Chapter 3: Curricular Areas, School Stages and Assessment

The main areas relevant for curricular planning have remained remarkably stable for a long time, despite major changes in social expectations and the academic study of different broad disciplines. It is important that each curricular area is revisited in depth, so that specific points of entry can be identified in the context of emerging social needs. In this respect, the status and role of the arts and health and physical education deserve special attention in view of the peculiar orbit of the 'extra-curricular' to which they were relegated almost a century ago. Aesthetic sensibility and experience being the prime sites of the growing child's creativity, we must bring the arts squarely into the domain of the curricular, infusing them in all areas of learning while giving them an identity of their own at relevant stages. Work, peace, and health and physical education have a similar case. All three have a fundamental significance for economic, social and personal development. Schools have a major role to play in ensuring that children are socialised into a culture of self-reliance, resourcefulness, peace-oriented values and health.

3.1 LANGUAGE

Language in this document subsumes bi-/ multilingualism. And when we talk of home language(s) or mother tongue(s), it subsumes the languages of home, larger kinship group, street and neighbourhood, i.e. languages(s) that a child acquires naturally from her/his home and societal environment. Children are born with an innate language faculty. We know from our everyday experiences that most children, even before they start their schooling, internalise an extremely complex and rule-governed system called language, and possess full linguistic capabilities. In many cases, children come to school with two or three languages already in place at the oral-aural level. They are able to use these languages not only accurately but also appropriately. Even differently talented children who do not use the spoken languages develop equally complex alternative sign and symbol systems for expression and communication.

Languages also provide a bank of memories and symbols inherited from one's fellow speakers and created in one's own lifetime. They are also the medium through which most knowledge is constructed, and hence they are closely tied to the thoughts and identity of the individual. In fact, they are so closely bound with identity that to deny or wipe out a child's mother tongue(s) is to interfere with the sense of self. Effective understanding and use of languages(s) enables the child to make connections between ideas, people and things, and to relate to the world around.

Multilingualism, which is constitutive of the identity of a child and a typical feature of the Indian linguistic landscape, must be used as a resource, classroom strategy and a goal by a creative language teacher. This is not only the best use of a resource readily available, but also a way of ensuring that every child feels secure and accepted, and that no one is left behind on account of his/her linguistic background.

If we wish to launch any sound programme for language teaching in schools, it is important to recognise the inbuilt linguistic potential of children as well as to remember that languages get socio-culturally constructed and change in our day-to-day interactions. Language(s) in education would ideally build on this resource, and would strive to enrich it through the development of literacy (scripts including Braille) for the acquisition of academic knowledge. Children with language-related impairments should be introduced to standard sign languages, which can support their continued growth and development to the fullest. A recognition of the linguistic abilities of learners would encourage them to believe in themselves and their cultural moorings.

3.1.1 Language education

The linguistic diversity of India poses complex challenges but also a range of opportunities. India is unique not only in that a large number of languages are spoken here but also in terms of the number and variety of language families that are represented in those languages. There is no other country in the world in which languages from five different language families exist. Even though they are so distinct structurally as to merit classification as different language families, namely, Indo-Aryan, Dravidian, Austro-Asiatic, Tibeto-Burman and Andamanese, they constantly interact with each other. There are several linguistic and sociolinguistic features that are shared across languages that bear witness to the fact that different languages and cultures have coexisted in India for centuries, enriching each other. Classical languages such as Latin, Arabic, Persian,

Several studies have shown that bilingual proficiency raises the levels of cognitive growth, social tolerance, divergent thinking and scholastic achievement. Societal or national-level multilingualism is a resource that can be favourably compared to any other national resource.

Tamil and Sanskrit are rich in their inflectional grammatical structure and aesthetic value, and can illuminate our lives, as many languages keep borrowing words from them.

Today, we know for certain that bilingualism or multilingualism confers definite cognitive advantages. The three-language formula is an attempt to address the challenges and opportunities of the linguistic situation in India. It is a strategy that should really serve as a launching pad for learning more languages. It needs to be followed both in letter and spirit. Its primary aim is to promote multilingualism and national harmony. The following guidelines may help us achieve this aim:

- Language teaching needs to be multilingual not only in terms of the number of languages offered to children but also in terms of evolving strategies that would use the multilingual classroom as a resource.
- Home language(s) of children, as defined above in 3.1, should be the medium of learning in schools.
- If a school does not have provisions for teaching in the child's home language(s) at the higherlevels, primary school education must still be covered through the home language(s). It is imperative that we honour the child's home language(s). According to Article 350A of our Constitution, 'It shall be the endeavour of every State and of every local authority within the State to provide adequate facilities for instruction in the mother-tongue at the primary stage of education to children belonging to linguistic minority groups'.
- Children will receive multilingual education from the outset. The three-language formula needs to be implemented in its spirit, promoting multilingual communicative abilities for a multilingual country.
- In the non-Hindi-speaking states, children learn Hindi. In the case of Hindi speaking states, children learn a language not spoken in their area. Sanskrit may also be studied as a Modern Indian Language (MIL) in addition to these languages.
- At later stages, study of classical and foreign languages may be introduced.

3.1.2 Home/First language(s) or Mother-tongue education

It is clear that through their innate language faculty and interaction with the family and other people around them, children come to school with full-blown communicative competence in their language, or, in many cases, languages. They enter the school not only with thousands of words but also with a full control of the rules that govern the complex and rich structure of language at the level of sounds, words, sentences and discourse. A child knows not only how to understand and speak correctly but also appropriately in her language(s). She can modulate her behaviour in terms of person, place and topic. She obviously has the cognitive abilities to abstract extremely complex systems of language-from the flux of sounds. Honing these skills by progressively fostering advanced-level communicative and cognitive abilities in the classroom is the goal of first-language(s) education. From Class III

Literature can also be a spur to children's own creativity. After hearing a story, poem or song, children can be encouraged to write something of their own. They can also be encouraged to integrate various forms of creative expression.

onwards, oracy and literacy will be tools for learning and for developing higher-order communicative skills and critical thinking. At the primary stage, child's languages must be accepted as they are, with no attempt to correct them. By Class IV, if rich and interesting exposure is made available, the child will herself acquire the standard variety and the rules of correct orthography, but care must be taken to honour and respect the child's home language(s)/mother tongue(s). It should be accepted that errors are a necessary part of the process of learning, and that children will correct themselves only when they are ready to do so. Instead of focusing attention on errors and 'hard spots', it would be much better to spend time providing children comprehensible, interesting and challenging inputs.

It is indeed hard to exaggerate the importance of teaching home languages at school. Though children come equipped with basic interpersonal communicative skills, they need to acquire at school cognitively advanced levels of language proficiency. Basic language skills are adequate for meeting situations that are contextually rich and cognitively undemanding such as peer-group interaction; advanced-level skills are required in situations that are contextually poor and cognitively demanding such as writing an essay on an abstract issue. It is also now well established that higher-level proficiency skills easily transfer from one language to another. It is thus imperative that we do everything we can to strengthen the sustained learning of Indian languages at school.

Language education is not confined to the language classroom. A science, social science or mathematics class is *ipso facto* a language class. Learning the subject means learning the terminology, understanding the concepts, and being able to discuss and write about them critically. For some topics, students should be encouraged to consult books or talk to people in different languages, or gather material in English from the Internet. Such a policy of languages across the curriculum will foster a genuine multilingualism in the school. At the same time, the language class offers some unique opportunities. Stories, poems, songs and drama link children to their cultural heritage, and also give them an opportunity to understand their own experiences and to develop sensitivity to others. We may also point out that children may effortlessly abstract more grammar from such activities than through explicit and often boring grammar lessons.

While many of the differently abled learners may pick up basic language skills through normal social interactions, they could additionally be provided with especially designed materials that would assist and enhance their growth and development. Studying sign language and Braille could be included as options for learners without disabilities.

3.1.3 Second-language Acquisition

English in India is a global language in a multilingual country. A variety and range of English-teaching situations prevail here owing to the twin factors of teacher proficiency in English and pupils' exposure to English outside school. The level of introduction of English is now a matter of political response to people's aspirations rather than an academic or feasibility issue, and people's choices about the level of its introduction in the curriculum will have to be respected, with the proviso that we do not extend downwards the very system that has failed to deliver.

The goals for a second-language curriculum are twofold: attainment of a basic proficiency, such as is acquired in natural language learning, and the development of language into an instrument for abstract thought and knowledge acquisition through (for example) literacy. This argues for an across-the-curriculum approach that breaks down the barriers between English and other subjects, and English and other Indian languages. At the initial stages, English may be one of the languages for learning activities that create the child's awareness of the world. At later stages, all learning happens through language. Higher-order linguistic skills generalise across languages; reading, (for example) is a transferable skill. Improving it in one language improves it in others, while reading failure in one's own languages adversely affects second-language reading.

Within the eight years of education constitutionally guaranteed to every child, it should be possible to achieve basic English-language proficiency in a span of about four years. A multilingual approach to schooling from the very outset will counter possible ill effects such as loss of one's own languages and the burden of sheer incomprehension.

English does not stand alone. The aim of English teaching is the creation of multilinguals who can enrich all our languages; this has been an abiding national vision. English needs to find its place along with other Indian languages in different states, where children's other languages strengthen English teaching and learning; and in "English-medium" schools, where other Indian languages need to be valorised to reduce the perceived hegemony of English. The relative success of "English-medium" schools shows that language is learnt when it is not being taught as language, through exposure in meaningful context. Thus English must be seen in relation to other subjects; a language across the curriculum is of particular relevance to primary education, and later all teaching is in a sense language teaching. This perspective will bridge the gap between "English as subject" and "English as medium". We should in this way move towards a common school system that does not make a distinction between " teaching a language" and "using a language as a medium of instruction".

Input-rich communicational environments are a prerequisite for language learning, whether first or second. Inputs include textbooks, learner-chosen texts, and class libraries, allowing for a variety of genres: print (for example, Big Books for young learners); parallel books and materials in more than one language; media support (learner magazines/newspaper columns, radio/audio cassettes); and "authentic" materials. The language environment of disadvantaged learners needs to be enriched by developing schools into community learning centres. A variety of successful innovations exists whose generalisability needs exploration and encouragement. Approaches and methods need not be exclusive but may be mutually supportive within a broad cognitive philosophy (incorporating Vygotskian, Chomskyan, and Piagetian principles). Higher-order skills (including literary appreciation and role of language in gendering) can be developed once fundamental competencies are ensured.

Teacher education needs to be ongoing and onsite (through formal or informal support systems), as well as preparatory. Proficiency and professional awareness are equally to be promoted, the latter imparted, wherever necessary, through the teachers' own languages. All teachers who teach English should have basic proficiency in English. All teachers should have

the skills to teach English in ways appropriate to their situation and levels based on some knowledge of how languages are learnt. A variety of materials should be available to provide an input-rich curriculum, which focuses on meaning.

Language evaluation need not be tied to "achievement " with respect to particular syllabi, but must be reoriented to the measurement of language proficiency. Evaluation is to be made an enabling factor for learning rather than an impediment. Ongoing assessment could document a learner's progress through the portfolio mode. National benchmarks for language proficiency need to be evolved preliminary to designing a set of optional English language tests that will balance curricular freedom with standardisation of evaluation that certification requires, and serve to counter the current problem of English (along with Mathematics) being a principal reason for failure at the Class X level. A student may be allowed to "pass without English" if an alternative route for English certification (and therefore instruction) can be provided outside the regular school curriculum.

3.1.4 Learning to Read and Write

Though we strongly advocate an integrated approach to the teaching of different skills of language, the school does need to pay special attention to reading and writing in many cases, particularly in the case of home languages. In the case of second and third, or classical or foreign languages, all the skills, including communicative competence, become important. Children appear to learn much better in holistic situations that make sense to them rather than in a linear and additive way that often has no meaning. Rich and comprehensible input should constitute the site for acquisition of all the different skills of language. In several communicative situations, such as taking notes while listening to somebody on the phone, several skills may need to be used together. We really wish children to read and write with understanding. Language – as a constellation of skills, thought encoders and markers of identity–cuts across school subjects and disciplines. Speech and listening, reading and writing, are all generalised skills, and children's mastery over them becomes the key factor affecting success at school. In many situations, all of these skills need to be used together. This is why it is important to view language education as everybody's concern at school, and not as a responsibility of the language teacher alone. Also, the foundational role of the skills associated with language does not stop with the primary or elementary classes, but extends all the way up to secondary and senior secondary classes as new needs arise in the subject areas. Development of life skills such as critical thinking skills, interpersonal communication skills, negotiation/ refusal skills, decision making/ problem-solving skills, and coping and self-management skills is also very critical for dealing with the demands and challenges of everyday life.

