Mathematics (4)

Mathematics

Grade(s) 4th, Duration 1 Year
Required Course

Course Overview

Fourth grade students will increase skills in Operations and Algebraic Thinking, Numbers and Operations in Base 10, Number and Operations in Fractions, Measurement and Data, and Geometry. Students will also engage in Problem Solving Strategies.

Mathematics (grade 4) courses typically emphasize number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; and measurement. Course content may include activities that help students increase operational fluency, make connections between abstract symbols and concrete events or concepts, or present conclusions based on data.
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Scope And Sequence

Timeframe	Unit	Instructional Topics
25 Day(s)	Operations and Algebraic Thinking	1. Multiplication and Division: Meanings and Facts 2. Generate and Analyze Patterns
65 Day(s)	Number and Operations in Base Ten	1. Place Value 2. Addition and Subtraction of Whole Numbers 3. Number Sense - Multiplying by 1-Digit Numbers 4. Developing Fluency: Multiplying by 1-Digit Numbers 5. Number Sense: Multiplying by 2-Digit Numbers 6. Developing Fluency: Multiplying by 2-Digit Numbers 7. Number Sense: Dividing by 1-Digit Divisors 8. Developing Fluency: Dividing by 1-Digit Divisors
20 Day(s)	Measurement and Data	1. Measurement Units and Conversion 2. Solving Measurement Problems
15 Day(s)	Geometry	1. Line, Angles, and Shapes
40 Day(s)	Number and Operations - Fractions	1. Fraction Equivalence and Ordering 2. Adding and Subtracting Fractions and Mixed Numbers with Like Denominators 3. Extending Fraction Concepts

Materials and Resources
Envision Math Program (primary resource)
Mad Minutes
Brain Pop
SuccessMaker
Math Daily 3 (Joan Moser and Gail Boushey)
Adaptedmind.com

Prerequisites
Successful completion of 3rd grade math.

Course Details

Unit: Operations and Algebraic Thinking

Duration: 25 Day(s)

Unit Overview
- Basic Facts and Algorithms
- Operation Meanings and Relationships
- Patterns, Relations, and Functions
- Variable
- Practices, Processes, and Proficiencies

Materials and Resources
Envision Math Program:

Topic 1 - Multiplication and Division; Meanings and Facts
Topic 2 - Generate and Analyze Patterns

This includes manipulatives found in the classroom.

Academic Vocabulary
Topic 1 - array, product, factors, multiple, commutative property of multiplication, zero property of multiplication, identity property of multiplication, distributive property, inverse operations, fact families

Topic 2 - repeating pattern

Summative Assessment
End of Topic Envision Test

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Topic: Multiplication and Division: Meanings and Facts	**Duration:** 15 Day(s)

Topic Overview

The student will use the four operations with whole numbers to solve problems.

The student will gain familiarity with factors and multiples.

Learning Targets

Meanings of Multiplication
Students recognize multiplication as repeated addition of equal groups used in arrays and comparisons.s

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Patterns for Facts
Use patterns to find products with factors of 2, 5 & 9.

Multiplication Properties
Use multiplication properties to simplify computations.

3, 4, 6, 7 & 8 as factors.
Students will use the distributive property to find products of the factors of 3, 4, 6, 7 & 8 by breaking apart problems into simpler problems.

Problem Solving: Look for a pattern
Students will recognize patterns and be able to continue the pattern.

Meanings of Division
Students use and draw models to solve division problems.

Relating multiplication and division
Students use arrays to write and complete multiplication and division fact families.

Special Quotients
Students use multiplication facts with 0 and 1 to learn about special division rules with 0 and 1.

Using multiplication facts to find division facts
Students will identify multiplication facts related to division facts in order to solve division problems.

Problem Solving: Draw a picture and write an equation
Students will draw pictures to problem solve multiplication situations and use their pictures to write number sentences.

Topic: Generate and Analyze Patterns	**Duration:** 10 Day(s)

Topic Overview

The student will generate and analyze patterns, including geometric figures, numerical patterns and function tables.

Learning Targets

Repeating Patterns
Students will identify and extend repeating geometric or repeating number patterns.

Number Sequences
Students will identify and extend whole-number patterns involving addition and subtraction.

Extending Tables
Students will extend tables of ordered pairs for situations involving multiplication, addition, or subtraction

Writing Rules for Situations
Students will find a rule and extend the table, given a table of number pairs.

