

Mathematics Syllabus

Grades 5 - 8

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Introduction

Mathematics is a core subject taught at the second cycle of the primary education (grades 5 - 8). It is believed that greater emphasis should be given to the teaching of mathematics as it is a key subject to scientific and technological developments of the country. Important findings from cognitive research have had the following principles and their implications for mathematics learning.

Thinking is a continual process and is fundamental to learning mathematics. The development of mathematical thinking does not linearly follow the acquisition of basic skills. This implies that instruction should provide opportunities for thinking and reasoning throughout the mathematics curriculum. Basic skills learning should not be separated from thinking skills learning. If students practice skills before they understand the underlying concepts, they will have difficulty learning the conceptual knowledge later and lack the power to use mathematics.

Thinking and knowledge are not separate components of mathematical competency but rather are highly related. The quality of mathematical thinking and reasoning is dependent on what one knows, and the development of what one knows is dependent on mathematical thinking and hence students must be provided with opportunities to construct mathematical knowledge through thinking and reasoning and to think and reason with their mathematical knowledge, as they attempt to make sense of their experiences through real world problem solving.

Students actively construct knowledge through doing and problem solving rather than by passively assimilating information from teacher and textbook and this implies that instruction should help students understand mathematical concepts rather than just give them isolated facts and procedures, students should solve problems in order to construct formal mathematical knowledge.

Problems are solved in various ways and knowledge is often constructed by groups of people and hence students should be encouraged to solve mathematical problems collaboratively, listen to and challenge each other, and value different problem solving approaches. The above principles and their implications lead us to develop a mathematics curriculum with the following characteristics.

Hands-on:- Involving students in really doing mathematics - experimenting first - hand with physical and simulated objects and mathematical constructs before learning abstract mathematical concepts.

Minds - on:- Focusing on the core concepts and critical thinking processes and skills needed for students to create and recreate mathematical concepts and relationships in their own minds.

Reality -on:- Allowing students to explore, discover, discuss and meaningfully construct mathematical concepts and relationships in contexts that involve real - world problems and projects that are relevant and interesting to the learner.

Making use of other countries' best experience and needs assessment of our own society, the curriculum guides for this cycle have been revised based on the hands - on, minds - on and reality - on approach. It is believed that a hands - on, minds on and reality-on approach makes the learning of mathematics:

- Engaging in the sense that students are actively involved in the learning process and not viewed simply as 'receptacles' for knowledge.
- Authentic, since what students are learning has meaning to them as individuals, as members and active participants of the society.
- Sustainable in the sense that students are equipped with modern and applicable tools for life - long learning.

The spiral approach of curriculum development process has been adopted to make sure that each topic is treated at each grade level of the cycle with appropriate depth.

Grade 5 - 8 Mathematics Curriculum Revision Team

1. Ato Tesfaye Ayele **MoE**
2. " Fikremariam Regassa **MoE**
3. " Mesfin Tefera **MoE**

Members of the Team from the Regions

1. W/o Wubit Addis **A.A.**
2. " Bernesh Genet **A.A.**
3. Ato Awraris Abera **A.A.**
4. " Girma Bonsa **Oromia**
5. " Kifele Yilma **A.A.**
6. " Awgichew Yalew **SNNPR**
7. " Musa Jema **Somali**
8. " Lulu Ayele **Hareri**
9. " Dangachew Yalew **DireDawa**

International Consultant

Dr. Patricia Hiddleston **UK**

The Learning Objectives for Grade 5-8

At this cycle students acquire basic mathematical knowledge and develop important mathematical skills and positive attitude towards the subject so that they are able to learn more; reason rationally, think creatively, make correct decisions and be able to solve real life problems. To this end the following are the objectives of mathematics learning at this cycle. After completing the cycle, students should be able to:-

- Extend their knowledge of the number system and operations on numbers to the set of rational numbers and operations using rational numbers.
- Understand the concept 'set' and operate on sets using Venn diagrams.
- Work with variables in formulae.
- Develop skills for solving linear equations and inequalities.
- Use the knowledge of ratio, proportions and percentages to solve problems.
- Use the Cartesian coordinate plane for drawing and reading graphs.
- Identify, construct and describe properties of quadrilaterals, triangles and circles.
- Use the basic principles of trigonometric ratios to solve problems.
- Collect data, construct and interpret simple graphs for given data and calculate mean, mode and median of a given data.
- Determine square roots and cube roots of perfect squares and cubes.
- Use the conditions for similarity to determine whether given triangles are similar or not and solve related problems.
- Identify congruent triangles by using the tests for congruency.
- Determine probabilities of simple events.
- Identify pyramids and cones and parts of a pyramid and a cone.
- Calculate volumes of rectangular prisms.
- Apply mathematics to solve problems encountered in students' day to day life activities.
- Develop interest to study mathematics more.