The conventionally trained language teacher associates the training of speech with *correctness* rather than with the expressive and participatory functions of language. This is why talking in class has a negative value in our system, and a great deal of the teacher's energy goes into keeping children quiet, or getting them to pronounce correctly. If teachers see the child's talk as a resource rather than as a nuisance, the vicious cycle of resistance and control would have a chance to be turned into a cycle of expression and response. There is a vast body of knowledge available on how talk can be used as a resource, and pre- and in-service teacher education programmes must introduce teachers to this. Designers of textbooks and teacher manuals could also plan and provide precise guidance to teachers regarding

ways in which the subject matter can be explored further with the help of small group talk among children, and undertaking activities that nurture the abilities to compare and contrast, to wonder and remember, to guess and challenge, to judge and evaluate. In the orbit of listening, similar detailed planning of activities for incorporation in textbooks and teacher manuals would go a long way in resurrecting the significant skill and value area. It covers the ability to pay attention, to value the other person's point of view, to stay in touch with the unfolding utterance, and to make flexible hypotheses about the meaning of what is being said. Listening, thus, forms as complex a web of skills and values as talking does. Locally available resources include folklore and storytelling, community singing and theatre. Storytelling is appropriate not only for pre-school education, but continues to be significant even later. As a narrative discourse, orally told the stories lay the foundations of logical understanding even as they expand the imagination and enhance the capacity to participate vicariously in situations distant from one's life. Fantasy and mystery play an important role in child development. As a sector of language learning, listening also needs to be enriched with the help of music, which includes folk, classical and popular compositions. Folklore and music also deserve a place in the language textbook as discourses capable of being developed with the help of exercises and activities unique to them.

While reading is readily accepted as a focus area for language education, school syllabi are burdened with information-absorbing and memorising tasks, so much so that the pleasure of reading for its own sake is missed out. Opportunities for individualised reading need to be built at all stages in order to promote a culture of reading, and teachers must set the example of being members of such a culture. This requires the

Why don't children learn to read?

- √ *Teachers lack basic pedagogic skills (understanding where the learner is, explaining, asking appropriate questions and, an understanding of the processes of learning to read, which range from bottom-up processes such as syllable recognition and letter-sound matching, to top-down processes of whole-word recognition and meaning making from texts. They also often lack class-management skills. They tend to focus on errors or hard spots rather than on imaginative input and articulation.*
- √ *Pre-service training does not give the teacher adequate preparation in reading pedagogy, and neither does in-service training address the issue.*
- √ *Textbooks are written in an ad-hoc fashion, with no attempt to follow a coherent strategy of reading instruction.*
- √ *Children from disadvantaged backgrounds, especially first-generation learners, do not feel accepted by the teacher, and cannot relate to the textbook.*

A workable approach to beginning reading

- √ *The classroom needs to provide a print-rich environment, displaying signs, charts, work-organising notices, etc. that promote 'iconic' recognition of the written symbols, in addition to teaching letter-sound correspondences.*
- √ *There is a need for imaginative input that is read by a competent reader with appropriate gestures, dramatisation, etc.*
- √ *Writing down experiences narrated by children, and then having them read the written account.*
- √ *Reading of additional material: stories, poems, etc.*
- √ *First-generation school goers must be given opportunities to construct their own texts and contribute self-selected texts to the classroom.*

major means of discouraging reading. The development and supply of a range of supplementary reading material relevant to all school subjects and across the grades require urgent attention. A great deal of such material, though of varying quality, is available in the market, and could be utilised in a methodical manner to expand the scope of classroom teaching of a subject. Teacher training programmes need to familiarise teachers with such material, and to give them yardsticks by which to select and use it effectively.

The importance of writing is well recognised, but the curriculum needs to attend to its innovative treatments. Teachers insist that children write in a correct way. Whether they express their own thoughts and feelings through writing is not considered too important. Just as the prematurely imposed discipline of pronunciation stifles the child's motivation to talk freely, in his or her own dialect, for instance, the demand for writing in mechanically correct ways blocks the urge to use writing to express or to convey one's ideas. Teachers need to be persuaded and trained to place writing in the same domain as artistic expression, and to cease perceiving it as an office skill. During the primary years, writing abilities should be developed holistically in conjunction with the sensibilities associated with talking, listening, and reading. At middle and senior levels of schooling, note making should receive attention as a skill-development training exercise. This will go a long way in discouraging mechanical copying from the blackboard, textbooks and guides. It is also necessary to break the routinisation of tasks like letter and essay writing, so that imagination and originality are allowed to play a more prominent role in education.

Some problems in school Mathematics education

1. *A majority of children have a sense of fear and failure regarding Mathematics. Hence, they give up early on, and drop out of serious mathematical learning.*
2. *The curriculum is disappointing not only to this non-participating majority, but also to the talented minority by offering them no challenges.*
3. *Problems, exercises and methods of evaluation are mechanical and repetitive, with too much emphasis on computation. Areas of Mathematics such as spatial thinking are not developed enough in the curriculum.*
4. *Teachers lack confidence, preparation and support.*

3.2 MATHEMATICS

Developing children's abilities for mathematisation is the main goal of mathematics education. The narrow aim of school mathematics is to develop 'useful' capabilities, particularly those relating to numeracy–numbers, number operations, measurements, decimals and percentages. The higher aim is to develop the child's resources to think and reason mathematically, to pursue assumptions to their logical conclusion and to handle abstraction. It includes a way of doing things, and the ability and the attitude to formulate and solve problems.

This calls for a curriculum that is ambitious, coherent and teaches important principles of mathematics. It should be ambitious in the sense that it seeks to achieve the higher aim mentioned above, rather than only the narrower aim. It should be coherent in the sense that the variety of methods and skills available piecemeal (in arithmetic, algebra, geometry) cohere into an ability to address problems that come from other domains such as science and social studies in high

school. It should be important in the sense that students feel the need to solve such problems, that teachers and students find it worth their time and energy to address these problems. The twin concerns of the Mathematics curriculum are: what can mathematics education do to engage the mind of every student, and how can it strengthen the student's resources?

As mathematics is a compulsory subject at the secondary stage, access to quality mathematics education is the right of every child. In the context of univeralisation of education, the first question to ask is, what mathematics can be offered in eight years of schooling that will stand every child in good stead rather than be a preparation for higher secondary education alone? Most of the skills taught in primary school mathematics are useful. However, a reorientation of the curriculum towards addressing the 'higher aims' mentioned above will make better use of the time that children spend in school in terms of the problem-solving and analytical skills that it builds, and in preparing children to better meet a wide variety of problems in life. Also, the tall shape of mathematics (where mastery of one topic is a prerequisite for the next) can be de-emphasised in favour of a broader-based curriculum with more topics that starts from the basics. This will serve the needs of different learners better.

3.2.1 Vision for School Mathematics

- Children learn to enjoy mathematics rather than fear it.
- Children learn important mathematics: Mathematics is more than formulas and mechanical procedures.
- Children see mathematics as something to talk about, to communicate through, to discuss among themselves, to work together on.
- Children pose and solve meaningful problems.
- Children use abstractions to perceive relation-ships, to see structures, to reason out things, to argue the truth or falsity of statements.
- Children understand the basic structure of Mathematics: Arithmetic, algebra, geometry and trigonometry, the basic content areas of school Mathematics, all offer a methodology for abstraction, structuration and generalisation.
- Teachers engage every child in class with the conviction that everyone can learn mathematics.

Many general tactics of problem solving can be taught progressively during the different stages of school: abstraction, quantification, analogy, case analysis, reduction to simpler situations, even guess-and-verify exercises, are useful in many problem-solving contexts. Moreover, when children learn a variety of approaches (over time), their toolkit becomes richer, and they also learn which approach is the best. Children also need exposure to the use of heuristics, or rules of thumb, rather than only believing that Mathematics is an 'exact science'. The estimation of quantities and approximating solutions is also essential skill. When a farmer estimates

Visualising proof:
Why is 3×5 = 5×3?

Three groups of five *Five groups of three*

the yield of a particular crop, he uses considerable skills in estimation, approximation and optimisation. School Mathematics can play a significant role in developing such useful skills.

Visualisation and representation are skills that Mathematics can help to develop. Modelling situations using quantities, shapes and forms are the best use of mathematics. Mathematical concepts can be represented

in multiple ways, and these representations can serve a variety of purposes in different contexts. All of this adds to the power of Mathematics. For example, a function may be represented in algebraic form or in the form of a graph. The representation p/q can be used to denote a fraction as a part of the whole, but can also denote the quotient of two numbers, p and q. Learning this about fractions is as important, if not more, than learning the arithmetic of fractions.

There is also a need to make connections between Mathematics and other subjects of study. When children learn to draw graphs, they should also be encouraged to think of functional relationships in the sciences, including geology. Our children need to appreciate the fact that Mathematics is an effective instrument in the study of science.

The importance of systematic reasoning in Mathematics cannot be overemphasised, and is intimately tied to notions of aesthetics and elegance so dear to mathematicians. Proof is important, but in addition to deductive proof, children should also learn when pictures and constructions provide proof. Proof is a process that convinces a sceptical adversary; school mathematics should encourage proof as a systematic way of argumentation. The aim should be to develop arguments, evaluate arguments, make and investigate conjectures, and understand that there are various methods of reasoning.

Mathematical communication is precise and employs unambiguous use of language and rigour in formulation, which are important characteristics of mathematical treatment. The use of jargon in Mathematics is deliberate, conscious and stylised. Mathematicians discuss what is appropriate notation since good notation is held in high esteem and believed to aid thought. As children grow older, they should be taught to appreciate the significance of such conventions and their use. For instance, this means that setting up of equations should get as much coverage as solving them.

Problem posing

√ *If you know that 235 + 367 = 602, how much is 234 + 369? How did you find the answer?*

√ *Change any one digit in 5384. Did the number increase or decrease? By how much?*

In discussing many of these skills and processes, we have referred to a multiplicity of approaches and procedures. These are all crucial for liberating school Mathematics from the tyranny of applying them only to those algorithms that are taught.

3.2.2 The Curriculum

At the pre-primary stage, all learning occurs through play rather than through didactic communication. Rather than the rote learning of the number sequence, children need to learn and understand, in the context of small sets, the connection between word games and counting, and between counting and quantity. Making simple comparisons and classifications along one dimension at a time, and identifying shapes and symmetries, are appropriate skills to acquire at this stage. Encouraging children to use language to freely express one's thoughts and emotions, rather than in predetermined ways, is extremely important at this and at later stages.

Having children develop a positive attitude towards, and a liking for, Mathematics at the primary stage is as important, if not more than the cognitive skills and concepts that they acquire. Mathematical games, puzzles and stories help in developing a positive attitude and in making connections between mathematics and everyday thinking. It is important to

note that mathematics is not just arithmetic. Besides numbers and number operations, due importance must be given to shapes, spatial understanding, patterns, measurement and data handling. The curriculum must explicitly incorporate the progression that learners make from the concrete to the abstract while acquiring concepts. Apart from computational skills, stress must be laid on identifying, expressing and explaining patterns, on estimation and approximation in solving problems, on making connections, and on the development of skills of language in communication and reasoning.

At the upper primary stage, students get the first taste of the power of Mathematics through the application of powerful abstract concepts that compress previous learning and experience. This enables them to revisit and consolidate basic concepts and skills learnt at the primary stage, which is essential from the point of view of achieving universal mathematical literacy. Students are introduced to algebraic notation and its use in solving problems and in generalisation, to the systematic study of space and shapes, and for consolidating their knowledge of measurement. Data handling, representation and interpretation form a significant part of the ability of dealing with information in general, which is an essential 'life skill'. The learning at this stage also offers an opportunity to enrich students' spatial reasoning and visualisation skills.

At the secondary stage, students begin to perceive the structure of Mathematics as a discipline. They become familiar with the characteristics of mathematical communication: carefully defined terms and concepts, the use of symbols to represent them, precisely stated propositions, and proofs justifying propositions. These aspects are developed particularly in the area of geometry. Students develop their facility with algebra, which is important not only in the application of mathematics, but also within mathematics in providing justifications and proofs. At this stage, students integrate the many concepts and skills that they have learnt into a problem-solving ability. Mathematical modelling, data analysis and interpretation taught at this stage can consolidate a high level of mathematical literacy. Individual and group exploration of connections and patterns, visualisation and generalisation, and making and proving conjectures are important at this stage, and can be encouraged through the use of appropriate tools that include concrete models as in Mathematics laboratories and computers.

The aim of the Mathematics curriculum at the higher secondary stage is to provide students with an appreciation of the wide variety of the application of Mathematics, and equip them with the basic tools that enable such application. A careful choice between the often conflicting demands of depth versus breadth needs to be made at this stage. The rapid explosion of Mathematics as a discipline, and of its range of application, favours an increase in the breadth of coverage. Such increase must be dictated by mathematical considerations of the importance of topics to be included. Topics that are more naturally the province of other disciplines may be left out of the Mathematics curriculum. The treatment of topics must have an objective, that is, the communication of mathematical insights and concepts, which naturally arouse the interest and curiosity of students.

3.2.3 Computer Science

The tremendous effectiveness of the computer and computing technology in shaping modern society has created the need for an educated public that can utilise such technology most effectively for the betterment of society and humankind. There is, therefore, a

growing realisation of the need to have a place for these domains of knowledge in the school curriculum.

A distinction must be made between the Information Technology (IT) curriculum, which involves the use and application of tools of the information and computer age, and the Computer Science (CS) curriculum, which is concerned with how these tools are designed and deployed. Both of these have their place in school education.

