understand measurement and geography).

e. Assessment is different - A traditional way to assess a student is to do a written paper for instance a write-up on a topic. A modified way to do this might be to ask for a presentation recorded on video or even an audio narrative based on the topic.

3.4.1.4 Examples of Transformation through Redefinition

a. Connect with the wider world - connecting your students with other people around the world as part of the learning journey.

b. Publishing work - having students publish their work online where it can be viewed by peers and the broader community.

c. Recording students as they deliver a presentation or practice a physical skill, then using this recording to prompt student reflection.

d. Experiment with tasks that use extensive multimodal elements (e.g. producing documentaries or short films, webpages, print documents with creative layouts).

Box C-3.4-i

Teachers may ask themselves the following questions as they determine the use of technology in their classroom. Redefining the learning process does not need to be the goal. A few simple technological additions to an already effective teaching strategy might be needed to make a difference.

- *What am I hoping to achieve by using this technology?*
- *How will it make a difference to my students' learning?*
- *Why is it preferable to not use technology?*
- *How equipped am I and my students to use this technology?*
- *How much time do I have to invest in making it work?*

3.4.2 Child Rights and ICT

The UN commission on the Rights of the Child adopted General Comment 25 on the digital rights of children in 2021 and issued the following guidance. There are four principles for children's rights:

a. Non-discrimination: Children must be protected from discrimination and treated fairly, whoever they are.

b. Survival and development: Children must be supported to grow up into what they want to be without harmful interference. In this context, the privacy and use of data of children must be handled with care.

c. Best interest of the child: When making any decision, adults — including governments and businesses — must do what is best for children rather than themselves.

d. Respect for children's views: Children have opinions that must be taken into account in all things they care about.

Based on the above principles, UNICEF has recommended specific rights for children in the context of the use of ICT. These principles have been adopted by NDEAR too.

Box C-3.4-ii

UNICEF – Children's Digital Rights

"In a digital world, where their actions and interactions could impact them into adulthood, the duty to protect children is that of governments, private organizations, and civil society.

v. Children have the right to privacy and the protection of their personal data.

vi. Children have the right to freedom of expression and access to information from a diversity of sources.

vii. Children have the right not to be subjected to attacks on their reputations.

viii. Children's privacy and freedom of expression should be protected and respected in accordance with their evolving capacities.

ix. Children have the right to access remedies for violations and abuses of their rights to privacy and free expression, and attacks on their reputation."

India's protection of personal data bill and laws related to the protection of children contain principles that must be applied in the digital context as well. Children have to be protected from tracking, tracing and in the context of education, labelling and discrimination.

Based on the above potential, possibilities, and precautions of ICT use in school education, it is necessary to evolve a set of guiding principles for the use of ICT in school education.

3.4.3 Stage-Specific Guidelines for ICT Use

a. In all stages, students should not be exposed to any digital content that has commercial advertisements.

b. In the Foundational Stage ICT use by students should be avoided. Students should engage with concrete material and real-life experiences. Engagement with ICT should be limited to specific audio-visual presentations made by teachers. Teachers can use ICT to create physical content like worksheets and other concrete materials but should avoid generating digital content for direct use by very young children.

c. In the Preparatory Stage ICT use by students should be restricted and limited to very specific needs. ICT use by students should be carefully supervised by teachers. Access to internet is perhaps not necessary. All digital content should be downloaded and made available offline.

d. In the Middle Stage ICT use by students should continue to be under direct supervision of teachers. Digital content accessible over internet can be utilized but under supervision of teachers.

e. In the Secondary Stage, clear norms, and guidelines for use of ICT should be discussed with students. These norms should be given equal importance as to norms of behaviour in the classroom and school premises.

Chapter 4

Guidance and Counselling in School

(To be edited)

Children are unable to learn optimally when they are undernourished or unwell. Hence, the nutrition and health (including mental health) of children will be addressed, through healthy meals and the introduction of well-trained social workers, counsellors, and community involvement into the schooling system". [NEP 2020, 2.9]

...recognizing, identifying, and fostering the unique capabilities of each student, by sensitizing teachers as well as parents to promote each student's holistic development in both academic and non-academic spheres" [NEP 2020, Principles of this Policy, p.5]

Efforts will be made to involve community and alumni in volunteer efforts for enhancing learning by providing at schools: one-on-one tutoring; the teaching of literacy and holding of extra help sessions; teaching support and guidance for educators; career guidance and mentoring to students; etc. In this regard, the support of active and healthy senior citizens, school alumni and local community members will be suitably garnered. Databases of literate volunteers, retired scientists/government/semi government employees, alumni, and educators will be created for this purpose." [NEP 2020, 3.7]

Guidance can be broadly defined as the process of assisting individuals to enable themselves. It is the process of a supportive engagement that enables a person to find direction, for making their own decisions and actions, towards personal well-being and useful social participation. Often, it involves a trustful relationship where the person guiding is in some position of trustworthiness, seniority, or authority, or is deemed insightful or knowledgeable.

Counselling as a process involves an individual consulting another for advice. Much like the process of guidance, it involves helping individuals to understand and act upon their attitudes and decisions. Except that here, this change-seeking aspect takes a more central feature and often requires a skillful (and well-trained) individual to engage and challenge individual patterns of belief and behaviour.

In the school environment, Guidance and Counselling can be seen as paired words and not separate activities. Here, it refers to the process of supporting the learning and maturation of students and not as a stand-alone or a separate part of the school curriculum. It must be seen as complementary to the overall curriculum. Another important point to note is that the school curriculum is almost wholly designed for student groups. The pointed focus of Guidance and Counselling is on an individual student's needs of learning, health, and well-being.

Having a system of guidance and counselling would also help Teachers, parents, and administra-

tors to meet needs of different students e.g., difficulties in learning, career and higher education choices, maturation-related issues (adolescence, autonomy, social cohesion), mental health and well-being.

Section 4.1
Scope in Schools

In the context of schools, Guidance and Counselling can be seen as supporting the attainment of educational aims. It contributes to creating an ethos of overall well-being, teaching individuals an ethic of care and mutual respect. The scope of Guidance and Counselling support may be seen as follows:

a. Health and well-being for members of the school community: Providing basic Guidance and Counselling to students, parents, and administrators in the context of the school community in the following areas:

i. **Physical health and wellness:** This is one of the most crucial needs of growing up that requires careful addressing by schools. Designing programmes that contribute to good health and physical fitness for all students across the Stages in their school life is a central goal.

ii. **Psychological health and wellness:** With a primary focus on students, Guidance and Counselling work must teach strategies for emotional regulation and positive motivation. While mild to moderate challenges with mental health challenges can receive counselling support within the school, it would be necessary to direct students and families to more qualified professionals outside the school system for clinical diagnosis and support.

iii. **Social participation and cohesion:** This would involve teaching strategies for healthy adherence to social norms, expectations, and valuable social participation in the school. Schools would need to be equipped to meet the challenges of resistance, aggression, isolation, and bullying.

iv. **Cognitive health and growth:** Identifying students who are struggling to meet cognitive developmental milestones, advising their parents with supportive strategies, and planning for additional teaching support.

v. **Learning needs and diversity:** Identifying challenges of attention and Specific Learning Disabilities, attending to challenges that arise from any form of physical disability in students, and creating Individualized Education Plans.

b. Providing support for administrative and systemic improvements: Individuals involved in Guidance and Counselling support must also be consulted while making decisions about the school's functioning, policies, programmes, and activities. Enabling systemic improvements in schools that are cognizant of the diversity of learning needs primarily and other members' needs for support.

c. Academic and Career counselling: Helping students to make choices in the various Stages of their school life whenever newer curricular areas are introduced. Also helping with making decisions about academic and career choices after secondary school.

Section 4.2
Who Can Guide and Counsel

In formal and informal ways, School Teachers, Principals have always played the role and have long been naturally vested with the responsibility of guiding and counselling students and parents. These members of the school are best placed (because of their daily contact and connection) to take up the responsibility too.

Teachers, Principals, will be required to continue playing the role of guides and counsellors and should get basic education in this regard so they have the required skills and capacities. However, it is an urgent need that a professional/specialist for Guidance and Counselling at least at the cluster level as suggested in NEP 2020 must be appointed as soon as possible.

Also, considering the ground realities of a vast majority of schools across the country, it is important and reasonable to acknowledge that school systems will have their limitations in addressing many challenges that come up concerning Guidance and Counselling. A successful plan for such support would require an understanding of what kinds of challenges School Teachers, Principals *can* manage to address and what kinds of events or issues they cannot manage themselves but *only direct* to professionals outside the ambit of the school.

However, Schools that have the resources and access to professionals can simply take the lead and follow what NEP 2020 suggests.

Section 4.3
Expected Outcomes

A good quality Guidance and Counselling support process in schools over time will ensure the following outcomes are achieved **at the level of individual students.**

a. Students would be physically and mentally healthy as individuals and comfortably practice positive learning habits.

b. Students would be retained in school and the number of school dropouts in all Stages of schooling is lowered significantly.

c. Students with diverse learning needs find equitable opportunities for support and growth.

d. Individual students will be able to make good subject choices, vocational and career choices based on the advice they receive from Guidance and Counselling.

e. Teachers and parents would be able to meaningfully communicate and support student learning.

f. Administrative policies and practices would keep students' achievement of knowledge, capacities, values and dispositions at the heart of all decision-making processes.

g. The school environment would be experienced as safe and protected by all members of the school.

h. The school environment is seen as a space that allows for creative expression.

i. The school year would look well-planned and designed with good-quality learning processes that demand rigour and discipline in students.

j. The school would receive adequate support and respect from the local community.

Chapter 5

Developing Sensitivity to and Care for the Environment

(To be edited)

Certain subjects, skills, and capacities should be learned by all students to become good, successful, innovative, adaptable, and productive human beings in today's rapidly changing world…these skills include: ... environmental awareness including water and resource conservation, sanitation and hygiene; ... [NEP 2020, 4.23]

The societal challenges that India needs to address today, such as access for all its citizens to clean drinking water and sanitation, quality education and healthcare, improved transportation, air quality, energy, and infrastructure, will require the implementation of approaches and solutions that are not only informed by top-notch science and technology but are also rooted in a deep understanding of the social sciences and humanities and the various socio-cultural and environmental dimensions of the nation. [NEP 2020, 17.4]

With climate change, increasing pollution, and depleting natural resources, there will be a sizeable shift in how we meet the world's energy, water, food, and sanitation needs, ... resulting in the need for new skilled labour, particularly in biology, chemistry, physics, agriculture, climate science, and social science." [NEP 2020, Introduction]

It is clearly understood that the world is at a crisis point due to environmental concerns. It is equally clear that encouraging students to build an understanding of the environment, develop sensitivity towards the environment and find ways to demonstrate care about their environment is a critical responsibility of school education.

Developing sensitivity to and care for the environment is a central theme throughout the school education curriculum in this NCF.

Learning about the environment helps students discover it's beauty and take pride, ownership and responsibility for its care. Students naturally observe and explore things and various processes around them, and this will build on that natural ability and interest. This also helps to develops specific values e.g., dignity, appreciating diversity, respect for all living beings, respect for resources and their use, equitable distribution of available resources.

While it is important that students acquire a conceptual understanding of environmental issues and challenges, as well as an appreciation of the magnitude of the problem, it is equally important to ensure they do not get discouraged or despair for their future. To do this, the curriculum must focus presenting possibilities and positive examples of actions to contain or reverse environmental damage. At the same time, it must be emphasized that the onus for mitigation is not

only on individuals but on communities and nations as well.

India has a long history and rich traditions of environmentally sustainable practices. It is important for our students to understand this and learn about such practices from across different regions of our country.

Section 5.1
Learning about the Environment across School Stages

Learning about the environment is an integral part of this NCF across all School Stages. This is reflected in different ways - as part of Learning Standards at every Stage (as reflected in Curricular Goals and Competencies), as part of pedagogical processes across Stages, conceptually integrated into curricular areas and as a separate curricular area.

a. At the Foundational Stage, Curricular Goals and Competencies are organised around the domains of development and not as curricular areas. Developing a positive regard for the environment, caring for all life forms and finding joy in engaging with nature is part of the Learning Standards at this Stage. Spending time in nature is an integral part of pedagogy at this Stage encouraging children to observe and interact sensitively with plants, animals, insects and birds.

b. At the Preparatory Stage, learning about the environment is integrated into World Around Us, one of the curricular areas at this Stage. The focus is to begin with the immediate environment of students and gradually broaden it by the end of the Stage. An inter-disciplinary approach would enable learning and ensure that students do not receive a fragmented view of the world around. At this Stage, there are Learning Standards related to observing, understanding and engaging with nature. Pedagogical processes that emphasize caring for nature (e.g., growing plants, observing animals, using water carefully) are also the focus at this Stage. For students to become environmentally literate, they must learn by doing themselves.

c. At the Middle Stage, concepts related to the environment are integrated into Science and Social Science. This is to ensure that students engage with the basic 'knowledge of the environment' to enable deeper understanding of ideas around the environment at the next Stage. Learning Standards in Science and Social Science include those on understanding the environment (e.g., explores the living world around us, and its interaction with the inanimate world in scientific terms; Understands the spatial distribution of resources, their conservation and the interdependence between natural phenomena and human life). Pedagogical processes continue to emphasize sensitivity to and care for the environment.

d. At the Secondary Stage, Environmental Education is part of Inter-Disciplinary Areas, a separate curricular area at this Stage. They will focus on developing a holistic understanding of key concerns and issues related to the environment drawing upon their understanding across other curricular areas. At this Stage, students can independently deepen their environmental knowledge, assess issues, and analyze their causes, make informed judgements on statements and debates in the media and in society, and use a range of techniques developed in earlier grades to investigate, analyze, synthesize, question, critique, and draw their own conclusions. They can use multiple perspectives to develop an

integrated understanding, and advocate actions for certain environmental phenomena.

Across Stages, students' continuous engagement with and care of their environment is emphasized. Values related to the environment (e.g., collaboration, respect for diversity) have to be demonstrated by adults in the school so that students develop them as well. As students grow older, they must be encouraged to deepen their environmental knowledge, assess issues, show initiative, creativity, perseverance, and problem-solving skills for environmental action.

Chapter 6

Rootedness in India

Instilling knowledge of India and its varied social, cultural, and technological needs, its inimitable artistic, language, and knowledge traditions, and its strong ethics in India's young people is considered critical for purposes of national pride, self-confidence, self-knowledge, cooperation, and integration. [NEP 2020, Introduction, p. 4]

Knowledge of India will include knowledge from ancient India and its contributions to modern India and its successes and challenges, and a clear sense of India's future aspirations with regard to education, health, environment, etc. These elements will be incorporated in an accurate and scientific manner throughout the school curriculum wherever relevant. [NEP 2020, 4.27]

All curriculum and pedagogy, from the foundational stage onwards, will be redesigned to be strongly rooted in the Indian and local context and ethos in terms of culture, traditions, heritage, customs, language, philosophy, geography, ancient and contemporary knowledge, societal and scientific needs, indigenous and traditional ways of learning etc. – in order to ensure that education is maximally relatable, relevant, interesting, and effective for our students. Stories, arts, games, sports, examples, problems, etc. will be chosen as much as possible to be rooted in the Indian and local geographic context. Ideas, abstractions, and creativity will indeed best flourish when learning is thus rooted. [NEP 2020, 4.29]

Our country is one of the most diverse nations on earth. We have a rich heritage and culture with varied traditions within and across local communities. Our country is also home to deep knowledge in a variety of disciplines and fields from literature to mathematics, philosophy to arts, grammar to astronomy, ecology to medicine, architecture to agriculture, psychology to politics to education. Contemporary India is equally vibrant, taking its place in the modern world.

