Mathematics

Kindergarten-Grade 1

Algebraic Concepts

Sets: Create/Recognize
The learner will be able to construct and recognize sets with more, less, or equal members by matching.

Number Sentence: Create Problems
The learner will be able to develop problem scenarios leading to given number sentences using addition and subtraction.

Whole Numbers

Addition: Represent
The learner will be able to represent any situation involving the combining of sets as addition.

Addition/Subtraction: Develop/Apply
The learner will be able to develop and apply strategies for solving addition and subtraction basic facts.

Addition: Solve/Problems/Models
The learner will be able to apply concrete models to obtain solutions to basic addition problems.

Numeration

Patterns: Recognize/Explain/Extend
The learner will be able to recognize, explain, extend, reproduce, and create color, rhythmic, shape, number, and letter patterns possessing simple characteristics.

Mathematics Processes

Sorting: Classify/Objects
The learner will be able to recognize, sort, and classify objects according to size, number and other characteristics.

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Geometry

Shapes: Construct/Recognize/Sort
The learner will be able to construct, recognize, and sort basic two- and three-dimensional shapes (circle, square, rectangle, triangle) using concrete materials.

Positions: Relative
The learner will be able to identify, describe and interpret relative positions between objects (before, between, near, etc.).

Geometric Concepts: Explore/Environment
The learner will be able to explore the geometry present in the environment.

Measurement

Time: 1/1/2 Hour
The learner will be able to record time to the nearest hour and half-hour using an analog or digital clock.

Tools/Instruments: Choose/Apply
The learner will be able to choose or apply measurement tools for length, volume, temperature, and weight, and units of measure suitable for the given situation.

Money: Count/Compare
The learner will be able to count and compare a group of pennies, nickels, dimes, and quarters whose total is $2.00 or less.

Data Interpretation

Data: Collect/Represent/Interpret
The learner will be able to collect and represent information and interpret findings using pictures and bar graphs.

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Grades 2-3

Whole Numbers

Whole Numbers: Read/Write/Count/Model
The learner will be able to read, write, count, and model whole numbers.

Addition/Subtraction: Represent
The learner will be able to use concrete objects, pictures, and/or symbols to represent addition and subtraction with whole numbers.

Multiplication Facts: 12 X 12
The learner will be able to show verbal and/or written ability in applying multiplication facts up to 12 X 12.

Fractions

Fractions Parts: Through Tenths
The learner will be able to recognize, model, illustrate, and talk about fractional parts of a whole, and/or equivalent fractions.

Number Theory

Equivalent Forms: Identify/Formulate
The learner will be able to identify and formulate equivalent forms of whole numbers and common fractions.

Odd/Even: Describe/Difference
The learner will be able to apply physical objects or illustrations to describe the difference between odd and even numbers.

Numeration

Skip Counting: Use/Patterns/100
The learner will be able to use number patterns to skip count by ones, twos, fives, and tens.

Patterns: Extend/Infinitely
The learner will be able to extend number or object patterns that can be continued.

Patterns: Represent/Relationships

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The learner will be able to represent simple patterns and relationships using pictures, tables, charts, and graphs.

Algebraic Concepts

Fact Family: Multiplication/Represent
The learner will be able to use manipulatives to create representations of multiplication number facts.

Number Sentence: Completing
The learner will be able to complete simple number sentences using operational symbols and whole numbers.

Properties: Apply/Commutative
The learner will be able to apply the commutative property of addition.

Mathematics Processes

Modeling: Math Situations
The learner will be able to make models of problem scenarios, and make descriptions and evaluations of mathematical concepts and situations either in a graphic or written form.

Modeling: Illustrate/Change
The learner will be able to use models to illustrate qualitative and quantitative change in real world contexts.

Geometry

Shapes: Know/Attributes
The learner will be able to describe and compare characteristics of two- and three-dimensional figures.

Congruent/Similar: Justify
The learner will be able to comprehend methods for justifying that two figures are congruent or similar.

Symmetry: Demonstrate/Lines
The learner will be able to demonstrate lines of symmetry for geometrical figures.

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Real Numbers and the Coordinate Plane

Coordinate Systems: Name/Locations
The learner will be able to name locations in coordinate systems.

Measurement

Tools/Instruments: Choose/Apply
The learner will be able to choose or apply measurement tools for length, volume, temperature, and weight, and units of measure suitable for the given situation.

Time: Quarter-Hour/Tell
The learner will be able to tell time to the nearest five minutes using both analog and digital clocks.

Money: Compute/Simple
The learner will be able to perform simple computations with money, make change, figure out the number of items which can be purchased, calculate the total amount of money required for a purchase, etc.

Units: Create/Referents
The learner will be able to create common referents for measurement units for length, weight, volume (capacity), and time to formulate estimates and comparisons.

Data Interpretation

Data: Collect/Represent/Interpret
The learner will be able to collect and represent information and interpret findings using pictures and bar graphs.

