

# Grade 8 Mathematics TEKS

## Overview

In Grade 8 mathematics, students focus on using basic principles of algebra to analyze and represent proportional and non-proportional relationships. Students also focus on using probability to describe data and make predictions. Students use a variety of mathematical processes and tools to develop conceptual understanding and solve problems as they do mathematics.

## Number, operation, and quantitative reasoning: Students will

- Compare and order rational numbers (fractions, decimals, whole numbers, percents, and their opposites).
- Select and use forms of rational numbers to solve real-life problems.
- Approximate the value of irrational numbers ( $\pi$ ,  $\sqrt{2}$ , etc.) in problem situations.
- Express numbers in scientific notation using a calculator in problem situations.
- Add, subtract, multiply, and divide rational numbers in problem situations and justify the choice of operation.
- Evaluate solutions for reasonableness.
- Represent proportional relationships using multiplication by a constant factor (perimeter of a square is four times the length of a side, or  $P=4s$ ).

## Patterns, relationships, and algebraic thinking: Students will

- Compare and contrast proportional and non-proportional relationships.
- Estimate and find solutions to application problems involving percents and proportional relationships.
- Create a different representation given one representation of data such as a table, graph, equation, or verbal description.
- Estimate, find, and justify solutions to application problems using appropriate tables, graphs, and algebraic equations.
- Use an algebraic expression to find any term in a sequence.

## Geometry and spatial reasoning: Students will

- Generate similar shapes using both enlargements and reductions (dilations).
- Graph dilations, reflections, and translations on a coordinate plane.
- Draw solids from different perspectives.
- Use geometric concepts and properties to solve problems in fields such as art and architecture.
- Use pictures or models to demonstrate the Pythagorean Theorem.
- Locate and name points on a coordinate plane using ordered pairs of rational numbers.

## Measurement: Students will

- Find surface area of prisms and cylinders using physical models and nets (unfolded flat patterns).
- Connect physical models to formulas for volume of prisms, cylinders, pyramids, and cones.
- Estimate answers and use formulas to solve surface area and volume application problems.
- Use the Pythagorean Theorem to solve real-life problems.
- Use proportional relationships in similar shapes to find missing measurements.
- Describe effects on perimeter, area, and volume when dimensions of shapes are changed proportionally.

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## **Probability and statistics:** Students will

- Find the probabilities of compound events (dependent and independent).
- Use probability to make predictions and decisions.
- Select and use different models to simulate an event.
- Select the appropriate measure of central tendency (median, mode, and mean) to describe a set of data for a particular purpose.
- Draw conclusions and make predictions by analyzing trends in coordinate graphs.
- Construct circle graphs, bar graphs, and histograms with and without technology.
- Evaluate methods of collecting data to determine the truth of a prediction made from data.
- Recognize misuses of graphical or numerical information.
- Evaluate predictions and conclusions made based on data analysis.

## **Underlying processes and mathematical tools:** Students will

- Identify and apply mathematics to everyday experiences in and outside of school.
- Use a problem-solving model that includes understanding the problem, making a plan, carrying out the plan, and checking the solution for reasonableness.
- Select or develop problem-solving strategies such as drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve problems.
- Select tools such as real objects, manipulatives, paper/pencil, and technology to solve problems.
- Use techniques such as mental math, estimation, and number sense to solve problems.
- Communicate mathematical ideas using language, efficient tools, appropriate units of measure, and models (graphical, numerical, physical, algebraic).
- Evaluate the effectiveness of different representations to communicate ideas.
- Make conjectures from patterns or sets of examples and non-examples.
- Validate conclusions using mathematical properties and relationships.

## **Tips for Parents**

- Ask your child to estimate the volume of any familiar three-dimensional object using cubic inches, cubic feet, cubic meters, etc. (cereal boxes, soft drink cans, trash cans, etc.).
- When driving, pose questions about distance, speed, and time relationships. Ask variations of the question, “If I travel 400 miles in 8 hours, what is my average speed? Show me all the ways you can think about this problem.” (table of data, graphs, equation, numerical computation, etc).
- Encourage your child to write an equation that models real-life patterns with a constant rate of change. (The Cost of renting a video is \$3.50 plus late fees of \$1.50 a day; or algebraically,  $C = 3.50 + 1.50d$ ).
- Read papers and magazines with your child and generate questions that can be answered by interpreting the given data (line graphs, bar graphs, pie charts, etc).
- Be a strong role model by valuing mathematics. The world of mathematics has expanded to encompass not only computation but also a need for deeper, more powerful thinking and reasoning abilities for all students to navigate through future problem-solving situations. Instill in your child the confidence to trust their problem-solving abilities.