The Indian vision of education has been broad and deep, including the idea that education must foster both inner and external development. Learning about the external world should be in consonance with learning about one's inner reality and self. This is also an eminently practical perspective – developing good health and socio-emotional skills and developing the ability to think and make good and rational choices and decisions in the world, must occur in an integrated and holistic manner. Learning is not merely gathering information but is the development of self, of our relationships with others, being able to discriminate between different forms of knowledge, and being able to fruitfully apply what is learnt for the benefit of the individual and of society.

As promised in the NEP 2020, this NCF is strongly rooted in India's context and in Indian thought.

Section 6.1
How is this done across Stages and Curricular Areas? Some illustrations

Learning about India and situating learning in the child's context, both local and national, is an integral part of this NCF across all School Stages. This is reflected in different ways - as part of Learning Standards at every Stage (as reflected in Curricular Goals and Competencies), as part of pedagogical processes across Stages, and as a fundamental principle of content selection through the Stages and across curricular areas.

a. At the Foundational Stage, the child's own context is seen as the best source of learning across all domains of development. Stories, music, arts, games, from the local context are part of content used for teaching. Learning the value of seva is one of the Curricular Goals at this Stage. Children are given the opportunity to read and learn from the original stories of the Panchatantra, Jataka, Hitopadesha, and other fun fables and inspiring tales from the Indian tradition. Stories from the lives of great Indian heroes of history are also seen as an excellent way to inspire and introduce core values in children.

b. At the Preparatory, Middle and Secondary Stages, each curricular area takes a particular approach to embed this based on the nature and expectations of each discipline.

   i. **Arts:** The approach to Art Education in the NCF draws from ancient Indian texts like the *Natyashastra, Abhinaya Darpanam, Shilpashastra, Vaastushastra,* and *Chitrasutra* which have codified and structured the elements, methods, and aesthetic principles of the arts. Through different Stages, students will develop knowledge of these elements and principles and a vocabulary of the arts used to describe and discuss artworks and their processes. For example, *sruti, naada, raaga, taala, laya, bhaava, alankaar, nritta, natya, pramaana, saahitya, gamak, meend, rasa.*

   It will help students understand the unparalleled diversity and multicultural ethos of Indian artistic traditions through a consistent and meaningful engagement with local arts, crafts, music, dance, theatre, puppetry, pottery, textile arts, basketry, and so on. It also ensures that students are exposed to different genres of classical, folk, tribal, popular, and contemporary styles by providing adequate opportunities to view and be inspired by various aesthetic sensibilities and apply their imagination and expression while making their own artwork.

   The artistic processes of thinking, making and appreciation will but extend itself beyond the classroom to include the local community of artists and arts administrators, as well as a larger repository of art and culture through museums, archives, heritage sites, and other relevant cultural institutions and organizations.

   At the Preparatory Stage, students are expected to observe their local arts and cultures, and practice basic art forms like rangoli, clay work, pottery (without wheel), puppetry, folk songs, folk dances, and so on. At the Middle Stage, students are expected to learn simple artistic processes that are associated with different arts traditions and expand

their knowledge of artists and art forms across their state and neighbouring states. They are also expected to draw comparisons regarding the stylistic features and social contexts of various arts practices of the region. At the Secondary Stage, students are expected to broaden their arts exposure to art traditions from different parts of India and analyze the similarities and differences, and the possible causes due to geographical or social contexts. They will also apply this knowledge into their own art practice as they refine their crafting techniques and ideation skills.

ii. **Mathematics:** India has long history of contribution to mathematics in various domains of the discipline. Indian mathematicians discovered the zero and used it as a place holder which led to the development of most unique and powerful numeration system in the world. Later, the zero was also established as a number by an Indian mathematician who defined the zero as the absence of something and gave the symbol for it like for other numbers. Other major contributions are the discovery of negative numbers and the rules for basic operation in negative numbers, property of right-angled triangle that sum of the squares of perpendicular sides is equal to the square of the side opposite to the right angle and many more.

Mathematics in this NCF makes a deliberate effort to introduce students to these major contributions in the field of mathematics by Indian mathematicians. At the Preparatory Stage, students will be introduced to major contributions made by Indian mathematician in numeration systems. Student at the Middle Stage will be able to understand the development of important mathematical ideas over a period and locate the contribution of Indian mathematicians e.g., recognizes how concepts evolved over a period in different civilizations and the contributions of specific Indian mathematicians - Baudhayana, Panini, Pingala, Aryabhata, Brahmagupta, Virahanka, Bhaskara, Madhava, and Ramanujan. At the Secondary Stage, students will learn about contribution of Indian mathematicians to advanced mathematical ideas like algebra and coordinate geometry.

iii. **Science:** The focus is to discuss Indian contributions to scientific knowledge e.g., measurement systems and their role in regulating day-to-day lives, Indian calendar systems, contributions to astronomy, sound, material properties, metallurgy, chemical reactions, health and hygiene practices, traditional medicine systems and their basis, contribution made to space sciences, India's space missions, motion of bodies, estimations at astronomical scales, and the world of atoms. The content will demonstrate the progress of Indian thought in a comparative chronology, the unique nature of Indian contributions, and their role in nation building.

At the Middle Stage, students will be introduced to Indian scientific ideas which can be explored through observation in the local community e.g., local ways of measurement, Indian calendar system, movement of celestial bodies. At the Secondary Stage, students will be introduced to contribution made by Indians on major scientific discoveries and ideas e.g., astronomy, medical practice, space research.

iv. **Social Science:** One of the key Curricular Goals is for students to appreciates the importance of being an Indian (Bhartiya) by understanding India's glorious past and its rich diversity, geographical and cultural. Indian contributions to democratic ideas which flourished in ancient, medieval, and modern period are also an important part of student learning.

At the Middle Stage, students will learn of the historical underpinnings which formed the modern Indian state and how idea of peace, ahimsa and co-existence have been part of Indian culture since ancient times. At the Secondary Stage, students will go into details to understands India's past and appreciate our rich diversity, culture, traditions, literature, philosophy, and knowledge systems.

v. **Language:** Language education plays a crucial role to keep students rooted to their country, as it allows individuals to connect with their culture, heritage, and their place in the society. India is a country with a rich and diverse linguistic heritage, with over 19,500 languages/dialects spoken across the country. Learning in the mother tongue or a familiar language till the Foundational stage will keep students connected to their cultural heritage. R1 which is most often the regional language will help students form a deeper understanding and connect. Exposure to other two languages (R2 and R3) help students to become multilingual, appreciate diversity and help form a national identity.

   This language curriculum will help individuals to connect with their cultural roots and heritage by providing them with a deeper understanding of the language, literature, and cultural practices of the country. It will help individuals to develop a sense of pride and belonging to their community and country. The Learning Standards reflect a rootedness in Indian culture and traditions across Stages.

vi. **Physical Education:** Sports and physical activities are an inseparable part of our culture. It unites us together in one single emotion. India has very rich heritage of games/physical activity that developed across civilizations and centuries e.g., yoga, water sports, wrestling, *malkhamb*, archery, chariot racing, bullock racing, polo, different forms of martial arts, dance forms, dice games, hide and seek and innumerable number of other games/physical activities.

   The approach in Physical Education is to make these Indian games/physical activities an integral part of the curriculum across Stages. The chapter on Physical Education explicitly outlines more than 50 local games to be used at the Preparatory Stage, recommends regular practice of yoga from the Middle Stage onwards to build breathing techniques, strength, flexibility, and endurance.

Part D:

School Culture and Processes

Chapter 1

School Culture

School culture plays a significant and direct role in learning. It does so in two parts. First, it enables an effective learning environment, by ensuring that children are free of fear, are engaged and excited, and encourages dispositions such as curiosity that are important for learning. Second, it is one the biggest influences on the development of values and dispositions amongst students, which are important curricular goals.

Hence, school culture must be systematically shaped towards achieving the desired goals. NEP 2020 states that *"All participants in the school education system, including teachers, principals, administrators, counsellors, and students, will be sensitized to the requirements of all students, the notions of inclusion and equity, and the respect, dignity, and privacy of all persons. Such an educational culture will provide the best pathway to help students become empowered individuals who, in turn, will enable society to transform into one that is responsible towards its most vulnerable citizens (section 6.19)".*

The culture of the school also affects many other matters which in turn affect learning, such as the engagement and motivation of teachers and the involvement of community. These 'indirect effects' while important are not taken up in detail in this NCF.

Section 1.1
What is School Culture?

School culture can be understood in terms of values, norms, and beliefs or their manifestation in action in the form of relationships, behaviours, and practices. Students learn from the manifestations. It is these manifestations and thus the experience of the students that must systematically enable the curricular goals. It is therefore important for us to have clarity over these manifestations or the elements that constitute school culture. We see these constituent elements broadly in the following three categories:

Relationships: This refers to how the school staff, students and the other stakeholders relate with each-other. For example, whether Teachers listen to students patiently and care about their physical and emotional well-being; do teachers collaborate with each-other for providing a more wholesome experience for students; does school welcome parents and ensures their participation in the learning process.

Symbols: These are about various kinds of visual displays that we find in schools. For example, what is written on school walls and the pictures and paintings in the school corridor communicate what is valued by the school.

Arrangements and Practices: These are about arrangements – for example seating - and practices – for example, who participates in which sports – related to various classroom and school processes which signals the kind of culture the school stands for.

Unfortunately, many schools seem to pay little or no attention to this important aspect. Either they don't see its value, or they don't put in the necessary effort required.

Section 1.2
How does School Culture Effect Learning?

School culture contributes to student learning in two ways:

a. By creating safe, encouraging, and nurturing learning environment which is necessary for all kinds of learning engagements that are organized at school, and

b. By directly contributing to attainment of curricular goals through development of desirable values and dispositions.

1.2.1 Developing an Enabling Learning Environment

The learning environment at a school can be characterized either by constraint, compliance, and control, or it could be an atmosphere that instils trust, self-discipline, and inspiration to stretch one's perceived limits and achieve one's goals. An inclusive and nurturing culture forms the bedrock on which all school activities and pedagogical practices rest, grow, and succeed. Mutual respect, a fear-free environment, and healthy relationships among students and teachers are essential for having dialogue and collaboration. Without these, learning endeavours become a tedious task for everyone involved. Along with a fear-free environment, acting responsibly and showing rigour in studies are equally important characteristics of school environment that contribute to achieving the necessary learning in each grade and stage of schooling.

These are key characteristics of such an enabling learning environment and some constituent elements of school culture that contribute to achieving them. We can see that these elements are relationships, symbols, or arrangements and practices.

Table D-1.2-i

Characteristics of Enabling Environment	Constituent Elements of School Culture
Inclusive	• Ensuring participation of all in classroom activities as well as other school processes. • No discrimination based on gender, caste, religion, and other such factors. • Selection of content, pedagogy, and assessment practices to ensure inclusion.
Fear-free	• No place for any form of corporal punishment, and not allowing any bullying, threatening, verbal and non-verbal abuse and discrimination. • Acceptance for mistakes as a natural part of the learning process. • Practices of calm, respectful dialogues rather than violent reactions when one breaks school rules. • Plenty of opportunities to speak and perform for all students and not just the 'best' performers. • All school staff friendly and approachable.

Encouraging good habits of learning	• Observing elders (teachers and senior students) going about their tasks and routines responsibly. • Clear expectations on behaviour and work and ample support for fulfilling expectations. • Encourages persisting to complete one's work even when it may take the time or seem challenging. • Encourages individuals admitting to their faults and mistakes humbly. • Acknowledging and expressing gratitude for help received from others.
Caring	• Teachers check about students' health, try to know how they feel, their interest areas, what makes them happy and the challenges they are facing. • Teachers and students find ways of celebrating small achievements, progress made by students. • Immediate help is provided when someone is not well, going through a difficult time.
Responsibility	• Observing elders (teachers and senior students) being punctual and following the school timetable. • Observing elders (teachers and senior students) attending to their tasks diligently. • Sharing responsibilities in school Assembly, Bal Sabha, various student committees, assignments given by teachers. • Participation in decision-making processes in the classroom, peer groups, and student committees.

1.2.2 Development of Values and Dispositions

a. **The need for systematic and deliberate effort**

There are two major sources from where children derive their values and dispositions – our family/community and our schools. In both these spheres of their lives, the quality of relationships, symbols, and arrangements and practices (which we are calling constitutive elements of culture) are basically what determine what they imbibe from and how they behave in these spaces.

The School Principal and Teachers tend to rigidly follow what they inherit in terms of the prevailing school culture and processes which is largely driven by School Principals' or Teachers' own values and dispositions. Principals tend to focus their energy on administrative compliances while most Teachers remain confined to syllabus completion work and consideration of value development remains unattended to. As an outcome, schools not only fail to develop desirable values and dispositions but may end up reinforcing various kinds of discriminatory social practices related to caste, gender, class, religion, region (migration, language), disabilities, physical appearance and skin colour, and perceived talent (smart versus weak student).

It is absolutely clear and necessary that systematic, deliberate efforts are needed for development of values and dispositions which are comprehensive and done with all seriousness, very much like the efforts needed for teaching of subjects.

b. **Values and dispositions as listed in NEP 2020**

NEP 2020 gives us a comprehensive list of values that need to be fostered through schooling. These values are individually meaningful, and one cannot be subsumed in the other. But for curricular purposes, we can cluster ones that are more aligned and similar. The table below not only gives a list of these values and dispositions, in clusters, but also provides some constituent elements of school culture that will enable it.

Table D-1.2-ii

Values and Dispositions	Constituent Elements of School Culture
Empathy and Respect Sensitivity *Ahimsa* Respect for Elders Courtesy Forgiveness Compassion	• Practice of calm, respectful dialogue rather than violent reactions when one breaks school rules. • No corporal punishment, no bullying, threatening, verbal and non-verbal abuse. • Mistakes are seen as a natural part of the learning process. • Refraining from carrying grudges and all individuals are encouraged to practice forgiveness and support each other to heal from unpleasant experiences. • Encouragement and support available for all. • Teachers care about students' health, feelings, and interests. • Respect expressed in various forms towards elderly members of the immediate community, larger society, and nation. They are remembered through readings and discussions about their life and achievements. They are invited for interactions with and inspiration.
Responsibility *Swachchta* Respect for the Environment Patience Respect for Public Property Sustainability	• Following school rules and regulations, completion of tasks and assignments on time. • Sharing of school level responsibilities in school. Assembly, *Bal Sabha*, various student committees • Students and teachers participate in cleaning duties and in community service periodically. • Participates in decision-making processes in the classroom, peer groups, and student committees. • Practices of judicious and sustainable use of resources within school and outside. • Proper upkeep of one's belonging, classroom and school property and repair and restoration of damaged property and equipment regularly.

