

MATHEMATICS

CLASS - IX



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Preface

When we started working on this textbook, there were some questions that needed to be addressed like what can be done to make the book more interesting, readable and useful? Why should a concept or unit be included in the book? What sort of skills do we want to develop in the children? Can the book help to increase the participation of children in the process of learning mathematics.

While pondering over these questions, a lot of ideas came which were kept in mind while selecting the units. Then the chapters were decided, which were regularly reviewed. Every time some issues were encountered and the chapter was rewritten. In the present edition, simple colloquial language is used. The technical terms been contextualised for the understanding the meaning. Secondly, no rule or principle has directly been stated. Effort has been made to keep the thought process going. While reading the chapters the children are encouraged to discuss logically, listen to each other and then go ahead. We have tried incorporate the historical background so that the children might be acquainted with the growth and development of mathematics in almost all the units.

Most of the chapters begin with some interesting examples related to real life. The concepts have been developed gradually and follow an interactive mode. Simple questions based on a concepts have been solved to explain those concepts, then new situations have been created, which connect them to more difficult concepts, so that children are able to understand the concepts and apply them when needed. In this whole process a lot of mathematical skills like, understanding the abstract ideas, expressing them through mathematical symbols, explaining logically, giving proof, reaching to a conclusion, understanding and using appropriate language while defining, etc., have been developed.

Besides these there are several important things that help making the textbook useful. We have tried to incorporate those in this book. Please read and recognize them. If you feel there is a need to improve something, please do inform us. Your suggestions will help to make the book more useful.

We have received ample guidance and help from Vidya Bhawan Society, Udaipur, Saraswati Educational Institute, Chhattisgarh and Azim Premji Foundation in preparing this book. The council is grateful to them.

Director

S.C.E.R.T. Chhattisgarh
Raipur

Note for the teacher...

The secondary classes being the final period of general education, the expectation would be a to integrate the mathematical understanding and capability that we want to have in all citizens. The National Curriculum Framework enlarges the scope of this to include aspects of mathematization as an ability not restricted to solving mathematical problem given in the textbook. It goes beyond the obvious utility in daily life and is expected to enrich the scope of thought and visualization available to the student.

The Secondary school mathematics, therefore, on the one hand, needs to focus on consolidation of the conceptual edifice that has been initiated in classes 6 to 8 but also take it forward to help the child explore wider connection and deeper understanding.

The logical formulation and the arguments included in each step along with the precision of presentation are of value to engage with the world in more forceful manner. The broad description of purpose of mathematics for secondary classes, therefore, includes elaborating and consolidating the conceptual edifice, the ability to make logical arguments, the precise and concise formulation of ideas, ability to perceive rules and generalization and mechanisms to prove them. They must have a sense how to understand the notion of proof and the need for organized arguments. It also seeks to expand the ability to visualize, organize and analyze space and spatial transformations. Going beyond numbers to understanding number system in the abstract, forming general rules about numbers, understanding variables and equalities and learning to understand what solutions mean. These are just a few examples of the areas that are covered in the syllabus.

If we talk about the portion of mathematics mentioned in the N.C.F. 2005, we find it impresses on the need to develop an understanding of mathematics and ability to use it in all situations. It also means developing abilities in the learner that would influence his/her life in wider spheres. Mathematics has to move from expecting children to do unnecessarily complex calculations and move toward expecting her/him to reason logically because as a mathematics student she/he needs to understand how mathematics works rather than become an adept calculator or efficient book keeper. Not only she/he must engage with concepts but also enjoy the problems she/he is solving and the tasks that she/he is undertaking. Her/his ability to understand problems and find a way to solve them needs to be built upon so that she/he develops a confidence of being able to attempt any new problem she/he comes across. This does not mean that exercises given in the book or in the classrooms are those that go along the beaten track and are replete with different degree of mechanical complexity rather than they help the child explore the concepts and develop framework for it.

To develop the capacity to solve problems at this stage is important. While it has already been said that the learner should enjoy solving a problem, it also needs to be emphasized that the objective of solving a problem is not to find one correct answer by one correct method. It is also important for teachers to help the children find different approaches to solving problems and learn to realize that many problems have a variety of solutions. Situations need be created in the classrooms that ask children to construct their own problems and bring forth their own definitions so as to be able to understand the question and be able to choose the appropriate concepts and algorithms.

One of the many important things that emerge from the N.C.F. is about how a mathematics classroom should be. Along with that one point that needs to be mentioned is the importance of allowing children to share, exchange and develop ideas in a group jointly. The classes at the secondary stage are particularly important for this because children at the stage like to interact in groups and if these groups can be formed to encourage discussion on interesting issues arising from mathematics, then they will be able to form connections of what is learnt in the school with the real life experiences.

Mathematics in the secondary classes, therefore, has to keep in mind that learners are being prepared for formulating logical ideas and therefore be given tasks that help them understand the notion of proof, help them build the ideas necessary to prove something, understand and absorb basic concepts of mathematics and develop such a level of confidence in their capability that they learn the mathematical ideas and also use them.

Key ideas that you as a teacher should have in mind below entering a mathematics classroom:

- Mathematics is not a subject which should be transacted in the classroom where a teacher is the active entity and students are passive. Students should be given an environment where they can talk, share their thoughts and construct their knowledge.
- Giving the opportunity to students to talk is also a crucial from point of view of learning the language. Students should not only be able to communicate their mathematical ideas using their words and language but should also be able to move forward in the use of formal language of mathematics using symbols, graphs etc.
- The mathematics that students deal with in secondary level might be abstract but they should understand the concepts and form connections between them. They should also be able to make sense of the abstractness to connect with the subject.
- For teachers, textbook should be used as a tool to refer to and it shouldn't become a tool which guides the whole learning process. The teacher should decide themselves of how best they can use this textbook.

Authors

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