

A Guide to the Colorado Academic Standards



Mathematics

Eighth Grade



Working Together

To support families and teachers in realizing the goals of the Colorado Academic Standards, this guide provides an overview of the learning expectations for eighth grade mathematics and offers some possible learning experiences students may engage in during this school year.

Why Standards?

Created by Coloradans for Colorado students, the Colorado Academic Standards provide a grade-by-grade road map to help ensure students are ultimately successful in college, careers, and life. The standards aim to improve what students learn and how they learn in ten content areas, emphasizing critical-thinking, creativity, problem solving, collaboration, and communication as important life skills in the 21st century.

Mathematics for Middle Schools (6-8)

The mathematics standards throughout middle and high school build on the strong foundation of number developed during elementary school. Students begin to branch into other areas of mathematics such as probability, statistics and algebra. The study of geometry and geometric proof is also formalized during these years. The work of geometric proof is also extended to all parts of mathematics as students construct viable arguments and critique the reasoning of others. In each grade students investigate the world around them through mathematics. They confront problems and persevere in solving them as they strategically apply mathematical tools and techniques.

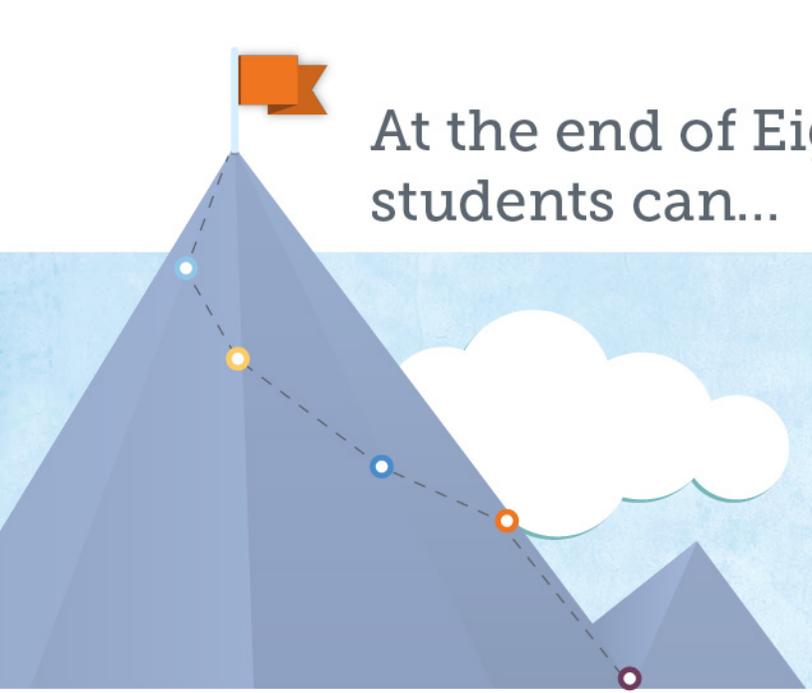
Where can I learn more?

- Contact your school district regarding local decisions related to standards, curriculum, resources, and instruction.
- Colorado Academic Standards Booklets: <http://www.cde.state.co.us/standardsandinstruction/GradeLevelBooks.asp>
- Mary Pittman, Mathematics Content Specialist at 303-854-4560, Pittman_m@cde.state.co.us



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At the end of Eighth Grade, students can...



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Mathematics Learning Expectations for Eighth Grade

Number Sense, Properties, and Operations

Calculate using radicals ($\sqrt{2}$, $\sqrt[3]{27}$) and exponents (7^2 , 5^{-6}); explain the difference between rational and irrational numbers; locate rational and irrational numbers on a number line; use scientific notation to write very large or small numbers (6.02×10^{23}).

Patterns, Functions, and Algebraic Structures

Fluently solve linear equations and systems of linear equations; explain the meaning of a function in mathematics; distinguish between functions whose graphs are linear (make a straight line) and those which are not linear; use tables, graphs, and equations to show linear relationships; describe the meaning of the slope (steepness) and y-intercept of a linear situation.

Data Analysis, Statistics, and Probability

Identify if two variables have a relationship by informally examining graphs and tables; create graphs and equations to describe linear relationships.

Shape, Dimension, and Geometric Relationships

Calculate distances and areas using the Pythagorean Theorem; calculate the volume of cones, cylinders and spheres; describe how rotating, stretching, shrinking, reflecting or sliding a shape impacts its shape and size; understand the difference between congruency and similarity; explain the concept of similarity and make connections between slope and similar triangles.

Throughout the Eighth Grade, you may find students...

- Measuring classmates' height and arm-span, and making a graph to show how height and arm-span are related.
- Solving a variety of algebra equations for "x" such as $3x + 28 = 8x - 34$.
- Using graphs and tables of data to determine if the relationship between the height of a plant and the amount it is watered each day is a function.
- Graphing phone plans with a flat rate of \$20 and a \$0.10 per minute fee on calls and identifying the y-intercept as the flat fee and slope as the per-minute charge.
- Proving why the sum of the angles in a triangle is always 180 degrees.
- Comparing the steepness of stairs and ramps for a variety of buildings (rise to run).
- Calculating the height of a kite using 150 feet of string that is directly above a pool 60 feet away from where you are standing.
- Computing the shortest distance between two points.
- Finding the height of a flag pole using shadows and similar triangles.
- Comparing when the cost of a cell phone plan is greater than, equal to, or less than the cost of another cell phone plan.
- Explaining why $1/7$ is rational but $\sqrt{2}$ is irrational.