Honesty **Integrity** ***Satya***	• Practice of being truthful by school staff and senior students and encouragement for the same. • Demonstrating right action even through difficulties and challenges (persisting to complete one's work even when it may take the time or seem challenging). • Encouragement for individuals admitting to their faults and mistakes humbly. • Credits and acknowledges others who have been helpful and supportive. • Reading and sharing of literature, real stories exemplifying honesty, integrity, and *satya.*
Fraternity **Patriotism** **Tolerance** **Peace** **Rootedness and Pride in India**	• A lot of exposure in various form to students to the diversity and richness of traditions and cultural practices of our country – through school assembly, displays on campus, excursion visits to important places. • All subjects talk about Indian contribution to the world in that discipline. • Celebration of national festivals. • Students learn about the Indian freedom struggle.
Justice, Equity & Fairness **Diversity** **Pluralism** **Gender Equality** **Liberty** **Respect for All**	• Discourages all discriminatory practices and adheres to the laws of the nation. • Mingling and bonding between students and teachers from diverse backgrounds. • Ensuring equal opportunities to all genders and students from all socio-cultural backgrounds. • Respect and space for varied opinions, interest areas, and talents among the school community. • Care for students' health, feelings, and interest areas • Provides nutritious meals to all and encourages togetherness in eating the meal. • Provides accessible physical infrastructure, and assistive devices, ensuring participation of all students in all school activities.
Seva ***Nishkam Karma* Sacrifice** **Helpfulness**	• Helping those in need within the school and outside. • Periodic community service opportunities to students. • Focus on performing one's duties and tasks rather than on personal gains and other benefits. • Appreciating relinquishing one's own individual desires and comforts for the sake of tasks for the greater good. • Focus on teamwork and growth of all individuals in the school.
Rational Thought and Scientific Temper	• Encouraging questions and inquiry-driven exploration. • Seeking evidence that supports facts. • Discouraging rumours and misbeliefs. • Analysing information from multiple sources and viewpoints. • Exploring new methods to solve various problems.

Creative imagination	• Encourages creative tasks among students and Teachers in different subjects. For example, students create their own books, prepare display boards, apply their learning to solve hypothetical imaginary or real-life problems. • Creative uses of available physical space and other resources. • Involving students in the creation and use of teaching-learning material. • Enhancing the aesthetics of the school environment, encouraging participation in the arts and games, and enhances greenery in school premises.
Hard work and Commitment	• Maintaining consistency and regular practice of all learning tasks and routines. • Demands that individuals take their learning seriously and complete tasks that they begin. • Works towards goals set by the Teachers and the Principal. • Literature, storytelling, in-person sharing by people on hard work and commitment.
Courage and Resilience	• Exploring multiple strategies while solving problems. • Persisting with learning tasks despite errors and failures. • Making efforts to resolve conflicts peacefully through dialogue. • Sharing of vulnerabilities, fears, and other emotions openly and seeking help when required.

The following sections detail the constituent elements – as relationships, symbols, and arrangements and practices – of a school culture that can lead to these outcomes.

Box D-1.2-i

Challenges

Building a school culture that reflects the above-mentioned practices will have to face a lot of internal and external challenges. Internally, the challenge will come from the staff and students when their beliefs and behaviour imbibed through society may not be in alignment. Similarly, school practices may conflict with the prevailing cultural practices in the families and society. For example, which a school practices gender equity, there may be instances of gender discrimination at home. These conflicts must be seen as necessary part of establishing desired school culture so engagement with these conflicts in various forms would be required.

Section 1.3
Constituent Elements of School Culture

1.3.1 Relationships

Relationships as one of the constituent components of school culture is basically about the different types of relationships that exist in a school, the essential expectations in those relationships and how these expectations are fulfilled responsibly. At the core is 'Teacher-student' relationship. But the quality of student-student, Teacher-Principal, parents-Teacher/Principal relationships too have a bearing on student learning.

The following are core characteristics of strong and inspiring relationships that a school needs to develop:

a. Mutual trust and respect

b. Openness, communication, and collaboration

c. Care

d. Responsibility

These core characteristics are seen in the context of school and learning. These are inter-related too and not water-tight categories. When you trust someone, you are open for sharing and collaborating. Similarly, a sense of responsibility naturally leads to caring for the other.

1.3.1.1 Mutual Trust and Respect

Trust and respect are fundamental to all relationships. Trust in this context refers to the basic belief in the human capability to learn, and the intent to exercise that capability to pursue goals that one assumes worthwhile. By respect, we mean recognizing and valuing an individual's existence, views, identity, and their fundamental rights bestowed by the Indian constitution.

In **Teacher-student relationships**, teachers openly show that they trust the capability of students and that they can all learn; they respect every student's pace of learning and make efforts to understand them as individuals from diverse backgrounds. Teachers help students feel a connect with the whole school community and at the same time build an identity and space for themselves; listen to them patiently and care about their physical and emotional well-being. Students feel respected when teachers give them time and space to share their feelings, views, and work.

For enriching **student-student relationships,** conscious efforts are necessary to give them opportunities to mingle and work collaboratively with peers hailing from different socio-cultural-economic backgrounds, different age groups, genders, and abilities. From a young age, students can be encouraged to speak politely, pay attention to one another, and demonstrate care and helpfulness at any given opportunity.

In India, Teachers need to be reinstated to the respect and status they once enjoyed as *Gurus*. In **Teacher-Principal/administration relationship**, trust and respect is critical for sustaining motivation, energy, commitment, and collaboration. It is done by providing good working condi-

tions i.e., having formal and informal ways of listening to teachers' views and experiences, inclusion in decision making, giving space to exercise their professional expertise within the larger policy guidelines and by appreciating their hard work. Another kind of relationship is the T**eacher-Teacher relationship.** It is important that all Teachers from diverse backgrounds, genders, age-groups, and experience get respect and support from other teachers. Teachers too need to be provided spaces and opportunities to learn from each other and to work collaboratively. Apart from academic sharing, Teachers also need to relax and rejuvenate so this could be purposively planned, be it engaging in sports and cultural activities or having some celebrations or excursion trips.

Schools need to build trust and respect in its **relationship with parents**. Parents need to feel comfortable in approaching School Principal and Teachers. When school reaches out to them, welcomes them, gives them regular updates, and consults them on relevant matters, and tries to use their knowledge and expertise, they feel respected.

1.3.1.2 Openness, Communication, and Collaboration

Openness, communication, and collaboration are characteristics of healthy relationships. When there is trust and respect in any relationship, people open-up, share and listen to each-other empathetically and are more than ready to engage in collective tasks because they derive pleasure and strength through that companionship. Here are a few ways how schools can work on this front:

a. There should be spaces for open sharing like circle time in classes, daily diary sharing in school assembly as well as encouragement for reaching out to Teachers and School Principal for frank sharing.

b. A lot of opportunities to be created for working together for Teachers and students. This helps them test as well as strengthen mutual trust and respect for each other. This will also help them to reflect on their own conditioning and to build inter-personal skills.

c. Art, music, drama, sports naturally provide such opportunities where we need to work in groups; so, finding space for these subjects in school timetable is necessary. Such time is also required for Teachers.

d. It is expected that when there is greater openness, greater communication and working together, there will be differences and conflicts; but they should be seen as opportunities for finding solutions collectively. Some differences may get resolved, some may take longer time, and some may never get resolved but that should not dampen the spirits and become an impediment for working collaboratively at tasks that matter for the advancement of the school.

All collaboration must be channelized for the **'pursuit for excellence'**. Students should be encouraged to set high expectations for themselves and support from others along with hard work should help them achieve their goals.

Relationships get tested when faced with a situation where classmates or schoolmates are competing against each other in a competition, be it a sport event or some other type of competition like debates, essay writing, Olympiads for Maths and Science etc. On one hand, the culture should help one to strive hard to excel in one's skills and at the same time, one should learn sportsman-

ship and how to deal with both success and failure. One can compete without compromising values of cooperation, empathy, resilience, appreciation of effort and excellence. The feeling of *'Mudita'* (the feeling of rejoicing in the achievement or success of others) can also be developed.

1.3.1.3 Care

Care is an essential expression of nurturing relationships when one feels related and responsible to the other. In normal circumstances, caring would mean acknowledging the presence of others by simple ways like smiling, greeting, handshaking and giving others space in physical terms (for sitting, during movement) as well as for voicing one's views and suggestions. When we care for others, we make efforts to know them better and which, in turn, helps us understand them as individuals with their strengths and weaknesses and likes and dislikes and what all they have been through in life. All this is important information that helps while living and working together.

The need for caring is truly felt in difficult times i.e., when one is unwell, facing some challenges at personal or family front or going through negative, undesirable emotions for some reason. This is when others need to extend support in ways which gives strength and helps the person come out of that situation.

Care is what people remember – both timely expression of it as well as not having it when it was needed. This goes a long way in nurturing relationships.

In the context of schooling, it must be seen in the context of the overall objective i.e., learning. So, caring would also mean expressing concerns politely and drawing attention of relevant people on issues which are affecting learning negatively.

1.3.1.4 Responsibility

Any relationship will not sustain if the related parties don't act responsibly. In the context of school-based relationships, acting and behaving responsibly means – following the agreed rules and regulations of the school; not to behave and act in ways that hurts others; and to work towards completing one's tasks for achieving one's goals. This is applicable to all who are part of the school community. Specifically speaking, students, the general expectations would be like – paying attention and following instructions, asking questions, expressing one's thoughts and doubts, working in groups, peer support, consistency in practice, and applying what one has learnt in real life situations, etc. This is what acting responsibly would mean for students in student-Teacher relationship. Similarly, for Teachers, the expectations would be like – making efforts to know individual students and what they already know, making them comfortable and listening to them, planning, finding effective and engaging ways of teaching, giving appropriate challenges and handholding support, and assessing progress of learning to make necessary changes in teaching, etc.

Anything that is detrimental to the process of learning; anything that disturbs or disrupts the process is to be avoided.

1.3.2 Symbols

Schools try to communicate a lot through use of symbols. A symbol is any form of visual sign – writing on the wall, paintings, idols, arrangement of physical objects that convey what the school is valuing. In some public schools, one comes across this phrase '*Shiksharth aaiye, Sewarth Jaiye* (come to learn, go to serve)' right at the entry gate. This is a daily reminder to students about why they are coming to school and what they are expected to do with their learning. Here are a few more symbolic displays that we generally come across in schools:

a. Schools may also use huge hoardings and display boards for public to emphasize what they feel valuable about the school. It could be pictures of students who secured top ranks in Board exams or different facilities the school provides. It could be about having smart classes or providing coaching in different sports.

b. There are lots of 'sayings' or 'quotes' written on school walls.

c. One may also find pictures of important and famous people and even idols representing certain religion either in Principals' room, staff room, classrooms or in school corridor.

d. The choices and arrangement of physical objects also carries huge symbolic value. Principals' chair would look very different than chairs for the staff. A school may choose not to provide chairs for Teachers in classrooms so that they must remain standing and in moving condition. The arrangement of furniture in classrooms also communicates school's beliefs on teaching-learning processes.

e. Some schools paint entire walls with some pictures while others may use display boards where student work is presented.

Schools need to consciously and carefully decide how to effectively use the power of symbols. It must be in alignment with values that schools are fostering so inclusive in terms of giving space to all kinds of good ideas, good work and allowing all students to contribute and learn from them. Here are some good practices in this regard:

a. Instead of having permanent 'sayings' or 'quotes' on the walls, a better way would be to have a dedicated space for 'thought of the day' and students can take responsibility of that. It could just be a small while board and students can take turns to write the thought there. This would be an inclusive practice as thoughts coming from not only the established national heroes but also the lesser-known individuals belonging to different communities can also be given space and recognition.

b. There could also be dedicated spaces for representing the local, regional, and national cultural heritage. Here again, refraining from having permanent displays will help student learning. These could be group project works and the display can remain there for a month. All students can be expected to read it and there could be a quiz or sharing session in the school assembly based on that display.

c. School corridor passage can have display boards where each class can display what they are learning so any visitor will get a good sense of classroom work just by taking a walk around the school. Selection of student work for display will be crucial and one need not select the 'perfect' looking or more visually appealing work. Work done by all students showing varied levels of capacity is far better as it will create ownership among students and whoever has a look will get a good sense of class progress.

d. Schools may also name some rooms/halls, even classes or buildings with some renowned personalities, rivers etc. There may be names given to student houses in larger schools. These should also reflect the diversity of our country.

e. School uniform also has symbolic value. The colour as well as the kind of dress chosen communicates to the world the belief of the school. One may opt for more traditional, modern or gender-neutral dress. Consideration of local climate, safety, easy availability, cost effectiveness will reflect school's sensitivity.

f. There could be a permanent kind of notice board in each school where some school related information for visitors and some important phone numbers (for example. child help line, hospital, school helpdesk) and key behavioural expectations from all on campus can be displayed.

g. Sometimes, schools practice symbolic representation of hierarchy. For example, there may be a different set of cup/mug in which Principal is served tea. Such practices need to be avoided as they go against the values a school is fostering.

1.3.3 Arrangements and Practices

All schools function with the help of certain classroom and school level processes. Each school process requires some arrangements and practices. For example, mid-day-meal is an important daily process in public elementary schools. To run mid-day-meal smoothly, some arrangement about procurement, cooking and serving are there. There will be practices around menu preparation, quality check, food serving and proper utilization of food waste. The nature of these arrangement and practices reflects and foster the beliefs and values of a school as well as of the education system.

In this section, we look at the arrangements and practices around major school processes – classroom processes, school assembly, mealtime, sports activities, engagement with parents and community. There are other processes too, but these are the key processes found in all schools. The school processes are dealt with more exhaustively – beyond the arrangements and practices which constitute school culture – in the subsequent chapter.

1.3.3.1 Classroom Practices

We need to understand how different classroom practices promote certain values.

Seating Arrangement: If all children always sit facing the board, such an arrangement conveys a perception that the primary sources of learning is the blackboard and the Teacher. While a circular, semi-circle or group seating arrangement allows students different learning experiences as they can interact with their peers and work collaboratively. If there is a practice of presumably smarter students occupying front seats and those who are lagging sit at the back, then this practice itself will reinforce who learns and who doesn't. Separate seating for boys and girls; students sitting on floor mats and teacher on the chair are ways that establish differences and hierarchies rather than breaking them.

Availability and accessibility of teaching-learning material: A classroom can be full of learning material – on walls, in the open racks and almirah or without it. Accessibility and uses is another issue. When there is sufficient and relevant material and students can make use it, then students can be engaged at different levels, and it brings more vibrancy in the learning process. Having a 'reading corner' with a collection of books that are suitable for the learning levels and age-groups of the students would encourage a culture of reading. Such practices clearly shows that the school's commitment towards ensuring learning for all.

Giving ownership and responsibility to students in the learning process: There could be a classroom culture where students are totally dependent on Teacher instructions and reluctant to take self-initiative. On the other hand, student can actively take charge of their learning process. They can be involved in preparing teaching-learning materials, displaying it on the walls, maintaining their own progress portfolio file, leading peer learning sessions and can even be asked to do short teaching sessions in the guidance of teachers.