While several countries have implemented CS and/or IT curricula in schools, we need to be aware of the challenges that Indian school students face. The first of these is the paucity of technology resources for computer science. It is absurd to teach computer science (let alone computer usage) without access to computing resources. Providing computer access and connectivity for all children is a tremendous technological and economic challenge. However, given the pervasive impact of computer technologies, we need to address this infrastructure challenge seriously and explore viable and innovative alternatives with regard to hardware, software and connectivity technologies appropriate for rural and urban Indian schools.

We also need to address the issue of the development of a comprehensive and coherent curriculum model in computer science and IT, which can serve as the basis for the beginning of a discussion between educators, administrators, and the general public. Certain core elements are common to several CS and IT curricula, and are applicable to Indian schools as well. These include the concepts of iterative processes and algorithms, general problem-solving strategies arising from computing, possibilities of computer usage, the place occupied by computers in the modern world, and the societal issues that arise thereby.

3.3 SCIENCE

One important human response to the wonder and awe of nature from the earliest times has been to observe the physical and biological environment carefully, look for any meaningful patterns and relations, make and use new tools to interact with nature, and build conceptual models to understand the world. This human endeavour has led to modern science. Broadly speaking, the scientific method involves several interconnected steps: observation, looking for regularities and patterns, making hypotheses, devising qualitative or mathematical models, deducing their consequences, verification or falsification of theories through observations and controlled experiments, and thus arriving at the principles, theories and laws governing the natural world. The laws of science are never viewed as fixed eternal truths. Even the most established and universal laws of science are always regarded as provisional, subject to modification in the light of new observations, experiments and analyses.

Science is a dynamic, expanding body of knowledge, covering ever-new domains of experience. In a progressive forward-looking society, science can play a truly liberating role, helping people escape from the vicious cycle of poverty, ignorance and superstition. The advances in science and technology have transformed traditional fields of work such as agriculture and industry, and led to the emergence of wholly new fields of work. People today are faced with an increasingly fast-changing world where the most important skills are flexibility, innovation and creativity. These different imperatives have to be kept in mind in shaping science education.

Good science education is true to the child, true to life and true to science. This simple observation leads to the following basic criteria of validity of a science curriculum:

1. *Cognitive validity* requires that the content, process, language and pedagogical practices of

Asking questions

"Air is everywhere" is a statement that every schoolchild learns. Students may know that the earth's atmosphere consists of several gases, or that there is no air on the moon. We might be happy that they know some science. But consider this exchange in a Class IV classroom.

Teacher: Is there air in this glass?

Students (in chorus): Yes!

The teacher was not satisfied with the usual general statement, "Air is everywhere." She asked the students to apply the idea in a simple situation, and found, unexpectedly, that they had formed some "alternative conceptions".

Teacher: Now I turn the glass upside down. Is there still air in it?

Some students said "yes", others said "no", still others were undecided.

Student 1: The air came out of the glass!

Student 2: There was no air in the glass.

In Class II, the teacher put an empty glass over a burning candle and the candle went out!

The students had performed an activity whose memory had remained vivid even two years later, but some of them at least had taken away an incorrect conclusion from it.

After some explanation, the teacher questioned the students further. Is there air in this closed cupboard? Is there air in the soil? In water? Inside our body? Inside our bones? Each of these questions brought up new ideas and presented an opportunity to clear some misunderstandings. This lesson was also a message to the class: do not accept statements uncritically. Ask questions. You may not find all the answers but you will learn more.

the curriculum are age appropriate, and within the cognitive reach of the child.

2. *Content validity* requires that the curriculum must convey significant and correct scientific information. Simplification of content, which is

What biology do students know?

"These students don't understand science. They come from a deprived background!" We frequently hear such opinions expressed about children from rural or tribal backgrounds. Yet consider what these children know from everyday experience.

Janabai lives in a small hamlet in the Sahyadri hills. She helps her parents in their seasonal work of rice and tuar farming. She sometimes accompanies her brother in taking the goats to graze in the bush. She has helped in bringing up her younger sister. Nowadays she walks 8 km. every day to attend the nearest secondary school.

Janabai maintains intimate links with her natural environment. She has used different plants as sources of food, medicine, fuelwood, dyes and building materials; she has observed parts of different plants used for household purposes, in religious rituals and in celebrating festivals. She recognises minute differences between trees, and notices seasonal changes based on shape, size, distribution of leaves and flowers, smells and textures. She can identify about a hundred different types of plants around her — many times more than her Biology teacher can — the same teacher who believes Janabai is a poor student.

Can we help Janabai translate her rich understanding into formal concepts of Biology? Can we convince her that school Biology is not about some abstract world coded in long texts and difficult language. Rather it is about the farm she works on, the animals she knows and takes care of, the woods that she walks through every day. Only then will she truly learn science.

necessary for adapting the curriculum to the cognitive level of the learner, must not be so trivialised as to convey something basically flawed and/or meaningless.

3. *Process validity* requires that the curriculum should engage the learner in acquiring the methods and processes that lead to the generation and validation of scientific knowledge and nurture the natural curiosity and creativity of the child in science. Process validity is an important criterion since it helps the student in 'learning to learn' science.
4. *Historical validity* requires that the science curriculum be informed by a historical perspective, enabling the learner to appreciate how the concepts of science evolve over time. It also helps the learner to view science as a social enterprise and to understand how social factors influence the development of science.
5. *Environmental validity* requires that science beplaced in the wider context of the learner's environment, local and global, enabling him/her to appreciate the issues at the interface of science, technology and society, and equipping him/her with the requisite knowledge and skills to enter the world of work.
6. *Ethical validity* requires that the curriculum promote the values of honesty, objectivity, cooperation, and freedom from fear and prejudice, and inculcate in the learner a concern for life and preservation of the environment.

3.3.1 The Curriculum at different Stages

Consistent with the criteria given above, the objectives, content, pedagogy and assessment for different stages of the curriculum are summarised below:

At the primary stage, the child should be engaged in joyfully exploring the world around and harmonising with it. The objectives at this stage are to nurture the curiosity of the child about the world (natural environment, artifacts and people), to have the child engage in exploratory and hands-on activities for acquiring the basic cognitive and psychomotor skills through observation, classification, inference, etc.; to emphasise design and fabrication, estimation and measurement as a prelude to the development of technological and quantitative skills at later stages; and to develop basic language skills: speaking, reading and writing not only for science but also through science. Science and social science should be integrated as 'environmental studies' as at present, with health as an important component. Throughout the primary stage, there should be no formal periodic tests, no awarding of grades or marks, and no detention.

At the upper primary stage, the child should be engaged in learning the principles of science through familiar experiences, working with hands to design simple technological units and modules (e.g. designing and making a working model of a windmill to lift weights) and continuing to learn more about the environment and health, including reproductive and sexual health, through activities and surveys. Scientific concepts are to be arrived at mainly from activities and experiments. Science content at this stage is not to be regarded as a diluted version of secondary school science. Group activities, discussions with peers and teachers, surveys, organisation of data and their display through exhibitions, etc. in schools and the neighbourhood should be important components of pedagogy. There should be continuous as well as periodic assessment (unit tests, term-end tests). The system of 'direct' grades should be adopted. There should be no detention. Every child who attends eight years of school should be eligible to enter Class IX.

At the secondary stage, students should be engaged in learning science as a composite discipline,

in working with hands and tools to design more advanced technological modules than at the upper primary stage, and in activities and analyses on issues concerning the environment and health, including reproductive and sexual health. Systematic experimentation as a tool to discover/verify theoretical principles, and working on locally significant projects involving science and technology, are to be important parts of the curriculum at this stage.

At the higher secondary stage, science should be introduced as separate disciplines, with emphasis on experiments/technology and problem solving. The current two streams, academic and vocational, being pursued as per NPE-1986, may require a fresh look in the present scenario. Students may be given the option of choosing the subjects of their interest freely, though it may not be feasible to offer all the different subjects in every school. The curriculum load should be rationalised to avoid the steep gradient between secondary and higher secondary syllabi. At this stage, the core topics of a discipline, taking into account recent advances in the field, should be identified carefully and treated with appropriate rigour and depth. The tendency to cover a large number of topics of the discipline superficially should be avoided.

3.3.2 Outlook

Looking at the complex scenario of science education in India, three issues stand out clearly. First, science education is still far from achieving the goal of equity enshrined in our Constitution. Second, science education in India, even at its best, develops competence but does not encourage inventiveness and creativity. Third, the overpowering examination system is basic to most, if not all, the fundamental problems of science education in India.

The science curriculum must be used as an instrument for achieving social change in order to reduce the divide based on economic class, gender, caste, religion and region. We must use textbooks as one of the primary instruments for equity, since for a great majority of school-going children, as also for their teachers, it is the only accessible and affordable resource for education. We must encourage alternative textbook writing in the country within the broad guidelines laid down by the National Curriculum Framework. These textbooks should incorporate activities, observation and experimentation, and encourage an active approach to science, connecting it with the world around the child, rather than information-based learning. Additionally, materials such as workbooks, co-curricular and popular science books, and children's encyclopaedia would enhance children's access to information and ideas that need not go into the textbook, loading it further, but would enrich learning that takes place through project work. There is a dearth of such materials with rich visuals in regional languages.

The development of science corners, and providing access to science experimentation kits and laboratories, in rural areas are also important ways of equitably provisioning for science learning. Information and Communication Technology (ICT) is an important tool for bridging social divides. ICT should be used in such a way that it becomes an opportunity equaliser by providing information, communication and computing resources in remote areas. ICT if used for connecting children and teachers with scientists working in universities and research institutions would also help in demystifying scientists and their work.

For any qualitative change from the present situation, science education in India must undergo a paradigm shift. Rote learning should be discouraged. Inquiry skills should be supported and strengthened

by language, design and quantitative skills. Schools should place much greater emphasis on co-curricular and extra-curricular activities aimed at stimulating investigative ability, inventiveness and creativity, even if these are not part of the external examination system. There should be a massive expansion of such activities along the lines of the Children's Science Congress, being held successfully at present. A large-scale science and technology fair at the national level (with feeder fairs at cluster/district/state levels) may be organised to encourage schools and teachers to participate in this movement. Such a movement should gradually spread to every corner of India and even across South Asia, unleashing a wave of creativity and scientific temper among young students and their teachers.

Examination reform should be initiated as a national mission, supported by adequate funding and high-quality human resources. The mission should bring teachers, educationists and scientists on a common platform; launch new ways of testing students that would reduce the high level of examination-related stress; curb the maddening multiplicity of entrance examinations; and undertake research on ways of testing multiple abilities other than formal scholastic competence.

These reforms, however, fundamentally need the overarching reform of teacher empowerment. No reform, however well motivated and well planned, can succeed unless a majority of teachers feel empowered to put it in practice. With active teacher participation, the reforms suggested above could have a cascading effect on all stages of science teaching in our schools.

3.4 Social Sciences

The social sciences encompass diverse concerns of society, and include a wide range of content drawn from the disciplines of History, geography, political science, economics, sociology and anthropology. Social Science perspectives and knowledge are indispensable to building the knowledge base for a just and peaceful society. The content should aim at raising students' awareness through critically exploring and questioning of familiar social reality.The possibilities of including new dimensions and concerns, especially in view of students' own life experiences, are considerable. Selecting and organising material into a meaningful curriculum, one that will enable students to develop a critical understanding of society, is therefore a challenging task.

Because the social sciences tend to be considered non-utility subjects and are given less importance than the natural sciences, it is necessary to emphasise that they provide the social, cultural, and analytical skills required to adjust to an increasingly interdependent world, and to deal with political and economic realities.

It is believed that the social sciences merely transmit information and are text centred. Therefore, the content needs to focus on a conceptual understanding rather lining up facts to be memorised for examinations. Reiterating the recommendations of '*Learning Without Burden* (1993), emphasis has to be laid on developing concepts and the ability to analyse socio-political realities rather than on the mere retention of information without comprehension.

There is also a peception that not many career options are open to students specialising in the social sciences. On the contrary, the social sciences are becoming increasingly relevant for jobs in the rapidly exapanding service sector, and also in developing skills of analysis and creativity.

In a pluralistic society like ours, it is important that all regions and social groups be able to relate to the textbooks. Relevant local content should be part of the teaching-learning process, ideally transacted through activities drawing on local resources.

It is also necessary to recognise that the social sciences lend themselves to scientific inquiry just as much as the natural and physical sciences do, as well as to indicate ways in which the methods employed by the social sciences are *distinct* (but in no way inferior to those of the natural and physical sciences).

The social sciences carry a normative responsibility of creating a strong sense of human values, namely, freedom, trust, mutual respect, and respect for diversity. Social science teaching should aim at generating in students a critical moral and mental energy, making them alert to the social forces that threaten these values.

The disciplines that make up the social sciences, namely, History, geography, political science, and economics, have distinct methodologies that often justify the retaining of boundaries. At the same time, cross disciplinary approaches that are possible should also be indicated. For an enabling curriculum, certain themes that facilitate interdisciplinary thinking need to be incorporated.

3.4.1 The Proposed Epistemological Frame

Based on the above considerations of popular perceptions, and the issues to be addressed in the study of the social sciences, the National Focus Group on the Teaching of the Social Sciences proposes that the following points be treated as basic for the revised syllabi. (Textbooks themselves should be seen as opening up avenues for further enquiry, and students should be encouraged to go beyond the textbook to further reading and observaion.)

