

Preface

At the centre of the transformation that School Education is undergoing presently is the new perspective to assessment and its relationship to the teaching-learning process. It is widely agreed that assessment influences what is taught and how teaching and learning are delivered. There is also a widespread belief among educational researchers and practitioners that assessment can and often does constrain rather than enhance learning outcomes. If we restrict our choices of teaching and learning activities to exercises that simply rehearse for examinations, then we run the risk of failing our learners during the teaching and learning process as a whole. Another pitfall in working towards assessment is that learners may concentrate simply on doing the bare minimum needed in order to guarantee a pass.

Hence the challenge of changing the traditional system of examination and evaluation has emerged as a major focus. By introducing Continuous and Comprehensive Evaluation at the secondary level in all its affiliated schools, CBSE has sent out a clear message that assessment must take into account all the aspects of the personality development of the learner and that since learning is a continuous process, assessment also has to be continuous. CCE fundamentally shifts the focus from testing to learning by perceiving assessment as an integral part of the overall framework of teaching and learning. It follows from this that when incorporated into classroom practice, assessment tends to lose its individual identity, getting subsumed into the instructional process.

Such a conceptualization necessitates a greater thrust on formative assessment. It must be said, at this stage, that though many schools have been practicing CCE and as a consequence, formative assessment procedures for classes I-VIII for many years, the overall thrust still continues to be – assessment for 'measuring' rather than 'enhancing' learning. In other words, there has been a general lack of conceptual clarity with regard to the formative assessment practices among stakeholders as a result of which, many apparently formative assessment tools and procedures have, in effect, been summative in nature, ie, exercises to gauge, at a particular point in time, student learning relative to content standards. Although the information gleaned from this type of assessment is important, it can only help in evaluating certain aspects of the learning process.

It brings us to the vital need of strengthening formative assessment because our overall aim is to facilitate learning by improving the teaching-learning process on the basis of information gathered from assessment.



In this sense formative assessment is a part of the instructional process, underpinning the importance of student involvement. Students need to be involved both as assessors of their own learning and as resources to other students bringing into focus the importance of self and peer assessment besides teacher assessment. Research shows that the involvement in and ownership of their work increases students' motivation to learn. The most significant advantage of formative assessment is that it makes learning an enjoyable experience because of student involvement, enhanced learning and unobtrusive techniques of assessment.

Summative assessment constitutes a public recognition of achievement and we are fairly familiar with most of the tools and procedures of summative assessment. However, many teachers may find it a challenge to develop effective formative assessment tools; they may also experience some difficulties in integrating them with classroom instruction. In order to provide conceptual clarity in this regard and to place some illustrative examples of formative assessment tasks in the hands of the teachers, the Board is bringing out a series of Manuals for classes IX and X in all the major subjects. This manual on Mathematics Class IX is one of them. The tasks exemplified in this Manual are of different types such as Cross Word Puzzles, Matching Items, Quizzes Worksheets, Activity Sheets, Tests and Multiple Choice Questions. The tasks provided are varied and cater to the different multiple intelligences.

It is fervently hoped that teachers and students will derive maximum benefit from these publications. By studying the contents carefully and by using the tasks in classroom teaching, teachers would be able to build their capacity not only for enhanced learning to take place but also for preparing their own materials to add value to curriculum delivery. Certain practical guidelines have been included in the manuals to enable schools and teachers to implement formative assessment within the CCE framework as proposed by the Board for classes IX and X.

This document has been prepared by a group of Mathematics teachers and I record the sincere appreciation of the Board to each of these contributors. I also convey my appreciation to Dr. Sadhana Parashar, Head (I & R), Dr. Srijata Das, Education Officer, Mr. P. Mani, Education Officer and Mr. S.K. Jena, Asstt. Education Officer for conceptualizing and coordinating the task of deciding the content and bringing out the manual.

I sincerely hope that with the availability of rich materials, teachers will be able to implement the CCE scheme in the right spirit in all the schools affiliated to CBSE. Comments for improvement of the manual are always welcome.

(VINEET JOSHI)

Chairman



Continuous and Comprehensive Evaluation

Education aims at making children capable of becoming responsible, productive and useful members of a society. Knowledge, skills and attitudes are built through learning experiences and opportunities created for learners in school. It is in the classroom that learners can analyse and evaluate their experiences, learn to doubt, to question, to investigate and to think independently. The aim of education simultaneously reflects the current needs and aspirations of a society as well as its lasting values and human ideals. At any given time and place they can be called the contemporary and contextual articulations of broad and lasting human aspirations and values.

An understanding of learners, educational aims, the nature of knowledge, and the nature of the school as a social space can help us arrive at principles to guide classroom practices. Conceptual development is thus a continuous process of deepening and enriching connections and acquiring new layers of meaning. Alongside is the development of theories that children have about the natural and social worlds, including themselves in relation to others, which provide them with explanations for why things are the way they are and the relationship between cause and effect.

Characteristics of learning

- All children are naturally motivated to learn and are capable of learning.
- Understanding and developing the capacity for abstract thinking, reflection and work are the most important aspects of learning.
- Children learn in a variety of ways-through experience, making and doing things, experimentation, reading, discussion, asking, listening, thinking and reflecting, and expressing themselves in speech or writing-both individually and with others. They require opportunities of all these kinds in the course of their development.
- Teaching something before the child is cognitively ready takes away real learning. Children may 'remember' many facts but they may not understand them or be able to relate them to the world around them.
- Learning takes place both within school and outside school. Learning is enriched if the two arenas interact with each other. Art and work provide opportunities for holistic learning that is rich in tacit and aesthetic components. Such experiences are essentially to be learnt through direct experience and integrated into life.
- Learning must be paced so that it allows learners to engage with concepts and deepen understanding rather than remembering only to forget after examinations. At the same time learning must provide variety and challenge, and be interesting and



engaging. Boredom is a sign that the task may have become mechanically repetitive for the child and of little cognitive value.

- Learning can take place with or without mediation. In the case of the latter, the social context and interactions, especially with those who are capable, provide avenues for learners to work at cognitive levels above their own.

Place of Evaluation in the Curriculum

A curriculum is what constitutes a total teaching-learning program composed of overall aims, syllabus, materials, methods and assessment. In short it provides a framework of knowledge and capabilities, seen as appropriate to a particular level. Evaluation not only measures the progress and achievement of the learners but also the effectiveness of the teaching materials and methods used for transaction. Hence evaluation should be viewed as a component of curriculum with the twin purpose of effective delivery and further improvement in the teaching learning process.

If properly understood, evaluation or assessment will not be perceived as something administered by the teachers and taken by the learners on the conclusion of a period of learning. When evaluation is seen as an end of the learning exercise, both the teachers and the learners will tend to keep it outside the teaching-learning process, rendering assessment broadly irrelevant and alien to the curriculum. Further such a perception associates anxiety and stress with evaluation for learners. On the contrary, if evaluation is seen as an integral part built into the teaching learning process; it will become continuous like both teaching and learning. When evaluation is subsumed into teaching-learning, learners will not perceive tests and examinations with fear. It will lead to diagnosis, remediation and enhancement of learning.

The scope of evaluation in schools extends to almost all the areas of learners' personality development. It should include both scholastic and co-scholastic areas, i.e. it should be comprehensive in nature. This is in line with the goals of education. Evaluation is continuous and reveals the strengths and weaknesses of learners more frequently, so that the learners have better opportunity to understand and improve themselves. It also provides feedback to the teachers for modifying their teaching strategies.

In view of getting a complete picture of the child's learning, assessment should focus on the learner's ability to –

- learn and acquire desired skills related to different subject areas.
- acquire a level of achievement in different subject areas in the requisite measure
- develop child's individual skills, interests, attitudes and motivation
- understand and lead a healthy and a productive life.
- monitor the changes taking place in a child's learning, behaviour and progress over time.
- respond to different situations and opportunities both in and out of school.
- apply what is learned in a variety of environments, circumstances and situations



- work independently, collaboratively and harmoniously.
- analyze and evaluate.
- be aware of social and environmental issues
- participate in social and environmental projects and causes.
- retain what is learned over a period of time.

Thus assessment is a useful, desirable and an enabling process. To realize this one needs to keep the following parameters in mind –

The need to:

- assess the learner.
- use a variety of ways to collect information about the learner's learning and progress in subjects and cross curricular boundaries.
- collect information continuously and record the same.
- give importance to each learner's way of responding and learning and the time it takes to do so.
- report on an ongoing continuous basis and be sensitive to every learner's responses.
- provide feedback that will lead to positive action and help the learner to do better

In the assessment process, one should be careful NOT to:

- label learners as slow, poor, intelligent etc.
- make comparisons between them.
- make negative statements.

Continuous and Comprehensive Evaluation

Continuous and Comprehensive Evaluation (CCE) refers to a system of school-based evaluation of students that covers all aspects of a students' development. It is a developmental process of a child which emphasizes on two fold objectives. These objectives are continuity in evaluation on one hand and assessment of broad based learning and behavioural outcomes on the other.

