Mathematics
Grade 4
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 millions and decimals through thousandths in standard and expanded form.
b. Round whole numbers and decimals to any stated place value.
c. State the value of each digit in a whole number through millions and a given decimal numeral through thousandths.
d. Explore patterns found in ancient number systems including Roman and Egyptian.
e. Compare, order, and describe decimals with or without using relationship symbols ($<$, $>$, $=$, $\neq$) and by placing decimals on a number line.
f. Examine relationships among metric units of length (mm, cm, m).
g. Estimate and measure length, using metric units. Select and use appropriate tools and units.
h. Identify and describe the characteristics of numbers divisible by 2, 3, 4, 5, 6, 9, and 10.
i. Identify prime and composite numbers through 100.
j. Identify factors and prime factors using factor trees.
k. Identify multiples.
l. Identify and define perfect squares and their square roots.
m. Write exponents to express powers of numbers and convert powers of numbers to standard form.
n. Explore writing numerals in expanded form using exponential notation.
o. Explain and apply the order of operations to evaluate numerical expressions using whole numbers.

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 using appropriate method of computation (mental mathematics, use of a calculator, use and discovery of alternate algorithms.
b. Apply addition and subtraction of whole numbers and decimals to money.

c. Multiply multiples of 10 by a one-or two-digit factor using mental computation.
d. Estimate and calculate products of whole numbers using appropriate method of computation (mental mathematics, use of a calculator, use and discovery of alternate algorithms.)
e. Estimate and calculate quotients of multiples of 10 by multiples of 10 using mental computation.
f. Estimate and divide whole numbers with 1 and 2-digit divisor using appropriate method of computation (mental mathematics, use of a calculator, use and discovery of alternate algorithms.)
g. Identify and apply identify, zero, commutative, associative, and distributive properties.
h. Interpret the meaning of a remainder in a problem-solving situation and justify in writing.
i. Select operations and appropriate symbols to solve multi-step problems, including problems involving perimeter and area.

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.

Algebra, Patterns, and Functions

Objectives – The student will be able to:

a. Identify, extend, create, and describe a variety of numeric and non-numeric patterns and generalize rules illustrated.
b. Interpret and write a rule for a function table involving one operation (+, -, x, ÷ with no remainders).
c. Complete a function table involving one or two operations.
d. Create a function table with one operation to solve a real world problem.
e. Apply a given two-operation rule for a pattern.
f. Determine the rule for a pattern involving two operations and write the rule in words or algebraic form.
g. Translate and evaluate situations into numerical and algebraic expressions.
h. Solve for the unknown in an equation using mental math and guess and check.

Statistics

Objectives – The student will be able to:

a. Analyze, interpret, and make predictions (in oral and written form) based on tables, single and double bar graphs, line plots, single and double line graphs, stem and leaf plots, and circle graphs.

b. Describe the shape and important features of a data set (using the terms cluster, range, and outlier).
c. Calculate the mean, median, and mode of a data set.
d. Interpret a data set based on the mean, mode, and range.
e. Determine the effect of outliers on the mean.

Number Relationships and Computation (Fractions)

Objectives – The student will be able to:

a. Construct models using a variety of manipulatives to illustrate a fraction for a region or part of a set.
b. Interpret a fraction as a representation of division.
c. Represent the relationship between fractions and decimals through models and symbols.
d. Estimate the value of a fraction and a decimal as being close to 0, 1/2, and 1 and indicate their placements on a number line.
e. Estimate and measure length and height using customary units.
f. Find factors and common factors of numbers.
g. Simplify fractions using the greatest common factor.
h. Find multiples, common multiples, and least common multiples (LCM) in order to determine least common denominator (LCD).
i. Calculate equivalent fractions.
j. Rename mixed numerals as improper fractions and improper fractions as mixed numerals.
k. Compare and order fractions, mixed numbers, decimals (through thousandths) and percents on a number line.
l. Determine equivalent decimals.
m. Express a fraction as a decimal and percent, and a decimal as a fraction and percent.

Probability

Objectives – The student will be able to:

a. List all possible outcomes of independent events using organized lists and tree diagrams.
b. State the probability of independent events for outcomes of equally likely, more (or most) likely, less (least) likely, certain, and impossible.
c. Find the probability of an independent event and express as a fraction, decimal, and percent.
d. Use theoretical probability to predict outcomes of an experiment.
e. Conduct an experiment and compare the results to predictions based on theoretical probability.
f. Explore the analysis of given game situations (spinner, dice, cubes, etc.) for fairness.

