

7TH GRADE MATHEMATICS

CURRICULUM GUIDE

BIG IDEAS

- ◆ Variable equations can be used to solve problems involving integers and rational numbers.
 - ◆ Variable expressions can be used to describe relationships.
 - ◆ There are precise and systematic ways to solve both inequalities and linear equations.
 - ◆ Rates, ratios and percents are used to describe various real-life situations.
 - ◆ Proportion, scale, similarity, congruence can show how various polygons relate to each other and to polyhedrons.
 - ◆ Geometric properties and formulas can be used to determine measurements including surface area and volume.
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THEMATIC FOCUS:

- ◆ Math classrooms are lively places for learning where students receive a rich diet of the following:
 - The use of mathematics to *solve problems*.
 - Application of *logical reasoning* to justify procedures and solutions.
 - Design and analyze multiple *representations*, make *connections* in and out of school.
 - See the National Council of Teachers of Mathematics (NCTM) [Principles & Standards for School Mathematics](#) for further information.
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UNITS OF STUDY

- ◆ Variables, Expressions and Integers
 - ◆ Multi-Step Equations and Inequalities
 - ◆ Rational Numbers and Equations
 - ◆ Ratio, Proportion and Probability
 - ◆ Percents
 - ◆ Surface Area, Volume, and Circle Formulas
 - ◆ Support Unit: Advanced Exponents, Scientific Notation and Fractions
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CONCEPTS AND SKILLS

It is essential that the following concepts and skills be addressed in contexts that promote problem solving, reasoning, communication, making connections and designing and analyzing representations. See [FOCAL POINTS](#) for more information about grade level content for mathematics.

7.1 Number and Operations and Algebra: Develop an understanding of operations on all rational numbers and solving linear equations

- Develop, analyze, and apply models (including everyday contexts), strategies, and procedures to compute with integers, with an emphasis on negative integers. (7.1.1)
- Extend knowledge of integers and positive rational numbers to solve problems involving negative rational numbers. (7.1.2)
- Develop and use strategies to estimate the result of rational number computations and justify the reasonableness of results. (7.1.3)
- Apply properties of rational numbers and algebra to write and solve linear equations in one variable. (7.1.4)

7.2 Number and Operations, Algebra and Geometry: Develop an understanding of and apply proportionality, including similarity

- Represent proportional relationships with coordinate graphs and tables, and identify unit rate as the slope of the related line. (7.2.1)
- Apply ratio and proportionality to solve problems, including percent (discount, sales, increase, decrease, etc.) and simple probability. (7.2.2)
- Use coordinate graphs, tables, and equations to distinguish proportional relationships from other relationships, including inverse proportionality. (7.2.3)

CONCEPTS AND SKILLS (CONTINUED)

- Develop and use scale factors and proportional relationships to solve problems, including similarity and congruence. (7.2.4)
- Convert among different units of measurement to solve problems, including rates. (7.2.5)
- Apply scale factor to analyze how the change in one measure (e.g., length, area, volume) affects another. (7.2.6)

7.3 Measurement and Geometry: Develop an understanding of and use formulas to determine surface area and volume

- Use models to explain the reasonableness of formulas for the circumference and area of circles. (7.3.1)
- Know common estimates of π and use these values to estimate and calculate the circumference and area of a circle. (7.3.2)
- Solve problems involving areas and circumferences of circles. (7.3.3)
- Use models to explain the reasonableness of formulas for the surface area of pyramids and cylinders, and volume of pyramids, cylinders, and cones. (7.3.4)
- Find and justify relationships among the formulas for the areas of different polygons when determining surface area. (7.3.5)
- Solve problems involving surface areas of pyramids and cylinders and volumes of pyramids, cylinders, and cones. (7.3.6)
- Estimate and compute the area and volume of complex or irregular shapes by dividing them into basic shapes. (7.3.7)

◆ **7th Grade Connections**

(Not standards for mastery, but are important topics to use to support and enrich the focal points.)

- Measurement
 - Scale Drawings
- Numbers and Computation
 - Non-terminating, non-repeating decimals/fractions

◆ **Math Work Samples & Assessment** In 7th grade, students should be provided multiple opportunities to complete math work samples and are required to complete at least one teacher-scored math work sample based on the official scoring guide. 7th graders are also required to take the Oregon Assessment of Knowledge and Skills (OAKS) test in the spring (see [Assessment](#) section for math scoring guides, sample tasks, and additional information).

◆ **Problem Solving** (see [Problem Solving](#) section for definitions, grade level descriptions, and instructional resources)

◆ **Math Placement** (see [Placement](#) section for course flowcharts, placement criteria, and additional information)

ESSENTIAL QUESTIONS

- ◆ How are rational numbers used to describe various real life situations?
- ◆ What are a unit rate and a slope? How are they related?
- ◆ How are area formulas similar to surface area and volume formulas?
- ◆ How does a change one dimension affect the area, volume, or surface area of an object?

ESSENTIAL SKILLS

- ◆ Apply mathematics in a variety of settings
 - Interpret a situation and apply workable mathematical concepts and strategies, using appropriate technologies where applicable.
 - Produce evidence, such as graphs, data, or mathematical models, to obtain and verify a solution.
 - Communicate and defend the verified process and solution, using pictures, symbols, models, narrative or other methods.

ESSENTIAL SKILLS (CONTINUED)

- ◆ Think critically and analytically. This skill includes all of the following:
 - Identify and explain the key elements of a complex event, text, issue, problem or phenomenon.
 - Develop a method to explore the relationships between the key elements of a complex event, text, issue, problem or phenomenon.
 - Propose defensible conclusions that address multiple and diverse perspectives.
 - Evaluate the strength of conclusions, differentiating reasoning based on facts from reasoning based on opinions.
 - See [ESSENTIAL SKILLS](#) for more information about ODE requirements.