

**Mathematics
Grade 5
Gifted and Talented**

QUARTER 1

Problem Solving Strategies

Objectives - The student will demonstrate the ability to:

- a. Select and then apply appropriate strategies to solve a problem from visual (draw a picture or diagram, create list, table or graph, act it out, use manipulatives, use spatial reasoning), numerical (guess and check, look for a pattern) symbolic (write an equation or number sentence, working backwards) perspectives.

Number Relationships and Computation – Number Theory and Place Value

Objectives – The student will demonstrate the ability to:

- a. Read and write whole numbers to billions and decimals through ten-thousandths for any stated place value.
- b. Compare and order or describe whole numbers and decimals with or without relationship symbols ($<$, $>$, $=$, \neq).
- c. Round whole numbers and decimals for any stated place value.
- d. Express whole numbers in expanded form using powers of ten and exponential notation.
- e. Calculate powers of whole numbers and square roots of perfect squares of whole numbers.
- f. Estimate the square root of a given number and justify in writing.
- g. Identify and describe the characteristics of numbers divisible by 2, 3, 4, 5, 6, 7, 9, 10, 11, and 13.
- h. Identify and describe numbers as prime and composite.
- i. Identify factors and prime factors using factor trees and prime factorization in exponential form.
- j. Compare and contrast factors and multiples.
- k. Solve problems using factors and multiples.
- l. Evaluate numerical expressions using order of operation involving whole numbers, fractions, and/or decimals.

Number Relationships and Computation (Whole Numbers and Decimals)

Objectives – The student will be able to:

- a. Estimate and calculate sums and differences of whole numbers and decimals, including money using appropriate method of computation (mental mathematics, use of a calculator, use and discovery of alternate algorithms.)
- b. Estimate and calculate products of whole numbers and decimals including money.
- c. Estimate and calculate quotients using whole numbers and decimals with whole number and decimal divisors.
- d. Divide a decimal by a decimal and annex zeros in the dividend.
- e. Divide using short division, when appropriate.
- f. Interpret quotients and remainders mathematically and in the context of a problem.
- g. Apply identity, zero, commutative, associative, and distributive properties.

- h. Calculate equivalent units of length, capacity, and mass within the metric system.
- i. Solve problems involving sums, differences, products, and quotients including area and perimeter of problems.
- j. Express whole numbers in scientific notation.

Algebra, Patterns, and Functions

Objectives – The student will be able to:

- a. Identify, extend, analyze, and create numeric patterns and sequences.
- b. Identify and extend arithmetic and geometric sequences.
- c. Complete and extend one- and two-operation function tables.
- d. Analyze and describe the relationship that generates a two-operation rule.
- e. Determine rule for a given function table involving 1 or 2 operations and write the rule in algebraic form.
- f. Create one- and two-operation function tables to solve real world problems.
- g. Explore number theory within patterns such as triangular numbers. Pascal's triangle, and the Fibonacci sequence.

QUARTER 2

Problem Solving Strategies

Objectives - The student will demonstrate the ability to:

- a. Select and then apply appropriate strategies to solve a problem from visual (draw a picture or diagram, create list, table or graph, act it out, use manipulatives, use spatial reasoning), numerical (guess and check, look for a pattern) symbolic (write an equation or number sentence, working backwards) perspectives.

Statistics

Objectives – The student will be able to:

- a. Analyze, interpret, and make predictions (in oral and written form) based on tables, frequency tables, stem-and leaf plots, back-to-back stem-and-leaf plots, line plots, double bar graphs, line graphs, double line graphs, circle graphs, and histograms.
- b. Determine the appropriate type of graph to effectively display data using tables (frequency tables), single and double bar graphs, single and double line graphs, stem-and-leaf plots, and line plots.
- c. Describe the shape and important features of a data set (using terms such as cluster, range, and outlier).
- d. Calculate and interpret measures of central tendency (mean, median, and mode) to interpret data sets.
- e. Apply the range and measures of central tendency to solve a problem or answer a question.
- f. Determine the affect of an outlier on the mean.
- g. Determine the affect of changes in a data set on the mean.

Number Relationships and Computation (Fractions) and Probability

Objectives – The student will be able to:

- a. Determine the possible outcomes of independent events using an organized list and tree diagram.

- b. Find the probability of an event with equally likely outcomes and express as a fraction, decimal, or percent.
- c. Compare the outcomes of theoretical probability with results of experimental probability.
- d. Express fractions as decimals and decimals as fractions.
- e. Compare and order fractions and mixed numbers mathematically and on a number line.
- f. Identify least common multiples (LCM) and greatest common factor (GCF) using prime factorization.
- g. Estimate and calculate the sums and differences of fractions, whole numbers, and mixed numbers in problem solving situations, expressing results in simplest form.
- h. Estimate and calculate the product of fractions, whole numbers, and mixed numbers.
- i. Connect fraction of a whole number with percent of a whole number and solve.
- j. Estimate and calculate the quotients of fractions, whole numbers, and mixed numbers in problem solving situations, expressing results in simplest form.
- k. Write a proportion with a missing element to make equivalent fractions.
- l. Apply ratios and unit rates to solve problems.
- m. Calculate equivalent units of length, capacity, and weight within the customary system.
- n. Calculate equivalent units of time.
- o. Determine start, elapsed, and end time.

