

CURRICULUM

GUIDE

Math – Grade 4

Providence
Schools

QUARTER I

Content students have to learn

Processes students will learn and use

Unit 1.1 – Comparing and Ordering Numbers (8 days)

- Understand rational numbers from 0 to 999,999 using models, explanations, and representations.
- Represent rational numbers in different ways by composing and decomposing and place value.
- Compare and order numbers to demonstrate an understanding of the magnitude of numbers.
- Identify when estimation is appropriate and estimate whole numbers using a variety of methods.
- Understand decimals as hundredths using money and the relationships among dollars, dimes, and pennies.

- » Communicate understanding of mathematics and the power of mathematical symbolism.
- » Demonstrate an understanding of mathematical concepts and relationships through a variety of methods.
- » Use appropriate representations to solve problems.

Unit 1.2 – Adding and Subtracting Whole Numbers (8 days)

- Use composition and decomposition strategies to mentally add and subtract.
- Perform multiple mental math estimation strategies.
- Understand and apply the standard algorithm and place-value strategies for multi-digit addition and subtraction.

- » Solve problems that have missing or extraneous information.
- » Use pictures or diagrams to understand and solve problems.
- » Solve problems by writing and completing a number sentence or an equation.

Unit 1.3 – Understanding and Developing Multiplication (9 days)

- Understand the relationship between repeated addition and multiplication.
- Use the properties of factors and multiples to solve multiplication problems to develop fluency.
- Apply the commutative, identity, associative, and zero properties and factors to find products.

- » Use appropriate representations to solve problems.
- » Demonstrate an understanding of mathematical concepts and relationships through a variety of methods (e.g., writing, diagrams, and pictures) to solve problems.
- » Solve problems by writing and completing a number sentence or equation.

Unit 1.4 – Understanding and Developing Division (6 days)

- Use strategies to solve problems.
- Use the inverse operations of multiplication and division to solve problems within fact families.
- Understand and apply the zero, identity, and commutative properties of multiplication and division.

- » Solve problems by using information from the problem and representing it in pictures or diagrams.
- » Solve problems by writing or completing a number sentence or equation.

QUARTER I

Content students have to learn

Processes students will learn and use

Unit 1.5 – Multiplying by One-Digit Numbers (9 days)

- Demonstrate that different numerical expressions can have the same value or that the value of one expression can be less than or greater than) the value of the other expression.
 - Estimate using appropriate methods to evaluate the reasonableness of a solution.
 - Demonstrate that place-value patterns can be used to find products when one factor is 10 or 100.
- » Use mental math strategies to make multiplication calculation easier.
 - » Understand and apply a variety of strategies for multiplication.
 - » Check answers for reasonableness in different ways, including using estimation and checking the answer against the question and conditions of the problem.
 - » Use a picture or a diagram to understand and solve a problem.

Content students have to learn

Processes students will learn and use

**Unit 2.1 – Extending Patterns and Writing Expressions
(5 days)**

- Represent mathematical phrases using a variable in an algebraic expression.
- Determine the value of an algebraic expression by replacing the variable(s) with given number(s) and doing the calculation.
- Identify patterns that can be used to find the relationship between two quantities.
- Find the value of an unknown quantity by using the relationship it has with a known quantity.

- » Solve problems by using objects to act out the actions in the problem.
- » Generalize solutions and apply strategies to new problem situations.
- » Use models, known facts, properties, and relationships to explain thinking and to justify answers and solution processes.

**Unit 2.2 – Multiplying by Two-Digit Numbers
(8 days)**

- Make estimates in a situation by identifying when estimation is appropriate.
- Select the appropriate method of estimation and evaluate the reasonableness of the solution.
- Use basic facts and place-value patterns to mentally multiply a two-digit number by a multiple of 10, 100, or 1,000.
- Use and compare the array, expanded, and standard algorithms for multiplication limited to two digits by two digits.

- » Use a variety of processes, including problem solving, reasoning, communicating, connecting, and representing when doing mathematics.
- » Understand that the answer to one problem/question may be used to find the answer to another problem/question.

**Unit 2.3 – Dividing by One-Digit Divisors
(11 days)**

- Use basic facts and place-value patterns to divide multiples of 10 and 100 by one-digit numbers.
- Use a variety of algorithms and estimation skills to solve division problems.
- Interpret the meaning of a remainder when solving problems.

- » Solve multistep problems by applying more than one operation.
- » Use models, known facts, properties, and relationships to explain thinking and to justify answers and solution processes.
- » Use physical models and diagrams to represent important ideas.

**Unit 2.4 – Identifying Lines, Angles, and Shapes
(8 days)**

- Describe and classify polygons by their sides and angles.
- Use attributes of angles and sides, including parallelism and perpendicularity, to identify and distinguish among polygons.
- Classify angles of polygons relative to 90 degrees.
- Copy, compare, and draw models of polygons.

- » Use commonalities in attributes of objects or situations to make generalizations about relationships.
- » Solve problems by making generalizations.
- » Communicate the attributes of polygons.

QUARTER 2

Content students have to learn

Processes students will learn and use

Unit 2.5 – Understanding Fractions (10 days)

- Describe a fraction using an area, set, and linear model.
- Use benchmark fractions, 0, and 1 to compare and order fractions.
- Represent the same fractional amount with different but equivalent fractions.
- Compare and order proper positive fractional numbers using models, number lines, or explanations.

- » Use words, pictures, numbers, or symbols in explanations.
- » Write an explanation to a problem that is correct, simple, complete, and easy to understand.

Unit 2.6 – Adding and Subtracting Fractions (3 days)

- Understand concepts of addition and subtraction of positive fractional numbers with like denominators using models, number lines, or explanations.