***Swachchta* (Cleanliness):** Cleanliness and tidiness of the classroom can be the responsibility of students. Before closing the day, the classroom can be cleaned and made tidy again for the next day.

There can be certain rituals that are followed during classroom processes. Different teachers may initiate and sustain different rituals that is why classes of different teachers could be very different cultural experiences. One may make the whole atmosphere relaxed but focused while another teacher may make it tense and intimidating. For example, there are teachers who start by having some informal chat and listening to what students would like to share before moving on to their teaching plan while another teacher may just expect all those who couldn't do their homework to stand up and give an explanation. Movements, speaking, interactions, praise or scolding, expressing happiness and concern all may take forms which either prove detrimental or add richness and joy to the learning process.

1.3.3.2 School Assembly

A lot can be achieved through school assembly if this space is utilized properly. Different groups of students can take lead in organizing it under guidance from teachers. It could be a forum where not only the home language but the whole range of language diversity of India can be given importance. Students can be encouraged to give presentations, sing songs, perform skits in several languages. Even if students learn to sing one song of the other parts of India, they feel some familiarity and connectedness. If there is enough space available, the whole group could dance on music selected from different parts of India.

On important days, Teachers and students can talk about different people or events that make that day memorable. Real stories of courage and resilience, *nishkaam karma* and *sewa* can be narrated. Opportunities for sharing what students are learning in various subjects, through library or from home should be created. One day, a quiz can be done based on the school corridor displays if these displays are changed regularly. Skits can be performed on various social issues to sensitize students and sometime could regularly be devoted to discussing current issues faced by our society and nation.

Duration of the assembly, seating arrangement, anchoring responsibility, proper communication on what would be done on each day, use of musical instruments, sound system and preparation for assembly etc. all needs to be paid close attention from cultural perspective. For example, it would be difficult to have the whole assembly standing. Asking students to sit in class-wise lines may not be needed as mingling with other students can be allowed. Even younger students can shoulder anchoring responsibility with seniors.

1.3.3.3 Mealtime

Mealtime is an important time so food quality and serving practices both are important in deriving satisfaction from it. Students from various socio-cultural backgrounds should sit and enjoy the meal together. For many students this could be one proper meal that they get during the day, so it is important that schools pay required attention. Teachers need to check the quality as well as participate in serving it or eating it alongside students. They can observe students eating habits and have a dialogue with them afterward. Good hygiene standards need to be maintained and groups of students and Teachers can take up this responsibility.

1.3.3.4 Sports Activities

Making room for sports activities in daily or weekly timetable in which the whole school participates is important. The setting of a playground, the group dynamics during sports is usually very different than a classroom. Different students may be more skilled, and they can even guide teachers on how to play a particular sport. Schools must not let go of the opportunity a playground offers for building student-student and student-Teacher relationship and in teaching cooperation, teamwork, courage, resilience etc. Students of all genders should be encouraged to play all the sports. There could be specially designed games or modified rules of regular games to allow the inclusion and equal participation of students with disabilities. Students can be motivated to try hard to improve their own skills and timings so a comparison with their own previous performance. Students can fix their own goals and teachers can also guide them to set next level of challenges.

1.3.3.5 Engaging with Pare nts and Community

Culture of a school easily reflects in the way it welcomes and engages with parents, community, and other visitors. Irrespective of the parental backgrounds, attitude and dispositions, schools need to make them comfortable. There should be clear communication with parents on when they can visit schools. They should be properly welcomed and attended to. Parents want to know 'what are their children learning' so the sharing from Teachers' side cannot be just about the challenges and struggles. The reception area or the school premises should have displays that reflect the kind of work happening in the school. There could be some activities and games designed for active engagement of parents. They can also be invited to share their experience and knowledge with students in a planned way. Regular home visits by Teachers would go a long way in building this parent-teacher relationship.

School need not limit itself to parents only. The larger community from where students come need to be engaged through annual day and other school functions and by school's participation in local events.

Box D-1.3-i

Inclusion and Participation

Inclusion and participation of all needs to be the core consideration across the elements of school culture. Otherwise only a few benefits from the opportunities available in school processes and majority may feel isolated or even discriminated. School processes have the potential to help every student and staff member experience a sense of belonging and togetherness with the others. Teachers must notice if any student is being or feeling excluded from the rest not only in classroom but also in informal settings, during breaks, play, or mealtimes. Teachers also need to ensure that students belonging to different genders, socio-economic groups, and with differential abilities interact with one another and develop meaningful bonds.

Discrimination and exclusion practised by teachers could take many forms. It starts with the belief that some students cannot learn because of their background, or ability and are labelled discriminatorily. There need to be processes that help Teachers become aware of their own biases and stereotypes, and how these get reinforced in their classroom practices.

It is important for school teams to assess if their approaches and methods are being inclusive, and not merely assume that they are. This can be done by frequently making space for discussions with students after the learning activities where students can be asked to express how they felt while participating – if they felt comfortable and experienced fairness. Such discussions can provide a space for all children to express the difficulties they experience and draw support from others. This also generates love, empathy, and care towards all.

Chapter 2

School Processes

Every school has certain processes in place to ensure two things – the smooth functioning of day-to-day activities and enabling the school to progress towards achievement of curricular goals. For example, schools must decide how they are going to make use of the available time on day-to-day basis as well as over the year. Therefore, the need of a yearly calendar as well as a daily timetable along with a process that helps in generating and incorporating changes in these instruments of time allocation.

All kinds of tasks, whether seemingly simpler ones like attending to visitors or ensuring cleanliness of school premises or the more complex ones like monitoring and improving the quality of teaching-learning and responding to disciplinary issues need to have well thought out processes. Processes should clarify what needs to be done, the process of decision making, and the spirit with which one must act and respond.

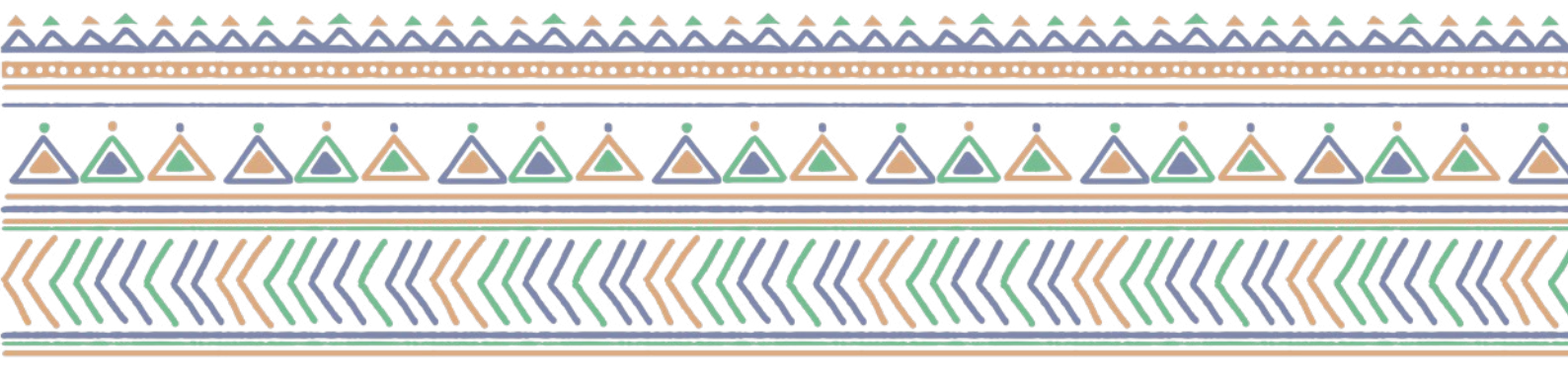
Another important aspect of school processes is that they reflect the values and beliefs of a school and in turn reinforce them. The previous chapter discussed this.

School processes can be seen in the following broad categories:

a. **Curricular Processes:** These are processes that have direct effect on learning. For example, the school timetable, school assembly, library, student committees, celebrations and events, use of technology.

b. **Curricular Associate Processes:** These are processes that have significant but mediating effect on learning. For example, processes for Teacher Professional Development, engagement with parents and community, MDM etc.

c. **Organisational Processes:** These are processes that enable the visualization and smooth functioning of the above two processes. For example, school development plan, annual calendar, mobilizing and allocating resources, data management and reporting, resolution of conflicts and disciplinary issues, safety related issues.



Section 2.1
Curricular Processes

These are processes that have direct effect on learning. For schools, an important question is to make best use of the time and resources available for student learning. Within this, there are two considerations - how to allocate time for learning of various subjects and how to create learning spaces beyond subject classrooms, such as school assembly, library etc. This section talks about how effective use of daily time and spaces and opportunities beyond subject classrooms could be made for learning. Subject teaching processes are covered in chapters dealing with specific subjects.

2.1.1 School Timetable

A timetable provides structure to the daily routines and activities carried out in the school. It must be decided very imaginatively so that it allows for different engagements without compromising the requisite time for different curricular subjects and whole/mixed group activities. A good timetable allocates time as per the weightage given to different curricular areas and provides scope for incorporating multiple activities (many of them may be weekly/fortnightly or monthly) without disturbing the larger structure too much. For example:

a. School assembly, last period of the day, and Saturdays could be seen serving multiple purposes. On alternate days, in place of school assembly, a common sports/activity period for the entire school can be imagined. Similarly, last period of the day could be dedicated for club activities (music, theatre, art, literature, sports etc.) where students can participate or even lead various creative engagements. This slot can be used for preparing for various events too without disturbing the flow and consistency which is required for learning improvement.

b. The idea of a block period for allowing extra time to certain topics would be ideal. For example, lab activity or project work require more time. So, teachers can mutually plan for utilizing block periods as necessary.

c. Saturdays can provide greater flexibility and scope for doing a variety of engagements such as short field trips, interaction with local community, dialogue around adolescent issues etc.

There shouldn't be too many changes in the daily timetable as it disturbs the rhythm of the school. It should be thought-out stage-wise keeping the demand for each stage in mind. Depending upon the time of the year, such as admissions, exams, festivals, there could be pre-planned variations to best utilize that period.

2.1.2 School Assembly

Assemblies bring the whole school community together and facilitate collective learning and appreciation that goes beyond the confines of subject domains. School assembly is an ideal way to start or end the day with positive vibes. Instead of making assemblies ritualistic and mechanical exercises, schools should think of innovative ways to make assemblies meaningful. A variety

of arrangements can be explored, and the sequence and format of presentations could change from one day to the next so that all students get opportunities to participate, interact, present, and respond to the events. Schools must ensure that the assembly does not impose any pressure to perform, or deliver 'perfect presentations', and instead should be seen as a process of sharing and learning, accepting flaws, and getting over stage fear by creating a setting that makes all students feel comfortable where no one is judged, insulted, or ridiculed.

Assembly in the Foundational Stage can be mostly held in the classroom with a weekly gathering of two or more grades in larger groups. From the Preparatory Stage, students could participate in multi-grade and whole-school assemblies.

Assemblies are generally done at the start of the day and depending upon the school size, it could be one or many small group assemblies happening simultaneously. A minimum of thirty minutes is needed to have some meaningful engagement. For larger weekly assemblies, more time can be provided. Presentations could include singing the national anthem and a variety of songs in different languages, a few minutes of meditation or quiet time, storytelling, skits, mime, reporting local news based on students' research and interactions with the local community, book/movie review, presentation of artwork, magic tricks, puppetry, sharing relevant instructions or information related to other school processes and school administration. Singing songs can involve the audience where they repeat the lines after the presenters, or they can all sing together if it is a commonly known song. Similarly, some physical activities, dance and movement can be performed by the whole group if there is sufficient space. Schools could also plan activities based on certain themes so that students can explore ideas and expressions in a variety of modes. All activities must aim to actively engage the audience and invite their responses.

Efforts must be made to ensure that all students get an opportunity to present at the assembly either individually or as a part of a group so that they gradually develop the confidence to express themselves openly and present their ideas to larger audiences.

2.1.3 Library

The role of books in formal education is central and starts even before one has gained literacy skills. Library opens up the scope for self-driven and guided acquisition of knowledge beyond textbooks by having access to a variety of good books and other digital resources from around the world. Therefore, a rich library in a school and a library corner in each classroom is a necessity.

A library could be housed in a dedicated room/hall or can be there in each classroom, but the critical point is 'availability' of relevant books in good numbers and an easy 'accessibility' mechanism. Efforts must be made to include content that represents various genres, India's rich heritage and the lives and imaginations of people from various regions and diverse backgrounds, including those who belong to the socio-economically disadvantaged groups. Bilingual books and some books in other Indian languages would be good in the library. The library should also have appropriate assistive devices, audiobooks, books in braille, and other such resources for people with disabilities.

Teachers have an important role to play in identifying what books need to be purchased and how to make use of them for enhancing student learning. They need to provide students ideas about what else they should study and research beyond what is given in the textbooks and should in general talk about books keeping in mind interest areas of students. They must come up with small assignments which require students to read and write about people, issues and general life matters from the library.

A vibrant library requires a variety of activities in order to develop a culture around reading and sharing. Simplest are the read-aloud sessions, oral storytelling, and book reviews. Making a pop-up or big book, 'meet the author' events can be thought of along with creative and restoration activities like writing workshop, making bookmarks, book repairs and restoration, designing illustrations, posters, book covers, bookbinding etc. Book donation drives can also be planned. A library committee that constitutes teachers, students, and community members could manage the various activities and arrangements of the library.

The purchase of new books and other resources can be decided by a library committee in consultation with the School Principal and could include a process of reading book reviews, visiting book fairs, and bookstores, and can also take suggestions from students, teachers, community etc.

In most schools, library responsibility is shared by a Teacher and possibly some students. Processes of cataloguing, organising, keeping a record of borrowed and returned books, promoting careful and gentle handling of books, monitoring damage, wear and tear, and restoring books, all these need to be a collective endeavour. When libraries have very strict rules or keep their books under lock and key, it defeats the whole purpose of having a library.

2.1.4 Student Committees and Forums

Every school must encourage the formation of students' committees and forums (*Baal Sabha, Baal Panchayat,* and other Student forums) to involve students in school activities and create a sense of ownership and responsibility among them. By participating in activities of different committees, students develop responsibility, cooperation, teamwork, pro-activeness, taking initiative, leadership, and conflict resolution. There can be multiple committees in which students can participate for short periods of time and then change over to another committee. This would ensure that all students get familiar with the management and functioning of various school processes.

Some of these committees take care of school related tasks such as ensuring cleanliness or managing mid-day-meal or organizing cultural events while some schools also have committees which work at community level. Health committee, Sports committee, Eco Club, Music Club, Heritage Club etc. take up engagement at community level under Teacher guidance. Through these forums, students get to participate in various tasks and develop expertise as well as respect for different fields of meaningful work.

2.1.5 Events and Celebrations

All school celebrations and events must be both enjoyable and meaningful exercises integral to the learning processes. Through a well-planned annual calendar, the events and celebrations can be integrated with various aspects of the academic plan.