The term 'continuous' is meant to emphasise that evaluation of identified aspects of students '*growth and development*' is a continuous process rather than an event, built into the total teaching-learning process and spread over the entire span of academic session. It means *regularity of assessment, diagnosis of learning gaps, use of corrective measures and feedback of evidence to teachers and students for their self evaluation.*

The second term 'comprehensive' means that the scheme attempts to cover both the scholastic and the co-scholastic aspects of students' growth and development. *Since abilities,*



attitudes and aptitudes can manifest themselves in forms other than the written word, the term refers to application of a variety of tools and techniques (both testing and non-testing) and aims at assessing a learner's development in areas of learning like:

- Knowledge
- Understanding/Comprehension
- Application
- Analysis
- Evaluation
- Creativity

Objectives of CCE are:

- To help develop cognitive, psychomotor and affective skills.
- To lay emphasis on thought process and de-emphasise memorization.
- To make evaluation an integral part of teaching-learning process.
- To use evaluation for improvement of students' achievement and teaching – learning strategies on the basis of regular diagnosis followed by remedial instruction.
- To use evaluation as a quality control device to maintain desired standard of performance.
- To determine social utility, desirability or effectiveness of a programme and take appropriate decisions about the learner, the process of learning and the learning environment.
- To make the process of teaching and learning a learner-centered activity.

Features of CCE are:

- The '*continuous*' aspect of CCE takes care of '*continual*' and '*periodicity*' aspect of evaluation.
- Continual means assessment of students in the beginning of instruction (*placement evaluation*) and assessment during the instructional process (*formative evaluation*) done informally using multiple techniques of evaluation.
- Periodicity means assessment of performance done frequently at the end of unit/term (*summative*)
- The '*comprehensive*' component of CCE takes care of assessment of all round development of the child's personality. It includes assessment in Scholastic as well as Co-Scholastic aspects of the pupil's growth.



- Scholastic aspects include curricular areas or subject specific areas, whereas co-scholastic aspects include Life Skills, Co-Curricular Activities, Attitudes, and Values.
- Assessment in scholastic areas is done informally and formally using multiple techniques of evaluation continually and periodically. The diagnostic evaluation takes place at the end of a unit/term test. The causes of poor performance in some units are diagnosed using diagnostic tests. These are followed up with appropriate interventions followed by retesting.
- Assessment in Co-Scholastic areas is done using multiple techniques on the basis of identified criteria, while assessment in Life Skills is done on the basis of Indicators of Assessment and checklists.

Source - Examination Reforms, NCERT

The functions of CCE are:

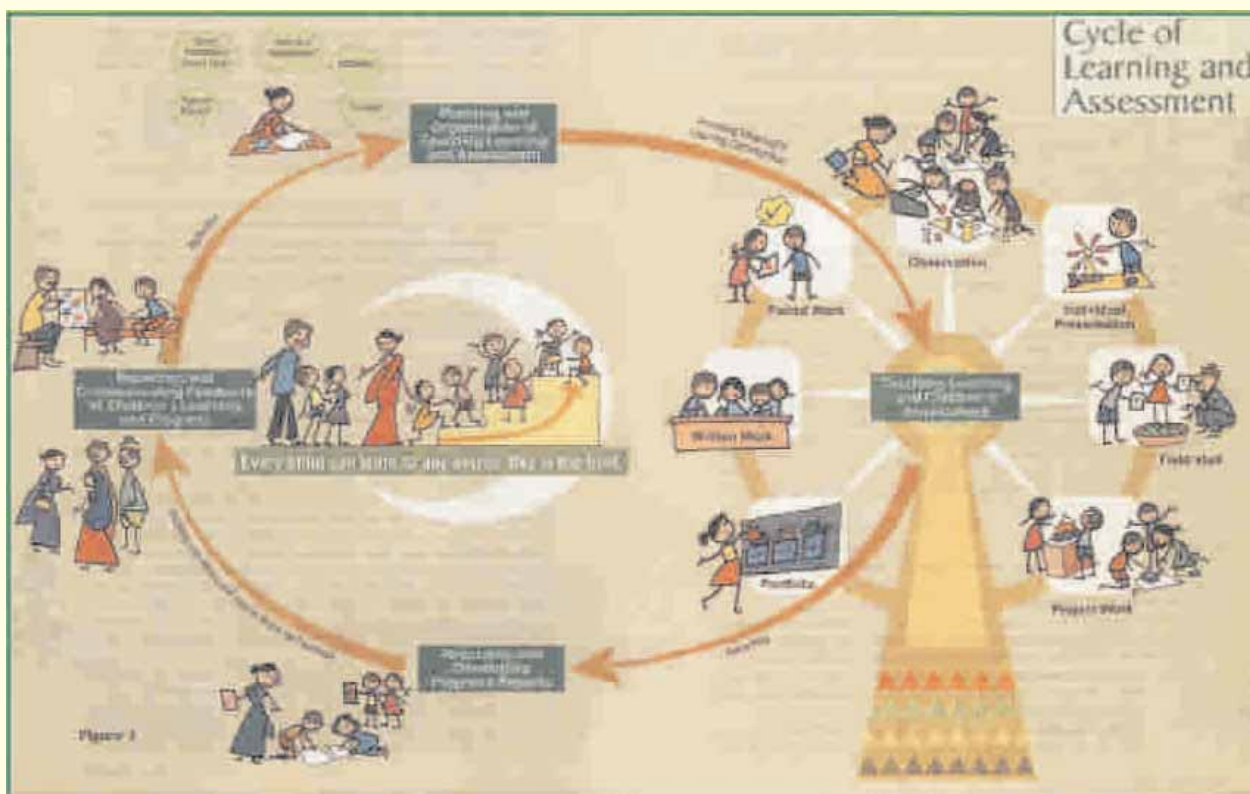
- It helps the teacher to organize effective teaching strategies.
- Continuous evaluation helps in regular assessment to the extent and degree of learner's progress (ability and achievement with reference to specific scholastic and co-scholastic areas).
- Continuous evaluation serves to diagnose weaknesses and permits the teacher to ascertain an individual learner's strengths and weaknesses and her needs. It provides immediate feedback to the teacher, who can then decide whether a particular unit or concept needs re-teaching in the whole class or whether a few individuals are in need of remedial instruction.
- By continuous evaluation, children can know their strengths and weaknesses. It provides the child a realistic self assessment of how he/she studies. It can motivate children to develop good study habits, to correct errors, and to direct their activities towards the achievement of desired goals. It helps a learner to determine the areas of instruction in which more emphasis is required.
- Continuous and comprehensive evaluation identifies areas of aptitude and interest. It helps in identifying changes in attitudes, and value systems.
- It helps in making decisions for the future, regarding choice of subjects, courses and careers.
- It provides information/reports on the progress of students in scholastic and co-scholastic areas and thus helps in predicting the future successes of the learner.

Continuous evaluation helps in bringing awareness of the achievement to the child, teachers and parents from time to time. They can look into the probable cause of the fall in achievement if any, and may take remedial measures of instruction in which more emphasis is required. Many times, because of some personal reasons, family problems or adjustment problems, the children start neglecting their studies, resulting in a sudden drop in their achievement. If the teacher, child and parents do not come to know about this sudden drop in the achievement and the neglect in studies by the child continues for a longer period then it will result in poor achievement and a permanent deficiency in learning for the child.



The major emphasis of CCE is on the continuous growth of students ensuring their intellectual, emotional, physical, cultural and social development and therefore will not be merely limited to assessment of learner's scholastic attainments. It uses assessment as a means of motivating learners in further programmes to provide information for arranging feedback and follow up work to improve upon the learning in the classroom and to present a comprehensive picture of a learner's profile.

It is this that has led to the emergence of the concept of School Based Continuous and Comprehensive Evaluation.



Source : Ncert

Scholastic and Co-scholastic Assessment

In order to have Continuous and Comprehensive evaluation, both scholastic and co-scholastic aspects need to be given due recognition. Such a holistic assessment requires maintaining an ongoing, changing and comprehensive profile for each learner that is honest, encouraging and discreet. While teachers daily reflect, plan and implement remedial strategies, the child's ability to retain and articulate what has been learned over a period of time also requires periodic assessment. These assessments can take many forms but all of them should be as comprehensive and discreet as possible. Weekly, fortnightly, or quarterly reviews (depending on the learning area), that do not openly compare one learner with another and are positive and constructive experiences are generally recommended to promote and enhance not just learning and retention among children but their soft skills as well.



School Based Continuous & Comprehensive Evaluation

There has been a consistent move towards reducing the load on the student by making public or board examination stress free. Over the decade there has been a high pitched race towards more marks and thus more competitiveness among students and schools.

The move of the CBSE to replace marks with grades is a step in the right direction. The paradigm shift is to empower schools by creating a workable school based continuous and comprehensive scheme.

School Based Continuous and Comprehensive Evaluation system should be established to:

- reduce stress on children
- make evaluation comprehensive and regular
- provide space for the teacher for creative teaching
- provide a tool of diagnosis and remediation
- produce learners with greater skills

Position Paper on Aims of Education - NCF 2005, NCERT

Aims of School Based CCE

- Elimination of chance element and subjectivity (as far as possible), de-emphasis of memorization, encouraging Comprehensive evaluation incorporating both scholastic and co-scholastic aspects of learners development.
- Continuous evaluation spread over the total span of the instructional time as an integral built-in aspect of the total teaching-learning process.
- Functional and meaningful declaration of results for effective use by teachers, students, parents and the society.
- Wider uses of test results for purposes not merely of the assessment of levels of pupils' achievements and proficiencies, but mainly for its improvement, through diagnosis and remedial/enrichment programmes.
- Improvement in the mechanics of conducting examinations for realizing a number of other allied purposes.