As pointed out by the Kothari Commission, the social science curriculum hitherto emphasised developmental issues. These are important but not sufficient for understanding the normative dimension, like issues of equality, justice, and dignity in society and polity. The role of individuals in contributing to this 'development' has often been overemphasised. An epistemological shift is suggested so as to accommodate the multiple ways of imagining the Indian nation. The national perspective needs to be balanced with reference to the local. At the same time, Indian History should not be taught in isolation, and there should be reference to developments in other parts of the world.

It is suggested that instead of Civics, the term Political Science be used. Civics appeard in the Indian school curriculum in the colonial period against the background of increasing 'disloyalty' among Indians towards the Raj. Emphasis on obedience and loyalty were the key features of Civics. Political Science treats civil society as the sphere that produces sensitive, interrogative, deliberative, and transformative citizens.

Gender concerns need to be addressed in terms of making the perspectives of women integral to the discussion of any historical event and contemporary concerns. This requires an epistemic shift from the patriarchal preconceptions that inform much of the social studies at present.

The concerns related to the health of children, and also those related to social aspects of changes and developments occurring in them during adolescence like changing relationships with parents, peer group, the opposite sex and the adult world in general, need to be addressed appropriately. The responses to the health needs of children and adolescents/youth through policies and programmes at different levels are closely related elements of these concerns.

The concept of human rights has a universal frame of reference. It is imperative that children are introduced to universal values in a manner appropriate for their age. Reference to day-to-day issues, e.g. the problem of getting water, can be discussed so that young students become aware of issues related to human dignity and rights.

3.4.2 Planning the Curriculum

For the primary grades, the natural and the social environment will be explained as integral parts of languages and mathematics. Children should be engaged in activities to understand the environment through illustrations from the physical, biological, social, and cultural spheres. The language used should be gender sensitive. Teaching methods should be in a participative and discussion-oriented mode.

For Classes III to V, the subject Environment Studies (EVS) will be introduced. In the study of the natural environment, emphasis will be on its preservation and the urgency of saving it from degradation. Children will also begin to be sensitised to social issues like poverty, child labour, illiteracy, caste and class inequalities in rural and urban areas. The content should reflect the day-to-day experiences of children and their life worlds.

WATER AND THE ENVIRONMENT	
Where does water come from? How are seas, oceans, rivers formed?	NATURAL SOURCES OF WATER Rivers, lakes, seas, underground water
What are our local water resources?	WATER RESOURCE MAPPING Local/regional/national
Why do wells dry up? How do handpumps work?	RELATIONSHIP BETWEEN NATURAL AND MAN-MADE SOURCES OF WATER
Are big dams more beneficial than small dams?	Understanding the water table Handpump System of irrigation Environmental impact of big dams
How do people in desert areas procure water? What causes droughts?	WATER IN DIFFERENT ECO-SYSTEMS Water sources in desert areas Water sources in mountainous regions Droughts and floods
SOCIAL ASPECTS OF WATER	
Who controls the village well?	CASTE AND CLASS Purity and pollution control over water resources
Who fetches water?	GENDER DIVISION OF LABOUR AND AVAILABILITY OF WATER
Do we have enough water?	Local and regional conflicts over drinking and irrigation water Water as a market force
Why is clean water essential?	HEALTH Body's need for water Right to potable clean water Water-borne diseases

At the upper primary stage, Social Studies will draw its content from History, geography, political science and economics. History will take into account developments in different parts of India, with sections on events or developments in other parts of the world. Geography can help develop a balanced perspective related to issues concerning the environment, resources and development at different levels, from local to global. In Political Science, students will be introduced to the formation and functioning of governments at local, state, and central levels and the democratic processes of participation. The economics component will enable students to observe economic institutions like the family, the market and the state. There will also be a section that will indicate a multidisciplinary approach to these themes.

At the secondary stage, the Social Sciences comprise History, geography, sociology, political science and economics. The focus will be on Contemporary India, and the learner will be initiated into a deeper understanding of the social and economic challenges facing the nation. In keeping with the epistemic shift proposed, these will be discussed from multiple perspectives, including those of the SC and ST and disenfranchised populations. Efforts should be made to relate the content as much as possible to the children's everyday lives. In History, India's freedom movement and other aspects of its modern History can be studied, as well as significant developments in other parts of the world. History should be taught with the intent of enabling students better understand their own world and their own identities came into being as shaped by a rich and varied past. History should now help them discover processes of change and continuity in their world, and to compare ways in which power and control were and are exercised. Geography should be taught keeping in mind the need to inculcate in the child a critical appreciation for conservation and environmental concerns along with developmental issues. In Political Science, the focus should be on discussing the philosophical foundations that underlie the value framework of the Indian Constitution, i.e. in-depth discussion of equality, liberty, justice, fraternity, secularism, dignity, plurality, and freedom from exploitation. As the discipline of Economics is being introduced to the child at this level, it is important that the topics should be discussed from the perspective of the people.

The higher secondary stage is important as it offers a choice of subjects to students. For some students, this stage may be the end of their formal education, leading to the world of work and employment; for others, the foundation for higher education. They may choose either specialised academic courses or job-oriented vocational courses. The foundation at this stage should equip them with basic knowledge and the necessary skills to make a meaningful contribution in the field they choose. A range of courses from the social sciences and commerce may be offered, and students may exercise their choice. Subjects need not be grouped into separate 'streams', and students should have the freedom to opt for subjects or courses according to their need, interest and aptitude. The social sciences will include disciplines like political science, geography, History, economics, sociology and psychology. Commerce may include business studies and accountancy.

3.4.3 Approaches to Pedagogy and Resources

Social science teaching needs to be revitalised for helping the learner acquire knowledge and skills in an interactive environment. The teaching of the social sciences must adopt methods that promote creativity, aesthetics, and critical perspectives, and enable children to draw

Theatre in Education

Theatre is one of the most powerful, yet least utilised art forms in education. In the exploration of self in relation to others, the development of understanding of the self, and of critical empathy, not only for humans but also towards the natural, physical and social worlds, theatre is a medium par excellence.

Dramatising texts is only one small part of theatre. Much more significant experiences are possible through role play, theatre exercises, body and voice control and movement, and group and spontaneous enactments. Such experiences are important not only for teachers in their own development, but also for teachers to provide to children.

relationships between past and present, to understand changes taking place in society. Problem solving, dramatisation and role play are some hitherto underexplored strategies that could be employed. Teaching should utilise greater resources of audio-visual materials, including photographs, charts and maps, and replicas of archaeological and material cultures.

In order to make the process of learning participative, there is a need to shift from mere imparting of information to debate and discussion. This approach to learning will keep both the learner and the teacher alive to social realities.

Concepts should be clarified to students through the lived experiences of individuals and communities. It has often been observed that cultural, social and class differences generate their own biases, prejudices and attitudes in classroom contexts. The approach to teaching therefore needs to be open-ended. Teachers should discuss different dimensions of social reality in the class, and work towards creating increasing self-awareness amongst themselves and the learners.

3.5 Art Education

For decades now, the importance of the arts in the education system has been repeatedly debated, discussed and recommended, but without much progress in this direction. The need to integrate art education in the formal schooling of our students now requires urgent attention if we are to retain our unique cultural identity in all its diversity and richness. Far from encouraging the pursuit of the arts, our education system has steadily discouraged young students and creative minds from taking to the arts or, at best, permits them to consider the arts to be 'useful hobbies' and 'leisure activities'. The arts are reduced to tools for enhancing the prestige of the school on occasions like Independence Day, Founder's Day, Annual Day, or during an inspection of the school's progress and working. Before or after that, the arts are abandoned for the better part of a child's school life, and the student is headed towards subjects that are perceived as being more worthy of attention. General awareness of the arts is also ebbing steadily among not just students, but also their guardians, teachers and even among policy makers and educationists.

> On a winter morning, the teacher asked the children to draw a 'morning scene'. One child completed the drawing and then darkened the background, almost hiding the sun. "I asked for a morning scene! The sun should be bright!" the teacher exclaimed. She didn't notice the child's eyes darting to the window; it was still dark today, and the sun was behind heavy wintry grey clouds.

Schools and school authorities encourage the arts of a superficial and popular nature and take pride in

putting up events that showcase song and dance performances and plays that may entertain, but have little aesthetic quality. We can no longer afford to ignore the importance of the arts and must concentrate all possible energies and resources towards nurturing artistic capabilities and creating cultural and artistic awareness amongst the students of the vast and varied cultural inheritance we have. The arts in India are living examples of the country's secular fabric and cultural diversity. They include a variety of folk and classical forms of music and dance, theatre, puppetry, clay work, visual arts, and crafts from every region of India. Learning any of these arts would enrich the lives of our young citizens, not only in their school years but also throughout their lives.

The arts, visual and performing, need to become an important component of learning in the curriculum. Children must develop skills and abilities in these areas, and not treat these as a mere entertaining fringe. Through the arts curriculum students must be introduced to the rich and varied artistic traditions of the country. Arts education must become both a tool and a subject taught in every school as a compulsory subject (up to Class X), and facilities for the same may be provided in every school. All the four main streams covered by the term the arts, i.e. music, dance, visual arts and theatre, should be included. Awareness also needs to be built among parents and guardians, school authorities and administrators regarding the importance of the arts. Emphasis should be given to learning rather than teaching, and the approach should be participatory, interactive, and experiential rather than instructive.

Throughout the years of school, during all stages, the mediums and forms of art allow children to develop both a playful as well as a disciplined exploration of themselves and diverse materials, and allows them to experiment with many forms of expression. Music,

Heritage Craft Traditions

Craft is a productive process, a wonderful indigenous technology that is far from outmoded. The raw materials are all indigenously available, and environmentally friendly. There is a rich resource of living craft skills, techniques, designs and products that would and could form a rich core resource for the curricular areas of both art and work. Working with hands, with materials and with techniques helps in understanding processes, becoming resourceful, taking initiative, and in problem solving. Such experiences are of irreplaceable value for all children. This area is also well suited as a meaningful site for inclusive education.

Craft must be taught both as a creative and aesthetic activity and as work. It could be integrated into the study of History, social and environmental studies, geography and economics. Developing a perspective on gender, environment and community should also be an integral part of 'critical' craft learning.

- *Crafts could enter into the curriculum as a part of 'art', with an emphasis on creative and aesthetic aspects.*
- *Crafts persons themselves should be teachers and trainers for craft, and ways of enabling them to serve schools on a part-time basis need to be evolved.*
- *Crafts should be taught as a lively, experiential exercise.*
- *Crafts should be taught as projects, and not as classroom exercises.*
- *Different curricula should be planned for different crafts; resources such as design books, samplers, source books, tool guides, and crafts maps are needed.*
- *Craft labs equipped with adequate materials and tools need to be developed.*
- *Craft melas could be organised to expose children to crafts persons and craft traditions, and also for children to showcase their own creative endeavours.*

dance and theatre all contribute to the development of the self, both cognitive and social. The importance of such experiences during the pre-primary and primary school years cannot be overemphasised.

Language, exploration of nature, and an understanding of the self and others can all be experientially learnt and understood by children through various art forms. By their very nature, the art forms allow all children to participate.

Resources for the integration of the arts and heritage crafts should be available in every school. Thus, it is important that the curriculum provide adequate time for a range of art activities. Block periods of about one hour to one and half hours are necessary, especially where theatre, dance, and clay work are involved. The emphasis should not be on attaining some adult standards or notions of 'perfect art', but on supporting the child's own expression and style through exposure to material, skills and technique, but without overemphasising them. Over the years, teachers would help children to move towards formulating and executing their own art projects independently with dedication and persistence, while cultivating a sense of aesthetic quality and excellence.

In the secondary and higher secondary school stages, the art curriculum may allow children to specialise in some areas of their interest. Along with learning the skills and practising them, children could also at this stage learn about the theory of art and aesthetic experience, which could deepen their appreciation and also help them understand the significance of this area of knowledge. Discussions about popular cultural art forms, different kinds of art traditions (cultural differences) and creativity would also provide them with a perspective on the variety of forms and the development of 'taste'. It is important, therefore, that the curriculum not be biased and judgemental about high or low forms of culture, nor treat classical and folk art forms differently. It would also prepare those who wish to choose an art form for specialised study during the +2 stage, or even consider pursuing a career in the arts.

More resource material on arts education should be made available for arts education teachers. Teacher education and orientation must include a significant component that will enable teachers to include arts education efficiently and creatively. In addition, more Bal Bhavans, which have played an important role in the urbanscape, should be established at district headquarters, and eventually at all block centres as well. These would facilitate the additional teaching of arts and crafts activities, and provide opportunities for children to learn these at first hand.

3.6 Health and Physical Education

It is widely acknowledged that health is influenced by biological, social, economic, cultural and political forces. Access to basic needs like food, safe drinking water supply, housing, sanitation and health services influences the health status of a population, and these are reflected through mortality and nutritional indicators. Health is a critical input for the overall development of the child, and it influences enrolment, retention and school completion rates significantly. This curriculum area adopts a holistic definition of health within which physical education and yoga contribute to the physical, social, emotional and mental development of a child.