Schools can conceptualize small and large celebrations imaginatively. Apart from the usual annual day and national festivals, there could be periodic celebrations of student learning and achievements, welcoming a new teacher or a new group of students, farewell for outgoing students, achievements of school alumni and school's contribution to the community welfare, activity/games and interaction with parents and community members, local food festivals and so on. The school team may decide to cook and eat together, play together, or take up some school-level or community-level work collectively at least once a month and this event itself could be a celebration of unity and collective enjoyment. For Annual Day, national festivals, and Sports Day, the school would need more elaborate planning and preparation as this is the time when larger community is also involved.

Preparation: All events require adequate preparation and arrangements. The process of planning, selection of programmes, preparation of invitation material, posters, decorations, rehearsal, anchoring and interaction with guests, all of these should involve students' participation. Rehearsals and preparation for events should be a part of the overall teaching-learning process where students get opportunities to present as an extension of their classroom activities and learning. This implies that classroom activities include arts integration and are multi-disciplinary.

Presentations: The presentation of programmes do not require the pomp and show with elaborate costumes, stage props, and makeup in the younger age groups. Students need to wear comfortable clothes for activities that involve physical movement and dance. They could adopt other strategies like masks, headgear, and symbolic paper costumes. Students, teachers, and the local community could be encouraged to provide live acoustic music support, rather than using recorded music.

Judicious use of resources: Schools should be conscious of the use of resources and time and plan the events with sensitivity and careful thought. Schools should consciously use eco-friendly materials, and ensure cleanliness and order throughout the event, and avoid generating noise pollution caused by powerful sound systems and amplifiers. Participation of all can be ensured by organising more frequent small-scale events where different groups of students get a chance to present and participate. Those who have presented in one event can participate as the audience in the others.

Section 2.2
Curricular Associate Processes

For effective teaching-learning to happen, some processes are required for Teachers to collectively reflect on and improve the quality of teaching. Similarly engaging parents so they also provide requisite support, and maintaining good health of students have significant mediating effect on learning.

2.2.1 Teacher collaboration and Professional Development

Teachers' professional competence and collaborative efforts is the most critical factor affecting student learning. Every school needs effective processes that enable this. It is the main responsibility of the School Principal. Trusting and respecting them is the foundation and Principals can do it in multiple ways – by listening to them, by providing them the facilities and resources to work, by arranging academic and other support, and by involving them as equal partners in school related decision making. Basic bonding among teachers and School Principal is necessary for the success of initiatives towards school improvement.

Schools requires mechanisms that facilitate sharing, reflection and working together among teachers. Teachers need to realize that teaching in a school context is a collective responsibility, so they need to rise above the notion of teaching as an individual act limited to a subject domain centred around prescribed syllabus and textbook. Having subject-based groups at school or school cluster/complex level will help teachers to get a sharing and learning platform, new ideas and resources as well as appreciation and critical feedback. Wherever possible, teachers of different curricular areas could collaborate to create integrated plans that are implemented together. Monthly forums of mixed group teachers can take up generic issues – like how to address adolescence related issues – for which teachers are not adequately prepared. A culture of peer reviewing of each other's work, observing classes of other Teachers, and documenting one's experiences will go a long way in teacher learning. Without teacher collaboration for learning, it is difficult to imagine a vibrant school culture and effective school processes.

Senior teachers can be identified and groomed to become mentor teachers for the new teachers. There could be a well thought out school-based induction for the new teachers in which they get to learn about the vision and practices of the school and the expectations from them as well as the nature of support available. Journal writing, documenting one's teaching experiences and writing articles for various education periodicals is yet another way for teacher development as writing helps one systematize one's thoughts and experiences. This also enables teachers to reach beyond school audience and connect to the wider community of education professionals.

Teachers also need time to breathe, relax and engage in recreational activities. As students are taken to excursion tours and film screening, sports day or club activities are organized for students, similar efforts are needed for the group of teachers.

2.2.2 Engaging with Parents and Communities

Schools need to build quality relationships with parents and community to not only assist student learning but also fulfil the larger role a school is expected to play in the life of the community it serves. Here are some possible ways schools can make parents and community members real partners:

At the very beginning, when parents come for admission for their children, an orientation on what the school stands for, its teaching-learning processes and expectations from parents must happen. This could be done in several forms – one to one meeting where individual queries can be responded to; meeting with a group of parents where a presentation on the school can be given and sharing a written document about what parents should know. A tour of the school premises led by students would be a more creative and effective way of doing this. By interacting with students, parents would get a good feel of what teachers would be sharing.

Parents should get regular updates on student progress. Parents Teacher Meeting (PTM) should not be primarily about telling parents what issues and challenges being faced with their children but what all their children are learning, and the efforts being made by the school. Maintaining an updated student progress portfolio will be a huge help in doing this sharing and parents will be happy to see how the school is keeping a proper record of student progress. On PTM days, schools could organize activities for them that they would love to participate in and enjoy. This will help build camaraderie among the parent body. Students can give some live performances of what they have learnt. Different students should get a chance for sharing if a school organizes such events.

Parents must be invited to school functions and celebrations. Schools must find ways to engage them actively in such events rather than keeping them as mere audiences/spectators. So, design of such functions and celebrations should aim for active engagement of parents. They could also be asked to visit the school on any working day according to their convenience to observe regular school functioning. They can sit in the morning assembly and later spend some time in the classes. During intervals, they can interact with students and teachers. This will give them a first-hand experience of what goes on in a school on a normal day. Some parents could also be seen as important resource persons who can, under a well-thought-out plan, can contribute academically too. Bagless day is one such window where parental engagement can be planned.

Teachers should also visit parents periodically as knowing the home environment and the larger socio-cultural context of children is a pre-requisite for providing more customized support to students.

The school's relationship should not be limited to the current group of parents. The larger community from where students come to school should also be involved systematically in school processes. One simple way to reach out to them is to invite them to events, functions, and celebrations where it is easier to accommodate larger groups. Exhibitions of work by students, *Baal* Mela, book fairs, film festivals, health camps, cleanliness drives, and campaigning for other social awareness causes are opportunities to engage with the larger community. If the school publishes any newsletter or magazine, it can also be distributed to a larger audience. Community based events and service by student clubs (for example, sports clubs, art and culture clubs, health and wellness clubs etc.) can be organized. Schools should have an active alumni group and with their help, it would be a lot easier to build and sustain this connection.

2.2.3 Mealtime, Health, and Hygiene

NEP 2020 clearly points out that nutrition plays a very significant role in learning, particularly in the early years; however, too many of our students are malnourished as they simply do not receive balanced diet for proper physical growth. Hunger and malnutrition indeed prevent too many students from actively participating in school processes. For such students, the mid-day-meal provided in school is the only proper meal that they eat.

So, paying attention to mid-day-meal goes a long way in ensuring good health of students and thereby improving their participation in school and finally learning. Where food is cooked in school, there is greater opportunity to ensure quality and variety of food. Good hygienic practices are required for cooking and serving. Groups of Teachers and students can take serving responsibility in rotation basis. Efforts are needed to avoid wastage of food or proper use of the leftovers. It could also be used for compost generation.

Mealtime is also about observing food habits of students. Some students don't like to eat some dishes and if they bring eatables from home, it could be processed food directly bought from shops. So, school needs to consciously create opportunities for dialogue around food, food habits and our health, culture, and traditions. Another possibility is to discuss food choices and what influences them. How does discrimination occur based on food and eating habits? Dialogue around such questions helps students understand the social-cultural aspect of food.

Schools need to organize regular medical camps at the school and cluster level. This could be done with support from government health department. The height and weight of all students in the school could also be monitored on a regular basis and recorded systematically. In the case of students who are found to have any specific medical conditions that could range from poor eyesight, skin allergies, or any symptoms of vitamin deficiencies, dialogue with their parents/families could be initiated and necessary care and treatment followed up on a regular basis. For any serious health conditions, the schools could ask the parents/families to seek proper medical attention.

Due to various circumstances, many students struggle with hygiene issues. As a Teacher, it is important to ensure that hygiene issues among students are handled with sensitivity. Here are some pointers to keep in mind when such issues arise in school.

a. Empathize with the student's situation, find out the reasons behind the issues and help the students address their hygiene difficulties.
b. Where students lack resources at home to ensure basic hygiene, the school could provide them e.g., soaps, nail clippers, sanitary pads for girls.
c. Make hygiene a class practice routine for everyone.
d. Opportunities could be found in subject teaching, in assembly and by involving local community members/NGOs to educate the students in the classroom on good health and hygiene practices.
e. Proper hygiene practices must be followed in residential schools and schools with kitchen facilities. Food and other edible items must be stored carefully and hygienically. Dining areas and other spaces where children eat their meals must also be clean and hygienic.

Section 2.3
Organisational Processes

These are processes that enable the visualization and smooth functioning of the above two categories of school processes.

2.3.1 School Development Plan

Most important among these is to prepare a school development plan that covers all aspects of school functioning. It sets yearly priorities and decisions are made for addressing challenges and taking initiatives to achieve goals in a timeframe.

As the saying goes, when we fail to plan, we basically plan to fail. School improvement is at the core of all planning and review exercises, and it requires the whole school team to have the vision about where they want to reach ultimately and in shorter durations with a clear understanding about where the school stands today.

It is the responsibility of School Principals to constantly work towards aligning the entire team's vision for the school in every aspect with the vision of the national education policy. Simultaneously they also need to regularly build consensus over how to respond to local and contextual issues that may arise in the life of a school. Here under, some major dimensions of school planning are briefly described:

Each school needs to do an institution level planning covering all aspects of its functioning with clear goals to be achieved during a set timeframe. There may be given formats and processes to be followed as prescribed by the education department. For example, which stakeholders need to participate in this exercise. The participation of the community and school management committee is also crucial in this endeavour. Senior students can also be involved along with identified local people who could bring in both ideas and support in some form.

A good school development plan should set clear academic and administrative goals along with implementation level clarity regarding who will do what and if resources are required than how and where to mobilise those resources. One major part of it will be curricular planning for the year, broken down into quarterly and monthly timeframe. One needs a good understanding of last year's progress and current challenges at subject and student level to do both strategic and detailed planning. Both stage level and subject level planning would be needed so teachers need to collaborate to develop these plans.

Other aspects to be covered in this plan are of the enabling nature. What to do for teacher support and development; what resources need to be procured or created; if any major repair and maintenance tasks are there; and what more could be done to engage parents and community.

Processes for communicating decisions, expectations, and feedback must be planned well. Most of the communication should be through formal meetings and properly documented. Deciding modes of communication is equally important.

School Principals need to closely monitor and provide hand-holding support to teachers and support staff without which they may struggle. Implementation and review related planning are equally important. Thinking through steps towards achieving the set goals help a school progress and monthly, quarterly review helps in making mid-course corrections.

2.3.2 Time and Resource Allocation

A critical part of planning is to make best use of available time and other resources as well as generating the required resources.

2.3.2.1 Annual Calendar

Schools need to plan their whole academic year at the beginning through an annual school calendar. This should include - session start and end dates, admission related schedule, examinations, national festivals (Republic Day, holidays, Independence Day), dates of different functions and day celebrations like sports day, science day, children's day, field trips, PTMs, holidays for student and teachers, alumni meetings, summer camps etc. Alignment with important dates as shared by the education department and local community level engagements is also necessary. This list should be made through a collective exercise with Teachers and parents and should be shared with all stakeholders including students. Any strategic decision regarding daily timetable is also done at the time of preparing the school development plan.

2.3.2.2 Mobilizing and Allocating Resources

Schools have some fixed resources and some that get consumed in the teaching-learning process. At the start of the year, proper planning needs to be done around what resources will be needed, how to procure and/or mobilize them and who all will be making use of them. Certain resources like computer, printer could be there in the staff room and a register could be maintained for keeping track of prints. Similarly, stationery for Teachers' use could be placed in a common almirah in the staff room. If a computer lab for students is available, then one teacher should oversee its use and upkeep. For mobilising resources from community and from public, systematic efforts would be needed in the leadership of School Principal or a committee in which selected parents and students can also be members.

2.3.3 Ensuring Student Safety

Schools need to ensure that all students are protected from any kind of injury or harm. Students are not only vulnerable to physical injury but are also exposed to various forms of discrimination, harassment and abuse that cause emotional harm and can even scar them for a long time. The safety and well-being of every life on the school campus must always be given the utmost priority. This can be achieved by promoting and practising safety in all school processes on a regular basis. Safety within the school premises is the collective responsibility of the whole school community.

2.3.3.1 Physical Safety

i. Road safety around the schools is an important aspect that needs to be given due attention. School authorities and School Management Committees could work with local administrators to ensure that appropriate road signage that marks school zones, are installed.

ii. Periodic inspections of buildings and equipment including play equipment, laboratory equipment and furniture could be conducted. All indoor infrastructure must be free of sharp edges, splinters, and objects that could potentially cause physical injury to anyone. Potentially hazardous equipment, laboratory chemicals and sharp tools must be stored carefully and accessible only to responsible adults. The age of students should be considered if they are to use these objects and must always be done under the supervision of Teachers/ adults. Clear communication procedures could be followed to instruct students on how to use laboratory equipment, as well as other guidelines for using play equipment, rules for field trips or excursions, etc.

iii. Safety and first-aid kits must be easily accessible and available for use.

iv. It is suggested that a responsible adult supervises students during breaks and play time on the playground and corridor, staircase, and any other open areas.

v. Teachers and adults in the school must ensure that students of all ages and genders are protected from physical offences, violence, and sexual offences. School administrations should have stringent measures to check and stop all forms of corporal punishment meted out towards students.

vi. Schools could conduct regular fire drills involving all members of the school to orient students, Teachers, and other staff on how to evacuate the building safely and help those in need. Open spaces that could serve as safe assembly areas during natural disasters also need to be demarcated and clearly communicated.

vii. In case of an accident or a medical emergency, a supervising adult to take a decision and inform parents immediately. If a child feels unwell in school but it is not a medical emergency the Teacher may contact the parents and ask them to pick up the child or if possible, some responsible person from school may take the child home after ascertaining that there will be somebody responsible at home. Alternatively, if there is a place to rest, the child may rest and return home at the normal time.

2.3.3.2 Emotional Safety

The school is intended to be a place where all children are treated equally, and they feel safe and completely free of the fear of adults or peers. All schools could orient their staff and teachers on the harm caused by emotional trauma caused by verbal abuse, threats, and ill-treatment, particularly on young minds. It is also important for schools to be aware of the home environment of students, and whether they may be facing or witnessing any form of physical or emotional abuse, and discrimination. Initiating dialogue and showing concern for the well-being of all children develop mutual trust between students and teachers and create a space for authentic sharing. Students could use such opportunities to openly express their discomfort, fears, and anxieties about any spaces, objects, people, animals, and other beings that could be the cause, and resolve these issues without delay. The school environment and culture must always strive to practice

values of love, kindness, compassion, empathy, *ahimsa* and seva as mentioned in NEP 2020. Teachers should be encouraged to always use positive language with students and provide encouragement that reinforces affirmative behaviour and actions in the classroom and otherwise.

It is equally important to pay attention to the emotional safety of Teachers and other adults on the school premise. Feeling emotionally secure plays a critical role in all adults' lives, and positively impacts their ability to take responsible decisions in all tasks. Students constantly observe the behaviour and actions of adults and often mimic what they see. It is therefore important for all Teachers and adults to model emotional regulation, compassion, and affirmative speech in their daily routines.

