

Program of Studies – Mathematics – Eighth Grade

The mathematics program in grade eight includes strong literacy connections, active and hands-on work with concrete materials and appropriate technologies. Grade eight 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 eighth 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 mentioned in the first paragraph.

Problem solving includes multiple strategies for modeling, interpreting and formulating problems based in real-world situations, within and outside of mathematics, and aids in investigating and understanding mathematical content.

Mathematical communication includes modeling problems using oral, written, concrete, visual, graphical and algebraic methods to define, interpret and argue mathematical ideas. Mathematical communication includes mathematical symbolic notation (letters and marks used in mathematics to name numbers, operations, sets, relations).

Mathematical connections include relating mathematical ideas within mathematics and to other disciplines using graphic, numerical, physical, algebraic and verbal models.

Mathematical reasoning includes inductive and deductive reasoning necessary in developing conjectures and validating arguments.

Multiple representations allow students to be able to recognize common mathematical structures across different contexts. In the middle grades, students can use representations for more abstract concepts, such as rational numbers or linear relationships, or to portray, clarify, or extend an idea.

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.