Geometric Patterns
Students will extend patterns of cubes or tiles.

Problem Solving: Act It Out and Use Reasoning
Students will use the strategies *Act It Out* and *Use Reasoning* to solve problems.

Unit: Number and Operations in Base Ten	**Duration:** 65 Day(s)

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Unit Overview
- Basic Facts and Algorithms
- The Base-Ten Numeration System
- Comparison and Relationships
- Equivalence
- Estimation
- Operation Meanings and Relationships
- Patterns, Relations, and Functions
- Practices, Processes, and Proficiencies

Materials and Resources
Envision Math Program:

Topic 3 - Place Value
Topic 4 - Addition and Subtraction of Whole Numbers
Topic 5 - Number Sense: Multiplying by 1-Digit Numbers
Topic 6 - Developing Fluency: Multiplying by 1-Digit Numbers
Topic 7 - Number Sense: Multiplying by 2-Digit Numbers
Topic 8 - Developing Fluency: Multiplying by 2-Digit Numbers
Topic 9 - Number Sense: Dividing by 1-Digit Divisors
Topic 10 - Developing Fluency: Dividing by 1-Digit Divisors

Manipulatives found in the classroom.

Academic Vocabulary
Topic 3 - digits, place value, standard form, expanded form, word form, compare

Topic 4 - breaking apart, compensation, counting on, commutative property of addition, associative property of addition, identity property of addition, inverse operation

Topic 5 - partial products, compensation

Topic 6 -

Topic 7 - compatible numbers

Topic 8 -

Topic 9 - remainder

Topic 10 -

Summative Assessment
End of Topic Envision Assessment

Topic: Place Value	**Duration:** 8 Day(s)

Topic Overview
The student will round whole numbers, compare and order numbers,and identify place values.

Learning Targets
Representing Numbers
   Students will read and write 3-digit and 4-digit numbers.

Place Value Relationships
   Students will learn how digits within a multi-digit whole number relate to each other by their place value.

Comparing Numbers
   Students will compare whole numbers through hundred thousands.

Ordering Numbers
   Students will apply their knowledge of place value to compare and order numbers.

Rounding Whole Numbers
   Students will show how to use place value to round whole numbers.

Problem Solving: Make an Organized List
   Students will systematically find and record all possible outcomes for a situation.

Topic: Addition and Subtraction of Whole Numbers	**Duration:** 8 Day(s)

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Topic Overview

The student will use mental math to add and subtract, estimate sums and differences, add and subtract whole numbers, and subtract across zeros.

Learning Targets

Using Mental Math to Add and Subtract
  Students will apply a variety of methods to add and subtract whole numbers mentally.

Estimating Sums and Differences of Whole Numbers
  Students will round whole numbers to estimate sums and differences.

Adding Whole Numbers
  Students will add numbers to hundreds and thousands with and without regrouping.

Subtracting Whole Numbers
  Studetns will subtract numbers to thousands with and without regrouping.

Subtracting Across Zero
  Students will subtract numbers with zeros to thousands.

Problem Solving: Draw a Picture and Write an Equation
  Students will use a picture or diagram to translate an everyday situation into a number sentence or equation.

Topic: Number Sense - Multiplying by 1-Digit Numbers   **Duration:** 8 Day(s)

Topic Overview

The student will construct arrays and multiply by 10 and 100, multiply by multiples of 10 and 100, break apart to multiply, use mental math to multiply, and use rounding to estimate.

Learning Targets

Arrays and Mutiplying by 10 and 100
  Students will use arrays to multiply by 10 and 100.

Multiplying by Multiples of 10 and 100
  Students will use basic multiplication facts and number patterns to multiply by multiples of 10 and 100.

Breaking Apart to Multiply
  Students will break apart numbers and use arrays to mutliply 2 digit by 1 digit numbers.

Using Mental Math to Multiply
  Students will use compensation to multiply numbers mentally.

Using Rounding to Estimate
  Students will use rounding to estimate solutions to multiplication problems.

Problem Solving: Reasonalbeness
  Students will check for reasonableness by making sure their calculations answer the questions asked and by using estimation to make sure the calculation was performed correctly.

Topic: Developing Fluency: Multiplying by 1-Digit Numbers   **Duration:** 8 Day(s)

Topic Overview

The student will multiply up to 4-digit by 1 digit, using arrays and expanded and standard algorithms.

