

OAK LAWN-HOMETOWN SCHOOL DISTRICT 123

SEVENTH GRADE MATH ESSENTIAL OUTCOMES

STATE GOAL 6: DEMONSTRATE AND APPLY A KNOWLEDGE AND SENSE OF NUMBERS, INCLUDING NUMERATION AND OPERATIONS (ADDITION, SUBTRACTION, MULTIPLICATION, DIVISION) PATTERNS, RATIOS, AND PROPORTIONS.

Why this goal is important: Numbers and operations on numbers play fundamental roles in helping us make sense of the world around us. Operations such as addition, subtraction, multiplication, and division as well as the ability to find powers and roots, extend the notion of numbers to create tools to model situations and solve problems in our everyday lives.

GOAL 6 - STANDARD A: Demonstrate knowledge and use numbers and their representations in a broad range of theoretical and practical settings.

- Recognize, translate between, and apply multiple representations of rational numbers
- Read, write, recognize, model, and interpret integers, including translating numerical expressions into word problems or word problems into numerical expressions (e.g., a number subtracted from 10 is the same as $10 - x$).
- Order and compare integers, terminating decimals, fractions, and mixed numbers.
- Solve problems involving descriptions of numbers, including characteristics and relationships (e.g., square numbers).

GOAL 6 - STANDARD B: Investigate, represent, and solve problems using number facts, operations (addition, subtraction, multiplication, division) and their properties, algorithms, and relationships.

- Identify and apply order of operations to simplify numeric expressions involving whole numbers, fractions, and decimals.
- Add, subtract, multiply, and divide mixed numbers.
- Identify and apply the following properties of operations with rational numbers:
 - Commutative
 - Associative
 - Distributive
 - Additive
 - Multiplicative
 - Inverse
 - Zero
- Solve problems using the appropriate form of a rational number (fraction, decimal, or percent).

GOAL 6 - STANDARD C: Compute and estimate using mental mathematics, paper- and pencil methods, calculators, and computers.

- Make estimates appropriate to a given situation, and analyze what effect the estimation method used has on the accuracy of the results
- Justify and estimation method and verify the reasonableness of the answer result

GOAL 6 - STANDARD D: Solve problems using comparison of quantities, ratios, proportions, and percents.

- Create and explain ratios that represent a given situation
- Use ratios to describe problem situations
- Read, write, recognize, model, and interpret percents from 0 to 100%

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STATE GOAL 7: ESTIMATE, MAKE, AND USE MEASUREMENTS OF OBJECTS, QUANTITIES, AND RELATIONSHIPS AND DETERMINE ACCEPTABLE LEVELS OF ACCURACY.

Why this goal is important: Measurement provides a way to answer questions about “how many,” “how much,” and “how far.” It is an indispensable component of business, manufacturing, art medicine, and many other aspects of life. All people must be able to choose an appropriate level of accuracy for a measurement, to select what measuring instruments to use, and to correctly determine the measures of objects, space, and time.

GOAL 7 - STANDARD A: Measure and compare quantities using appropriate units, instruments and methods.

- Sketch with given specifications line segments, angles, triangles, and quadrilaterals.
- Solve problems involving the conversions with the same measurement system for capacity and square units.
- Understand the difference between surface area and volume and demonstrate that two objects may have the same surface area but different volumes or may have the same volume, but different surface areas.
- Determine a missing term in a sequence, extend a sequence, and construct and identify a rule that can generate the terms of an arithmetic or geometric sequence.

GOAL 7 - STANDARD B: Estimate measurements and determine acceptable levels of accuracy.

- Compare and estimate length, area, perimeter, volume, weight, mass, and angles (0 degrees to 180 degrees) using a given referent.

GOAL 7 - STANDARD C: Select and use appropriate technology, instruments, and formulas to solve problems, interpret results, and communicate findings.

- Determine the volume and surface area of a right rectangular prism and circular prism using an appropriate formula or strategy.
- Solve problems involving scale drawings and maps.