- Introduction of concomitant changes in instructional materials and methodology.
- Introduction of the semester system from the secondary stage onwards.
- The use of grades in place of marks in determining and declaring the level of pupil performance and proficiency.

The above goals are relevant for both external examination and evaluation in schools

Characteristics of School Based Evaluation

- Broader, more comprehensive and continuous than traditional system.
- Aims primarily to help learners for systematic learning and development.
- Takes care of the needs of the learner as responsible citizens of the future.
- Is more transparent, futuristic and provides more scope for association among learners, teachers and parents.

School based evaluation provides opportunities to teachers **to know the following about their learners:**

- What they learn
- How they learn
- What type of difficulties / limitations they face in realising learning objectives together
- What the children think
- What the children feel
- What their interests and are dispositions

The focus has shifted to developing a deep learning environment. There is a paradigm shift in the pedagogy and competencies of 'controlling' to 'enriching' to 'empowering' schools.

Traditional Schooling	Enriching Schooling	Empowering Schooling
<ul style="list-style-type: none"> • Teacher centred • Subjects and classes • Sorting and ranking individuals <p>Competency:</p> <ul style="list-style-type: none"> • Memory • Competitive 	<ul style="list-style-type: none"> • Student centred • Self Directed • Continuous assessment <p>Competency:</p> <ul style="list-style-type: none"> • Critical thinking • Collaborative • Creative 	<ul style="list-style-type: none"> • Experience centred • Virtual authenticity • Multi literacies <p>Competency:</p> <ul style="list-style-type: none"> • Risk taking • Ethical • Interactive



There are four Assessment Paradigms

Assessment of Learning

Most commonly, assessment is defined as a process whereby someone attempts to describe and quantify the knowledge, attitudes or skills possessed by another. Teacher directedness is paramount and the student has little involvement in the design or implement of the assessment process in these circumstances–

- Summative
- Teacher designs learning
- Teacher collects evidence
- Teacher judges what has been learnt (and what has not)

Assessment for Learning

The assessment for learning involves increased levels of student autonomy, but not without teacher guidance and collaboration. The assessment for learning is sometimes seen as being akin to 'formative assessment' and can be seen as informing teaching. There is more emphasis towards giving of useful advice to the student and less emphasis on the giving of marks and the grading function–

- Teacher designs learning
- Teacher designs assessment with feedback to student
- Teacher assesses what has been learnt (student develops insight into what has not)

Assessment as Learning

'Assessment as learning' is perhaps more connected with diagnostic assessment and can be constructed with more of an emphasis on informing learning. Assessment as learning generates opportunities for self assessment and for peer assessment. Students take on increased responsibility to generate quality information about their learning and that of others–

- Teacher and student co-construct learning
- Teacher and student co-construct assessment
- Teacher and student co-construct learning progress map

Assessment for learning and assessment as learning activities should be deeply embedded in teaching and learning and be the source of iterative feedback, allowing students to adjust, rethink and re-learn.

Assessment in Learning

The assessment in learning places the question at the centre of teaching and learning. It deflects the teaching from its focus on a 'correct answer' to focus on 'a fertile question'.



Through the inquiry, students engage in processes that generate feedback about their learning, which come from multiple sources, and activities. It contributes to the construction of other learning activities, lines of enquiry and the generation of other questions–

- Student at the centre of learning
- Student monitors, assesses and reflects on learning
- Student initiates demonstration of learning (to self and others)
- Teacher as coach and mentor

Teachers and students need to understand the purpose of each assessment strategy so that the overall assessment 'package' being used by learners and teachers accurately captures, generates and uses meaningful learning information to generate deep learning and understanding.

Purpose of Assessment

- To ascertain what learning, change and progress takes place in the child over a period of time in different subjects of study and other aspects of the child's personality.
- To find out the needs and learning style of every learner.
- To devise a teaching-learning plan that is responsive to the individual needs and learning styles.
- To improve the teaching-learning materials by adding value.
- To help every learner find out their interests, aptitudes, strengths and weaknesses so that the learner can evolve effective learning strategies.
- To measure the extent to which curricular objectives have been realized.
- To enhance the effectiveness of the teaching-learning process.
- To record the progress of every learner and communicate it to parents and other stakeholders.
- To maintain a dialogue between the teacher and the student and also the parents as a collaborative endeavor for overall improvement of the system.
- To involve the learners in the process through peer and self assessment.

Different stages in Assessment

Examination is not assessment; it is only one of the tools of assessment. As we have seen above, assessment is an integral part of the teaching-learning process and hence cannot be seen as the final stage in isolation. The overall aim of assessment is to gather information to improve the teaching-learning process. So it has certain distinct stages.

Stage-1: Gathering information about and evidence of the extent of effectiveness of teaching and learning



We gather information in a variety of ways, using a number of tools. Observation, conversation and discussion, assignments, projects, different types of tests etc are some of the methods and tools we use for collecting information.

Stage-2: Recording of Information

The information gathered has to be systematically recorded because it constitutes not only rich inputs that have to be used for improving teaching and learning but also evidence to support the conclusion we come to about the progress made by the students. In order to make the recording effective, we must use different recording devices such as learner profile, anecdotal records, case studies, report books etc. It is essential that the information is recorded in both quantitative and qualitative terms along with well thought out and objective observations by the teacher. It is also necessary to keep samples of students' work as evidence to support the report of the teacher. The most important aspect of good recording and reporting is that it shows the progress of the learner in different domains over a period of time.

Stage-3: Analysing and Reporting the Information Collected

The recorded information constitutes valuable feedback that the teacher, the student and the parents should use to enhance the learning process. To do this, the gathered information has to be analysed periodically so that the teacher can draw conclusions about how a child is learning and progressing. Such analysis and the grading that is done is actually a mapping of the progress of students in a learning environment. Analysis and review also leads to unambiguous statements about the strengths of every child and the aspects requiring further improvement. The report has to be communicated to the learners and their parents so that they are able to collaborate with the teacher to take the necessary steps for improving learning. It is essential that the child is encouraged to compete with self rather than with others. One of the key components of engaging students in the assessment of their own learning is providing them with descriptive feedback as they learn. Research shows descriptive feedback to be the most effective instructional strategy to move students forward in their learning. Descriptive feedback provides students with an understanding of what they are doing well, links to classroom learning and specific input on how to reach the next step.

Stage-4: Using the Information for Improvement

Assessment should result in improvement. Though the student, the teacher and the parents are all stakeholders in this paradigm, it is the teacher who has to take the initiative to use the analysis of information on each learner to enhance learning. This calls for reflective practices. Some questions that the teacher could ask himself/ herself are:

1. Are all the learners involved in the activities of the class?
2. Are there learners who face problems in coping with the pace and flow of the teaching-learning process ?
3. What are their problems and how should I help them?
4. Is there something in my teaching strategy that has to be modified to make the class learn better? How should I go about it?



5. Are there some learners who are not challenged by the materials and methods and hence lose motivation quickly? How should I respond to their special needs?
6. Are there some lessons/ chapters/ units that pose difficulties to many learners? How should I add value to these portions of the syllabus?
7. Have I identified certain common errors, mistakes and instances of lack of conceptual clarity from the information collected and analysed? How should I go about an effective programme of remediation?
8. Is my classroom time management effective? What are the changes that I could introduce to make it more learner and learning oriented?
9. Am I getting adequate support from the school management, my colleagues, the parents and the community? How can I involve all the stakeholders more actively in what I am doing for the benefit of my learners?
10. What are my own needs of professional development? How can I fulfil them in a continuous manner?

Such reflective questions will help the teacher modify and refine the programme of teaching to achieve the learning objectives as well as to enhance his/ her professional competence continuously.

By now it is well established that learning is a continuous process and it involves informal, formal and non-formal modes. It is also widely acknowledged that children learn by constructing their knowledge and it makes learning a process that takes place within the children rather than without. In this paradigm of constructivism, the teacher ought to recognize the importance of different stages of learning i.e., the initial stage where the existing knowledge of the learner is seen as the entry level, the second stage where new knowledge is understood and accommodated with the existing knowledge and the third stage where the constructed knowledge as a 'whole' is tested by the learner by applying it to real life situations for making sense of the world and the self and for drawing conclusions, problem solving, decision making etc. What constitutes knowledge at the third stage automatically becomes the learner's existing knowledge for further learning and thus it is a cyclical process.

The main purpose of assessment is to enhance the effectiveness of the learning process and hence it has to be integrated appropriately with every stage of learning. Since learning is continuous, assessment also must be continuous. Otherwise the learner will not be able to know whether she/ he is proceeding along the right lines, what is the stage at which he experiences difficulties, what are the new inputs and strategies that are required to successfully continue the process of construction of knowledge and what is the help that is expected from the teacher.

Similarly the teacher also has to know at what stage of learning each learner is at a particular point of time, what are the changes that are to be made to the teaching strategies to make every child learn effectively and what further help can be provided. For instance, when a child in class I comes to school, it is probable that the child has not had any formal schooling earlier. It does not mean that the child has no prior knowledge because learning, as has been pointed out earlier, can be through informal and non formal



modes too. So the teacher's duty is to identify the prior knowledge of the child while dealing with a particular concept or skill. It is only then that the teacher can facilitate the process of construction of knowledge by each learner.