2.3.3.3 Intellectual Safety

Learning requires sustained intellectual engagement, so students need to feel safe to take risks while expanding their thinking capacities. This implies that mistakes will occur and committing errors is accepted as a part of a healthy learning process. It is important that all students freely express their opinions without the anxiety of being ridiculed, reprimanded, or punished.

The classroom environment should encourage the participation of all children to respond to questions and contribute to discussions with the confidence that what they say has value, even if it may be incorrect; because it provides insights into how every individual student perceives the world and how each may have a unique way of learning and understanding. Using demeaning language, labelling, or personally criticising students could hurt their self-esteem and result in poor participation in learning activities. Teachers often assign specific responsibilities to certain students with the assumption (spoken or unspoken) that others are not capable of carrying out the same task. This immediately sends a message to the other students that they might not be "good enough" and lowers their confidence. Care must be taken to rotate all responsibilities among all students and include Teachers and adult staff in working along with students to provide timely encouragement and support to those who may face difficulties.

2.3.3.4 Preventing Sexual Harassment

All schools must be aware of and stringently adhere to the laws pertaining to POSH (Prevention of Sexual Harassment) for adults and POCSO (Protection of Children from Sexual Offenses). All adults at the school must behave in a manner that reflects the values of being an educator and responsible adult and protect their colleagues and students from sexual transgressions and violations. This is an area of safety that schools must show zero tolerance for.

Some examples of sexual harassment include passing unsavoury remarks, gender-based insults or sexist remarks, making obscene jokes, innuendoes and taunts, displaying pornographic or other offensive or derogatory pictures, cartoons, pamphlets or sayings, making unwelcome sexual overtures in any manner over any medium or in person, touching or brushing against the body of others, body gestures and manners that could be offensive or frightening to the other gender, forcible physical touch or molestation, physical confinement against one's will and any other act likely to violate one's privacy.

2.3.3.5 Cyber Safety

It is important to establish clear norms for the use of computers and the internet. Students must be taught cyber safety, the appropriate use of technology and the internet, and be educated about the function of, and disruption caused, by screens and handheld gadgets. Students using computers as part of their school curriculum must always access the internet under Teacher supervision. This will enable the appropriate learning of the medium and help with monitoring student activity, safeguarding them from potential cyber risks like online impersonation, bullying, unregulated and inappropriate adult content, and so on. Another crucial step in protecting students is to prepare the computers for students' use by blocking noneducational and inappropriate sites so that they become inaccessible. Web cameras may be used for school projects and other organised class activities only under Teacher supervision and in no other circumstances.

It will be educationally valuable and relevant for students to be taught both, the usefulness as well as the problems of social media platforms. The pandemic enforced the widespread use of smartphones and tablets for participating in online classes. However, this seems to have brought along with it a screen dependence in students across the age groups, affecting their capacity for focused attention and 'deep reading'.

2.3.3.6 General Safety Measures

a. Addresses and phone numbers of parents to be regularly updated and kept accessible – emergency contact numbers must be available for all students/adults.

b. Information about any medical condition and the associated medication or preventive measures to be obtained at the time of recruitment/admission, updated regularly, and made available to all concerned.

c. Information about any emotional upheaval or trauma that the child may be going through temporarily to be made available to all concerned teachers.

d. Telephone numbers of the closest medical centre/hospital/doctor, ambulance, fire station and police station to be easily accessible - put up in a central place for all to see.

e. Private transportation facilities that are being used by students need to be checked regularly for safety standards e.g., in the case of using private transport, the vehicle condition must be verified and in proper order, a background check of the drivers must be carried out to ensure that they have a valid driver's license and are of sound health.

f. Digital devices should have child-protection features to ensure online safety of all children.

2.3.4 Resolving Differences, Conflicts, and Disciplinary Issues

This section talks about the mechanisms to deal with matters of indiscipline and conflicts encountered in the school life. This could be in the form of irregularity, lack of seriousness towards classwork, homework, teasing, passing comments, rivalry, bullying, damage to school property, sexual harassment, substance abuse etc. Here are some suggested steps:

a. **Clear communication on expected behavioural norms and consequences.**
There should be written behavioural expectations which must be communicated to students and parents at the time of admission. These should largely be defined in positive terms and if there is a student diary then school rules should also find space there. Staff room, classroom and general notice board of the school can also have this for ready reference. From time to time, in school assembly or in classroom situation, these could be discussed so that the rationale behind school rules could be communicated and understood properly. Consequences or not abiding by the rules should also be clear, communicated and followed.

b. **Polite reminders and encouragement for self and peer led correction.**
There should be ways of drawing attention to any lapse of expected behaviour. This should be done politely with an expectation that the person involved will avoid repeating it. For example, there could be a chart on the classroom wall for students in the Preparatory Stage where they self-rate their participation in classroom and school activities. In higher Grades, students themselves can speak to the erring students. When majority follow the rules then those who are not following get easily identified and one can be expected to take corrective measures.

c. **Dialogue and counselling**
Next step is to have dialogue with those who have difficulty following the rules, and in some cases with the whole class or school as collective efforts may be needed. Class Teachers or in extreme cases, the School Principal, could hold this dialogue as this would demand a certain level of maturity and expertise. These dialogues need to be carried out with empathy as well as firmness. One will have to do it separately rather than in front of others. The intent should be to understand why a student is behaving in ways which is detrimental to one's own learning and that of others. Few Teachers could be identified and be trained to counsel students. At the school complex level, a counsellor can be appointed to assist teachers in dealing with special cases.

d. **Withdrawal from activity/classes, temporary isolation, warning, fine, consultation with parents**
When the earlier steps don't work; there is repeated instances of rule breaking; violence, intentional damage to school property, then these measures would be required.

e. **Expulsion from school**
This is the last resort. If nothing works then, in the interest of others safety and for smooth functioning of school, this step may be required.

If schools make their best efforts in building nurturing culture and by keeping students meaningfully engaged, the instances of indiscipline will anyway get minimized. Classroom processes should not allow small incidents to hijack the learning objectives for the day. As classroom management skill, one must learn what to pay attention to and address immediately, what to ignore and what to attend afterward. It has been observed that frequent disruptions and lack of consistency in the teaching-learning process is an important factor leading to low levels of learning. Incidents of undesirable behaviour should be forgotten once the erring students make amends and should not be used for showing any inappropriate behaviour on the part of the others.

2.3.5 Data Management and Reporting

All schools must develop efficient systems for recording, storing, and utilizing various kinds of data. Progress review, planning and reporting - all depend on authentic data and its interpretation so a proper sourcing, upkeep of data (if possible, in computerized form) will be of great help.

The most critical set of data for schools is regarding student learning. Keeping track of student progress in both qualitative and quantitative ways is needed at the level of teachers and the School Principals. Simple things like how students' reading and writing skills are improving over months or grades informs teachers about the impact of their teaching. Similarly, tracking student attendance helps us see how it impacts student learning. School Principal and teachers need to regularly study student learning data to understand the status and to take requisite steps timely.

Though proper data management is a must for each school, it should aid student learning efforts rather than becoming a burden for teachers. Intelligent use of technology has a lot of potential to ease things on this front. The responsibility of recording and managing data will be distributed for class level but it should also be collated by one person (school admin, Principal, or a Teacher) to see the overall picture.

Part E:

Ecosystem

Chapter 1

Ensuring an appropriate Environment for Learning

We would like all students to look forward to coming to school every day. A safe and stimulating physical environment can help to make school a positive experience for all. Studies have also shown that when physical spaces are carefully designed to cater to the needs of students, they can have a positive impact on their overall well-being and learning.

Since most students spend close to six hours a day in school where they are engaged in a variety of activities, it is important to design school infrastructure in a way that addresses learning requirements and allows for play, gatherings, interaction with others and interaction with nature. All these aspects contribute to learning and support the smooth functioning of school processes.

Quality, completeness, and maintenance of infrastructure is a key differentiator between a good school and a not-so-good one, especially in the eyes of parents and community.

Safe, barrier-free, and adequate physical infrastructure must be available as per prescribed norms. Buildings and equipment must meet safety standards as per the law. Adequate budgets and utilization for infrastructure development, infrastructure maintenance and teaching-learning material must be available.

While the importance of safe and adequate infrastructure is well-recognised, many schools still struggle to meet the basic requirements for a conducive learning environment. On the other hand, there are many schools that have taken several initiatives to improve their infrastructure and ensure a better learning environment for their students through strong School Management Committees and with the help of local communities. These schools have applied many creative ideas to overcome space and resource limitations to achieve learning goals. Collaboration among school administrations, local authorities, and the local community can play a critical role in finding solutions to infrastructural challenges that many schools face. Some basic requirements that all schools should aim to address are detailed out in the following sub-sections.

Section 1.1
Outdoor Infrastructure

Schools exist in varied environments across the country - from the midst of a busy main street with heavy traffic to the midst of an idyllic landscape, bordering a forest. Setting up a school with the right infrastructure and safety measures can be a challenge in many locations across the country.

All schools must ensure that basic standards for infrastructure and safety are met to help ensure learning for all students.

1.1.1 Basic Structure and Compound Wall

School buildings should be permanent structures constructed with appropriate materials that ensure structural stability and long-term safety of all individuals who use the space. The school boundaries and grounds need to be protected from various external elements that could threaten the safe movement of students and so, a compound wall and a secure gate can ensure that entry and exit of visitors to the school are properly organised and monitored.

1.1.2 Open Space for Play and Safe Assembly

An outdoor open space in schools can double up as a space for students to play, as well as a place for large gatherings or a dedicated assembly point in the case of any emergency (e.g., fire, natural disaster). Schools could opt to install play equipment like swings, climbing frames, slides, jungle gyms and so on for young students.

1.1.3 Trees, Plants and Nature

Nature is a great Teacher. The presence of trees (including local fruit trees) and plants where students can find shade, explore and invent their own games, and observe birds, insects and butterflies has a positive impact on learning. In addition to local flora and fauna, schools could have a dedicated kitchen garden where students participate in growing and nurturing plants, and a composting pit to process organic waste from the kitchen.

1.1.4 Ramps and Lifts

Schools must take measures to make the physical environment accessible for people and students with disability. Ramps must be provided for wheelchair access, and lifts can be provided in schools that need them.

Section 1.2
Indoor Infrastructure

1.2.1 Classrooms

Classrooms are where Teachers and students spend a majority of their time in schools. Schools must have sufficient classrooms to accommodate all students comfortably and ensure that the dignity of every student is respected.

Classrooms must be well-ventilated and well-lit spaces. Depending on the climatic conditions and school requirements, basic lights, fans, and electric power outlets with safe electrification would also need to be provided in classrooms.

The design of classrooms must take into consideration accessibility for all students and people with disability, the nature of different subjects and the recommended pedagogy, movement for a variety of learning activities, furniture for flexible seating arrangements, blackboards for Teachers and students, and facilities for storage and display.

Classroom organisation could be flexible in some cases, giving students the opportunity to move to other rooms. For example, a room dedicated for language learning could be designed to offer an immersive print-rich environment with easily accessible resources for different learning levels across Grades. Similarly, dedicated rooms for the arts could be planned for conducting arts activities, with the provision of sufficient space for movement and storage of materials, props, stationery, and instruments. Wherever possible, schools could consider making provisions for using digital technologies and equipment to support learning practices (TV/projector/ interactive board either in the classrooms or as a commonly shared multipurpose media room).

1.2.2 Libraries

Depending on the space available in the school, there can be three types of libraries set up.

a. School library

This is a separate room dedicated for use as a library with adequate furniture to store a wide range of books arranged and catalogued systematically, for students and Teachers. Books could be categorized according to reading level, language, subject, and so on. Systematic labelling could help students navigate through the collection and also maintain entries in a library record book.

Story books for early readers are usually light and full of colourful pictures. These can be hung on the wall at a lower level using a string to draw the attention of younger readers, provide easy access for them to choose different books to browse through or spend time reading or to help them decide which books they want to read.

Such a library could also include multimedia and audio-visual learning resources with computers, projectors and other relevant devices available.

There should be sufficient space and appropriate furniture for students to sit comfortably

and spend time reading, researching, and accessing resources in the library.

b. Classroom library, Corner library

If a school has limited space, libraries can be set up in classrooms with appropriate material available for that particular Grade.

A corner library could also be set up in one part of a particular classroom. Here too, bookshelves, tables or cupboards can be used to place the books.

c. Community library

A school could also choose to make its library more open by extending it for the use of the local community after school hours. A school could also set up a part of the library outside the school premises, in a place that gives access not only to its students but to students of other schools, or other children and adults in the community. Such initiatives can become lively and enriching centres especially when different people contribute books, periodicals, magazines towards the library collection.

School alumni, youth, and adults could volunteer to help early readers by reading to them, organising story-telling activities, or by managing the library resources. A community library could also serve as a space for students to study after school hours, get together and help one another with their homework.

1.2.3 Laboratories

Although laboratories are commonly associated only with science, schools must aim to expand the idea of a laboratory to all disciplines. Laboratories must be kept open and accessible to students during their learning hours. They must be perceived as spaces for 'doing' - extending to a variety of learning experiments across discipline, where students explore, discover, and verify knowledge.

For example, students can access instruments required for measurement and geometry alongside the raw materials like wood to create their own measuring instruments. A lab can also have a stock of natural clay that can be used for visualising and creating 3D models, seals, toys, and other resources that can aid learning. The concept of a laboratory could be extended to workshops for woodwork/carpentry, electronics, mechanics, pottery, textile and sewing in schools for Middle and Secondary Stages.

1.2.4 Dining Area and Drinking Water

The area for eating meals must be shaded, clean, spacious, and hygienic. It should be welcoming to all people to sit comfortably and eat together. The dining area must also have sufficient space and an adequate number of taps for washing dishes and utensils after meals. Easily accessible and hygienic drinking water facility should be provided in all schools. Timely maintenance of these facilities must be followed.

1.2.5 Toilets

Well-lit clean toilets with safe and well-maintained plumbing and uninterrupted supply of water. Separate toilets for different genders and people with disability must be provided. Girls' toilets should stock sanitary pads and provide covered dustbins for the safe disposal of used sanitary pads.

1.2.6 Semi-open/ Partially Shaded Areas

Schools could also have semi-open areas like partially shaded corridors or verandas where students can move safely, sit and play indoor games, or seek shelter from the rain. These areas could also accommodate display facilities where charts, poem cards, story cards, students' art works and writings, are presented and changed periodically. Schools could also think of creating interactive spaces in these areas, where students find opportunities for sensorial exploration e.g., interactive materials like walls/surfaces with a variety of textures, objects that produce different sounds that students can play like musical instruments, wind chimes, can be installed.

1.2.7 Uninterrupted Supply of Water and Electricity

Regular and uninterrupted supply of water and electricity are essential for the smooth functioning of any school. Disruption in water supply can impact the hygiene and cleanliness of toilets and the kitchen. Electricity is essential to power many devices that are used not only for learning, but also to operate computers and other electric and electronic devices that are integrated into school routines.

Schools could work closely with the local administrative authorities to ensure that the supply of water and electricity are prioritised for the school. At the same time, steps can be taken to educate all members of the school staff and students to use water and electricity conscientiously and report any misuse.