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, label with correct symbolic notation, and draw points, lines, line segments, rays, and planes.
b. Identify ordered pairs in Quadrant I.
c. Plot ordered pairs to construct points, lines, line segments, rays in Quadrant I.
d. Identify, describe, and classify lines as intersecting, parallel, or perpendicular.
e. Identify, classify, estimate, measure (using a protractor), draw and label with correct symbolic notation acute, right, obtuse, straight, and reflex angles.
f. Identify and describe the parts of a circle.
g. Describe the relationship between the radius and the diameter of a circle.
h. Identify the characteristics of quadrilaterals: square, rectangle, parallelogram, rhombus, and trapezoid.
i. Determine the perimeter for regular figures (use formulas when appropriate) and irregular figures (measuring and partitioning).
j. Determine the missing dimension of quadrilaterals given the perimeter using whole numbers, fractions, and decimals.
k. Analyze properties of polygons through dodecagons using the number of sides, length of sides, and the measure of the angles.
l. Plot ordered pairs and use them to construct polygons in Quadrant I.
m. Identify and model transformations: translations, reflections, and rotations.
n. Identify, describe, and represent similarity and congruency with geometric figures and real-world objects.
o. Identify and describe linear and rotational symmetry of two-dimensional shapes.
p. Identify cones, cylinders, rectangular and triangular prisms, and rectangular and triangular pyramids.
q. Identify, compare, and analyze attributes of three-dimensional shapes using the number of edges, faces, and vertices.
r. Analyze the surface of a solid geometric figure to determine the plane figures.
s. Determine the area of squares, rectangles, and irregular figures formed by squares and rectangles.
t. Explain what happens to the perimeter and area of squares and rectangles when one of the dimensions changes.

Number Relationships and Computation (Fractions) and Measurement

Objectives – The student will be able to:

a. Estimate, add, and subtract fractions and mixed numerals with like and unlike denominators with renaming.
b. Calculate equivalent units of time.
c. Determine elapsed time and end time.

d. Illustrate and model the product of a whole number and a fraction.
e. Estimate and multiply a fraction by a whole number.
f. Illustrate and model the product of two fractions in order to show why the product of two fractions is smaller than either factor.
g. Estimate and multiply a fraction by a fraction and express in simplest form.
h. Estimate and multiply a mixed number by a whole number, a fraction by a mixed number, and a mixed number by a mixed number and express in simplest form.
i. Estimate and divide a whole number by a fraction.
j. Determine equivalent units of capacity, weight, and length in customary units.

Number Relationships and Computation (Decimals)

Objectives – The student will be able to:

a. Multiply and divide a decimal through thousandths by 10, 100, and 1,000 using mental computation.
b. Determine equivalent units of capacity, mass, and length within the metric system.
c. Estimate and calculate products of a whole number by a decimal.
d. Estimate and calculate products of a decimal by a decimal.
e. Multiply two decimals when zero must be added to the product.
f. Estimate and calculate quotients of a decimal by a whole number.

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.

Number Relationships and Computation (Ratios and Proportions)

Objectives – The student will be able to:

a. Read and write ratio notations to compare two quantities.
b. Write equal ratios by finding equivalent fractions.
c. Use proportion reasoning to solve a problem using equivalent fractions.
d. Define the term percent.
e. Express a fraction and decimal as a percent and percent as a fraction and decimal.
f. Estimate and calculate the percent of a given number using benchmark percents (1%, 10%, 20%, 50%).
g. Solve real-life problems using benchmark percents.
h. Explore algorithms for finding percent of a number.

Number Relationships and Computation (Integers)

Objectives – The student will be able to:

a. Identify and define positive and negative integers.
b. Locate positive and negative integers on a number line.
c. Compare, order, and describe integers on a number line.
d. Name an ordered pair from a point on the coordinate plane in all four quadrants.
e. Plot ordered pairs on a coordinate plane in all four quadrants.
f. State and define the absolute value of an integer.
g. Use the additive inverse property to create zero pairs.
h. Add negative and positive integers.
i. Solve one-step equations involving addition, subtraction, multiplication, and division.
j. Explore two-step equations with positive and negative integers using algebra and function tables.

Statistics (Constructing Graphs)

Objectives – The student will be able to:

a. Identify and apply sampling methods (observations, surveys, experiments) and random sampling.
b. Collect data by conducting surveys to answer a question.
c. 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.
d. Organize and display data using tables (frequency tables), single and double bar graphs, single and double line graphs, stem-and-leaf plots, and line plots.
e. Use graphing software (i.e. GraphLinks, GraphPower, GraphClub, or MS Excel) to construct tables and graphs.
f. Interpret and compare data in tables (frequency tables), single and double bar graphs, single and double line graphs, stem-and-leaf plots, and line plots.
g. Recognize misuses of data and analyze misleading data representation.