Undernourishment and communicable diseases are the major health problems faced by the majority of children in India, from the pre-primary to the higher secondary school stages. Therefore, the need to address this aspect at all levels of schooling, with special attention to vulnerable social groups and girl children. It is proposed that the midday meal programme and medical

check-ups be made a part of the curriculum and education about health be provided that address the age-specific concerns at different stages of development. The idea of a comprehensive school health programme, conceived in the 1940s, included six major components, viz., medical care, hygienic school environment, and school lunch, health and physical education. These components are important for the overall development of the child, and hence need to be included in the curriculum. The more recent addition to the curriculum is yoga. The entire group must be taken together as a comprehensive health and physical education curriculum, replacing the fragmentary approach current in schools today. As a core part of the curriculum, time allocated for games and for yoga must not be reduced or taken away under any circumstances.

There is growing realisation that the health needs of adolescents, particularly their reproductive and sexual health needs, require to be addressed. Since these needs predominantly relate to sex and sexuality, which is culturally a very sensitive area, they are deprived of opportunities to get the appropriate information. As such, their understanding of reproductive and sexual health and their behaviour in this regard are guided predominantly by myths and misconceptions, making them vulnerable to risky situations, such as drug/substance abuse and HIV/AIDS transmission. Age- appropriate context-specific interventions focused on adolescent reproductive and sexual health concerns, including HIV/AIDS and drug/substance abuse, therefore, are needed to provide children opportunities to construct knowledge and acquire life skills, so that they cope with concerns related to the process of growing up.

3.6.1 Strategies

Given the multidimensional nature of health, there are many opportunities for cross-curricular learning and integration. Activities such as the National Service Scheme, Bharat Scouts and Guides, and the National Cadet Corps are some such areas. The sciences provide opportunities for learning about physiology, health and disease, and the interdependencies between various living organisms and the physical habitat. The social sciences could provide insights into community health as well as an understanding of the spread, control and cure of infectious diseases from a global socio-economic perspective. This subject lends itself to applied learning, and innovative approaches can be adopted for transacting the curriculum.

The importance of this subject to overall development needs to be reinforced at the policy level, with participation by administrators, other subject teachers in schools, the Health Department, parents and children. Recognising this subject as a core subject Health and Physical Education must continue to be a compulsory subject from the primary, to the secondary stages, and as an optional subject at the higher secondary stage. However, it needs to be given equal status with other subjects, a status that is not being given at present. In order to transact the curriculum effectively, it is essential to ensure that the minimum essential physical space and equipment are available in every school, and that doctors and medical personnel visit school regularly. Teacher preparation for this area needs well-planned and concerted efforts. This subject area, consisting of health education, physical education and yoga, must be suitably integrated into the elementary and secondary pre-service teacher education courses. The potential of the existing physical education training institutes should be reviewed and utilised adequately. Similarly, their appropriate syllabi and teacher training for transaction of yoga in schools need to be reviewed and reformulated. It is also essential to ensure that these concerns are integrated into the activities of the National

Service Scheme, the Scouts and Guides, and the National Cadet Corps.

The 'needs-based approach' could guide the dimensions of the physical, psychosocial and mental aspects that need to be included at different levels of schooling. A basic understanding of the concerns is necessary, but the more important dimension is that of experience and development of health, skills and physical well being through practical engagement with play, exercise, sports, and practices of personal and community hygiene. Collective and individual responsibilities for health and community living need to be emphasised. Several national health programmes like Reproductive and Child Health, HIV/AIDS, Tuberculosis and Mental Health have been targeting children as a focus group with prevention in view. These demands on children need to be integrated into existing curricular activities rather than adding these on.

Yoga may be introduced from the primary level onwards in informal ways, but formal introduction of yogic exercises should begin only from Class VI onwards. All interventions, including even health and hygiene education, must rely on the practical and experiential dimensions of children's lives. There may be more emphasis on the inclusion of sports and games from the local area.

It should be possible to organise the utilisation of school space, at the block level at least, for special sports programmes both before school hours and after school hours to enable children with special talents for sports to come here for special training and during vacation periods. It should also be possible to develop these sports facilities so that many more children can avail of these for leisure-time sports activities and engage with team games such as basketball, throwball, volleyball, and local forms of sports.

3.7 Work and Education

Work, understood simply, is an activity directed toward making or doing something. It also means making one's work or capabilities, or both, available for someone else's purposes for monetary or other forms of return. A number of these activities are related to producing food, articles of daily use, looking after the physical and mental well-being of people, and other activities related to the administration and organisation of society. In any society, in addition to these, two basic dimensions (producing goods and establishing smooth functioning), various other activities also contribute to human well-being, and in that sense are considered forms of work.

Understood in this sense, work implies a commitment to other members of the society and/or community as one is contributing one's work and capabilities for fulfilling their needs. Second, it implies that one's contribution made through work will be submitted to public standards of performance and hence will be valued and judged by others. Third, work implies contributing to the functioning of social life as it either produces something that makes life possible or helps in the functioning of society in general. Finally, work enriches human life as it opens up new dimensions of appreciation and enjoyment.

However, we must not forget that children are often socialised into discriminatory practices and values and that adults socialise children within the dominant socio-cultural paradigm. It is important to recognise that both adults and children are socialised in the same way. We also have to remember that work as forced labour is perhaps the most demeaning of all coercions. There have to be adequate measures in place to ensure that introduction of work as an integral part of the curriculum should never

lead to a situation where work is thrust on unwilling children, or that the 'work' itself is a hindrance to the child's education and normal growth and development. Routine and repetitive activity carried on for the sake of production or work that is associated with the division of labour based on caste and gender should be strictly avoided. Also, a teacher making children work without him/herself participating in the work is unlikely to achieve the objectives of integrating work with the curriculum. The inclusion of work within the school must also never be used as the justification for the exploitation of children.

Work is also an arena for learning for children, whether in the home, the school, the society or the workplace. Children begin to absorb the concept of work as early as the age of two years. Children imitate their elders and like pretending to do work. For example, it is not unusual to see very young children pretending to 'sweep' the floor, or 'hold meetings', or 'build houses', or 'cook'. Work as an educational tool is used by many pedagogies. For example, the Montessori system integrates work concepts and skills from the very beginning. Cutting vegetables, cleaning the classroom, gardening and washing clothes are all a part of the learning cycle. Beneficial work that is in keeping with the child's age and ability, and which contributes to the child's normal growth and development, when introduced into children's lives can serve to enable children to learn values, basic scientific concepts, skills and creative expression. Children gain an identity through work, and feel useful and productive as work adds meaning and brings with it membership to society and enables children to construct knowledge.

Through work one learns to find one's place in society. It is an educational activity with an inherent potential for inclusion. Therefore, an experience of involvement in productive work in an educational setting should make one appreciate the worth of social life and what is valued and appreciated in society. Since work defines some achievable targets and creates a web of interdependence, it entails making efforts in a disciplined manner, thus creating possibilities for greater self-control, focusing mental energies and keeping emotions under check. The value of work, particularly skills that involve good finish, are undervalued as a means of achieving excellence and learning self-discipline. The discipline exercised by the material (say, clay or wood) is more effective and qualitatively different from the discipline exercised by one human being over another. Work involves interaction with materials or other people (mostly both), thus creating a deeper comprehension and increased practical knowledge of natural substances and social relationships. All this is in addition to the usual physical skills involved in learning a trade that may be turned into a means of earning a livelihood. The aspects of work mentioned here draw attention to the meaning-making and knowledge-construction dimension of work. This is the pedagogic function that work can play in the curriculum.

Benefits of this nature can be drawn from work only if it becomes an integral part of the school curriculum. Pursued in an academic setting, work carries the remarkable potential of generating new forms of creativity and understanding while opening up the possibility of transforming the nature of work itself. This has become even more essential as in a majority of families in India contributing to household work and family trade is a way of living, but this pattern is changing due to the pressure of school on children's time and the rampant competition in memorisation of information. Academic activity tends to be imprisoned within disciplinary boundaries. When

academic learning and work are simultaneously collocated, there is a chance of greater creativity in academic pursuits as also in the methods and tools of doing work. A synergetic enhancement can take over. That is how efficient hand pumps were designed. High-flying polythene balloons used to burst while going through the extremely cold stratosphere untill a scientifically minded worker suggested that putting a little carbon powder in the fabric would help to keep it warm by absorbing sunlight. Indeed, all great inventors were tinkerers who knew a little science. Edison, Ford and Faraday belonged to this category, so also those who invented the first pair of spectacles or the telescope. There is little doubt that much of the traditional knowledge of our potters, craftsmen, weavers, farmers and medical men has come through such pursuits – where these individuals were simultaneously engaged in physical work and academic thinking. We need to infuse such a culture of innovation, curiosity and practical experience in our education system.

However, schools at present are not geared for work as a part of the curriculum in terms of infrastructure or learning material. Work is necessarily an interdisciplinary activity. Therefore, integrating work into the school curriculum would require a substantial amount of pedagogical understanding of how it would be integrated with learning and the mechanisms for assessment and evaluation.

Institutionalising work in the school curriculum will require creative and bold thinking that breaks out of its stereotyped location in periods of Socially Useful and Productive Work (SUPW), something about which all children and teachers are justifiably sceptical. We need to examine how the rich work knowledge base and skills of marginalised children can be turned into a source of their own dignity as well as a source of learning for other children. This is especially important in the context of the growing alienation of the middle-upper-class children from their cultural roots and the central role played by the education system in aggravating and accelerating this process. There is immense potential for utilising the knowledge base of the vast productive sections of society as a powerful means for transforming the education system. Work seen as a form of 'valid' knowledge allows one to re-examine the invisibility of the contributions of women and non-dominant groups to what is regarded as valuable in society. Productive work would need to find a place at the centre of the curriculum in order to act as a powerful corrective to the 'bookish', information-oriented and generally unchallenging character of school education and, in turn, help relate the latter to the life needs of the child. Pedagogical experience in using work would become an effective and critical developmental tool at different stages of childhood and adolescence. Thus, 'work-centred education' is different from vocational education.

The school curriculum from the pre-primary to the senior secondary stages should be reconstructed for realising the pedagogic potential of work as a pedagogic medium in knowledge acquisition, developing values and multiple-skill formation. As the child matures, there is a need for the curriculum to recognise the child's need to be prepared for the world of work, and a work-centred pedagogy can be pursued with increasing complexity while always being enriched with the required flexibility and contextuality. A set of work-related generic competencies (basic, interpersonal and systemic) could be pursued at all stages of education. This includes critical thinking, transfer of learning, creativity, communication skills, aesthetics, work motivation, work ethic of collaborative functioning, and entrepreneurship-cum-social

Activities for Peace Awareness

Age 5 + Handle with Care: Let children stand in a row. Give them a paper leaf of a teak tree or canna or banana plant. Let them pass the leaf over their heads in any way they want until it reaches the back of the row. A child then brings the leaf to the front and the cycle starts again. Children are then asked to look at the damage caused to the leaf as it has been handled. This activity could lead to a discussion about leaves and the different trees from which they come from. Damage to a single leaf is representative of damaging nature. The leaf stands for the whole of creation.

Age 7+ Sharing Feelings: Let children sit in a circle and ask each other, "Which was the happiest day in your life? Why was it so happy?" Let each child answer the question. Let some of the children role play one or more of the experiences. As, children become more familiar with the idea of sharing their feelings, ask more difficult questions such as "What makes you really afraid? Why do you feel that way? How do you feel when you watch someone fighting? Why do you feel that way? What makes you really sad? Why?"

Age 10 + Overcome Injustice with Justice: Explain that there are many reasons for injustice in this world, that justice is a basic means for creating peace in the world. Give two or three examples of injustice. Ask the children to give more examples. Then ask the questions: "What was the cause of the injustice? How would you feel in the same situation?" Have some children share their answers with the rest of the class.

Age 12 + Be a Peace Lawyer: Tell the children that they are peace lawyers drawing up peace laws for a country. List five of the most important laws that they would each suggest? Which of the laws suggested by others are you prepared to add to your list? Which laws are you not prepared to accept? Why not?

accountability. For this evaluation, parameters would also need to be redesigned. Without an effective and universal programme of work-centred education, it is unlikely that UEE (and later Universal Secondary Education too) would ever succeed.

3.8 EDUCATION FOR PEACE

We live in an age of unprecedented levels of violence, with constant threats posed by intolerance, fanaticism, dispute and discordance. Ethical action, peace and welfare are facing new challenges. War and violence occur due to unresolved conflicts, though conflicts may not always lead to violence and war. Violence is one of the many possible responses to conflict. Non-violent conflict-resolution skills could be nurtured and applied constructively to disputes between the individuals, groups and nations. The space for peace education within the framework of National School Curriculum document is compellingly clear in the light of the escalating trends of, and taste for, violence globally, nationally and locally. Education is a significant dimension of the long-term process of building up peace – tolerance, justice, intercultural understanding and civic responsibility. However, education as practised in schools often promotes forms of violence, both real and symbolic. Under these circumstances, the need to reorient education and therefore the school curriculum takes priority. As a value, it cuts across all other curricular areas, and coincides with and complements the values emphasised therein. It is, therefore, a concern cutting across the curriculum and is the concern of all teachers.