To ascertain the prior knowledge of the learner, the teacher has to adopt many tools and techniques, including questions. In the same manner, during the process of learning as well as at the subsequent stage of application of knowledge to real life, the teacher has to continuously assess the learner to facilitate a smooth process of accommodation, assimilation and extension.

From the above, it may be apparent that assessment, which is in essence formative, has to be integrated with the teaching-learning process. Formative assessment by definition, is the process of finding out the felicity with which a learner is able to 'form' concepts and skills and hence it is process rather than product oriented. When assessment is divorced from the process of construction of knowledge, it ceases to be an effective learning-enhancing procedure. Hence teachers, principals, students and other stakeholders are to read this manual keeping in mind the broader prospective of the entire teaching- learning process instead of limiting it to assessment even though the manual is on formative assessment.

It is to be understood then that all assessments, if they are to be effective, ought to be formative. However, there are subtle differences between formative and summative assessments which are more procedural than absolute. We can safely say that the broad frame work of formative assessment consists of a larger sub set of formative and a smaller sub set of summative assessments. Even a summative assessment could be used formatively when the information gathered from the summative assessment is used to improve the pedagogy, the materials and the assessment tools. When assessment is seen predominantly as formative, learners will be able to enjoy learning and they will not experience undue stress. On the other hand, when we give importance to only year-end or term-end summative tests or examinations, as has been the practice in many schools till recently, the system will throw up situations like the following:

- The examination time table was announced yesterday. When I went home and showed a copy of the time table to my mother, she got very excited. She gave me a lot of instructions about what I should and should not do. TV was out as was chatting with friends. Examination jitters and nerves suddenly gripped the entire household. When my father returned from office, he too joined the frenzied discussions which were all about preparation, hard work, marks and the frightening consequences of poor performance. I didn't sleep that night.

– Shruti

- When I started writing the answer, my mind went completely blank. On the answer sheet in front of me I saw my father's face. He was telling me how important it was that I should do much better than my elder sister who he called a 'wash out'. In this trance like state I also heard my grandfather saying that if I didn't do well, his dreams would be shattered. Infact they all said that this was the foundation of my life.

– Deepak



- I am under a lot of stress ever since the time table for the examination was announced. If the Board results are not upto to the expectations, my performance will be assessed and I will be given junior classes from next session. I feel very frustrated and hassled. I should take some special classes and make the dull students practice many sample question papers. Let them also learn answers to important questions by heart. I should somehow make them get good marks. Otherwise I will not hear the end of it.

– Kavita, a teacher

Aren't we all familiar with such outpourings? Education ought to liberate children from fear, anxiety, stress, insecurity and humiliation and lead them to enlightenment. But, over the years we have turned this sublime process into a mundane instrument for material gains. When scoring marks, gaining admission, landing a job and creating wealth come to constitute the main purpose of education, it creates intense competition and consequently, enormous pressure on children. If we want to make learning an enjoyable experience for every child, the challenge of changing the traditional system of examination should be accorded top priority.

MINDSET : We have got so used to the examination driven education system that any attempt to put alternatives in place is received with doubt and even skepticism. The examination- oriented education has created a well-defined paradigm whose main features could be identified as the following:

- Learning is geared towards appearing in an examination that usually comes at the end of the academic session.
- So, teachers and students see assessment as something that comes after the stage of learning, i.e., first children learn and then they will be examined.
- Since formal examinations are based on prescribed syllabi, teaching and learning becomes text book based where the teacher's job is only to transact the information included in the text book.
- Learning becomes synonymous with storage and retrieval of information with very little scope for individual thinking, originality and creativity.
- Since examinations are conducted in the remote future, teachers and students tend to be relaxed initially and get increasingly anxious towards the end.
- The build-up of stress becomes scary to students and they hardly ever look forward to examinations (unless of course they see them as the final obstacle before the release of tension and anxiety).
- In this paradigm the teacher does not necessarily focus on the process of teaching- learning since it is only the final product that is going to be assessed as the student's performance in the examination.
- The student can and often does postpone learning till the last minute. On the one hand learning ceases to be continuous and on the other



it becomes unrealistically daunting due to the accumulated volume of learning to be attempted within a limited period.

- Students who have mastered the knack of cramming within a short period do well and those who lack this ability fare badly.

The above features, among all others that are often discussed and well known to all the stakeholders, have created a mindset that stems from the following beliefs.

- If there is no examination, teachers will not teach and students will not learn.
- Examination system is very comfortable for teachers because mostly they have only to teach the text books and prepare the students for the examinations at some distant future.
- If teachers have to take up continuous and comprehensive assessment, they have to put in more work. Hence status -quo is more comfortable.
- Assessment, if restricted to only the scholastic subjects, is a lot simpler than when it includes all the aspects of the student's personality.
- When assessment comes only at the end, teachers do not have the need to reflect on their practices and review them for causing better learning. It also means that no value addition is imperative to the materials and methods.
- The Changing Scenario: Now the mindset has to change because, the world over, the child is seen as the centre of the teaching-learning process. Assessment should take into account individual differences in terms of sociocultural and economic background, learning strategies, styles and aptitudes. While the belief that 'one size fits all' has to be discarded, there is a need to individualise the teaching-learning process that is constantly improved to help every child learn, albeit in his/ her own way. It means that assessment should go hand in hand with the teaching-learning process, providing rich inputs to the teacher and the students to continuously enhance the effectiveness of the process. This can be achieved if
 - assessment is integrated with teaching-learning
 - the teacher uses assessment for ascertaining the strengths and weaknesses of the materials, the methods and the learners
 - the teacher makes use of assessment to improve his own teaching and the learning of every student
 - the learner gains an insight into his learning style and strategies and uses this insight to improve his learning.



Scholastic Assessment

The desirable behaviour related to the learner's knowledge, understanding, application, evaluation, analysis, and creativity in subjects and the ability to apply it in an unfamiliar situation are some of the objectives in scholastic domain.

In order to improve the teaching learning process, Assessment should be both Formative and Summative.

Formative and Summative Assessment

Formative Assessment is a tool used by the teacher to continuously monitor student progress in a non threatening, supportive environment. It involves regular descriptive feedback, a chance for the students to reflect on their performance, take advice and improve upon it. It involves students' being an essential part of assessment from designing criteria to assessing self or peers. If used effectively it can improve student performance tremendously while raising the self esteem of the child and reducing the work load of the teacher.

Features of Formative Assessment

- is diagnostic and remedial
- makes the provision for effective feedback
- provides the platform for the active involvement of students in their own learning.
- enables teachers to adjust teaching to take into account the results of assessment
- recognizes the profound influence assessment has on the motivation and self-esteem of students, both of which are crucial influences on learning
- recognizes the need for students to be able to assess themselves and understand how to improve
- builds on students' prior knowledge and experience in designing what is taught.
- incorporates varied learning styles into deciding how and what to teach.
- encourages students to understand the criteria that will be used to judge their work
- offers an opportunity to students to improve their work after feedback,
- helps students to support their peers, and expect to be supported by them.

Formative Assessment is thus carried out during a course of instruction for providing continuous feedback to both the teachers and the learners for taking decisions regarding appropriate modifications in the transactional procedures and learning activities.

- '... often means no more than that the assessment is carried out frequently and is planned at the same time as teaching.' (Black and Wiliam, 1999)



- '... provides feedback which leads to students recognizing the (learning) gap and closing it ... it is forward looking ...' (Harlen, 1998)
- ' ... includes both feedback and self-monitoring.' (Sadler, 1989)
- '... is used essentially to feed back into the teaching and learning process.' (Tunstall and Gipps, 1996)

Summative Assessment is carried out at the end of a course of learning. It measures or 'sumsup' how much a student has learned from the course. It is usually a graded test, i.e., it is marked according to a scale or set of grades. Assessment that is predominantly of summative nature will not by itself be able to yield a valid measure of the growth and development of the child. It, at best, certifies the level of achievement only at a given point of time. The paper pencil tests are basically a one-time mode of assessment and to exclusively rely on them to decide about the development of a child is not only unfair but also unscientific. Over emphasis on examination marks focusing on only scholastic aspects makes children assume that assessment is different from learning, resulting in the 'learn and forget' syndrome. Besides encouraging unhealthy competition, the overemphasis on Summative Assessment system also produces enormous stress and anxiety among the learners.

Features of Summative Assessment

- Assessment of learning
- Generally taken by students at the end of a unit or semester to demonstrate the "sum" of what they have or have not learned.
- Summative assessment methods are the most traditional way of evaluating student work.

