

MATHEMATICS

CLASS-6



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FOREWORD

Mathematics is not only limited to its scope as a subject alone, but it also has an important role in understanding other subjects. The main objective of studying mathematics in class VI is to assimilate its universalisation in terms of different characteristics of geometrical figures, the concept of negative numbers (integers) and utilise the already attained understanding of Mathematics in various fields of life.

Mathematics is not a subject to be spoken of or understood. It is a subject where things have to be conceptualised in our minds and when one her/himself solves several problems related to an area, these concepts are strengthened.

Attempts have been made in this book to allow a student to form concepts in Mathematics and establish them for her/himself and also use these concepts in related environments in different fields of life. To obtain this objective the student has to read the book attentively follow the activities described and do them so as to draw conclusions from the experiences. One is also suggested to keep a written record of the activities and observations.

No book is complete in itself. Hence, if readers of this text have suggestions with respect to difficulties in the book and suggestions for improvement are brought forth, they can be very well taken up in favour for the students of this state in future.

We express our heartiest thankfulness and gratitude towards the teachers of several government & private schools, DIETs, professors from colleges & NGOs as well as senior citizens of the state who have steered and guided through the making of the book.

The National Council of Educational Research and Training (NCERT) sets some clear and measurable goals for class 1 to 8th. They are known as 'Learning outcomes'.

We have made some necessary changes in this textbook in reference with 'Learning out comes'. Some new contents have been added and some chapters have been transferred from one class to another. Do not let the teachers and the students get confused.

Director

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The glorious contribution of India to Mathematics

Till now you have studied mathematics and language as two main subjects. While studying mathematics, you must have thought how this subject came into existence? What could have been the contribution of Indians in its evolution?

India has a glorious history in the development of Mathematics. The decimal system that the whole world uses today was evolved in India. We could not decode the graphics of the Indus civilization, but the remains of the Harappan culture tell us that their knowledge of Mathematics, especially mensuration was quite advanced. The Aryans used the knowledge of mensuration that was developed during the Indus valley civilization in the making of their worship-altars (yagya-vedi).

When research in mathematics in Europe witnessed a dark age, India had scholars in mathematics like Aryabhatt, Brahmagupta, Mahaviracharya & Bhaskaracharya. Who could build the tradition of mathematics & mathematicians for the world. **Aryabhatt** founded the rules of estimating squares, square roots, cubes, cube-roots, areas of rectangle, triangle and sphere. The ratio of circumference and diameter denoted by π (pie) and got the decimal values accurated to the fourth place.

Brahmagupta evolved the tradition of Aryabhatt further and was the first mathematician who divided mathematics into algebra and arithmetic and was the first to use zero in algebra.

Mahaviracharya was also one who had the pride of developing the tradition of mathematics in India. He gave many rules about addition and subtraction of fraction and gave many entertaining examples for fraction.

Bhaskaracharya was the first mathematician who considered zero as a very small number and said that a number divided by zero, gives us infinitive.

Thus, many mathematicians had their great contributions to the field of mathematics that made India and Indian tradition of mathematics great.

FOR THE TEACHERS

What is Mathematics ?

Mathematics is that branch of study which basically includes numbers. The relationship between their characteristics features and spatial understanding. This would also assimilate congruence, angles & their drawings, quality and their quantifications etc.

Mathematics is used essentially not only in all areas of teaching & learning but also has its important role in life. Therefore, Mathematics is one of the core subjects for education at the primary level also. Generally, the basic concept of Mathematics is attained through experience related to concrete objects which is then propagated into abstract thoughts gradually. Understanding of Mathematics, therefore, advances step by step. At every step concepts are made more generalised and the scope of generalisation increases.

The relationship between Language and the learning of Mathematics : The meaning of logic and its proof.

Language plays a vital role in the learning of mathematics. Language is required to understand arithmetical logic and concept as well as to express them. Language also contributes a great extent to concretize. The mathematical concepts which are otherwise abstract or basically experiential.

Language is the basis of developing and using sequential logics along with its great utility in helping one use mathematics in everyday life. Hence, the use of language in its proper form and propagation cannot be denied. Through language we attempt to give a structure to some provable statements of mathematics which are derived from assumptions & concepts. Therefore, the basis of structuring mathematics is logic or justification. It is essential to bring children to experience this process which is a major part of the nature of mathematics and the way it is learnt.

During the study of mathematics in classes VI-VIII, we will begin to learn more wide and relatively more abstract theorems of mathematics.

Number of objects in a group, understanding of numbers and their general arithmetical processing will now move on to generalising number concepts, the concept of variables, proving

theorems, extended rules and applied mathematics. Along with these, we shall understand types of shapes and then construct and shall try to find out such objects around ourselves. We shall also start classification of numbers into a presentation and try to draw conclusions from a given data.

The main point about teaching mathematics is that we get ample scope about lending children to solve problems & draw their own conclusions because mathematics cannot be taught by spoken deliverance or discussions by a figurative concept that gets built up in ones own brain and this skill needs to be developed in the students.

The teaching of Mathematics

The study of mathematics is utilised in all activities of life but it is not limited to its use. Though its origination needs concrete experience & concrete objects and the propogation of mathematics is sequentially understood through abstract thoughts. This makes it clear that teaching of mathematics centrally takes care of the fact that learners are able to conceptualise ideas and theories in mathematics. We do not really need to explain questions in mathematics but is more related to solving of problems by students.

Therefore, we should provide help to the students' about widened mathematical concepts, concrete objects and experience taken into consideration while moving ahead. Therefore, for practising every lesson, it should be underlined which mathematical rule you are following up & universalising during the teaching of the lesson. At the end of the lesson, the child should be able to derive that rule and use it in the follow up of the exercises.

General Objectives of Teaching Mathematics at the Upper Primary Level

1. Strengthening of knowledge at the primary level.
2. Developing concepts of commerce, mathematics & elementary statistics.
3. The ability to understand the basics of mathematics and make it useful for everyday activities.
4. To develop the ability to solve easy problems related to commerce, mathematics, trigonometry, mensuration and elementary statistics.
5. To develop the competence of solving geometrical questions, to understand the

relationship between different stages of questions & assumption of logical analysis & mathematical concepts.

6. To understand the primary foundations of elementary algebra.
7. To attain competence, in understanding statistical graphs, pictures, charts, models & their use.
8. Logical ability, derivations & proofs and recognition of patterns.
9. Understanding problems & solving them.
10. Developing awareness about rational integration, similarity, environmental security, ideas of a small family, social evils, social equality.
11. Negative numbers, concept of variable, equation, number groups & their characters and fractions needs to be emphasised because they form the basis of mathematics ahead. Similarly, geometry also begins in this class and hence much practice is to be given at this level for such concepts.

Director

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