Education for peace seeks to nurture ethical development, inclucating the values, attitudes and skills required for living in harmony with oneself and with others, including nature. It embodies the joy of living and personality development with the qualities of love,

hope and courage. It encompasses respect for human rights, justice, tolerance, cooperation, social responsibility, and respect for cultural diversity, in addition to a firm commitment to democracy and non-violent conflict resolution. Social justice is an important aspect of peace education. The concern for equality and social justice, which refers to practising non-exploitation towards the have-nots, the poor and the underprivileged and creating a non-violent social system, is the hallmark of education for peace. Similarly, human rights are central to the concept of peace. Peace cannot prevail if the rights of individuals are violated. Basic to human rights are the values of non-discrimination and equality, which contribute to building a culture of peace in society. These issues are inter related. Peace education is thus a host of overlapping values.

Suggestions for Peace Activities

- √ *Set up special clubs and reading rooms in schools that concentrate on peace news and events that violate the norms of social justice and equality.*
- √ *Compile a list of films—documentaries and feature films—that promote the values of justice and peace. Screen them from time to time in schools.*
- √ *Co-opt the media as a stakeholder in education for peace. Invite influential journalists and editors to address children. Ask for space in news papers and journals for children's views to be published at least once a month.*
- √ *Celebrate the cultural and religious diversity of India in schools.*
- √ *Organise programmes to promote an attitude of respect and responsibility towards women.*

Peace education must be a concern that permeates the entire school life – curriculum, co-curriculum, classroom environment, school management, teacher-pupil relationship, teaching-learning processes, and the entire range of school activities. Hence, it is important to examine the curriculum and examination system from the point of view of how they may contribute to children's sense of inadequacy, frustration, impatience and insecurity. Also, the need to consciously counter the negative influence of the increasing violence around them, and its representation in the media, on the minds of children, and in its place promote a reflective engagement with more meaningful aspects of living an ethical and peaceful life. Education in the true sense should empower individuals to clarify their values; to enable them to take conscious and deliberate decisions, taking into consideration the consequences of their actions; to choose the way of peace rather than violence; to enable them to be makers of peace rather than only consumers of peace.

3.8.1 Strategies

Ethical development does not mean the imposition of do's and don'ts. Rather it calls for devising means and ways of helping children learn to make choices and decide what is right, what is kind, and what is best for the common good, keeping in view the broader implications for personal and social values.

Children can understand almost everything they hear and see, but are often not able to reconcile contradictions between what is said and what is done. Even a minor disagreement at home can affect children very deeply. A state of permanent disaffection amongst the elders in the house or a disintegrating relationship between parents creates the kind of incalculable fear and depression that is often manifested as aggression a few years later in early youth. There is a need to bring

parents and teachers together for more than only academic purposes. The responsibility of development of personal ethics does not rest solely with either parents or with the school.

Ethical development follows different patterns characterising different age groups. During the primary years, children are still exploring their immediate environment and developing a consciousness of their own self. Their behaviour revolves around avoiding punishment and seeking rewards. They form notions of good and bad, right and wrong depending upon what is approved or disapproved by their elders. At this stage, what they see in the behaviour and action of adults prompts them to construct their own understanding of ethical behaviour.

As children grow older, their reasoning capabilities develop. However, they are still not mature enough to question assumptions and norms. Inspired by the need to impress others and validate their self-image as strong and capable individuals, they tend to violate rules. At this stage, facilitating reflection on the basis of rules and norms, restrictions, constraints, duties and obligations, etc., through discussion and dialogue, produces insights into the linkage between the collective good, the value of restraint, sacrifice, compassion, etc., which constitute the moral ways of being.

Still later, as abstract thinking is fully developed, individuals can make well -reasoned judgements about what constitutes ethical behaviour. This may lead to the acceptance and internalisation of ethical principles, which then can be sustained in the long run. Even in the absence of an external authority, ethically mature individuals behave in just and appropriate ways, and understand the basis of rules and, norms, and appreciate how these contribute to overall peace and order in society.

Our earliest and best teachers found stories and anecdotes the best way to get across an important spiritual teaching or social message. Along with this is the universal fact that every child, no matter how dull or uninspired his home life, has something to say, some insight to contribute to a class discussion. The teacher needs to draw out the children, gain their confidence, and avoid using threatening language or hostile body language.

Work done by other living beings

Ask children to choose an animal or bird they know well and then list the 'work' they do, specifying if it is the male, female or young of the species. Discuss the reason for such distribution of labour and the rationale behind this. Ask them to write a poem or essay on what they have learnt and put these up as posters in the classroom.

Teaching values has often meant exhortations about desirable behaviour. It has also meant the suppression and denial of "improper" and "unacceptable" feelings and desires. This often leads children to hide their own real feelings, desires, thoughts and convictions and simply pay lip service to moral values and ideals, without making any commitment. Hence the need to move away from mere talk, to a meaningful discussion of experiences and reflections, eschewing a simplistic approach to moral behaviour, and instead exploring and understanding complex motivations and ethical dilemmas associated with human behaviour and actions.

Teachers should make deliberate attempts to infuse and reinforce the importance of peace-related values that are commensurate with the textual material taught in school and the developmental stages of children. For example, teachers can take advantage of the hidden components in a lesson by using appropriate strategies to awaken positive feelings, identifying experiences worth reflecting and, exploring, discovering, constructing understanding peace-related values.

Strategies like questions, stories, anecdotes, games, experiments, discussions, dialogues, clarification of values, examples, analogies, metaphors, role playing, and simulation are helpful in promoting peace through teaching-learning. The teaching and practise of ethics go from the personal sphere to social and community-oriented thinking and then link up with global perspectives. A teacher who is oriented to the perspective of peace can introduce such opportunities for reflecting at these scales, and identifying the inter linkages between them. Teacher education programmes should consider introducing peace education as an optional subject of study.

3.9 HABITAT AND LEARNING

The habitat is where any species finds conditions that permit it to thrive. Learning is a vital faculty of all animal species. Animals learn about the features of their own habitat by picking up clues as to where they may expect to find food or meet social companions or encounter enemies. For our ancestors, knowledge thus began with the exploration of their habitat. But as human beings' control over the environment has increased, and as people have begun to mould the world more and more to suit their needs, this component of knowledge has diminished so much that today formal education has become largely alienated from the habitat of the students. But as environmental degradation proceeds at an uprecedented pace, we are beginning to realise the importance of taking good care of our habitat. Humankind must, therefore, make an attempt to comprehend its roots, to re-establish links with its habitat, and to understand and take good care of it. In substance and spirit, then the theme ' Habitat and Learning' is equivalent to environmental education.

These significant concerns are best realised by infusing the components of environmental education as part of different disciplines while ensuring that adequate time is earmarked for pertinent activities. This approach can be meaningfully employed in the treatment of content in Physics, Mathematics, chemistry, Biology, geography, History, political science, health and physical education, art, music etc. Actvities constructed for life situations become a meaningful means for the engagement of learners. Rainfall, for instance, exhibits intricate variations over space and time. Data on such variations are available and can be used to promote many interesting activities in Physics and Mathematics. In Physics, simple experiments may be devised to visualise patterns of flow of fluids over uneven terrain, as well as to demonstrate how the ascent of air leads to cooling and precipitation and descent to the opposite effects. In Mathematics, a careful analysis of data for a longer period, say, 50 years, on decline in rainfall provides excellent possibilities for projects relating to data representation, visualisation and interpretation. Likewise, effluents from sewage treatment plants can form meaningful raw material for a variety of projects in chemistry. Besides, schools could work with panchayats, municipalities and city corporations to document biodiversity resources and associated knowledge. Schools can take up projects in Biology addressing specific issues of interest, such as the occurrence and utilisation of medicinal plants or the protection of rare and endangered fish in a body of water. People's representations of the environment and its specifics (animals, forests, rivers, plants etc.) through various forms of art, music, dance and craft illustrate their understanding of biodiversity. Such an understanding is also linked to the life of members of Scheduled Caste and Scheduled Tribe communities as they often depend on natural biodiversity resources to sustain their livelihoods. Recording such knowledge is part of the mandate of preparing of people's

biodiversity registers, and students can fruitfully be engaged in projects on the preparation of such registers. Projects assessing the nutritional role of wild plants, which provide important nutritional supplements in the diets of tribal communities, can be worthwhile components of health education. Likewise, preparation of maps of the immediate environment, documentation of environmental History, and analysis of political issues related to the environment may be made part of projects in geography, History and political science. Conflicts over water at the local, state, national and international levels offer a rich source for designing a variety of activities and projects connecting these descriptions of knowledge.

3.10 SCHEMES OF STUDY AND ASSESSMENT

The word 'school' all over the country by and large refers to Classes I to X, extending to class XII in some states, while in other states Classes XI and XII are regarded as pre-university or junior college. Some schools also include two to three years of pre-school classes. The breaking up of schooling into four 'stages' extends far beyond mere administrative convenience. From the point of view of curriculum design and teacher preparation, these stages have a developmental validity. Seen from a stage-wise perspective, curriculum thinking and school organisation can overcome problems created by the current preoccupation with 'monograde' classrooms as being the norm, with rigid application of age-based grouping of children, and class-wise teaching and learning objectives. Single and two- teacher primary schools could be reconceptualised as a learning group with different abilities and learning needs rather than as 'multigrade' classrooms requiring time- management techniques. Assessing children for what they have learnt could also then take place over a longer cycle of years spent in school, rather than as yearly requirements spelt out for each class, in hierarchical progression. This would allow more respect for children's pace of learning. Schemes such as the Minimum Levels of Learning (MLL) reinforced not only the rigid adherence to year-end outcomes, but also allowed for these to be further narrowed to lessons. Describing the characteristics and concerns of the curriculum, pedagogy and assessment in stages allow syllabi, textbooks and learning resources, and for teachers to plan for children's development and the gradual and cumulative deepening of abilities, competencies and concepts.

3.10.1 Early Childhood Education

The early childhood stage, until the age of 6–8 years, is the most critical period when the foundations are laid for life-long development and the realisation of full potential; research shows that there are 'critical periods' at this stage for full development of the brain's potential. The formation of later attitudes and values as well as the desire to learn are also influenced at this stage, while lack of support or neglect can lead to negative consequences, sometimes irreversible. Early Childhood Care and Education (ECCE) requires that young children be provided care, opportunities and experiences that lead to their all-round development — physical, mental, social and emotional, and school readiness. A holistic and integrated perspective views the health and nutritional needs of children as integrally related with their psychosocial/educational development. The curriculum framework and pedagogy for ECCE must be based on this holistic perspective, taking into account the various domains of development, the characteristics of children at each sub-stage, and their learning needs in terms of experiences.

It is well known that children have a natural desire to learn and make sense of the world around them.

Learning in the early years must hence be directed by the child's interests and priorities, and should be contextualised by her experiences rather than being structured formally. An enabling environment for children would be one that is rich in stimulation and experiences, that allows children to explore, experiment and freely express themselves, and one that is embedded in social relations that give them a sense of warmth, security and trust. Playing, music, rhyming, art and other activities using local materials, along with opportunities for speaking, listening and expressing themselves, and informal interaction are essential components of learning at this stage. It is important that the language used in early education is one that the child is familiar with in the immediate environment, while an informal multilingual classroom would help children to comfortably adjust to the early introduction of a second language (English) and the medium of instruction from Class I onwards. As the children who come under the purview of ECCE are a heterogeneous group, ranging from infants to pre-schoolers, it is important that activities and experiences for them are developmentally appropriate.

Early identification of disabilities assessment and the provision of appropriate stimulation would go a long way in preventing the aggravation of disadvantage on this account. The caution would be against pressurising children into the three R's (reading, writing and arithmetic) and the early introduction of formal instruction, i.e. against making pre-schools into training centres for admission to primary schools. In fact, the suggestion is that ECCE cover the age group 0–8 years (i.e. so as to include the early primary school years). This is in order that the holistic perspective of ECCE and its methodologies (all- round and integrated development, activity-based learning, listening and speaking a language before learning to write it, contextuality and continuity between home and school) can inform learning experiences of children throughout the childhood stage and lead to a smooth transition into the elementary school stage.

The ECCE programmes present a picture of plurality, with government, non-government (voluntary sector) and private agencies providing a variety of services. However, the coverage of these programmes is extremely narrow, and the quality of services provided is variable and largely poor. A vast majority of children, especially those belonging to poor and marginal groups, are not covered by early care programmes and are left to fend for themselves. Pre-school programmes range from those that subject children to a dull and monotonous routine to those where children are exposed to structured formal learning, often in English, made to do tests and homework, and denied their right to play. These are undesirable and harmful practices that result from misguided parental aspirations and the growing commercialisation of pre-schooling, and are detrimental to children's development and motivation to learn. Most of these problems derive from the still 'unrecognised' status of ECCE as a part of the mainstream education system. Polarised services both reflect and perpetuate the multiple overlapping social divides in our country. The deep gender bias and pervasive patriarchal values in Indian society are responsible for the failure to recognise the need for cre'ches and day-care facilities, especially for children of poor rural and urban working women; this neglect has also had an adverse impact on the education of girls.

