

## **MATHEMATICS: GRADE 7**

In Grade 7, instructional time should focus on four critical areas: 1) developing understanding of and applying proportional relationships; 2) developing understanding of operations with rational numbers and working with expressions and linear equations; 3) solving problems involving scale drawings and informal geometric constructions, and working with two – and three-dimensional shapes to solve problems involving area, surface area, and volume; and 4) drawing inferences about populations based on samples.

### **1. Developing Understanding of and Applying Proportional Relationships**

Students extend their understanding of ratios and develop understanding of proportionality to solve single- and multi-step problems. Students use their understanding of ratios and proportionality to solve a wide variety of percent problems, including those involving discounts, interest, taxes, tips, and percent increase or decrease. Student solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects. Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope.

### **2. Developing Understanding of Operations with Rational Numbers and Working with Expressions and Linear Equations**

Students develop a unified understanding of number, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percents as different representations of rational numbers. Students extend addition, subtraction, multiplication, and division to all rational numbers, maintaining the properties of operations and the relationships between addition and subtraction, and multiplication and division. By applying these properties, and by viewing negative numbers in terms of everyday contexts (e.g., amounts owed or temperatures below zero), students explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers. They use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve problems.

### **3. Solving Problems Involving Scale Drawings and Information Geometric Constructions, and Working with Two and Three-Dimensional Shapes to Solve Problems Involving Area, Surface Area, and Volume**

Students continue their work with area from Grade 6, solving problems involving the area and circumference of a circle and surface area of three-dimensional objects. In preparation for work on congruence and similarity in Grade 8 they reason about relationships among two-dimensional figures using scale drawings and informal geometric constructions, and they gain familiarity with the relationships between angles formed by intersecting lines. Students work with three-dimensional figures, relating them to two-dimensional figures by examining cross-sections. They solve real-world and mathematical

problems involving area, surface area, and volume of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

#### 4. Drawing Inferences About Populations Based on Samples

Students build on their previous work with single data distributions to compare two data distributions and address questions about differences between populations. They begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences.

Source: corestandards.org

#### Illinois Learning Standards: Grade 7 Overview

##### Ratios and Proportional Relationships

- Analyze proportional relationships and use them to solve real-world and mathematical problems.

##### The Number System

- Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

##### Expressions and Equations

- Uses properties of operations to generate equivalent expressions.
- Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

##### Geometry

- Draw, construct and describe geometrical figures and describe the relationships between them.
- Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

##### Statistics and Probability

- Use random sampling to draw inferences about a population.
- Draw informal comparative inferences about two populations.
- Investigate chance processes and develop, use, and evaluate probability models.

Source: corestandards.org