Section 1.3
Infrastructure that Ensures Safety

a. Choice of building material: Physical safety in a school begins with the choice of materials used in the construction of the school building. Schools must avoid using easily flammable materials like straw and ensure that the construction quality meets all school safety regulation standards. School building need to be secure permanent structures with long term stability.
b. Electrification and Plumbing in the building must be standardised and concealed.
c. Doors, Windows, Gates: Toilets for all genders must ensure safety and privacy by installing proper doors with latches that can be used by students of all age-groups comfortably. Windows must be installed in all classrooms to ensure proper ventilation and light. Main entry and exit points of the school premises should have gates that can be closed and opened smoothly and locked after school hours.
d. Safety during emergencies: Multiple entry and exit points could be provided to avoid stampedes during emergency evacuations. Schools must have fire safety mechanisms and fire extinguishers in proper working condition. They could conduct regular fire drills involving all members of the school to orient students, Teachers, and other staff on how to evacuate the building safely and help those in need. Open spaces that could serve as safe assembly areas during natural disasters also need to be demarcated and clearly communicated. Helpline and Emergency numbers should be displayed in multiple locations on the school premises. Safety and first-aid kits must be easily accessible and available for use.

Other aspects of safety and its operationalisation are provided in the chapter on School Processes.

The Ministry of Education's Guidelines on School Safety and Security clearly define the measures that Schools and other relevant stakeholders must take to create a safe and secure environment for all children. They are an excellent resource for all educational institutions and settings.

Section 1.4
Infrastructure that Ensures Inclusion

All common spaces and common property on the school campus that are meant for students and Teachers should be made accessible to all students and Teachers.

This includes barrier-free access to all parts of the school for people and students with disability e.g., entry, exit, corridors, classrooms, library, laboratories, dining areas, play areas, toilets, use of furniture, use of learning material.

Particular issues related to inadequate or inadequately-maintained infrastructure can create barriers for particular groups of students e.g.., one important reason why many adolescent girls have poor school attendance is the lack of proper toilet and sanitation facilities in school. Schools must have well-maintained, functional and safe toilets that are suitable for all students.

Chapter 2

Pupil Teacher Ratio

It is widely understood and accepted that the right Pupil-Teacher Ratio (PTR) enables individual attention by Teachers, and therefore can increase student engagement and achievement.

It is important to look at the PTR as not just a number, but as a measure that would lead to better Learning Outcomes. Many crucial classroom processes can be better implemented if the Teacher could operate in an environment of favourable PTR.

Pedagogy specialists argue that a lower PTR has a larger impact during the early years of schooling. It is found that children who attend schools with lower PTR have a greater likelihood of continuing schooling for a greater number of years.

One important caveat is that reducing PTR does not imply filling schools with underqualified and contractual Teachers. PTR must be improved through the appointment and professional development of qualified Teachers.

Along with improved PTR, issues of infrastructure, and the academic and pedagogic capability of Teachers must also be taken care of to take full advantage of lower PTR. There must be a full complement of Teachers for all students across all school Stages.

Chapter 3

Enabling and Empowering Teachers

The NCF for School Education is one of the core transformational forces of NEP 2020.

As is evident from the previous chapters, the curricular implementation of this NCF requires several actions around development of content, pedagogy in the classroom and assessment of student learning, all of this within a strong and enabling school culture.

For all this to happen, a supportive ecosystem is essential. This Section describes the kind of ecosystem needed for the implementation of the NCF - availability of adequate infrastructure and resources, criticality of Teachers, the role of Academic and Administrative Functionaries, Parents and Community in making this happen.

Section 17.1 mentions the infrastructure and learning resources support required to implement this NCF. Section 17.2 talks of empowering Teachers in different ways in line with NEP 2020. Section 17.3 outlines the role of academic and administrative functionaries. Section 17.4 enumerates the importance of parents and community supporting the learning of students.

Section 3.1
Ensuring an Enabling Environment of Teachers

A culture that encourages people to learn and work together and is characterised by trust and respect for all is critical to a good school - this is possible in an environment that is open and caring, and where dialogue, collaboration, enquiry, and reflection are embedded practices.

Teachers need resource-rich, motivating environments and continuous opportunities for professional learning and interaction. Teachers must feel a sense of pride in belonging to a well-qualified, close-knit, and vibrant professional group.

Section 3.2
Conductive Facilities and Work Environment

Adequate and safe physical infrastructure, facilities, and learning resources must be made available with safe drinking water, functioning toilets with running water, and basic hand washing facilities.

The infrastructure and teaching materials necessary to teach students effectively, must be made available.

Section 3.3
Pre-Service Teacher Education

The first step is to estimate Teacher demand and supply. This must be undertaken by NCTE on priority, building on existing studies related to demand and supply of Teachers for specific Stages.

This will help to ensure that the right number and type of universities offer the four-year Integrated Teacher Education Programme (ITEP) with specializations across School Stages.

The curriculum for the specializations within the ITEP must be based on the curriculum and pedagogy of the NCF. It must also ensure adequate practice opportunities for student Teachers in all school environments.

The Teacher Eligibility Test (TET) should also be extended to all teachers of the Foundational and Secondary Stages once the re-structuring of school stages is complete. NEP 2020 envisages the extension of the TET to cover all stages of education.

This certification of suitability to teach will cover teachers across all kinds of schools. Recruitment of teachers must be through a rigorous process comprising not only a written test but also an interview and classroom demonstration, as stated in NEP 2020.

Section 3.4
In-Service Teacher Education, Mentoring and Support

Teacher professional development is a journey, and Teachers progress through it at their own individual pace.

Teachers will be at different phases of their development journey and will have different development needs. Within each phase, the learning experience needs to be holistic and complete to a point that it can help Teachers to bring about sustained change in their practice and move to the next phase.

Professional development of Teachers must be such that they become competent and reflective individuals with the ability to drive educational improvement. Teachers must engage continuously with their professional development through a variety of means. Platforms for peer learning with mentoring and coaching support must be made available.

The NCERT, SCERTs, DIETs, BITEs, BRCs, CRCs provide academic mentoring and support to schools and Teachers through the development of support material, capacity building sessions, on-site visits, and quality monitoring and supervision.

These academic resource institutions play a key part in ensuring that teacher professional development opportunities are continuously available.

Section 3.5
Career Ladder and Professional Development Opportunities

All Stages of school education are critical and will require Teachers who are competent and committed. NEP 2020 speaks of parity in service conditions across all Stages of school education.

This means that, as soon as possible and in the long term, pay and service conditions of Teachers have to be commensurate with their social and professional responsibilities, and must be set so as to attract and retain talented Teachers in the profession.

All Teachers, from Foundational Stage Teachers to Secondary Stage Teachers, will be recruited with standard service conditions as per their work requirements, and the same salary structure.

All Teachers must have the opportunity to progress in their career (in terms of salary, promotions, etc) while remaining as Teachers in the same stage of education (i.e., Foundational, Preparatory, Middle, or Secondary).

The approach will be to ensure that growth in one's career (salary and promotion) is available to Teachers within a single school stage, and that there is no career progression-related incentive to move from being Teachers in early stages to later stages (though such career moves across stages will be allowed, provided the Teacher has the desire and qualifications for such a move).

Section 3.6
Teacher Autonomy and Teacher Accountability

Teachers are responsible for student learning and must be held accountable for it. But Teacher empowerment and autonomy are preconditions for accountability. Accountability is critical but so is autonomy - an empowering culture based on autonomy is a necessary condition for accountability.

Competent and capable Teachers are critical to improve the quality of learning. Supportive environments within schools and the eco-system improve teacher effectiveness. Teachers are unique individuals, with their own set of beliefs and personal theories about learners, learning, and education.

To a creative and discerning Teacher, every learning episode presents unanticipated opportunities to spontaneously and naturally stimulate and support learning of what was not planned, and to omit, on that particular occasion, learning of what was originally intended or planned.

Teachers must have the pedagogic autonomy to plan and organize content, decide the sequence, and methods of teaching children as the situation demands, along with ways of assessing their learning. All this must be based on the prescribed Curricular Goals, Competencies, Learning Outcomes, and pedagogical approaches and principles.

Chapter 4

Role of Academic and Administrative Functionaries

Section 4.1
Role of Academic and Administrative Functionaries

The Head Teacher or School Principal must create a supportive and empowering culture for Teachers so that they teach well – helping them in planning classes, providing access to appropriate resources, observing classes, and providing constructive feedback, and creating an ethos where conversations centre around children's learning. Another critical role that Head Teachers play is that of building relationships with parents and community.

Academic Functionaries have important roles to play with respect to school visits and on-site support, continuous professional development at the cluster-level meetings, in the development of innovative learning materials as well as the development of a pool of academic resource persons to support Teachers. Functionaries at the cluster and block levels need to support teachers through classroom observation and demonstration of pedagogy. DIETs must develop extensive material for children and Teachers in the local language. In addition, DIETs must also create plans to support Teachers in the use of these materials. At the level of SCERT the focus should be to develop the State curriculum, syllabus, textbooks, and other material. The SCERT should also take responsibility for sourcing, contextualising, and anchoring translation of materials wherever necessary.

Administrative Functionaries have a critical role in ensuring appropriate budgetary allocations for all aspects of resourcing, availability of teachers, timely supply of teaching-learning material, with regular monitoring and review of progress. Appropriate collection and use of data would be necessary to ensure access to Socially and Economically Disadvantaged Groups. The integration of technology for this purpose would reduce effort while ensuring that data-based decision making becomes possible very quickly.

An indicator of the quality will be the attainment of Competencies and learning outcomes. The NAS makes this tracking possible. In addition to NAS, States may plan State Learning Achievement Surveys (SLAS) with this focus.

Large-scale advocacy through public service messages and media campaigns, direct communication with parents, and wide-scale dissemination of simple methods and materials needed to enable parents to actively support their students' learning needs could also be designed.

Section 4.2
Role of Parents and Community

Parents and family are co-partners with the school in their children's learning and development. Communication with parents needs to be frequent and ongoing, with parents being treated as equal partners in the process of the child's education. This could be done by inviting parents to school regularly for discussions about their child's learning, and by the Teacher conducting home visits. Parents and families can contribute to the school in several ways – be part of the School Management Committee, participate in celebrations, share knowledge and expertise in specific topics, support Teachers during field trips, and co-teach or observe classes. Parents can also plan and run events in the school like Sports Day or Annual Day.

The local community is defined as parents, family, residents of the neighbourhood, youth groups, community leaders, and local governance institutions. The community could be involved in and support the school in several ways. For example, ensure enrolment and regular attendance, mobilise funds for infrastructure and learning materials, organise ingredients for more nutritious meals locally, and so on.

Glossary of Terms

1. **Aavartam**- Tempo, rhythm.
2. **Abhinaya**- Ancient Indian texts defining the principle of arts.
3. **Abhyas**- Practice.
4. **Adavu**- Fundamental movement steps in classical dance.
5. **Adi Shankara**- 8th-century Indian Vedic scholar and teacher.
6. **Aditi**- Introduction.
7. **Aesthetic Appeal**- Artistic/beautiful elements or expressions or moment within a physical activity.
8. **Ahimsa**- Non-Violence.
9. **Aipan**- Traditional Indian floor paintings.
10. **Akshara**- Alphabets.
11. **Alankaara**- Elaboration, personification and melodic variations.
12. **Alpana**-Traditional Indian floor paintings.
13. **Alternative Conceptions** - Ideas which students use to explain various scientific concepts that do not match with the generally accepted scientific explanation of those concepts.
14. **Anandamaya Kosha** -Inner self.
15. **Anganwadis**- A childcare centre that provides health, education, and nutrition services to children less than six years, mothers, and adolescents throughout the country; set up under the Integrated Child Development Services (ICDS) scheme.
16. **Annamaya Kosha**- Physical layer.
17. **Anubhava**- Direct perception.
18. **Anumana**- Using inferences to come to new conclusions from observations is on another way of coming to know.
19. **Anupalabdi**- Perception of non-existence is considered a valid form of knowledge.
20. **Anuprasa**- Alliteration.
21. **Apnapan**- Familiarity.
22. **Arthapatti**- Knowing through circumstantial implication.
23. **Athishayokthi**- Hyperbole.
24. **Bal Panchayats** -Children's Parliament in India.
25. **Bal Sabha**- Children's Assembly in India.
26. **Balvatikas-** A one-year preparatory class before Grade 1 for children aged 5-6 years; it can be in an Anganwadi, a pre-school, primary school, or any other configuration.
27. **Bauddhik Vikas** -Intellectual development.
28. **Bhaava**- Emotions.
29. **Bharatanatyam**- A form of dance.

30. **Bhartiyata-** Indianness.
31. **Biodiversity Collapse** – Described as the loss of life on Earth at various levels, going from reductions in the genetic diversity to the collapse of entire ecosystems.
32. **Bir Lasit Phukari-** Assamese commander.
33. **Bodh-** Conceptual understanding.
34. **Bol**- Tempo, rhythm.
35. **Capacity** -That we refer to in this document, are procedural knowledge – 'knowing how'.
36. **Carbon Credits** – A permit which allows a country or organization to produce a certain amount of carbon emissions, and which can be traded if the full allowance is not used.
37. **Carbon Footprint** – A carbon footprint is the total amount of greenhouse gases (including carbon dioxide and methane) that are generated by all living beings.
38. **Carbon Offsets** – A carbon offset is a credit that a person or organization can buy to decrease its carbon footprint.
39. **Chaitsik Vikas**- Spiritual development.
40. **Chāli-** Fundamental movement steps in classical dance.
41. **Chaupad**- A board game.
42. **Chitrasutra** -Ancient Indian Texts defining the principle of arts.
43. **Circle Time**- When all children sit in a circle with the teacher and talk.
44. **Cognition**- Knowledge of student related to concepts as well as process capacities.
45. **Cognitive**– Any mental activity relating to or involving the processes of thinking and reasoning.
46. **Cognitive Development**– Any mental activity relating to or involving the processes of thinking and reasoning.
47. **Coordinative Abilities**- An ability to perform difficult movement structures quickly and purposefully.
48. **Curricular Goal** - are broad directions for the curricular designers to realize the educational vision of NEP 2020 after giving due consideration to the developmental domains.
49. **Curricular Goal**– Statements that give directions to curriculum development and implementation.
50. **Darpanam**- Ancient Indian texts defining the principle of arts.
51. **Deewar Patrika**- Wall newspaper.
52. **Dhingli**- Cotton dolls.
53. **Dholak**- Indian musical instrument.
54. **Differential Access** – Difference in access to resources by different groups.
55. **Displacement** – The displacement of human populations refers to the relocation of large numbers of people from their homes due to environmental causes and development.
56. **Disposition**- Dispositions are the attitudes and perceptions that form the basis for behaviour.