Good quality ECCE programmes have a positive impact on children's all-round development. This in itself is reason enough to demand that all children have a right to ECCE, and it is hence unfortunate that the 0–6 age

group has been excluded from the purview of Article 21. In addition, ECCE is also seen to have critical linkages with enrolment of children in schools and learning outcomes. To provide ECCE of equitable quality to all children, it is not only necessary to vastly enhance the funds committed for this purpose, but also to address through different strategies the five basic dimensions of quality, namely, developmentally appropriate curriculum, trained and adequately rewarded teachers, appropriate teacher-child ratio and group size, infrastructure supportive of children's needs, and an encouraging style of supervision. While there is need for decentralisation, flexibility and contextuality in these programmes, there is also an urgent need to evolve appropriate norms and guidelines and set in place a regulatory framework so that children's development is not compromised. Capacity building at all levels in relation to the plurality of roles that different functionaries play, as well as fair wages, must also be ensured.

3.10.2 Elementary School

The period of elementary school (from Class I to Class VIII) is now also recognised as the period of compulsory schooling vide the constitutional amendment making education a fundamental right. The beginning of this period marks the formal introduction of the child to reading, writing and arithmetic, culminating in the introduction of the formal disciplines such as the sciences and the social sciences towards the end of elementary school. This period of eight years is one of tremendous cognitive development, shaping reason, intellect and social skills, as well as the skills and attitudes necessary for entering the work place.

As the effort to achieve UEE is stepped up, the elementary school classes now cater to many children of school-going age coming from diverse backgrounds. Plurality and flexibility without compromising on standards need to become the hallmark of education for this period. Education during this period must be of an integrated character, enabling children to acquire facility in language and expression and to grow in self-confidence as learners, both within and outside school.

The first concern of the school is on the development of the child's language competence: issues related to articulation and literacy, and the ability to use language to create, to think and to communicate with others. Special stress is needed to ensure that there are maximum opportunities for those who wish to study in their mother tongue, including tribal languages and linguistic pockets, even if the number of students is small. The ability of the system to promote and nurture these options, along with working out mechanisms to ensure that future options remain open, should become a marker of its ability to provide for quality education. To achieve this, there must be a creative and concerted effort to maintain the multilingual genius of Indians and implement the three-language formula. While English may be taught during this period, it must not be at the expense of learning Indian languages.

The development of mathematical thinking, beginning with learning numeracy and moving towards the enjoyment of and facility with more abstract ideas, needs to be supported with concrete experiences and work with manipulations. It is in the early years, up to Class IV, that efforts at diagnosing learning difficulties and addressing remedial work in language and mathematics must be directed.

Such concrete experiences are also essential in the introduction to the integrated study of the environment through which children's intuitive knowledge of the world is integrated into school knowledge. Over the years, this study should move towards a more disciplinary approach, but with integrative themes, within which there are located opportunities to develop

concepts and learn the vocabulary and methods of the discipline.

The study of arts and crafts is essential for developing not only the aesthetic sensibility but also for learning how to manipulate materials and developing attitudes and skills essential for work. The curriculum must expose children to practical life skills and work experiences of varied kinds. Physical development through sports activities is also a must. A variety of activities at this stage of schooling should be made available, including participating in cultural programmes, organising events, travelling to places outside the school, providing experiences to develop socially and emotionally into creative and confident individuals sensitive to others, and capable of taking initiative and responsibility. Teachers with a background in guidance and counselling can design and lead activities to meet the developmental needs of children, thus laying the foundation for the necessary attitudes and perceptions towards the self and the world of work. They can also provide the needed support and guidance to children belonging to various strata of society for their sustenance through the elementary school years. The approach to the whole curriculum should be process oriented rather than outcome oriented. All these arenas of development should be made available to all children. Care must be taken to ensure that the curriculum does not reinforce stereotypes about preferences, choices and capabilities of different groups. In this context, the gradual inclusion of vocationally oriented skills as a part of exposure to work would be an important aspect of an inclusive curriculum.

3.10.3 Secondary School

Secondary school is a period of intense physical change and formation of identity. It is also the period of intense vibrancy and energy. The ability for abstract reasoning and logical thinking emerges, allowing children the possibility of deep engagement with both understanding and generating knowledge beyond the here and now. A critical understanding of the self in relation to society also emerges during this period.

The courses at this level generally aim at creating an awareness of the various disciplines and introduces students to the possibilities and scope of study in them. Through such engagement, they also discover their own interests and aptitudes and begin to form ideas on what courses of study and related work they might like to pursue later. Such needs could be effectively met by guidance and counselling interventions of an organised nature with the support of trained teachers and professional counsellors. For a large number of children, this is also a terminal stage, when they leave school and begin acquiring productive work skills. Those for whom this stage becomes terminal on account of socio-economic circumstances need opportunities for learning creative and productive work skills while the system as a whole moves towards universalising secondary education. Providing access to libraries and experience in laboratories is essential, and hence there must be a concerted effort to ensure that all children have access to such facilities.

These two years are shadowed by the spectre of achieving respectable 'board examination' marks in this examination since this will determine future options. Schools often proudly state that they finish the entire syllabus for Class X by the end of the first term, and spend the rest of the year (two terms) on revision, so that students are well prepared for their examination. Class IX of this stage, and later Class XI, are sacrificed for the same reason. This preoccupation with the examination, and its deleterious effect on learning, needs to be reviewed and challenged. Is it worth

wasting a year of perhaps the most fruitful period of a child's life in such non-productive engagement? Is it not possible that by pacing learning more evenly through out the year, we may serve preparation for the examination itself in a much better way? On account of the examinations, many other curricular areas, especially sports and arts, are also compromised. It is necessary to ensure that these areas are protected, and also that a serious attempt is made to institute meaningful experiences of work during this period.

Most boards in the country offer limited or no optional courses in this period; two languages (one of which is English), Mathematics, science and social sciences are the typical examination subjects. In this group, the courses of Mathematics and English, which are responsible for the 'failure' of a large number of students, need to be revisited and redesigned. The policy of declaring pass–fail in the whole examination, and the meaning of the 'pass mark', may also need to be reviewed. Related issues are discussed in Chapter 5, in the section on examination reforms.

A few boards also encourage students to choose an optional course from a range that includes economics, music and cookery. Such options could be increased, and the possibilities of substituting the more traditional disciplines with these options could also be considered. Vocational options could also be introduced. Many such vocational options may arise from the world of productive work in the local community. For example, auto maintenance in garages, tailoring and paramedical services offer possibilities for collaboration to create meaningful vocational courses; school boards could accredit such learning and thereby also recognise the many sites of learning that are situated outside school. In our country, many vocational stream courses have deteriorated in their quality, and hence are unable to provide students with meaningful work-related knowledge and skills. In many cases, these courses have degraded into routine credentialing courses, and make no distinction between learning to do a job versus learning to get a job.

3.10.4 Higher Secondary School

The status of the academic and vocational streams at the higher secondary stage needs to be reviewed in view of the continued preoccupation with and influence of the board and entrance examinations, and in view of the continued privilege given to the so-called academic stream and the failure of the vocational stream to take off. During this period of two years students make choices based on their interests, aptitudes and needs regarding their future life.

The possibilities of choosing optional courses of study for exploring and understanding different areas of knowledge, both in relation to one's interest and one's future career, is integral to this stage. Exploring disciplines and approaching problems and issues from rich interdisciplinary perspectives are possible at this stage. There is a need to allow for such investigations to take place between and outside the 'subjects' chosen for study.

Most boards of study offer a variety of subject areas in addition to the compulsory language courses. There is a concern about the formal or informal restrictions that operate to narrow the choice of subjects of study for students. Several boards restrict the combinations in the form of 'the science stream', 'the arts stream' and 'the commerce stream'. The CBSE does not restrict the possibility of combinations that students can choose, but in view of the increasing popularity of some combinations of subjects of study, and also because of a perception of status of subjects in relation to each other, many such options are now foreclosed to students. Further, universities also need to review their admission criteria as they currently restrict admission

based on the kinds and combinations of courses studied at the +2 stage. As a consequence, many significant and meaningful combinations of study, such as, for example, Physics, Mathematics and Philosophy, or Literature, Biology and History, are closed to students.

Recent trends of schools tailoring their classes to medical and engineering courses have led to an artificial restriction on the courses they offer in school, arguably on grounds of popularity and timetabling. In many parts of the country, students who want to study the arts and liberal subjects are left with very few options. Schools also discourage students from opting for unconventional combinations, often on account of timetabling considerations. We believe it is essential to keep all options open for students. In case there are not enough students in a school opting for a particular subject, schools could consider working out arrangements with other schools in the neighbourhood so that they could employ a resource teacher together. Such resource teachers could also be employed at the block level to teach such special subjects that would not otherwise be available in a school. School boards may also consider a more active role in promoting subjects and streams of study.

The courses offered at the +2 stage need to be alive to recent and current developments in the disciplines, as new knowledge areas are carved out, disciplinary boundaries shift and multidisciplinary studies develop. To allow students to engage with areas of study that are growing in importance within the disciplines and fields, courses could also be designed to offer optional modules, rather than trying to cover everything and packing courses with too much information. For example, History could have an optional module to study either Archaeology or World History; similarly, Physics could offer the options of Astronomy, Space Science and Rocketry etc.

Under pressure to 'cover' vast syllabi, many important aspects of learning such as practicals and field trips, and ways of learning such as reference work, project work and presentations, are not fully utilised, to the detriment of overall learning. Well -equipped laboratories and libraries, and access to computers, are essential, and all efforts must be made to ensure that schools and junior colleges are well equipped with such resources.

The vocational stream originally was meant to address the needs of those who would enter the work force earlier than those who would enter the professions via the traditional academic streams, or those who would pursue study and research. We recommend infusing productive work as a pedagogic medium for knowledge acquisition, developing values and multiple skill formation at all stages of education, including the +2 stage.

Given the developmental nature of this stage, guidance and counselling by trained professionals must be made available to children. Interventions to enhance self/career awareness, career exploration and planning are also essential. Besides, this stage coincides with adolescence, a period in an individual's life that is marked by personal, social and emotional crises created due to the demands of adjustment required in family, peer group and school situations. The provision of these services in schools would help create the support system required to cope with increasing academic and social pressures.

3.10.5 Open Schooling and Bridge Schooling

Beginning with the National Open School, open school boards, which have begun to function in a few states, now are able to provide much more flexibility and options for students. The range of subjects they offer is wide. With more flexibility in examination taking,

The purpose of evaluation is not

- √ *to motivate children to study under threat.*
- √ *to identify or label children as 'slow learners', or 'bright students', or 'problem children'. Such categories segregate children, placing the onus for learning solely on them, and detract from the role and purpose of pedagogy.*
- √ *to identify children who need remediation (this need not wait for formal assessment; it can be detected by the teacher in the course of teaching and attended to as a part of pedagogic planning, through individualised attention).*
- √ *to diagnose learning difficulties and problem areas—while broad indications about conceptual difficulties can be identified via evaluation and formal testing. Diagnosis requires special testing instruments and training. It is also specific to foundational areas of literacy and numeracy, and is not meant for subject areas.*

and the possibility of credit transfer from other boards, open schools have been able to provide a more humane approach to the process of certification. Knowledge about and access to open schools could be more widely disseminated along with efforts to address misconceptions regarding equivalence with other board examinations. By scheduling these examinations closer to the dates of other board examinations, it would also be possible to ensure that students do not lose a school year.

Bridge courses are conducted widely in many parts of the country to enable children who are out of school to study in programmes and become integrated into classes suitable to their age. In the medium term, it is essential to have well - conceived programmes that are able to meet this curricular objective. Anything less than this would exacerbate the deprivation that these children have already suffered, and constitute a flagrant disregard of their rights. Rigorous research and development of the pedagogy and materials required for such programmes to succeed, stringent implementation norms and provisioning of facilities, as well as continued academic and social support for these children after they have been placed in school are essential.

3.11 ASSESSMENT AND EVALUATION

In the Indian education system, the term evaluation is associated with examination, stress and anxiety. All efforts at curriculum definition and renewal come to naught if they cannot engage with the bulwark of the evaluation and examination system embedded in schooling. We are concerned about the ill effects that examinations have on efforts to make learning and teaching meaningful and joyous for children. Currently, the board examinations negatively influence all testing and assessment through out the school years, beginning with pre-school.

At the same time, a good evaluation and examination system can become an integral part of the learning process and benefit both the learners themselves and the educational system by giving credible feedback. This section addresses evaluation and assessment as they are relevant to the normal course of teaching-learning in the school, as a part of the curriculum. Issues relating to the examination system, and in particular to the board examinations, are addressed separately in Chapter 5.

3.11.1 The Purpose of Assessment

Education is concerned with preparing citizens for a meaningful and productive life, and evaluation should be a way of providing credible feedback on the extent to which we have been successful in imparting such an

education. Seen from this perspective, current processes of evaluation, which measure and assess a very limited range of faculties, are highly inadequate and do not provide a complete picture of an individual's abilities or progress towards fulfilling the aims of education.

But even this limited purpose of evaluation, of providing feedback on scholastic and academic development, can be achieved only if the teacher is prepared even before the course of teaching begins, armed with not only the techniques of assessment but also the parameters for evaluation and the various tools that will be employed. In addition to judging the quality of the students' achievements, a teacher would also need to collect, analyse and interpret their performances on various measures of the assessment to come to an understanding of the extent and nature of the students' learning in different domains. The purpose of assessment is necessarily to improve the teaching-learning process and materials, and to be able to review the objectives that have been identified for different school stages by gauging the extent to which the capabilities of learners have been developed. Needless to say, this does not mean that tests and examinations will have to be conducted frequently. On the contrary, routine activities and exercises can be employed effectively to assess learning.

