

**Grade Seven**  
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**Correlations with Oklahoma**  
**Instructional Mathematical Goals and Objectives**

The following concepts and skills are required by all students completing seventh grade. The **Major Concepts** should be taught in depth using a variety of methods and applications so that all students have accessibility to and an understanding of these concepts. **Maintenance Concepts** have been taught previously and are a necessary foundation for success in mathematics at this level.

**MAJOR CONCEPTS**

**Patterns-**

**Algebraic Expressions, Equations**

**Number Sense-**

**Common Percents,  
Fraction-Decimal Comparisons**

**Geometry-Plane**

**Area, Perimeter, Angles**

**Measurement-Metric**

**Compare, Convert, Compute, Tools**

**Data Analysis-Probability**

**Sampling, Predict Probabilities**

**MAINTENANCE CONCEPTS**

**Patterns, Functions, and Algebra**

**Properties, Factors, Multiples,  
Primes, GCF, LCM,  
Order of Operations**

**Number Sense-**

**Fractions, Decimals, Percents-  
Convert, Compare, Order**

**Operations-**

**Add, Subtract, Multiply and  
Divide, Fractions**

**Geometry-**

**Symmetry, Congruency,  
Similarity, Angles, Circles,  
Transformations**

**Measurement-**

**Applications, Customary**

**Data Analysis-**

**Collect, Analyze, Mean, Median  
Mode, Range**

**THINK STARH**

Use the image of a star with **Content** at its center and **Problem Solving**, **Communications**, **Connections**, **Reasoning**, and **Representation** at its five points to design illuminating lessons (see page 77).

**I. Patterns: Algebraic Expressions and Equations**

- A. Use expressions to describe the general case for extensions represented by data in tables, graphs, and models (e.g., 2, 4, 6, 8, ...2n).
- B. Simplify and evaluate algebraic **expressions** (e.g., if  $x = -5$  evaluate  $2x$ ).
- C. Identify, explain, and apply the commutative, associative, distributive, inverse and identity **properties** (e.g.,  $n + 0 = n$ ,  $2(x + 3) = 2x + 6$ ).
- D. Solve simpler linear equations (e.g., use **properties**, graph ordered pairs with paper and pencil, use graphing calculators).

- E. Describe the identify situations that model linear graphs (e.g., interpret the meaning of variables in problem context).
- F. Apply the **order of operations** and test calculators to see whether it has been included (e.g., simplify expressions, determine which calculators follow the proper **order of operations**).

## II. Number Sense

- A. Integers
  - 1. Represent, compare, can order positive and negative integers and describe their use in real-life situations (e.g., temperature, sea level, stock market fluctuations, football yardage).
  - 2. Use the basic operations on integers to solve problems.
- B. Ratio, Proportion, and Percents
  - 1. Understand the concept of **ratio** and **proportion** and be able to demonstrate it with models (e.g., similar geometric shapes, growth patters, scale models).
  - 2. Identify and write problems using **ratio** and **proportions** (e.g., find equivalent **ratios**).
  - 3. **Estimate** and solve problems using **ratio**, **proportions**, and percents (e.g., include percent greater than 100 and less than 1, use scale factors, determine missing sides of similar figures, construct circle graphs).
  - 4. Apply concepts of rate of chafe (e.g., heart rate per minute, pay to hours worked overtime, area with a change in sides).
- C. Exponents
  - \*1. Describe concepts of positive exponents including zero using **manipulatives** and calculators to develop exponential patterns (e.g., model getting paid a penny the first day 2 cents the second day, 4 cents the third day...).
  - \*2. Build models of **multiples** to investigate squares and prefect square roots (e.g., build rectangular **arrays** for numbers 1 to 100 and note which can be represented as squares).
  - 3. Estimate the square root of a number between two consecutive **integers**.
  - 4. Read, represent, and interpret large numbers in expanded, exponential, and scientific notation; use bench,marks (e.g., population of one’s state) to discuss their magnitude.

## III. Geometry—Plane

- A. Develop and use formulas to solve problems involving perimeter (circumference), and area of polygons and circles.
- B. Describe, draw, classify, and compare geometric figures according to their shapes and properties (e.g., circles, quadrilaterals, hexagons, determine whether all squares are rectangles, explain why “only” triangles, quadrilaterals, and hexagons can tile a plane).

- C. Identify parallel, perpendicular, horizontal, and vertical lines according to their properties (e.g., examine properties of geometric figures containing sets of perpendicular or parallel lines on a coordinate graph).
- D. Describe and compare interior, exterior, **complementary**, **supplementary**, and vertical angles (e.g., using graph paper, software, protractors to measure angles between parallel lines with a transversal).
- E. Identify, describe, and sketch relationships between geometric figures using congruency, similarity and transformations and incorporate into problem-solving skills (e.g., explore ratios and similarity with overhead projectors, rotate figures  $90^\circ$ ,  $180^\circ$ , and  $360^\circ$ ).
- F. Locate points on a coordinate plane in all four **quadrants**.
- G. Integrate geometric concepts to solve occupational and practical, everyday problems (e.g., use the Pythagorean relation, right triangles, rip off corners of a paper triangle and reassemble to prove the sum of the angles equals  $180^\circ$ ).

#### IV. Measurement—Applications, Metric

- A. Compare and convert a given measurement to another metric measurement unit (e.g., centimeters to meters, kilograms to grams, milliliters to liters).
- B. Compute metric measurements of combined units using appropriate methods.
- C. Select and use appropriate tools for metric measurements in practical applications and understand measurement will only be precise to one-half of the unit used for measurement.
- D. Give a reasonable estimate of measurement using the appropriate metric unit (e.g.,  $30^\circ\text{C}$  is the temperature on a hot day; a meter is approximately the height of a door knob).

#### V. Data Analysis—Probability

- A. Predict possible outcomes and compute simple probabilities given data from a sample (e.g., use data from lists, tree diagrams, frequency distribution tables, area models).
- B. Express probabilities as fractions and decimals.
- C. Determine the **probability** of an event involving “or” or “not” (e.g., on a spinner with 1 blue, 2 red and 2 yellow sections, what is the **probability** of getting a red or a yellow?).
- D. Explore sampling procedures (random, limited, biased) and draw conclusion about populations (e.g., consider potential sources of bias).