Learning Targets

Arrays and Using an Expanded Algorithm
  Students will record multiplcation using an expanded algorithm.

Connecting the Expanded and Standard Algorithms
  Students will multiply 2 digit numbers by 1 digit numbes using paper and pencil methods.

Multiplying 2 digit by 1 digit Numbers
  Students will multiply 2 digit numbers by 1 digit numbers using the standard algorithm and estimate to check for reasonableness.

Multiplying 3 and 4 digit by 1 Digit Numbers
  Students will use the standard algorithm to m ultiply 3 and 4 digit numbers by 1 digit numbers.

Multiplying by 1 Digit Numbers
  Students will multiply 2, 3, and 4 digit numbers by 1 digit numbers using the standard algorithm and estimae to check for reasonableness.

Problem Solving: Missing or Extra Information
  Students will identify what information in a problem is missing or is not needed.

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Topic: Number Sense: Multiplying by 2-Digit Numbers | **Duration:** 7 Day(s)

Topic Overview
The student will multiply 2-digit numbers by multiples of 10, using arrays, mental math, and estimation.

Learning Targets

Arrays and Multiplying 2 Digit Numbers by Multiples of 10
Students will use arrays to multiply 2 digit numbers by multiples of 10.

Using Mental Math to Multiply 2 Digit Numbers
Students will discover and use patterns to multiply by multiples of 10.

Using Rounding to Estimate
Students will use rounding to estimate solutions to multiplication problems involving two 2 digit numbers.

Using Compatible Numbers to Estimate
Students will use compatible numbers and rounding to estimate solutions to multiplication problems involving two 2 digit numbers.

Problem Solving: Multiple-Step Problems
Identify and answer hidden questions to solve multi-step problems with operations.

Topic: Developing Fluency: Multiplying by 2-Digit Numbers | **Duration:** 7 Day(s)

Topic Overview
The student will use arrays and expanded algorithms to multiply 2-digit by 2-digit numbers.

Learning Targets

Arrays and multiplying 2 Digit Numbers
Students will use arrays to multiply two digit numbers by two digit numbers to find the product.

Arrays and an Expanded Algorithm
Students will use an expanded algorithm to multiply two digit numbers by two digit numbers to find the product.

Multiplying 2 Digit Numbers by Multiples of 10
Students will use grids and patterns to multiply 2 digit numbers and multiples of 10.

Multiplying 2 Digit by 2 Digit Numbers
Students will use partial products to multiply 2 digit numbers by 2 digit numbers and find the products.

Problem Solving: Two-Question Problems
Students will solve two-question problems.

Topic: Number Sense: Dividing by 1-Digit Divisors | **Duration:** 8 Day(s)

Topic Overview
The student will use mental math to divide, estimate quotients, divide with remainders, and solve multiplication and division stories.

Learning Targets

Using Mental Math to Divide
Students will use basic facts and patterns of zeros to solve division problems with 3 digit dividends and 1 digit divisors.

Estimating Quotients
Students will use compatible numbers and rounding to estimate quotients.

Estimating Quotients for Greater Dividends
Students will estimate quotients of multidigit division problems using multiplication facts and place value concepts.

Dividing with Remainders
Students will divide whole numbers by 1 digit divisors resulting in quotients with remainders.

Multiplication and Divison Stories
Students use words and models to represent multiplication and division problems accurately.

Problem Solving: Draw a Picture and Write an Equation
Students will draw pictures and write related number sentences to solve problems.

Topic: Developing Fluency: Dividing by 1-Digit Divisors | **Duration:** 10 Day(s)

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Topic Overview
The student will divide up to 4-digit by 1-digit numbers, learn division as repeated subtraction, and use objects to divide.

Learning Targets

Using Objects to Divide: Divison as Repeated Subtraction
Students will use repeated subtraction to model division.

Division as Repeated Subtraction
Students will record division as repeated subtraction.

Using Objects to Divide: Division as Sharing
Students will use place value to understand the algorithm of long division.

Dividing 2 Digit by 1 Digit Numbers
Students will use the standard algorithm to divide a two digit number by a one digit number.

Dividing 3 Digit by 1 Digit Numbers
Students will use the standard algorithm to divide 3 digit numbers by 1 digit numbers.