Summative Assessment

- "Good summative assessments--tests and other graded evaluations--must be demonstrably reliable, valid, and free of bias" (Angelo and Cross, 1993).
- '...assessment (that) has increasingly been used to sum up learning...'(Black and Wiliam, 1999)
- '... looks at past achievements ... adds procedures or tests to existing work ... involves only marking and feedback grades to student ... is separated from teaching ... is carried out at intervals when achievement has to be summarized and reported.' (Harlen, 1998)



Scholastic Assessment (Part I A)		
Formative Assessment (Flexible Timing)		Summative Assessment (Written-End of term)
Tools	Techniques	
<ul style="list-style-type: none"> • Objective type • Short Answer • Long Answers • Questions • Observation schedule • Interview schedule • Checklist • Rating scale • Anecdotal records • Document Analysis • Tests and inventories • Portfolio analysis 	<ul style="list-style-type: none"> • Tests • Assignments • Quizzes and Competitions • Projects • Debates • Elocution • Group discussions • Club activities 	<ul style="list-style-type: none"> • Objective type • Short Answer • Long Answers

Implications for the Teaching Community

The on going process of transformation of school education in general and evaluation practices in particular has re-defined the teacher's role. Some of the major implications are as follows:

- Teaching practices can no longer be a mechanical routine. Since formative assessment is an integral part of the classroom teaching, the teacher has to devise ways and means to use the feedback for improving curriculum transaction.
- Teaching the text book will not be the main mode of classroom practices. Value addition in terms of interactive tasks, co-operative assignments and projects and integration of new content will be required to involve all the learners in the teaching-learning process.
- Since formative assessment requires the teacher to devise appropriate tools and procedures that are specific to a unit or lesson taught, it will become imperative for the teacher to constantly add new materials and strategies to his/ her repertoire. It will also mean that the lesson plan becomes dynamic and constantly changing according to the needs of the lesson and the learners.
- The teacher has to become a true knowledge worker, referring to sources, reading



new materials, discussing curriculum-related issues with colleagues and experts, writing materials and taking up research.

- Teaching can no longer be a six or seven hour job. It is a profession and the practitioner has to prepare himself/ herself every day not only in the school but also outside the school.
- Recording and reporting will necessarily become more detailed because a number of parameters sometimes ignored or only weakly attempted have to be included effectively. Teachers will be required to devote adequate time on a regular basis for formative assessment and its recording. It also means that teachers should develop tolerance for complexity and ambiguity.

In short, the mindset has to change and the teaching community should develop a greater sense of accountability.

The Changing Paradigm

Introduction of Continuous and Comprehensive Evaluation has brought about a sea-change in the classroom. The main aspect of this change is the fact that assessment is becoming an integral part of the teaching-learning process. CCE and formative assessment are not new concepts and many schools have been practicing them for a long time now. However, assessment of scholastic and co-scholastic areas using a range of tools and indicators has provided the evaluation process a firmer scientific base as well as credibility. Similarly, though formative assessment has been part of the evaluation practices followed by schools, it has not been systematically used to identify learning gaps and for remediation. In a sense the system of unit tests, assignments and projects being used to reflect continuous assessment of learning has become more 'summative' in nature because the feedback is hardly used for improving the teaching-learning practices. It is necessary hence, to understand the concepts of formative assessment and summative assessment in proper perspective so that we are able to not only construct tools accordingly but also use them for the purposes for which we construct them.

What is Formative Assessment ?

Let us look at a task:

Subject: Social Science Class: VIII

Topic: Women, Caste and Reform

Task: Dramatization

Procedure:

1. Students will be divided into groups. They will in their groups, discuss and prepare a short skit on any of the social ills prevalent in the Indian Society at different periods of time.
2. The social ills may include Sati, Child Marriage, Female Infanticide, Denial of Education to Women and Gender Disparity.



3. Each group will prepare a small skit and perform it. Each student will be asked to speak some dialogue.
4. After the presentation, students will have a discussion.

Learning Objectives:

- To enable the learners to gain an insight into the social evils prevalent in India at different periods of time.
- To provide an opportunity to the learners to reflect on social evils and verbalize their feelings.

Skills:

To develop in the students the ability to

- Write scripts
- Deliver dialogue
- Act
- Work in teams

Assessment

The performance of the groups will be assessed on the basis of content, dialogue-delivery and clarity of concept.

Time:

- Discussion and script writing: 2 periods;
- Presentation: 1 period

Follow up:

The presentations could be discussed by the class. Wherever the concept is not clear, teacher could encourage students to give their comments. The teacher could also revisit any part of the lesson that has not been clearly understood by the students.

Is this a formative or summative assessment task?

It has the following features:

- The main objective is to enable the learners to gain an understanding of the concept of social evils perpetrated against the girl child and the woman in India at different periods of time.
- The task is part of the teaching-learning of the topic of women, caste and reform.
- The task involves students in group interaction and presentation.



- After the task is completed, the teacher gives feedback for improvement. Also, if needed, the lesson may be reviewed.
- Assessment is done on the basis of well-defined criteria.
- The task is done in the classroom as part of the lesson.
- The main purpose is not to measure the knowledge of the learners. The task aims to provide conceptual clarity to the learners through experiential learning.
- It also encourages further learning.

These attributes are at the heart of Formative Assessment.

Let us now look at the following questions given in a test:

What are the different social evils prevalent in Indian society at different times? How have they affected girl children and women? Write your answer in about 200 words.

This is a typical question that figures in a summative test or examination. Here the main aim is to measure the extent of knowledge of the learners in the lesson tested. The answers of the learners will be marked or graded on the basis of value points and a marking scheme. The information collected by the teacher may not be used to diagnose the problems faced by learners or for remediation since the test is usually conducted after completing the unit or lesson.

However, if a short quiz or test is conducted on the topic when the lesson is in progress to ascertain the learning gaps for the purpose of providing further help to learners, it will be formative in nature. So, by and large the way in which a tool is used, i.e. for enhancing learning or for ascertaining and measuring the extent of learning, decides whether it is for formative or summative purpose.

For our own conceptual clarity let us look at the attributes of Formative and Summative Assessment in detail.

Formative Assessment

- Formative Assessment is the assessment that takes place during a course or programme of study.
- It is an integral part of the learning process.
- It is often informal, i.e., it is carried out by teachers while teaching.
- It provides feedback to both teacher and learner about how the course is going and how learning can be improved during the course.
- It helps teacher and learner answer the following questions:
 - Are the learners doing what they need to do?
 - Are the teaching and learning strategies chosen by the teacher in need of modification?



When the cook tastes the soup, that's formative;
when the guests taste the soup, that's summative."

– Robert Stakes.

Summative Assessment

- Summative Assessments are given periodically to determine at a particular point in time what students know and do not know.
- Summative Assessments are usually associated with standardized tests such as Board Examination, Half-yearly and Annual Examination and even Unit Tests.
- They are spread out and occur after instruction every few weeks, months or once a year.
- Hence they are tools to help evaluate the effectiveness of programmes, school improvement goals, alignment of curriculum and student placement.
- Since they are used to 'sum up' learning they are called Summative Assessments.
- They are always formal in nature.
- These assessments happen too far down the learning path to provide information at the classroom level and to make instructional adjustments and interventions during the A good comprehensive assessment programme balances formative and summative assessments.

• Formative Assessment is assessment
for
learning

• Summative Assessment is assessment
of
learning

• Formative Assessment is
PEDAGOGY

• Summative Assessment is essentially
EVALUATION

• Formative Assessment can be
thought of as
'PRACTICE'

• Summative Assessment can be
seen as
PERFORMANCE AFTER PRACTICE

• A good comprehensive assessment programme balances
formative and summative assessments



What is NOT Formative Assessment?

It is seen that under the guise of continuous evaluation schools conduct a series of 'tests'. There are tests for almost every day of the week or every month of the academic session. The argument put forth is that only by conducting frequent tests continuous assessment can be ensured. However, such practices can hardly be called formative assessments because they are not integrated with the teaching-learning process. Nor is the information collected by the teachers from such tests effectively and systematically used for improving the teaching-learning process.

Case Study

Students of class IX are given the following project in science:

Project on Communicable Diseases

- Collect information about communicable diseases by referring to books and journals and surfing the internet.
- Present the information in a folder with illustrations, pictures and photographs.

- The folders should be submitted for evaluation within 15 days.
- The folders will be evaluated on the following criteria:

Content, Neatness of Presentation and Illustration

Students complete the task individually and submit the folders by the dead line. Teacher grades the work of the students as per the assessment criteria.

Question:

- Is it a good formative task?
- How are the students helped by the teacher and peer groups in doing the task?
- What are the objectives of the project?
 - To assess the student's ability to collect information and present them?

Or

- To enable the students to deepen their learning?

If the purpose is to help the learners acquire a deeper understanding of the topic of the project then the project should be organized differently.

- Teacher should discuss the project with the learners.
- They will explore ways in which information could be gathered, understood and adapted.
- Provide scope for group work so that learners study the topic collaboratively and help and support each other.



- Teacher monitors the entire process at regular intervals, giving feedback for correction, modification and refinement.
- Besides submitting a folder, the learners are also required to make a presentation to the class or take a viva voce.
- Assessment is done by involving the learners in peer assessment.
- The information gathered by the teacher and the learners is used to improve and further the teaching-learning process.

One major concern with regard to such projects and assignments is that the teacher has very little scope to ensure that they are done by the students themselves. It is now common knowledge that projects and assignments can be 'bought' from shops. Instances of parents doing the projects are also not uncommon. Furthermore, downloading information from the internet also leads to very little learning.

Hence, to use projects and assignments as effective tools of formative assessment, the teacher should take certain precautions:

- Make the learners do the task as far as possible in the school itself under the direct supervision of the teacher.
- Discuss the project with the learners and monitor their progress at every stage.
- Involve them in the assessment process through self and peer assessment.
- Give descriptive feedback as an instructional strategy to move students forward in their learning.
- Help students link their classroom learning with the task and their experience.
- Follow it up with activities like revisiting some of the concepts, explanations etc.

What does this Manual contain?