STATE GOAL 8: USE ALGEBRAIC AND ANALYTICAL METHODS TO IDENTIFY AND DESCRIBE PATTERNS AND RELATIONSHIPS IN DATA, SOLVE PROBLEMS, AND PREDICT RESULTS.

Why this goal is important: Algebra unites patterns and quantities in patterns with the means of describing change through the use of variables and functions. Its concepts and analytical methods allow people to consider general solutions to problems with common characteristics and develop related formulas. All people must be able to use algebraic methods to construct and examine tables of values; to interpret the relationships expressed by patterns in these tables; to relate change and variation in changes; and to find solutions to everyday problems using algebra’s symbolic manipulation and formulas.

GOAL 8 - STANDARD A: Describe numerical relationships using variables and patterns.

- Simplify algebraic expressions by identifying and combining like terms.
- Recognize equivalent forms of algebraic expressions.
- Describe and apply properties of arithmetic and multiplicative and additive inverses.

GOAL 8 - STANDARD B: Interpret and describe numerical relationships using tables, graphs, and symbols.

- Graph and interpret inequalities on a number line.
- Understand the relationship among tables, graphs, and symbols for a given set of data.

GOAL 8 - STANDARD C: Solve problems using systems of numbers and their properties.

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- Represent and analyze problems with linear equations.
- Justify algebraic solutions using number properties.

GOAL 8 – STANDARD D: Use algebraic concepts and procedures to represent and solve problems.

- Represent written words with algebraic expressions or equations.

STATE GOAL 9: USE GEOMETRIC METHODS TO ANALYZE, CATEGORIZE, AND DRAW CONCLUSIONS ABOUT POINTS, LINES, PLANES, AND SPACE.

Why this goal is important: Geometry provides important methods for reasoning and solving problems with points, lines, planes, and space. While we still use modern technology and employ a wider variety of mathematical tools today, we still study geometry to understand the shapes and dimensions of our world. Historically, geometry is a way to develop skill in forming convincing arguments and proofs. This goal of developing a means to argument and validation remains an important part of our reasons for studying geometry today.

GOAL 9 - STANDARD A: Demonstrate and apply geometric concepts involving points, lines, planes, and space.

- Solve problems involving two- and three-dimensional shapes.
- Identify, describe, and determine the radius and diameter of circle.
- Identify or analyze relationships of angles formed by intersecting lines.
- Solve problems using properties of triangles and quadrilaterals (e.g., opposite sides of a parallelogram are congruent).

GOAL 9 - STANDARD B: Identify, describe, classify, and compare relationships using points, lines, planes, and solids.

- Recognize which attributes (such as shape, perimeter, and area) change or do not change when plane figures are compound, decomposed, or rearranged.
- Represent and analyze shapes using coordinate geometry; e.g., given three vertices and the type of quadrilateral, find the coordinates of the fourth vertex.
- Determine if figures are similar and identify relationships between corresponding parts of similar figures.

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STATE GOAL 10: COLLECT, ORGANIZE, AND ANALYZE DATA USING STATISTICAL METHODS; PREDICT RESULTS; AND INTERPRET UNCERTAINTY USING CONCEPTS OF PROBABILITY.

Why this goal is important: The ability to understand and interpret data (e.g., opinion polls, stock prices, tax rates, crime statistics, scientific studies, weather reports) grows more important each day. Students must be able to organize data, make sense of variables and patterns, and judge the logical reasonableness of any claims and interpretations made. All students need to understand and apply the role probability plays in data collection and decision-making. Data analysis and use are important abilities necessary for all careers.

GOAL 10 - STANDARD A: Organize, describe and make predictions from existing data.

- Compare different representations of the same data.

GOAL 10 - STANDARD B: Formulate questions, design data collection methods, gather, and analyze data and communicate findings.

- Read, create, and interpret box-and-whisker plots, stem-and-leaf plots, and other types of graphs.

GOAL 10 - STANDARD C: Determine, describe, and apply the probabilities of events.

- Find theoretical and experimental probabilities.
- Use tree diagrams, the counting principle, permutations, and combinations to solve problems.

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