- » Solve problems using a diagram or writing or completing a number sentence or equation.
- » Use physical models and diagrams to represent important mathematical ideas.

QUARTER 3

Content students have to learn

Processes students will learn and use

Unit 3.1 – Understanding Decimals (7 days)

- Demonstrate conceptual understanding of decimals as hundredths using models, explanations, or other representations.
- Compare and order decimals using models, number lines, or explanations.
- Understand the relationship between a fraction and a decimal.

- » Generalize solutions and apply strategies to new problem situations.
- » Use models, known facts, properties, and relationships to explain thinking and to justify answers and solution processes.
- » Recognize equivalent representations of concepts and procedures and translate among them as appropriate (for example, understand how the addition of whole numbers, fractions, and decimals is related).

Unit 3.2 – Adding and Subtracting Decimals (9 days)

- Solve problems involving addition and subtraction of decimals.
- Use estimating strategies to calculate addition or subtraction of decimals.
- Understand the models and algorithms for adding or subtracting multi-digit decimals.

- » Solve problems by making a reasoned first try for what the answer might be, and then by using additional reasoning to arrive at the correct answer.
- » Use models, known facts, properties, and relationships to explain thinking and to justify answers and solution processes.

Unit 3.3 – Finding Area and Perimeter of Shapes (10 days)

- Develop conceptual understanding of perimeter of polygons using models, manipulatives, or formulas.
- Develop conceptual understanding of area of rectangles, polygons, or irregular shapes on grids using models, manipulatives, or formulas.
- Make estimates by selecting appropriate methods.
- Evaluate estimation methods for reasonableness.
- Identify the relationships between the perimeter and area of a polygon.
- Understand how recording information in a table can help with understanding and solving problems.

- » Generalize solutions and apply strategies to new problem situations.
- » Use models, known facts, properties, and relationships to explain thinking and to justify answers and solution processes.
- » Recognize relationships among different topics in mathematics.
- » Link concepts and procedures.

Unit 3.4 – Identifying and Classifying Solids (6 days)

- Use properties or attributes to identify, compare, and describe three-dimensional shapes.
- Identify, compare, and describe rectangular prisms, triangular prisms, cylinders, or spheres.
- Use the shape of bases or the number of lateral faces to describe three-dimensional shapes.
- Build models of rectangular prisms from two or three-dimensional representations.

- » Generalize solutions and apply strategies to new problem situations.
- » Use physical models and diagrams to represent important mathematical ideas.
- » Use models, known facts, properties, and relationships to explain thinking and to justify answers and solution processes.

QUARTER 3

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Unit 3.5 – Measuring and Estimating Customary and Metric Units Including Time and Temperature (13 days)

- Measure and use units of length to solve problems and make conversions.
 - Measure and use units of capacity to solve problems and make conversions.
 - Express time using different units that are related to each other.
 - Determine the duration of an event when the start and end times can be identified.
 - Express temperature using degrees Fahrenheit or Celsius.
 - Estimate length in different measurement systems.
- » Solve problems when the initial data point is unknown by starting with the end result and reversing the steps and processes to find the initial point.

Content students have to learn

Processes students will learn and use

**Unit 4.1 – Using Data in Graphs
(11 days)**

- Interpret line plots, tables, bar graphs, pictographs, and circle graphs to answer questions related to data.
- Interpret and give directions between locations in the first quadrant of a coordinate grid.
- Organize and display data using tables, line plots, bar graphs, and pictographs to answer questions and solve problems.
- Understand that median, mode, and range are ways to analyze patterns, trends, and distributions of data.
- Collect, organize, and display data to draw conclusions and make predictions in real-world situations.

- » Demonstrate an understanding of mathematical concepts and relationships through a variety of methods (e.g., writing, graphing, charts, diagrams, number sentences, or symbols).
- » Use physical models and diagrams to represent important mathematical ideas.
- » Use appropriate representations to solve problems or to portray, clarify, or extend a mathematical idea.

**Unit 4.2 – Understanding Equations
(6 days)**

- Show equivalence between two algebraic expressions when the variable is replaced with its assigned number and the resulting calculations are completed.
- Understand that a solution to an equation is a value of the unknown (or unknowns) that makes an equation true.
- Solve equations by using properties of equality and inverse operations.
- Understand that a solution to an inequality is a value that makes the inequality true.

- » Use the problem-solving strategy of working backward.
- » Use rules of arithmetic and algebra with notions of equivalence to transform equations and inequalities so solutions can be found.
- » Communicate understanding of solving equations and inequalities.

Unit 4.3 – Identifying Transformations, Congruency, and Symmetry (10 days)

- Demonstrate congruency with translations, reflections, and rotations of plane figures using models or explanations.
- Identify similarity by applying the characteristics of similar figures to solve problems using models or explanations.
- Identify rotational symmetry and use an angle measure to describe a rotation.
- Determine similarity by using models and pictures.

- » Use models, known facts, properties, and relationships to explain thinking and to justify answers and solution processes.
- » Demonstrate an understanding of mathematical concepts and relationships through a variety of methods (e.g., writing, graphing, charts, diagrams, number sentences, or symbols).
- » Use physical models and diagrams to represent important mathematical ideas.
- » Use appropriate representations to solve problems or to portray, clarify, or extend a mathematical idea.

QUARTER 4

Content students have to learn

Processes students will learn and use

Unit 4.4 – Probability (9 days)

- Use counting techniques to find the number of possible combinations in a probability event.
 - Use counting techniques to find simple permutations.
 - Determine the possible outcomes of an event by representing pictorially using a tree diagram and counting to find the number of possible outcomes.
 - Determine the chance or likelihood of an event occurring.
- » Solve problems by reasoning about the conditions in the problem.
 - » Communicate thinking about probability.
 - » Solve problems by representing thinking using a tree diagram.

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