After the introduction of CCE in schools affiliated to CBSE in class IX during 2009-10, the Board felt it necessary to provide a holistic picture of CCE to all the stakeholders, particularly the teachers. Hence a Teacher's Manual on Continuous and Comprehensive Evaluation - Class IX & X was brought out. Besides giving detailed information about the scheme of CCE, fundamentals of assessment of co-scholastic and scholastic areas, dimensions of school-based assessment and tools and techniques of evaluation for formative and summative purposes have also been included in the manual. The term-wise split up of weightage for formative and summative assessments has also been provided in the manual.

As a sequel to this publication, the Board decided to bring out a series of manuals to provide exemplar and illustrative materials on Formative Assessment in Languages, Mathematics, Science and Social Science for classes IX and X. Detailed guidelines with specifications for Summative Assessment have already been provided to schools. It is the formative assessment that needs to be strengthened and hence these manuals.



Objectives of the Manual on Formative Assessment

1. To clarify the concept of formative assessment within the broad framework of CCE.
2. To integrate formative assessments (FA 1, FA 2, FA 3 & FA 4) with the materials prescribed and classroom procedures.
3. To help teachers and learners use formative assessment for enhancing the teaching-learning process.
4. To provide a rich source of formative assessment tasks for the units/ lessons in Languages, Mathematics, Science and Social Science for classes IX and X.
5. To help teachers use the Formative Assessment tasks given in the manuals for generating further tasks on their own.
6. To enable teachers to gain conceptual clarity with regard to Formative and Summative Assessments.
7. To motivate teachers to build their capacity to add value to materials and methods.
8. To help teachers plan and manage time effectively.
9. To provide guidelines to schools to record formative and summative assessments in a systematic manner.
10. To provide scope for teacher development in the area of assessment as well as for consultations and enrichment.
11. To initiate a healthy and meaningful interaction between different stakeholders on CCE and the place of formative assessment in this scheme.
12. To make the teaching-learning process enjoyable for both the teachers and the learners.

Content:

The manual contains the following broad areas.

1. Formative Assessment & Summative Assessment: Concept and distinction.
2. What are NOT good formative assessment practices.
3. Overall framework of Formative Assessment with split up of units, time frame, periodicity, number of tasks for each formative assessment, calculation of weightage and recording, analysis and follow-up.
4. Formative Assessment Tasks for different units/ lessons in Languages, Mathematics, Science and Social Science for classes IX & X.



Overall Framework of Formative Assessment in Classes IX & X - Scholastic Areas

Scholastic Part 1 (A)

Evaluation of Academic Subjects in Class IX & Class X.

Six assessments are proposed. These are valid for most schools, however they can be varied or adapted with written communication to the Board.

Type of assessment	Percentage of weightage in academic session	Month	Term wise weightage
FIRST TERM			
Formative Assessment-1	10%	April-May	FA 1+2 = 20%
Formative Assessment-2	10%	July-August	
Summative Assessment-1	20%	September	SA1 = 20%
SECOND TERM			
Formative Assessment-3	10%	October-November	FA 3+4 = 20%
Formative Assessment-4	10%	January- February	
Summative Assessment-2	40%	March	SA2 = 40%
Total Formative Assessments = FA1 + FA2 + FA3 + FA4 = 40%			
Summative Assessments = SA1 + SA 2 = 60%			

The following points have to be noted by teachers and students (For Classes IX & X).

- There are two formative assessments each in the first and second term.
- Each Formative Assessment is again divided into smaller assessments (class assignments, quiz, projects, written tests) which can carry different marks.
- Each formative assessment has a weightage of 10% which can be arrived at by taking an average of all tasks or the best three or four.
- The total weightage of all the four formative assessments is 40%.
- The time-frame, split up of syllabus as per the four formative assessments, and the minimum number of suggested tasks for each formative assessment have been given



in the annual planner for each subject. The annual planner is only suggestive and schools can adapt it as per their needs.

Formative Assessment and Classroom Teaching

The formative assessment tasks have been designed keeping the following principles in mind:

- Formative assessment is an integral part of classroom practices. So they have been related to the syllabus to be transacted.
- The tasks generally specify the following:
 - Unit/ Lesson
 - When to conduct the task.
 - Approximate time required for each task.
 - Objectives of the task.
 - Task specifications.
 - Procedure for conducting the task including preparation, if any.
 - Criteria for assessment
 - Feedback and follow-up.

Teachers, however, have the freedom to make minor modifications in the overall design of the task to suit their requirements.

The most important aspect to be kept in mind is that these tasks are meant to be integrated with the teaching-learning process, i.e. while teaching a unit/ lesson (and NOT after). Also the follow up in terms of providing further help to clear doubts, remove problems faced by learners and make modifications in teaching methods and strategies has to be given utmost importance. Hence FA tasks will figure in the teaching plans developed by teachers.

Split-up of Syllabi

To facilitate smooth implementation of CCE, CBSE has already provided split-up of syllabi for all the subjects term-wise. This manual has further sub-divided the syllabi reflecting the name and number of units/ lessons covered for FA 1, FA 2, SA 1, FA 3, FA 4 and SA 2. Though the weightage for each of the four Formative Assessments is 10 %, the number of units/ lessons may vary for each of these depending on the time available in the annual academic calendar. Teachers are advised to study the suggested annual calendar at the beginning of the academic session and collaboratively design their own annual plan making any minor modifications they feel necessary to suit their specific needs. However it is necessary that the overall scheme is retained to ensure that continuous and comprehensive evaluation is carried out in its true spirit.



Summative and Formative Assessments

In the first term the weightage given to formative assessment (FA 1 + FA 2) is 20%. The weightage given to SA 1 is 20%. Schools should assess the students in the entire syllabus meant for the first term in SA 1. What it means is that there may be one or two units that are transacted after FA 2. These units will be included for assessment in SA 1. Similarly, in the second term, the rest of the syllabus will be assessed in SA 2. It implies that teachers need not be unduly concerned about assessment of the units/ lessons that are taught after conducting FA 4. These units/ lessons along with the others meant for second term will be covered by SA 2 for 40%. It is also to be noted that if any unit/ lesson has not been formatively assessed due to time constraint, it will be assessed summatively at the end of each term.

Procedure for Formative Assessments

- The suggested split up of syllabi will be followed by teachers for formative assessment.
- The minimum number of formative assessment tasks as suggested in the annual plan have to be conducted. However, teachers can give more than the minimum number of tasks depending on the need and time available.
- The performance of students in each task will be assessed on the basis of assessment criteria given.
- The total of marks obtained by each student in the formative tasks will be calculated and reduced to 10 marks. For instance, if three tasks of 5 marks each have been given for FA 1 and a student obtains 3, 3 and 2 in these tasks, the total obtained by the student will be 8 out of 15. The weightage for 10 will be $(8 \div 15) \times 10 = 5.33 = 5 = \text{Grade C2}$ (The total will be rounded off to the next whole number if the decimal is 0.5 or more. If less, it will be ignored). Similarly the mark will be calculated for FA2, FA3 and FA4 and the total will yield the marks in formative assessment out of 40% marks for the whole academic session.

Record Keeping

It is absolutely essential that teachers maintain a clear record of the formative assessments conducted because they will be verified by CBSE from time to time. The following points have to be kept in mind while recording FA.

- Individual report book as suggested by CBSE has to be maintained in addition to student report form.
- A separate consolidated marks register must be maintained reflecting the following for each student.
 - Tools of Formative Assessment (quiz, MCQs, debate, group discussion, creative writing, presentation etc) must be recorded.
 - Maximum marks, marks obtained and weightage for 10 marks for each of the four formative assessments must be maintained.
 - Cumulative total in FA must be calculated and recorded.



Schools may devise a suitable format for the marks register. Many schools are computerising the entire process of recording the assessments. While evolving such a programme, care may be taken to ensure that all the relevant particulars are included in the programme.

- Recorded evidence of student performance and teacher/ self/ peer assessment has to be collated and maintained so that queries of parents may be answered based on such evidence. In this context the importance of student portfolio gains significance. It is suggested that every student maintain a portfolio consisting of the best of their written work in each subject. These should include the work submitted as draft as well as the edited and improved versions to demonstrate the progression of learning over a period of Teacher will find it convenient to open individual student portfolio folders at the beginning of an academic session, discussing with students the importance of and the procedure for maintaining the portfolios.
- It is to be noted that the assessment has to be reflected in the report book only as grades. The grades will be on the 9 point grading scale as given below:

91 - 100	A1
81 - 90	A2
71 - 80	B1
61 - 70	B2
51 - 60	C1
41 - 50	C2
33 - 40	D
21 - 32	E1
00 - 20	E2

- The marks in the consolidated marks register will be calculated to arrive at the weightages for different FAs & SAs and the equivalent grades will be entered in the Report Book. What it means is that the assessment of each task in FA and each SA test will be carried out in terms of marks which will be entered in the consolidated Marks Register. Grades to be entered in the Report Book once in each term will be calculated accordingly from the consolidated Marks Register.
- Apart from the above records, schools will also maintain a Results Register for each section which could be consolidated for primary and secondary classes at the end of the academic session.

