

MATHEMATICS Fifth Grade

VALUES AND ATTITUDES	The student will: Recognize that there is a definite sense of order in God's world. Understand numbers, ways of representing numbers, relationships among numbers, and number systems. God's universe is composed of appropriate spacing, measurement and geometric designs. Use visualization, spatial reasoning, and geometric modeling. Understand patterns, relations, and functions. Use varied methods for analyzing data. Use the ability to reason with our mind. Develop mathematical knowledge through problem solving.
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STRAND A Number Sense, Numeration, and Numerical Operations

OBJECTIVES
Rational numbers <ul style="list-style-type: none">• Use place value through millions.• Round whole numbers to the nearest tens, hundreds, thousands, ten thousand and one-hundred thousand.• Demonstrate the commutative and associative, identity and distributive properties of rational numbers.• Estimate products.• Multiply whole numbers by a 2- or 3-digit factor.• Relate exponential notation to repeated multiplication.• Estimate and solve division problems with 2- and 3- digit divisors.• Simplify numerical expressions using the order of operations.• Find and explain multiples, common multiples, and least common multiple of numbers.• Find and explain factors, common factors, and greatest common factor of numbers.• Identify prime and composite numbers less than 100.• Use Sieve of Eratosthenes.• Determine if there is sufficient information to solve a problem.• Identify missing or extraneous data when solving problems.• Solve multi-step problems using an organized approach, and multiple strategies including: restating the problem; classifying lists; and, writing a number sentence.• Verify and interpret results with respect to the original problem.• Use calculator to analyze patterns and relationships among whole numbers, decimals and rational numbers.• Solve complex single step problems that require addition, subtraction, multiplication and division using a calculator.
Large and small numbers, positive integers, decimals, and fractions <ul style="list-style-type: none">• Identify and explain equivalent decimals and fractions at the symbolic level.• Compare and order numbers with decimals to the thousandths place.• Compare and order fractions that are written with the same numerators, common denominators or different denominators.• Rewrite whole numbers as fractions with varying denominators.

- Write mixed numbers when given models.
- Change improper fractions to mixed numbers and mixed numbers to improper fractions.
- Use models or illustrations to write numbers as improper fractions.
- Add and subtract fractions with like denominators.
- Multiply a fraction by a whole number.
- Use models and pictures to add and subtract fractions and mixed numbers with unlike denominators.
- Find like denominators using LCD.
- Estimate results and compute sums and differences with decimal numbers.
- Estimate results with addition and subtraction of mixed numbers.
- Use models and pictures to multiply a whole number by a decimal number; record and explain.
- Interpret percents as part of a hundred.
- Find decimal and percent equivalents for common fractions and explain why they represent the same value.
- Compute a given percent of a whole number.
- Identify and represent, on a number line, decimals, fractions, mixed numbers, and positive and negative integers.
- Demonstrate the relationship between fractions and decimals.
- Identify equivalent fractions when given two or more commonly used fractions.

Addition, subtraction, and simple multiplication and division of fractions and decimals

- Add, subtract, multiply and divide with decimals.
- Add with negative integers; subtract positive integers from negative integers; and verify the reasonableness of the results.
- Demonstrate proficiency with division, including division with positive decimals and long division with multi-digit divisors.
- Understand the concept of multiplication and division of fractions.
- Compute and perform simple multiplication and division of fractions.
- Apply procedures to solving problems.
- Find the reciprocal of a fraction, whole number or mixed number.
- Solve simple problems involving addition and subtraction of fractions and mixed numbers. Express answers in simplest form.

STRAND B Spatial Sense, Measurement, and Geometry

OBJECTIVES

Properties and relationships in geometry, and standard units of metric and customary measurement

- Use and make models to demonstrate formulas for the area and perimeter of squares and rectangles.
- Use and make models to compare units of area within the same system.
- Use and make models to investigate and compare units of volume.
- Calculate the area and perimeter of rectangles and the perimeters of plane figures.
- Select appropriate metric/English units to determine linear measure of an object.
- Compare and classify polygons and polyhedra using concrete and pictorial representations and appropriate vocabulary and to create models of polyhedra including cubes, cylinders, cones prisms, and pyramids.
- Use a compass to draw circles and to identify and determine the relationships among the radius, diameter, chord, center, and circumference.

- Use a protractor to draw and measure acute, right, and obtuse angles; identify and label the vertex, rays, interior and exterior of an angle.
- Draw two-dimensional views of three dimensional objects made from rectangular solids.
- Use a variety of quadrilaterals and triangles to draw conclusions about the sum of the measures of the interior angles.
- Use grids to model proportions by reducing or enlarging drawings.
- Investigate similar figures using rulers and protractors.
- Understand the concept of volume and use the appropriate units in common measuring systems to compute the volume of rectangular solids.
- Solve multi-step problems involving geometry, spatial visualization, and measurement including length, weight, time, capacity, temperature, perimeter, area, and volume.
- Verify and interpret results.
- Identify alternate strategies for solving a problem.
- Use calculators and computers when appropriate for problem solving.

STRAND C Patterns, Algebra, and Functions

OBJECTIVES

Patterns, relationships, and elementary algebraic representation

- Investigate patterns that occur when changing numerators or denominators of fractions.
- Identify and use the rules for divisibility.
- Make generalizations and predict results using patterns, relationships, and functions occurring in computation, geometry, graphs, and other applications.
- Represent variables, expressions, and relationships using models.
- Solve multi-step problems involving patterns, relationships, and functions.
- Identify and graph ordered pairs in the four quadrants of the coordinate plane.

STRAND D Data, Probability, and Statistics

OBJECTIVES

Graphing, probability and data analysis

- Interpret and construct line graphs and bar graphs.
- Explain decision process in selecting and constructing appropriate graphs, e.g., pictograph, bar, line plot, circle, and line graph.
- Systematically collect, organize, display and interpret data using information from a variety of content areas.
- Compare complex displays of data on the same graph, computer applications, and Venn diagrams.
- Determine the mean of a given set of data.
- Describe a set of data using the range, median, mean and mode.
- Identify ordered pairs of data from a graph and interpret the meaning of the data in terms of the situation depicted by the graph.
- Know how to write ordered pairs correctly.
- Show all arrangements (permutations) and combinations of up to four items and explain all possible outcomes.
- Compare experimental and theoretical (expected) results for a variety of simple experiments.
- Use an organized approach and appropriate strategies to solve multi-step problems involving graphing, probability, and statistics.
- Use fractions and percentages to compare data sets of different sizes.

STRAND E Mathematical Reasoning

OBJECTIVES

Problem solving

- Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, sequencing and prioritizing information, and observing patterns.
- Determine when and how to break a problem into simple parts.
- Solve problems using two or more steps.
- Identify missing information needed to solve a problem.
- Use estimation to verify the reasonableness of calculated results.
- Apply strategies and results from simpler problems to more complex problems.
- Use a variety of methods, e.g., words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.
- Express the solution clearly and logically by using the appropriate mathematical notation and terms; support solutions with evidence in both verbal and symbolic work.
- Indicate the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.
- Make precise calculations and check the validity of the results from the context of the problem.
- Evaluate the reasonableness of the solution in the context of the original situation.
- Note the method of deriving the solution and demonstrate a conceptual understanding of the derivation by solving similar problems.
- Develop generalizations of the results obtained from solving a problem and apply them in other circumstances.