

## Program of Studies – Mathematics – Fourth Grade

The mathematics program in grade four includes strong literacy connections, active and hands-on work with concrete materials and appropriate technologies. Grade four problem solving, mathematical communication, connections, mathematical reasoning and multiple representations should be a part of the mathematics curriculum. The use of these techniques enhances and extends students' mathematics skills. Accuracy is an integral part of the mathematics program.

Students should have opportunities to work individually and in groups of varying size and composition in order to conduct investigations, process information and discuss important mathematical concepts. Students must have regular opportunities to share their ideas with others and to solve problems generated as a result of their learning experiences.

The mathematics content standards at the fourth grade level are directly aligned with Kentucky's **Academic Expectations**. Mathematics standards are organized around five “Big Ideas” that are important to the discipline of mathematics. The five big ideas in mathematics are: Number Properties and Operations, Measurement, Geometry, Data Analysis and Probability and Algebraic Thinking. The Big Ideas are conceptual organizers for mathematics and are similar at each grade level to ensure students have multiple opportunities throughout the students' school careers to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to the Big Ideas of mathematics. The understandings represent the desired results – what learning will focus upon and what knowledge students will be able to explain or apply. Understandings can be used to frame development of units of study and lesson plans.

Skills and Concepts describe ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for mathematics are fundamental to mathematical literacy, mathematical power and build on prior learning.

Effectively implementing the Program of Studies requires a common understanding of the process standards below.

**Problem solving** includes developing and applying strategies to problems from everyday and mathematical situations and evaluating the solutions relative to the original problem situation.

**Mathematical communication** includes concrete materials, visual representations and diagrams that relate language to mathematical symbols in speaking, reading, writing and listening to mathematical ideas.

**Mathematical connections** include:

- relating concepts to other concepts and procedures (e.g., fraction, decimal)
- relating concepts of one mathematical topic to another (e.g., geometry, measurement)
- relating concepts of a mathematical topic to other disciplines (e.g., statistics, social studies).

**Mathematical reasoning** includes recognizing patterns and relationships and using models, known facts and mathematical properties to explain and justify thinking.

**Multiple representations** allow students to be able to recognize common mathematical structures across different contexts. In elementary school, students most often use representations to reason about objects and actions they can perceive directly.

**Academic Expectation 1.5-1.9** (Students use mathematical ideas and procedures to communicate, reason and solve problems.) is infused throughout the mathematics instruction P-12 and is integral to the content and instruction across all grade levels.

**Academic Expectation 1.16** (Students will use computers and other kinds of technology to collect, organize and communicate information and ideas.) is an essential and integral part of instruction across the content and the mathematics Program of Studies.