Task Types Appropriate for Formative Assessment

The Teacher's Manual on CCE throws much light on the types of assessment tools available to the teacher. It also mentions that all the tools are not appropriate for formative assessment. In this manual an attempt has been made to clarify what is NOT formative assessment. Since the purposes of formative and summative assessments differ, the tools



have to be chosen carefully. However, as a general rule, the following will help teachers in making a decision in this regard:

- Formal Paper Pencil tests are not always suitable for formative assessment because schools tend to make use of them more for summative rather than for formative purpose.
- Similarly, Projects and Assignments that need much work outside the school and class hours also may not be ideal for formative assessment. The reasons are obvious:
 - Without proper monitoring, these tasks may lose their validity and credibility. (Students may just copy or download from the internet. Parents and others may actually do the projects and assignments. Now a days projects and assignments could be bought from 'Education Shops'!)
 - **To be formative, the tasks should involve collaboration, discussion, reflection and improvement.**

On account of these reasons, projects and assignments should be very carefully used as tools of formative assessment. However, in the hands of imaginative and resourceful teachers, they may become effective formative assessment tools.

- What can be effectively assessed through formative assessment cannot be assessed through summative assessment. Practical skills and all the co-scholastic areas have to be assessed formatively.
- By combining formative and summative assessments all the aspects of a learner's personality development can be comprehensively covered.

Some of the Precautions that can be taken

a) Give realistic projects and assignments. Don't give topics like:

'Survey of Moghul Architecture.

It will invariably lead to 'Cut & Paste' practices. On the other hand, it will be realistic to expect students to attempt the following on their own:

Choose any one example of Moghul Architecture. Collect information and pictures on the monument. Write a brief report in about 2 pages giving the following details:

- Name of the Monument.
- Period when built.
- Who built it.
- The purpose (History of the Monument)
- Salient Architectural features.
- Its present state.



- b) It is not enough if we make the project or assignment simple and realistic. In order to ensure that further learning has taken place and that the students are able to link new knowledge with what they have learnt in the class, the teacher could interview each student on the project. The interview, if conducted imaginatively, could be very brief but at the same time give proof of the student's own research and presentation.
- c) Make projects a group activity so that it can be done in the classroom itself. Groups will decide, with the teacher's help, what projects they will work on, division of the project into smaller units, allotment of smaller units among members etc. It means that project work should be discussed in the class to make it work.
- d) Fix a time frame and interact with groups to see where they are at different stages, what they are doing and whether they need any help. This will instill seriousness of purpose, besides motivating the students to take up their work with keen interest.
5. As pointed out earlier, the formative and summative tools are determined by the purpose for which they are used.
 - a. If the purpose is to formally ascertain at a given point in time what students know and do not know, then it is summative.
 - b. If the purpose is to informally get information regarding how the course is going, how learning can be improved during the course itself, what are the challenges faced by individual learners and how the teacher should address them, then it is formative.

So it is the purpose of the tools that usually determines whether it is for formative or summative assessment. Having said this, we can still make an attempt to identify assessment tools that are more suitable for formative assessment than for summative assessment. Since summative assessment is formal and is usually a paper-pen test, what cannot be assessed by such means can be assessed only through formative assessment tools.

Suggested Tools for Formative Assessment

Language

- Listening Comprehension
- Reading Comprehension
- Debate/ speech/ Group Discussion/ Role Play /Presentation
- Dramatization/ Dialogue/ Conversation/ Commentary
- MCQs/ Quiz
- Grammar Exercises.
- Writing/ Completing a poem, story, script, play, diary entry etc.



- Web Charts, Concept Mapping
- Visual Representation
- Letter, E-mail, data interpretation, article, bio sketch and dialogue completion

It is suggested that at least one out of four tasks should be used for assessing conversation skills in the form of listening comprehension or conversation.

Mathematics

- Data handling and analysis.
- Group projects
- Problem solving
- Maths Lab Activities
- Quiz/ oral questions
- Experiments
- Presentations
- Chart, model making
- Visual Representation
- Simple and interesting assignments
- Mathematical puzzles based on various theorems.

It is suggested that for Mathematics at least one activity out of four should be used for assessing performances in maths lab activities.

Science

- Experiments
- Information gathering and deducing
- Presentations on science concepts/ experiments
- Investigations for stated problems
- MCQs and Science Quiz
- Simple and interesting assignments
- Group assignments and projects
- Model Making



- Science symposium/ seminar.
- Preparation of various compounds/salts
- explanation of different natural phenomenon using scientific principles.

It is suggested that for science, at least one out of four formative assessments in the year are experiments.

Social Science

- Written assignments involving inference, interpretation and evaluation
- Commentaries
- Simple projects (group & individual)
- Presentations (group & individual)
- Quiz and MCQ's
- Models and charts.
- Debates
- Symposium/ Seminar
- Conducting interviews of historical figures
- Role plays
- Dramatization of historical events

It is suggested that in social Science at least one out of four should be based on project. In addition to the tools listed above teachers can devise other informal ways in which formative assessment can be done. For instance observation of student's performance in the class (participation, answering questions etc) can also be used effectively for formative assessment. Written tests have not been included in the above list because they tend to become formal and hence are more suitable for summative assessment. Moreover, if written tests are also used for formative purposes, there will be a tendency to use them more often as they are relatively easy to construct and administer. This will lead to an increase in the stress level of students. They are better used for summative assessment. This, however, does not prevent teachers from holding one minute tests, open book tests and concept-based questions expecting written answers during the course of teaching a unit or lesson. The answers have to be analysed and discussed to provide conceptual clarity and address gaps in learning. Some of the formative assessment tasks included in this manual involve a fair bit of writing. However, they are all to be attempted in the class with scope for feedback.

How to use this Manual

As already mentioned, this manual contains a number of formative assessment tasks for classes IX & X in all the main scholastic subjects. Teachers can make use of them in



a planned manner not only to assess learning but also to enhance the effectiveness of their own teaching. Some suggestions for the effective use of the formative tasks are given below:

a. Planning

At the beginning of the academic session teachers of the same subject can consult each other and draw out a plan of formative assessment for the entire session. A suggested annual planner is given for each subject in the manual. The annual plan drawn up by each school should include the following details:

- How many formative tasks will be used for FA 1, FA 2, FA 3 and FA 4. (The number of tasks should not be less than the minimum suggested)
- The identified tasks from the manual (Teachers are, however, free to add their own tasks to the ones given in the manual)
- While deciding/ choosing the tasks, care should be taken to select a variety so that knowledge and skills are covered comprehensively and there is no scope for monotony to set in. For example, in Mathematics practical skills will be assessed through formative assessment. The plan could distribute tasks over the four formative assignments in such a way that all the aspects are assessed at least twice or thrice in a session. Similarly the tasks may be chosen in other subjects in such a way that they assess different skills and competencies using a variety of modes of assessment.

b. Classroom Strategies

Since the tasks are to be integrated with classroom instruction, teachers have to embed them in their lesson plans.

Task specification as given in the manual may be used by teachers in the following manner:

Objectives: These specify the learning outcomes for each task and hence help teachers and learners in developing a focus. They are also meant to be kept in view at the time of assessment.

Procedure: A task may need some preparations on the part of the teacher. These are included under 'Procedure'. The different steps to be followed, precautions to be taken and suggestions for collecting information are also provided under this heading.

Criteria for Assessment

In order to make the assessment objective and systematic, specific criteria have been provided for each task along with suggested marks. It is essential that the teachers put up these criteria or read them out to the class before commencing a task. Learners should know on what basis they will be assessed. It will also give them task clarity. The scores obtained by students in each of the tasks conducted must be recorded. The record of assessment should also be maintained. Wherever a written product emerges, it may be made part of the student portfolio.



Feedback/ Follow Up

This is a crucial stage in formative assessment. The performance of students gives valuable information about their understanding, conceptual clarity, problems faced and gaps in learning. Based on this information, teachers could give feedback and undertake follow up activities for remediation and enrichment. The information will also enable teachers to modify their practices for enhanced effectiveness of learning.

Some Challenges

Teachers may face certain challenges in integrating formative assessment with teaching. This may be due to

- Large class size
- Scarcity of time
- Constraints imposed by logistics
- Strategy to assess group/ pair tasks.

With the help of proper planning these challenges could be overcome. Some suggestions are given below:

Large Class Size

- Choose tasks that involve group work and pair work.
- Tasks that require written answers from the learners could be peer assessed.
- Answers to MCQs and other objective type questions could be marked by students themselves by exchanging their work sheets as the teacher calls out the answers.
- All the students in a class need not be assessed in one period. It means that the tasks may be distributed among groups of students so that the teacher is able to assess them in different periods. The implication is that in large classrooms all the students need not be assessed in all the tasks. By planning the tasks carefully, all the skills can however be covered by rotating the tasks among groups of students.
- It follows from this that all the students need not be involved in the same task at a time. In order to cater to multiple intelligence, teachers could adopt a flexible approach with regard to giving tasks to students. For instance, students good in written work may be given tasks different from students good at practical work.

Time Management

Since the number of teaching periods for each subject is pre-determined, teachers may feel that conducting formative assessment tasks within the allotted periods may prove to be difficult. However, it is to be borne in mind that formative assessment is to be built into the teaching-learning process and it only represents a change in the methods to be adopted for curriculum transaction. By reducing explanations and frontal teaching, adequate time could be found for tasks and activities. Some other suggestions are:



- Proper planning will result in efficient time management.
- Complete the preparations for each task well before the class begins so that there is no wastage of time.
- Use self and peer assessment strategically.
- Train learners in the initial part of the term to collaborate with each other and the teacher.
- Over a period of time they will be able to maintain efficiency and brisk pace.
- It is essential that the scoring sheet with names of students is prepared at the beginning of the academic session as per the annual plan. Columns for FA 1, FA 2, FA 3, FA 4 may be provided along with details of the tasks selected for each assessment and the maximum marks so that recording of scores does not take much time.
- Train the students in maintaining their portfolios. A folder may be maintained for every subject in which the best written products could be filed by each student. When students are helped to take responsibility for record keeping, it will ease some burden on the teachers besides leading to better time management.