Mathematics

Grades 4-6

Numeration

Compare/Order: Rational Numbers
The learner will be able to compare and order rational numbers using physical or illustrated models.

Estimate: Decide/Justify/Reasonableness
The learner will be able to decide and justify the reasonableness of solutions by approximating prior to actual computation with whole numbers.

Pattern: Geometric/Numeric
The learner will be able to extend and finish both numeric and geometric patterns.

Patterns: Identify/Explain/Represent
The learner will be able to identify, explain, and represent number and geometric patterns and relationships.

Number Theory

Equivalent Fractions/Decimals/Percents
The learner will be able to illustrate fractions as decimals and percents using physical and pictorial models.

Equivalent Forms: Compose/Decompose
The learner will be able to create equivalent representations for the same number through decomposing and composing numbers.

Classify Numbers: Explain
The learner will be able to explain classes of numbers based upon their attributes.

Algebraic Concepts

Operations: Understand/Arrays
The learner will be able to understand that arrays can illustrate multiplication, areas, and division.

Number Sentence: Recognize/Write
The learner will be able to recognize or write the suitable operation or number sentence to obtain a solution to a story problem.

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Properties: Apply
The learner will be able to apply the properties of addition and multiplication including commutative, identity/addition, associative, identity/multiplication, and distributive property.

Rates: Compare/Explain/Rate of Change
The learner will be able to compare and explain scenarios that involve constant and/or varying rates of change by applying various strategies.

Whole Numbers

Multiplication/Division: Strategies
The learner will be able to correctly apply the following strategies of multiplication and division concepts with whole numbers: commutative property, distributive property, identity property and associative property.

Multiplication Facts: 12 X 12
The learner will be able to show verbal and/or written ability in applying multiplication facts up to 12 X 12.

Integers

Integers: Recognize/Positive/Negative
The learner will be able to recognize positive and negative numbers and zero.

Mathematics Processes

Modeling: Apply/Multiple Representations
The learner will be able to apply multiple representations for situations to translate among diagrams, models, and symbolic expressions.

Geometry

Shapes: Identify/Draw/Use/Attributes
The learner will be able to recognize, draw, and apply symbolic notation to signify the characteristics of geometric shapes including points, parallel and perpendicular lines, planes, rays, and parts of a circle.

Combining/Partitioning
The learner will be able to study and predict the result of combining and/or partitioning geometric figures by drawing, representing, or describing the figure created.

Mathematics

Transformations: Investigate
The learner will be able to investigate the effect to the size, shape and position of an object after sliding, flipping turning, enlarging or reducing it.

Symmetry: Draw/Polygons
The learner will be able to draw lines of symmetry in polygons.

Representation: Recognize/Prism
The learner will be able to recognize a two-dimensional representation (net) of a rectangular prism.

Angles: Estimate
The learner will be able to approximate angles using different angles as benchmarks such as, 45, 90, and 180 degrees.

Real Numbers and the Coordinate Plane

Coordinate Systems: Find/Location
The learner will be able to use simple two-dimensional coordinate systems to find locations on a map and to illustrate points and basic figures.

Measurement

Units: Choose/Metric/Customary
The learner will be able to choose suitable customary and metric measurement units for length (include perimeter and circumference), area, capacity, volume, weight, mass, time, and temperature.

Problem Solving: Time
The learner will be able to correctly use customary and invented time units to obtain problem solutions.

Problem Solving: Estimate/Measurement
The learner will be able to approximate solutions to real world measurement problems, including estimates of time, temperature, and money.

Perimeter/Area: Regular Polygons
The learner will be able to solve problems regarding perimeter and area of regular polygons.

Conversion: Within Metric/Customary
The learner will be able to apply multiplication and division to perform conversions of units of measure within the U.S. customary or metric system.

Mathematics

Probability/Statistics

Data Collection: Answer Questions
The learner will be able to gather and organize simple data sets in order to answer questions.

Data Analysis: Compare/Sets
The learner will be able to compare several data sets in order to develop and test hypotheses, and use the findings to confirm or deny it.

Outcomes: Predict/Events
The learner will be able to use the set of possible outcomes to predict events.

Data Interpretation

Analyzing Graphs: Interpret/Compare
The learner will be able to make interpretations of graphs, tables, scales, and charts through comparison and calculations.

Mathematics

Grades 7-8

Numeration

Compare/Order: Whole Numbers/Decimals
The learner will be able to make comparisons and place in order whole numbers, integers, fractions, decimals, and percents.

Number Properties: Use/Operations
The learner will be able to use the properties of numbers and operations including inverses in algebraic situations derived from economics, business, and the sciences.

Estimate: Decide/Justify/Reasonableness
The learner will be able to decide and justify the reasonableness of solutions by approximating prior to actual computation with non-negative rational numbers.

Patterns: Study/Make/Generalize
The learner will be able to study, make, and generalize number and visual patterns including patterns that have a recursive nature.

Patterns: Represent/Translating Forms
The learner will be able to translate representations of patterns between tables, charts, and pictures.