QUARTER 3

Problem Solving Strategies

Objectives - The student will demonstrate the ability to:

- a. Select and then apply appropriate strategies to solve a problem from visual (draw a picture or diagram, create list, table or graph, act it out, use manipulatives, use spatial reasoning), numerical (guess and check, look for a pattern) symbolic (write an equation or number sentence, working backwards) perspectives.

Geometry

Objectives – The student will be able to:

- a. Identify, describe, and classify lines as intersecting, parallel, or perpendicular.
- b. Identify, describe, measure angles formed by intersecting lines, line segments, and rays. (Vertical, adjacent, complementary, and supplementary angles.)
- c. Identify angles formed when two parallel lines are cut by a transversal.
- d. Identify, classify, measure (using a protractor), draw, and label acute, right, and obtuse angles.
- e. Identify regular polygons to dodecagons.
- f. Identify polygons within a composite figure.
- g. Identify and classify triangles by sides and angles.
- h. Find the sum of the interior angles of a triangle and calculate the measure of a missing angle.
- i. Compare, classify, and analyze geometric relationships in quadrilaterals by length of sides and measure of angles.

- j. Explore the relationship between the number of angles in a polygon and the measures of interior angles. Determine the measure of a missing angle.
- k. Explore the relationship between the legs and hypotenuse of right triangles.
- l. Explore the Pythagorean theorem.
- m. Analyze properties of 2-dimensional figures on a coordinate plane.
- n. Identify and describe congruent and similar polygons and their corresponding parts.
- o. Analyze translations, reflections, and rotations of geometric figures.
- p. Identify, describe, and plot the results of transformations on a coordinate plane in quadrant I.
- q. Identify and describe the parts of a circle.
- r. Identify and classify triangular and rectangular pyramids and prisms by the number of edges, faces, vertices, and base.
- s. Explore Euler's Formula to show the relationship among the number of faces, vertices, and edges of 3-dimensional figures.
- t. Compare a plane figure to surfaces of solid geometric figures.

Measurement

Objectives – The student will be able to:

- a. Measure angles with a protractor to the nearest degree.
- b. Construct angles using a protractor.
- c. Describe the relationship between the parts of a circle.
- d. Recognize and interpret π .
- e. Find circumference of a circle given the radius and diameter.
- f. Construct a circle with a specific radius or diameter using a compass or ruler.
- g. Discover and calculate the area of triangles, trapezoids, parallelograms, and circles using appropriate formulas.
- h. Calculate the area and perimeter of composite figures consisting of rectangles, triangles, and/or circles.
- i. Determine the lengths of the sides of a regular polygon given the perimeter.
- j. Calculate the surface area of rectangular prism, rectangular pyramid, and a cylinder using the appropriate formula.
- k. Calculate the volume of solid figures including cylinders and rectangular prisms.
- l. Explore scale drawings.
- m. Explore proportionality in determining similarity in plane figures.

Number Relationships and Computation (Integers)

Objectives – The student will be able to:

- a. Read, write, and represent integers and their absolute value.
- b. Compare and order integers using relational symbols ($<$, $>$, $=$) and on a number line.
- c. Add, subtract, multiply, and divide integers.
- d. Calculate powers of integers.
- e. Use order of operations to evaluate mathematical expressions with integers.
- f. Locate points on a number line and on a coordinate graph in all four quadrants.
- g. Graph transformations on a coordinate plane in all four quadrants.

QUARTER 4

Problem Solving Strategies

Objectives - The student will demonstrate the ability to:

- a. Select and then apply appropriate strategies to solve a problem from visual (draw a picture or diagram, create list, table or graph, act it out, use manipulatives, use spatial reasoning), numerical (guess and check, look for a pattern) symbolic (write an equation or number sentence, working backwards) perspectives.

Algebra, Patterns, and Functions

Objectives – The student will be able to:

- a. Write and evaluate algebraic expressions to represent unknown quantities using whole numbers, fractions, and decimals.
- b. Simplify algebraic expressions represented by physical models by combining like terms.
- c. Simplify algebraic expressions by combining like terms.
- d. Write equations to represent relationships and real-life situations.
- e. Solve for the unknown in one-and two-step equations.
- f. Identify and write inequalities to represent relationships and real world situations.
- g. Solve an inequality with one variable and graph situations on a number line.
- h. Graph linear data from a function table.
- i. Identify and describe the change represented in a linear graph.
- j. Translate the graph of a linear relationship on to a table of values that illustrates the type of change.
- k. Explore the rate of change (slope) of a linear relationship using a table of values and a graph.
- l. Apply linear equations and their function tables and graphs to real-life situations ($d = rt$).
- m. Interpret information from a scatter plot.

Number Relationships and Computation (Ratios, Proportions, and Percents)

Objectives – The student will be able to:

- a. Represent ratios in a variety of ways.
- b. Use rates and unit rates to solve problems.
- c. Write a proportion with a missing element to solve a problem.
- d. Investigate the meanings of percents, less than 1%, and greater than 100%.
- e. Estimate and compute a percent of a given number.
- f. Apply the formula $I = prt$ to calculate simple interest.
- g. Calculate discounts, sale price, and sales tax.
- h. Explore construction of circle graphs as an application of percent.

Unit 11: Number Relationships and Computation

Objectives – The student will be able to:

- a. Identify place value for base five numerals.
- b. Convert between base five and base ten numerals.
- c. Explore operations of addition, subtraction, and multiplication in base five.
- d. Express a numeral from another base as a base ten numeral.
- e. Explore real world applications of binary number system.
- f. Explore ancient number systems with place value (Babylonian and Mayan) as an extension of pattern.