Logistics

Photocopying of worksheets may not be feasible in all the schools. Teachers have to adopt a few strategies to overcome this problem.

Suggestions

- Only elaborate worksheets and those with diagrams and pictures need to be photocopied.
- Wherever possible, the worksheet can be put up on the blackboard.
- If technology is accessible, worksheets could be projected with the help of an LCD projector.
- MCQ's and objective type questions could be read out and students instructed to write only the answers on a sheet of paper.
- Instructions for pair work, group work and whole class work could be read out once or twice.
- Share with the Principal and school administration the requirement of photocopies in advance so that the school makes adequate arrangements.
- Always use both the sides of the sheet of paper for photocopying. It may mean that more than one task is photocopied on a single sheet. After the students complete one task the sheets may be collected and redistributed for the next task.
- Whenever possible, worksheets could be shared by two or more students.
- Train the students to observe economy in the use of paper/ worksheet.



Strategy to assess group/ pair tasks.

Initially teachers may find it a little difficult to assess group/ pair tasks because the product is usually from more than one student. Some suggestions are given below to help the teachers in this regard:

- Wherever possible group and pair tasks could be broken down into smaller areas and each member of the group could be assigned an area.
- Where the above is not feasible, the contribution of each student to group work has to be observed and monitored.
- Usually after group discussion a presentation is to be made by each group. Care may be taken to rotate the presentation among all the students so that over a period of time all are given an opportunity to present the group's views.
- Group tasks may be assessed for the entire group/ pair. It means that members of each group may get the same mark/ grade. However, in pair tasks it is easier to assess the performance individually.
- Since formative assessment is informal, group tasks may be assessed on broad parameters such as participation, contribution and effectiveness of each member of the group.
- It is necessary that the teacher monitors group tasks properly to ensure that every student is participating and no student dominates.

Conclusion

This document has laid emphasis on teacher-preparedness, planning and co-ordination. It is suggested that at the time of drawing out an annual plan, the principal interacts with each subject committee and helps the teachers prepare a plan of action ensuring that assessment is integrated with the teaching-learning process.

It may be necessary to prepare detailed lesson plans for each unit/ lesson besides the overall plan for the first and second term. While the lesson plan should essentially be an innovative tool evolved by each teacher depending on the concepts to be taught, the needs of the learners and other socio-cultural factors, it is perhaps advisable to include certain broad areas in the lesson plan to make it reflect the integration of continuous and comprehensive evaluation. While these broad areas, along with the format of the lesson plan could be decided by each school, the following components could be included to ensure holistic planning:

- Content/ topic/ lesson.
- Concepts/ skills
- Instructional Objectives.
- Levels -entry, process, integration, exit.



- Tools of assessment with specific questions
- Remediation.

It is also suggested that the formative tasks may be assessed for ten marks or multiples of ten to facilitate easy calculation of weightage. Similarly, self evaluation by students could be encouraged by integrating ICT and developing student self-access tools. While it will provide ample scope for learner autonomy, it will also reduce the burden on the teachers. Finally a word about projects. This document specifies that projects should, as far as possible, be done in the school itself. But certain projects that call for extensive research and work involving hands and using different materials may be difficult to be carried out within school hours. Since the main concern is about the genuineness and credibility of the work submitted for assessment by the students, if adequate care is taken by the teacher in monitoring the project work, students may be allowed to do some part of it outside the schools. Detailed guidelines on the precautions to be taken in this regard have been provided in this manual. By making the projects realistic and simple, teachers can ensure authenticity of the work of students.



Description of Formative Assessment Tasks and Rubrics for Assessment:

1. Class work/Homework/Assignments

This is a part of regular teaching learning of Mathematics. As a part of classwork, teacher may give class worksheets, MCQ worksheets etc. To give enough practice to students, H.W. and assignments can be given. Assignments may contain questions other than the prescribed text book. It may include all types of questions viz. short/long/MCQ etc which would test knowledge, understanding, and application of concepts taught.

Sample Rubric for C.W/H.W/Assignment Assessment

Parameter	Observation Points	Marks allotted
Periodicity	Work is submitted on time regularly	On the basis of rating scale
		3 2 1
		Always regular Regular Irregular
Maintenance	Neatness/presentation	1 mark
Accuracy	Correctness	1 mark

2. Mathematics Laboratory Work:

Work done by students in the Maths lab is a part of Formative assessment. It is further divided into two parts:

- **Maths activities** : As prescribed in CBSE Mathematics laboratory Manual
- **Maths Project Work** : Some projects are suggested in the CBSE Mathematics laboratory Manual as well as in the present Manual. Apart from this teacher may select any Maths project in at least one Formative assessment duration

Sample Rubric for Recording Math lab activity Work (15 Marks)

Lab Ethics (Parameters) (1 mark each)	Performance of Activity Scale 5 to 1	File Record (Parameters) (1 mark each)
Brings material for activity	Able to explain concept correctly after completion (5) Or Completes activity in the class independently (5)	Index/Cover
Takes interest in class	Takes help and complete the task(4)	Neatness
Regularly attends Math lab class	Works independently but not able to complete (3)	Submits work on time
Takes care of property in Maths lab	Tries to perform hands on in the lab (2)	Regularly brings file
Listens attentively during demonstration	Just initiate the task allotted (1)	Does correction work (if any)



Sample Rubric for Maths project work

(10 Marks)

Parameter	Observation Points	Marks
Topic	Selection of Topic	1
Originality	Collection of data and information	2
Presentation	Creativity	2
Conclusion	Inference and Mathematics involved	2
Viva	Explanation	3

3. Creative activities: This may include atleast one of following in each formative assessment duration

- Oral assessment
- Quiz
- Discussion
- Presentation by students
- Making of charts/material
- Role play
- Mathematical games
- Math Magazine
- Self composed Math Poem
- Model Making
- Any other

Note: Teacher may plan assessment rubric according to the activity taken.

Sample Rubric for Oral Assessment and Recording Oral task

Parameter	Observation Points
Participation	<ul style="list-style-type: none"> • Raise questions
Response	<ul style="list-style-type: none"> • Give response to questions asked by the teacher
Correct Knowledge	<ul style="list-style-type: none"> • Answers/responses are correct
Confidence/Expression	<ul style="list-style-type: none"> • Able to express knowledge gained

Note: Teacher may prepare a rating scale for awarding marks.

Recording Oral Assessment Task: Teacher may take a recording sheet for noting the observations while oral assessment process is on. Ticks/Cross can be marked in the respective columns according to the student's response in formative assessment duration. On the basis of observations, marks may be allotted.



Formative Assessment		Class / Sec.		Task Oral Test		
Roll No.	Name of student	Class Response (5 marks)				Teacher's Remark
		Participation (1 mark)	Response (1 mark)	Correct Knowledge (2 marks)	Confidence/Expression (1 mark)	5
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						



Distribution of Mathematics Laboratory Activities

<p>Math Lab Activities for FA1 and FA2</p>	<ul style="list-style-type: none"> • To obtain conditions for consistency or inconsistency for given pair of linear equations in two variables. a) Pair 1: $2x - y + 8 = 0$; $8x + 3y - 24 = 0$ Pair 2: $x + 2y = 3$; $4x + 3y = 2$ b) Pair 1: $3x - y = 2$; $9x - 3y = 6$ Pair 2: $2x + 3y = 9$; $4x + 6y = 18$ c) Pair 1: $x + 2y - 4 = 0$; $x + 2y - 6 = 0$ Pair 2: $x + 4y = 10$; $3x + 6y = 12$ • To verify the Basic Proportionality theorem using a parallel line board and triangle cut outs • To verify Pythagoras theorem by paper cutting and pasting. • To verify the ratio of areas of two similar triangles is equal to square of ratios of their corresponding sides.
<p>Math Lab Activities for FA3 and FA4</p>	<ul style="list-style-type: none"> • To verify the given sequence is an A.P. or not by paper cutting and pasting method. • To verify that the sum of first n natural numbers is $\frac{n(n+1)}{2}$, by graphical method. • To verify that the sum of first n natural numbers is n^2 by activity method. • To verify by paper cutting and pasting that the lengths of tangents drawn from an external point to a circle are equal • Demonstration that the area of circle is half the product of its circumference and radius • To verify that the sum of areas of three sectors of the same radii r formed at the vertices of any triangle is $\frac{\pi r^2}{2}$ • Comparison of surface areas of right circular cylinders made from same rectangular sheet when rolled along length and when rolled along breadth • Comparison of volumes of right circular cylinders made from same rectangular sheet when rolled along length and when rolled along breadth • Demonstration of the formula for the volume of right circular cylinder using clay • To make a cone of given slant height l and base circumference • Demonstration of formula for lateral surface area of a right circular cone • Demonstration of formula for volume of a right circular cone • Demonstration of formula for surface area of a sphere • Demonstration of formula for volume of a sphere • To show that medians of a triangle concur by paper folding • Probability experiment • Making a clinometers and using it finding height of taller objects