Fractions

Problem Solving: Operations/Fractions
The learner will be able to obtain solutions to problems involving the four basic operations with fractions, decimals and percents.

Rational and Irrational Numbers

Rational Numbers: Equivalent/Represent
The learner will be able to understand, explain, and/or apply equivalent representations for rational numbers: integers, decimals, fractions, percents, ratios, numbers containing whole number exponents, and scientific notation.

Number Theory

Divisibility/Multiples/Factors
The learner will be able to determine divisibility, multiples, and common factors, including a least and greatest common factor.

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Ratios/Proportions/Percents: Understand
The learner will be able to comprehend and use ratios, proportions, and percents using many different hands-on explorations.

Integers

Multiplication/Division: Integers
The learner will be able to determine what the resulting product or quotient will be when multiplying or dividing integers.

Algebraic Concepts

Exponents: Powers/Roots
The learner will be able to determine powers, squares, and square roots, applying manipulatives, models, calculators, tables and/or mental math.

Basic Operations: Apply/Problem Solving
The learner will be able to apply the basic operations in calculation and solving problems involving whole numbers, decimals, fractions, and mixed numbers (including like and unlike denominators).

Variables: Develop/Use
The learner will be able to develop the use of variables in elementary expressions and equations.

Expressions: Create/Equivalent Forms
The learner will be able to create equivalent forms for simple algebraic expressions.

Rates: Interpret/Graphs/Rate of Change
The learner will be able to interpret graphs that illustrate rates of change.

Formulas: Surface Area
The learner will be able to devise and apply formulas for surface areas of prisms, cylinders, and spheres, using manipulatives and technology as necessary.

Functions

Functions: Determine/Linear/Justify
The learner will be able to apply the information given in a table, graph, or rule to decide whether a function is linear and justify the reasoning behind the decision.

Mathematics

Mathematics Processes

Modeling: Apply/Multiple Representations
The learner will be able to apply multiple representations for situations to translate among diagrams, models, and symbolic expressions.

Models: Understand/Examples/Visual
The learner will be able to draw or use visual models that represent patterns and relationships to solve problems.

Geometry

Shapes: Identify/Classify/Describe
The learner will be able to recognize, classify, and relate the characteristics of two- and three-dimensional figures, including similarities and differences.

Polygons: Recognize/Properties
The learner will be able to recognize polygons based on their properties, including types of interior angles, perpendicular or parallel sides, and congruence of sides.

Transformations: Investigate
The learner will be able to explore the results of different types of transformations, including translations, reflections, rotations, and glide reflections, to enrich and extend concepts including congruence, similarity, parallelism, perpendicularity, and symmetry.

Problem Solving: Scale Factors
The learner will be able to determine and apply scale factors for similar figures to obtain solutions to problems using proportional reasoning.

Symmetry: Describe/Lines
The learner will be able to describe lines of symmetry of geometric figures.

Transformation: Isometries of a Plane
The learner will be able to classify two-dimensional isometries as reflections, rotations, or translations according to their fixed points.

Angles: Draw/Appropriate Tools
The learner will be able to measure angles using appropriate tools.

Real Numbers and the Coordinate Plane

Coordinate Geometry: Use/Examine
The learner will be able to apply coordinate geometry to examine the properties of geometric shapes.

Mathematics

Measurement

Volume: Measure/Customary/Metric
The learner will be able to measure volume/capacity applying US customary or metric units.

Units of Measurement: Equivalent
The learner will be able to use estimated equivalents between the standard and metric systems to approximate measurements of area and volume.

Problem Solving: Time
The learner will be able to correctly use customary and invented time units to obtain problem solutions.

Accuracy: Tools/Precision
The learner will be able to choose and apply tools that are suitable for the desired degree of precision.

Conversion: Within Metric/Customary
The learner will be able to apply multiplication and division to perform conversions of units of measure within the U.S. customary or metric system.

Data Interpretation

Communicating: Graphical Forms/Solution
The learner will be able to use graphical forms to show a solution to a problem, to provide visual representation of an idea, to explain concepts, and to express real world situations.

Scatterplots: Representing Data
The learner will be able to use a scatterplot to represent two-variable data on the coordinate plane and explain the manner in which the data points are distributed, if the pattern appears to be linear, draw a line that appears to best fit the data, and write the equation of that line.

Probability/Statistics

Measures of Central Tendency: Outliers
The learner will be able to study a data set by using and comparing combinations of measures of central tendency (mean, mode, median) and measures of spread (range, quartile, interquartile range), and explain how the inclusion or exclusion of outliers affects those measures.

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Data Shapes: Analyzing
The learner will be able to describe the shape of a given set of data by discussing the center, spread, correlations, and outliers.

Data Analysis: Patterns/Conjectures
The learner will be able to study given information with the aid of statistical tools, seeking for patterns in that data and forming conjectures based on those patterns.

Probability: Evaluate/Simple Event
The learner will be able to evaluate the probability of a simple event by using a model.