57. **Diverse Needs**– Different students learn in different way – learning needs of students vary based on their social, emotional, physical contexts, and current learning levels.
58. **Divyang Students**- Students with disability.
59. Domain - domain refers to specific aspects of growth and change. The major domains of development are physical, cognitive, language, and social-emotional.
60. **Domain**– Broad area of work that encompasses similar kinds of vocations.
61. **Dribble**- In soccer, hockey, and basketball an act of taking the ball forward with repeated slight touches or bounces.
62. **Ecological Balance** – Ecological balance is a term describing how ecosystems are organized in a state of stability where species coexist with other species and with their environment.
63. **Ecology** – The study of the relationships between living organisms, including humans, and their physical environment.
64. **Ecosystem** – The physical environment where plants, animals, and other organisms, as well as weather and landscape work together.
65. **Ektara**-Percussion Instruments.
66. **Empirical Evidence**– Observations and data obtained using senses and extension of senses.
67. **Environmental Degradation** – Environmental degradation refers to the loss of biodiversity through depletion and exploitation of natural resources.
68. **Environmental Literacy** – Having the knowledge, capacities, and dispositions to solve problems and resolve issues individually and collectively that sustain ecological, economic, and social stability.
69. **Environmental Literacy**– Students become aware of and concerned about the environment and associated concepts.
70. **Ethical Concerns**– Implications, benefits, misuse of knowledge and technology.
71. **Ethics**– Judgements or principles informed by value systems which direct behaviour.
72. **Falsifiability**– Possibility of a hypothesis, theory, and law to be proven wrong in light of new evidence.
73. **Fine Motor Skills**- The ability to make movements using the small muscles in our hands and wrists.
74. **Foundational Stage**– The stage of schooling for children aged 3 – 8 years.
75. **Free Play**- When children have full freedom to play in whatever way they want.
76. **Gaayan**- Vocals.
77. **Gamak**- Musical compositions.
78. **Ghungroo**- Musical anklets.
79. **Gross Motor Skills**- Skills involving large-muscle activities, they are key skills developed during infancy and include control of posture and walking.
80. **Guru**- Teacher.
81. **Home Curricular Goal** -

82. **Home Curricular Goal**– Goal related to students' engagement in home-based tasks.
83. **Humanism**– Approach in which all the beings are treated with dignity, humanity, and compassion.
84. **Hypothesis**– A statement suggesting a possible explanation for a phenomenon that is yet to be verified.
85. **Indigenous Knowledge** – The knowledge that an indigenous (local) community accumulates over generations of living in a particular environment.
86. **Indriya**- Senses.
87. **Information, Communication and Technology - (ICT)** – A diverse set of technological tools and resources used to create, store, transmit, share, or exchange information.
88. **Integrated Approach** – Approach to learning in which different subject areas are integrated, intertwining, and permeating each other.
89. **Jaanta Raja**- Marathi play.
90. **Janapadageete**- Kannada literature.
91. **Janapadakathe**- Kannada literature.
92. **Janna**- Kannada writer.
93. **Job** - the work that you do regularly to earn money
94. **Job**- The work that you do regularly to earn money.
95. **Kalamkari**- Form of Indian painting.
96. **Katha Upanishad** -Is one of the primary Upanishads, embedded in the last eight short sections of the Katha school of the Krishna Yajurveda.
97. **Keshiraja**- Kannada writer.
98. **Khanjira**- Tambourine.
99. **Kho Kho**- Traditional Indian sport.
100. **Kirtana Ghosha**- Assamese literature.
101. **Knowledge**- That we refer to in this document, is descriptive knowledge – 'knowing that'.
102. **Kolam**- Traditional Indian floor paintings.
103. **Koni Jun**- Assamese literature.
104. **Koyal-** A bird.
105. **Lavani-** Kannada literature.
106. **Laya**- Tempo.
107. **Learning Outcomes** - statements of the knowledge, skills, attitudes and values that all children must possess and demonstrate upon the completion of a learning experience or sequence of learning experiences.
108. **Learning Outcomes**- These are statements summarising the knowledge, skills, attitudes, and values that all children must possess and demonstrate upon the completion of a learning experience or sequence of learning experiences.
109. **Locomotor**- A physical action that propels an object or individual from one place to another.

110. **Maatras**- Diacritics.
111. **Manasik Vikas**- Emotional/Mental development.
112. **Mandana Misra**- Hindu philosopher.
113. **Mandana**- Traditional Indian floor paintings.
114. **Manipulative Skills**- Movement skills that require an ability to handle an object or piece of equipment with control.
115. **Manjira**- Cymbals.
116. **Manomaya Kosha** -Mind layer.
117. **Mātra**- Tempo, rhythm.
118. **Maulyavardhan**- Developing virtues.
119. **Meend**- Musical compositions.
120. **Mentor**– A person who focuses on including students in an activity, supports them in case of questions, and helps them learn work-related skills.
121. **Middle Stage**– The stage of schooling for children aged 11 - 14 years.
122. **Mitigation of Environmental Issues**– Environmental mitigation means an action or activity intended to remedy, reduce, or counter known negative impacts to the environment.
123. **Moro Reflexes**- When the baby gets started by an unexpected sound, light, or movement.
124. **Motor skills**- A function that involves specific movements of the body's muscles to perform a certain task.
125. **Mudita**- The feeling of rejoicing in the achievement or success of others can also be developed.
126. **Mudra**- Gestures and postures.
127. **Muhavar**- Sayings.
128. **Multidisciplinary** – Combining or involving more than one discipline or field of study.
129. **Muscle Memory**- The ability to reproduce a particular movement without conscious thought, acquired because of frequent repetition of that movement.
130. **Naada**- Sound and volume.
131. **Naatya**- Abstract movement and abhinaya.
132. **Nachiketa**- The son of Sage Vajasravasa.
133. **Nagar Palika**- Municipal Council in India.
134. **Natyashastra**- Ancient Indian Texts defining the principle of arts.
135. **Nishkam Karma**- Any action performed without any expectation.
136. **Non-renewable Sources**– They are resources that come from sources that will run out or will not be replenished in our lifetimes—or even in many, many lifetimes.
137. **Nritta/Nritya**- Pure abstract movement in dance.
138. **Pampa**- Kannada writer.

139. **Panchaadi**- Five-step learning process.
140. **Panchakosha Vikas**- Five-fold development.
141. **Panchayat Ghar**- The building where the Panchayat meets to discuss its working and perform its functions.
142. **Panchayat**- Village Council in India.
143. **Parishad**- Councils in India.
144. **Patachitra**- Traditional Indian painting.
145. **Peripheral vision**- The ability to see things where you are not directly looking.
146. **Phenomenon** – An observable fact or event that typically is unusual or difficult to understand or explain.
147. **Pramanas**- Proof and means of knowledge.
148. **Pranamaya Kosha**- Life force energy layer.
149. **Pranik Vikas**- Development of life energy.
150. **Prasar**- Expansion.
151. **Pratyaksa**- This is usually interpreted as direct perception through the five senses.
152. **Prayog**- Application.
153. **Predisposition**- Hold a particular attitude, or act in a particular way.
154. **Preparatory Stage**– The stage of schooling for children aged 8 – 11 years.
155. Prevocational - pre-vocational education is mainly designed to introduce participants to the world of work and to prepare them for entry into further vocational or technical programmes.
156. **Prevocational**- Prevocational education is mainly designed to introduce participants to the world of work, and to prepare them for entry into further vocational or technical programmes.
157. **Procedural Knowledge**– Knowledge to accomplish a task acquired by 'doing science'.
158. **Projectile Motion**- When a particle is thrown obliquely near the earth's surface, it moves along a curved path under constant acceleration directed towards the centre of the earth.
159. **Raaga Navarasa** -Nine aesthetic experiences.
160. **Raagas**- Indian classical music.
161. **Ranna**- Kannada writer.
162. **Rasanubhava**- Experiencing music.
163. **Rasika**- Audience/connoisseur.
164. **Renewable Resources** – They are resources is derived from natural sources that are replenished at a higher rate than they are consumed.
165. **Replicability**– Process that can be repeated and results in similar outcomes.
166. **Resource Person** – a person with expertise in a certain area who may be called upon as necessary to perform a task or provide information.
167. **Resource Person**– A person with expertise in a certain area who may be called upon as necessary to perform a task or provide information.

168. **Saahitya**- Lyrics or literature.
169. **Sabda**- In some systems of knowledge the testimony of an expert is admissible as true knowledge.
170. **Sabzi Mandi**- Vegetable market.
171. **Sāhitya**- Literature.
172. **Sattuka**- Jataka tales.
173. **Satya**- Truth.
174. **Scaffolding**– Specific and structured form of support provided to help children learn a particular concept.
175. **Scepticism**– Questioning the validity of any idea, process.
176. **Science Kit**– A set of scientific tools or devices (like ruler, thermometer, wire, battery, magnets, metal box, litmus paper, microscope, digital weighing machine etc.), chemicals and lab manuals put together to carry out experiments from school curriculum.
177. **Secondary Stage**– The stage of schooling for children aged 14 - 18 years.
178. **Seva**- Service.
179. **Shanti**- Peace.
180. **Sharirik Vikas**- Physical development.
181. **Shiksharth aaiye, Sewarth Jaiye**- Come to learn, go to serve.
182. **Shilpashastra**- Ancient Indian texts defining the principle of arts.
183. **Shishya-** Pupil.
184. **Shravana-** Listening.
185. **Shruti/ Sur-** Pitch.
186. **Skeletal Health**- Healthy framework of bones and cartilage that supports and protects the soft tissues and the internal organs of the body.
187. **Skill Lab** - specifically equipped practice rooms functioning as training facilities offering skill-based training for the practice of skills prior to their real life application.
188. **Skill Lab**- Specifically equipped practice rooms functioning as training facilities offering skill-based training.
189. **Smriti**- Remembered perception.
190. **Social Ecological System** – A social-ecological system recognizes humans to be a part of nature. This not only moves away from the thinking that people and nature are two separate entities, but also emphasizes strong linkages between people and nature.
191. **Socio Cultural** – It is related to the different groups of people in society and their habits, traditions, and beliefs.
192. **Spirit of Inquiry**– Motivation and enthusiasm to engage with questions in a systematic manner.
193. **Static exercise**- Performed by increasing tension in a muscle while keeping its length constant.
194. **Static Movement**- Movement in which you stand, sit, or lie still and hold a single position for period, up to about 45 seconds.

195. **Stimulation**– Simple activities such as playing, reading, and singing with children that improve young children's ability to think, communicate, and connect with others.
196. **Sulasa**- Jataka tales.
197. **Sur**- Musical elements.
198. **Surpeti**- Shruti-box.
199. **Sustainability** – The degree to which a process or enterprise can be maintained or continued while avoiding the long-term depletion of natural resources.
200. **Svaras**- Vowels.
201. **Swacchata**- Cleanliness.
202. **Swara/ Swar** – Note.
203. **Taala**- Musical elements/ tempo, rhythm.
204. **Tailbone**- The small bone at the bottom of the spine.
205. **Taittiriya Upanishad** - The Taittirīya Upanishad is a Vedic era Sanskrit text, embedded as three chapters of the Yajurveda.
206. **Tanpura**- Tambura.
207. **Tara Khozak**- Story written by Rabindranath Tagore.
208. **Tatkar**- Fundamental movement steps in classical dance.
209. **Theka**- Tempo, rhythm.
210. **Thirukkural**- Tamil literature.
211. **Tinkering Laboratory**– A space to work with materials and instruments to design and execute ideas in a flexible environment.
212. **Triple Planetary Crisis** – The triple planetary crisis refers to the three main interlinked issues that humanity currently faces – climate change, pollution, and biodiversity loss. It is considered that each of these issues has its own causes and effects, and each issue needs to be resolved to have a viable future on this planet.
213. **Upamana**- Knowing through analogy and comparison.
214. **Upanishad**- Vedic text.
215. **Utsara**- Arts carnival.
216. **Vaadan**- Instrumentals.
217. **Vaastushastra**- Ancient Indian texts defining the principle of arts.
218. **Vachanaganu**- Kannada literature.
219. **Vaddaradhane**- Kannada literature.
220. **Values** - Values are beliefs about what is right and what is wrong, while dispositions are the attitudes and perceptions that form the basis for behaviour.
221. **Vasudhaiva Kutumbakam**- The world as one family.
222. **Vijnanamaya Kosha**- Intellectual layer.
223. **Vikram Betaal**- Jataka tales.
224. **Visual Cues**: Concrete objects, pictures, symbols, or written words that provide a child with information about how to do a routine, activity, behaviour, or skill.

225. **Vocation** – a type of work or a way of life that you believe to be especially suitable for you.
226. **Vocation**– A type of work or a way of life that you believe to be especially suitable for you.
227. **Vyanjanas**- Consonants.
228. **Work** - to do something which needs physical or mental effort, in order to earn money or to achieve something.
229. **Work**- To do something which needs physical or mental effort, in order to earn money or to achieve something.
230. **Yama**- The deity of death.
231. **Yoga**- An ancient Indian discipline, including breath control, simple meditation, and the adoption of specific bodily postures; widely practised for health.

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National Focus Groups for the NCF

State Focus Groups for the NCF

SCERTs and State Departments of Education

Large number Teachers, Civil Society Organisations, Schools, and over 1.3 lakhs other stakeholders who participated in online survey for the NCF

Participants of the District-level consultations

Members of the Review Committee

All names in alphabetical order of last name within groups, other than Chairperson

Wide and Inclusive Process for Development of the National Curriculum Framework

The National Steering Committee (NSC) for the NCF, along with the Ministry of Education, and the NCERT, designed a large-scale, inclusive, and iterative process for the development of the NCF. This process benefited from the diverse and vibrant educational landscape of our country.

The process started with the States and Union Territories (UTs) setting up State Focus Groups which together had over 4000 experts, to write Positions Papers on 25 themes relevant to the development of the NCF. More than 500 papers were submitted by 32 States and UTs.

25 National Focus Groups were also formed to develop Position Papers on these 25 themes with an integrated national outlook.

District Institutes of Education and Training (DIETs) from across the country submitted more than 1550 District Consultation Reports (DCR). A mobile survey was launched to get inputs from Teachers and Educationists - 1,31,00 participants shared their views.

Alongside, consultation meetings were organized with various Ministries of Government of India to understand their vision and how education is important to realising their vision. NGOs, and other institutions working on the ground, shared their experiences and suggestions. Seminars were conducted in universities .to get suggestions from scholars on their expectations from school education. Open consultations were organized with various groups of teachers, parents, and students. The Digital Survey for National Curriculum (DiSaNC) was launched to get inputs from citizens of India, through 100 questions in various categories, so far over 10 lakh interested citizens, including parents and students have given their inputs.

The NSC designed a well-structured process to analyse and synthesize all the inputs received and to arrive at the NCF.

Thus, this NCF is the output of this deeply inclusive process that involved Teachers, parents, relevant government departments in the states, administrators, schools, NGOs working in education and allied areas, educationists and scholars from various fields, and other citizens of India.

Version 1.0

Updates will continue to be made to this document as it is integrated with and incorporated into the full National Curriculum Framework for School Education

In every epoch of humankind, knowledge represents the sum of what is created by all previous generations, to which the present generation adds its own.

The motif of the Mobius strip symbolizes the perpetual, developing and live nature of knowledge - that which has no beginning and that which has no end.

This Policy envisages creation, transmission, use and dissemination of knowledge as a part of this continuum.

- NEP 2020

National Curriculum Framework for School Education

2023