Well-designed assessment and regular report cards provide learners with feedback, and set standards for them to strive towards. They also serve to inform parents about the quality of learning and the development and progress of their wards. This is not a means of encouraging competition; if one is looking for quality in education, then segregating and ranking children and injecting them with feelings of inferiority cannot do it.

Last, credible assessment provides a report, or certifies the completion of a course of study, providing other schools and educational institutions, the community and prospective employers with information regarding the quality and extent of learning.

The popular notion that evaluation can lead to identifying the needs of remediation, to be attended to with remedial teaching, has created many problems in curriculum planning. The term remediation needs to be restricted to specific/special programmes that enable children who are having a problem with literacy/reading (associated with reading failure and later with comprehension) or numeracy (especially the symbolic aspects of mathematical computation and place value). Teachers require specific training for effective diagnostic testing that can be of assistance in remediation efforts. Similarly, remedial work would require specifically developed materials and planning so that the teacher is able to give one-on-one time to work with the child,

Competencies

Competencies is an attempt to shift the focus of teaching and related assessment away from superficial textbook-based factual content. However, in the MLL approach, competencies are broken up into detailed sub-competencies and sub-skills, assuming that the sum of these sub-skills is the competency. Frequently, with the focus on behaviour and performance concepts may not even feature in the assessment. This logical yet mechanical listing of sub-skills and rigid timetables for their achievement does not reflect either the concern that learning and use of the competency may itself be more flexible, or that the cycle over which competencies are learnt need not follow the timing or pace described, or that the whole may be greater than the sum of the parts.

Designing learning and test items for these detailed lists, and teaching to these learning outcomes, is impractical and pedagogically unsound.

beginning with what she/he knows and moving to what she/he needs to learn, through a continuous process of assessment and careful observation. Indiscriminate usage of the term distracts from the general problems of effective pedagogy, and makes the child solely responsible for her/his learning and also learning 'failure'.

3.11.2 Assessing Learners

Any meaningful report on the quality and extent of a child's learning needs to be comprehensive. We need a curriculum whose creativity, innovativeness, and development of the whole being, the hallmark of a good education makes uniform tests that assess memorised facts and textbook -based learning obsolete. We need to redefine and seek new parameters for and ways of evaluation and feedback. In addition to the learner's achievements in specific subject areas that lend themselves to testing easily, assessment would need to encompass attitudes to learning, interest, and the ability to learn independently.

3.11.3 Assessment in the Course of Teaching

Preparing report cards is a way for the teacher to think about each individual child and review what she/he has learnt during the term, and what she/he needs to work on and improve. To be able to write such report cards, teachers would need to think about each individual child, and hence pay attention to them during their everyday teaching and interaction. One does not need special tests for this; learning activities themselves provide the basis for such ongoing observational and qualitative assessments of children. Maintaining a daily diary based on observation helps in continuous and comprehensive evaluation. An extract from the diary of a teacher for a week notes the following: "Kiran enjoyed his work. He took an instant liking to the books that were informative and brief. He says that he likes simple and clear language. In noting down facts, he goes for short answers. He says that it helps him understand things easily. He favours a practical approach." Similarly, keeping samples and notes of the child's work at different stages provides both the teacher and the learner herself or himself with a systematic record of his/her learning progress.

The belief that assessment must lead to finding learning difficulties to then be remediated is often very impractical and not founded on a sound understanding of pedagogic practice. Problems regarding conceptual development cannot and do not wait for formal tests in order to be detected. A teacher can, in the course of teaching itself, come to know of such problems by asking questions that make children think or by giving them small assignments. She can then attend to them in the process of teaching–by ensuring that her planning is flexible and responsive to the learners and their learning.

3.11.4 Curricular Areas that cannot be 'Tested for Marks'

Each area of the curriculum may not lend itself to being 'tested'; it may even be antithetical to the nature of learning in the curricular area. This includes areas such as work, health, yoga, physical education, music and art. While the skill-based component of physical education and yoga could be tested, the health aspect needs continuous and qualitative assessments. Currently, this has the effect of making these subjects and activities 'less important' in the curriculum; these areas are inadequately provided for in terms of material resources and curricular planning, and marked by a lack of seriousness. Further, the time allocated for them is also frequently sacrificed to accommodate special classes. This is a serious compromise with parts of the curriculum that have deep educational significance and potential.

Even if 'marks' cannot be given, children can be assessed for their development in these areas. Participation, interest, and level of involvement, and the extent to which abilities and skills have been honed, are some markers that can help teachers to gauge the benefits of what children learn and gain through such activities. Asking children to self-report on their learning can also provide teachers with insight into children's educational progress and give them feedback on improving curriculum or pedagogy.

3.11.5 Design and Conduct of Assessment

Assessments and examinations must be credible, and based on valid ways of gauging learning.

As long as examinations and tests assess children's ability to remember and recall textbook knowledge, all attempts to redirect the curriculum towards learning will be thwarted. First, tests in knowledge-based subject areas must be able to gauge what children have learnt, and their ability to use this knowledge for problem solving and application in the real world. In addition, they must also be able to test the processes of thinking to gauge if the learner has also learnt where to find information, how to use new information, and to analyse and evaluate the same.

The types of questions that are set for assessment need to go beyond what is given in the book. Often children's learning is restricted as teachers do not accept their answers if they are different from what is presented in the guidebooks.

Questions that are open-ended and challenging could also be used. Designing good test items and questions is an art, and teachers should spend time thinking about and devising such questions. The interest and ability of teachers to design good questions can be promoted through district- or state-level competitions. All question papers must be designed graded for difficulty in order to permit all children to experience a level of success, and to gain confidence in their ability to answer and solve problems.

Trying to devise a good and effective open-book examination can be a challenge that we must try to take up in our curricular efforts at all levels of school. This would require teachers and examination setters to emphasise the interpretation and application of learning over the arguments and facts that can be located in the book. There have been successful demonstrations that such examinations can be carried out on a large scale, and that teachers can themselves be trusted with moderating the results of such examinations. In this way, the assessment of projects and lab work can also be made credible and sound.

It is important that after receiving their corrected papers, children rewrite the answers and that these are again reviewed by teachers to ensure that children have learnt and gained something out of the ordeal.

Posing Questions

State four considerations to be kept in mind while setting up an iron-smelting plant.

Versus

If an industrialist wanted to establish an iron - smelting plant, which site should she choose and why?

How does the shape of a bird's beak help in adaptation?

Versus

Draw the beak of a common bird seen in your neighbourhood. Based on the shape of the beak, explain what are likely to be the bird's food habits and where in your neighbourhood it is likely to find its food.

Competition is motivating, but it is an extrinsic rather than intrinsic form of motivation. It is, of course, much easier to establish and to manipulate, and therefore frequently resorted to by teachers and school systems as a way creating and nurturing the drive for excellence. Schools begin 'ranking' children as early as their pre-primary years as a way of inculcating in them a competitive spirit. Such a competitive drive has several negative side effects on learning; often superficial learning is sufficient to create and maintain impressions, and over time students lose their ability to take initiative or do things for the fulfilment of one's own interest; hence, areas that cannot be 'marked' are neglected. This has unhealthy consequences for classroom culture, making children individualistic and unsuited to team work. There is an absurd and unnecessary importance given to term examinations, often accompanied by extreme arrangements of invigilation and secrecy. While the physical and psychological effects of this may not be readily visible until middle school, they frequently lead to high levels of stress in children, and cause early burnout. Schools and teachers need to ask themselves whether there is really much to be gained out of such practices and to what extent learning requires such systems of marking and ranking.

3.11.6 Self-assessment and Feedback

The role of assessment is to gauge the progress that both learner and teacher have made towards achieving the aims that have been set and appraising how this could be done better. Opportunity for feedback, leading to revision and improvement of performance, should constantly be available, without exams and evaluations being used as a threat to study.

Grading and correction carried out in the presence of students and providing feedback on the answers they get right and wrong, and why. Asking children about why they answered what they did assists teachers in going beyond the written answer to engage with children's thinking. Such processes also take away the frightening judgemental quality of marks obtained in a test, and enable children to understand and focus on their mistakes and learn through these mistakes. Sometimes head teachers object, claiming that correction in the presence of the child reduces 'objectivity'. This is a misplaced concern for 'objectivity', stemming from a competitive system that believes in judging children. Such a concern for 'objectivity' is misplaced in evaluation, which is consistent with educational goals.

Not only learning outcomes but also learning experiences themselves must be evaluated. Learners happily comment on the totality of their experience. Exercises, both individual and collective, can be designed to enable them to reflect on and assess their learning experiences. Such experiences also provide them with self-regulatory capabilities essential for 'learning to learn'. Such information is also valuable feedback to the teacher, and can be used to modify the learning system as a whole.

Every classroom interaction with children requires their evaluation of their own work, and a discussion with them about what should be tested and the ways of finding out whether the competencies are being developed or not. Even very young children are able to give correct assessments of what they can or cannot do well. The role of teaching is to provide an opportunity to each child to learn to the best of his or her ability and provide learning experiences that develop cognitive qualities, physical well-being and athletic qualities, as also affective and aesthetic qualities.

Report cards need to present to children and parents a comprehensive and holistic view of the child's

development in many fields. Teachers must be able to say things about each child/student, that conveys to them a sense of individualised attention, reaffirms a positive self-image, and communicates personal goals for them to work towards. Whether it is marks or grades that are reported, a qualitative statement by the teacher is necessary to support the assessment. Only through such a relationship with each child can any teacher succeed in influencing him/her, and contributing to his/her learning. Along with the teacher assessing each child, each student could also assess himself or herself and include this self-assessment in the report card.

Currently, many report cards carry information on subject areas and have nothing to say about other aspects of the child's development, including health, physical fitness and abilities in games, social skills, and abilities in art and craft. Qualitative statements about these aspects of children's education and development would provide a more holistic assessment of educational concerns.

3.11.7 Areas that Require Fresh Thinking

There are many areas of the curriculum that can be assessed but for which we still do not have reliable and efficient instruments. This includes assessing learning that is carried out in groups, and learning in areas such as theatre, work and craft where skills and competencies develop over longer time scales and require careful observation.

Continuous and comprehensive evaluation has frequently been cited as the only meaningful kind of evaluation. This also requires much more careful thinking through about when it is to be employed in a system effectively. Such evaluation places a lot of demand on teachers' time and ability to maintain meticulous records if it is to be meaningfully executed and if it is to have any reliability as an assessment. If this simply increases stress on children by reducing all their activities into items for assessment, or making them experience the teacher's 'power', then it defeats the purpose of education. Unless a system is adequately geared for such assessment, it is better for teachers to engage in more limited forms of evaluation, but incorporating into them more features that will make the assessment a meaningful record of learning.

Finally, there is a need to evolve and maintain credibility in assessment so that they perform their function of providing feedback in a meaningful way.

3.11.8 Assessment at Different Stages

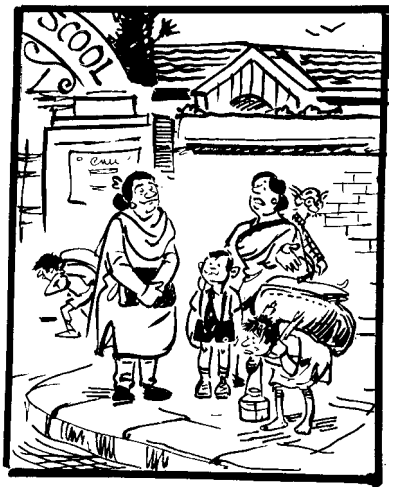
ECCE and Classes I and II of the Elementary Stage : At this stage, assessment must be purely qualitative judgements of children's activities in various domains and an assessment of the status of their health and physical development, based on observations through everyday interactions. On no account should they be made to take any form of test, oral or written.

Class III to Class VIII of the Elementary Stage : A variety of methods may be used, including oral and written tests and observations. Children should be aware that they are being assessed, but this must be seen by them as a part of the teaching process and not as a fearful constant threat. Grades or marks along with qualitative judgements of achievement and areas requiring attention are essential at this stage. Children's own self-evaluation can also be a part of the report card from Class V onwards. Rather than examinations, there could be short tests from time to time, which are criterion based. Term-wise examinations could be commenced from Class VII onwards when children are more psychologically ready to study large chunks of material and, to spend a few hours in an examination room, working at answering questions. Again, the progress card must indicate general observations on health and nutrition, specific observations on the overall

progress of the learner, and information and advice for the parents.

Class IX to class XII of the Secondary and Higher Secondary Stages : Assessment may be based more on tests, examinations and project reports for the knowledge-based areas of the curriculum, along with self-assessment. Other areas would be assessed through observation and also through self-evaluation.

Reports could include much more analysis about the students, various skill/knowledge areas and percentiles, etc., This would assist them by pointing out the areas of study that they need to focus on, and also help them by providing a basis for further choices that they make regarding what to study thereafter.



It's really cruel burdening kids like this. I had to hire that boy to help my son!
(Courtesy : R. K. Laxman in the Times of India)