Deciding Where to Start Dividing
Students will use the standard algorithm to divide 3 digit numbers by 1 digit numbers and properly decide where to begin dividing.

Dividing 4 Digit by 1 Digit Numbers
Students will estimate and find quotients for 4 digit dividends and 1 digit divisors.

Problem Solving: Multiple Step Problems
Students will identify the hidden question in a multistep problem. They use the answer to that hidden question to solve the original problem.

Unit: Measurement and Data   **Duration:** 20 Day(s)

Unit Overview
- Data Collection and Representation
- Estimation
- Measurement
- Patterns, Relations, and Functions
- Practices, Processes, and Proficiencies

Materials and Resources
Envision Math Program:

Topic 14 - Measurement Units and Conversions
Topic 15 - Solving Measurement Problems

Manipulatives found in the classroom.

Academic Vocabulary
Topic 14 - inch, foot, yard, mile, capacity, weight, ounce, pound, ton, millimeter, centimeter, decimeter, kilometer, meter, milliliter, liter, mass, gram, kilogram

Topic 15 - perimeter, area, line plot

Summative Assessment
End of Topic Envision Assessment

Topic: Measurement Units and Conversion   **Duration:** 13 Day(s)

Topic Overview
The student will use customary and metric units of measurement for length, capacity, weight, and mass.

The student will convert units of time.

Learning Targets

Using Customary Units of Length
Students will extimate and measure length by choosing the most appropriate unit of length.

Customary Units of Capacity
Students will estimate fluently with customary capacity units (cups, pints, quarts, and gallons). They will compare the relative sizes of capacity measurements.

Units of Weight
Students will extimate fluently and measure with units of weight.

Changing Customary Units
Students will be able to convert between customary units.

Problem Solving: Writing to Explain
  Students will solve and explain the answer to each problem in writing.

Using Metric Units of Length
  Students will estimate and measure length to the nearest centimeter, and choose the most appropriate metric unit of measuring length.

Metric Units of Capacity
  Students will estimate fluently with milliliters and liters. They will measure capacity using these metric units.

Units of Mass
  Students will estimate andmeasure with units of mass -- grams, and kilograms.

Changing Metric Units
  Students will be able to convert between metric units.

Units of Time
  Students will compare several different units of time and freely convert from one unit of time to another.

Problem Solving: Work Backward
  Studetns will solve problems that require finding the original times, measurements, or quantities that led to a resoult that is given.

Solving Area and Perimeter Problems
  Students will use the formulas for the perimeter and area of rectangles to solve real-world problems.

Solving Measurement Problems
  Students use diagrams to show data and analyze how the quantities are related to solve real-world measurement problems.

Solving Problems Involving Money
  Students solve real-world problems that involve money and giving change by counting.

Solving Problems Involving Line Plots
  Students construct line plots using given data and use the line plot to answer questions about the data set.

Problem Solving: Solve a Simpler Problem and Make a Table
  Students will break a problem into smaller, more manageable pieces and find a patern to fit.

Topic: Solving Measurement Problems

Duration: 7 Day(s)

Topic Overview
  The student will solve problems involving perimeter, area, measurement, money, and line plots.

Unit: Geometry

Duration: 15 Day(s)

Unit Overview
  - Geometric Figures
  - Measurement
  - Practices, Processes, and Proficiencies

Materials and Resources
  Envision Math Program

  Topic 16 - Lines, Angles, and Shapes

  Manipulatives found in the classroom.

Academic Vocabulary
  Topic 16 - point, line, plane, parallel lines, intersecting lines, perpendicular lines, line segment, ray, angle, right angle, acute angle, obtuse angle, straight angle, degree, unit angle, angle measure, protractor, polygon, side, vertex, triangle, quadrilateral, pentagon, hexagon, octagon, equilateral triangle, isosceles triangle, scalene triangle, right triangle, acute triangle, obtuse triangle, rhombus, trapezoid, parallelogram, rectangle, square, symmetric, line of symmetry

Summative Assessment
  End of Topic Envision Assessment

Topic: Line, Angles, and Shapes

Duration: 13 Day(s)

Topic Overview
  The student will identify aspects of plane geometry, including angles, polygons, and symmetry.

Learning Targets
  Points, Lines, and Planes
    Students will identify and describe points, lines, and planes.

  Line Segments, Rays, and Angles

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Students will learn geometric terms to describe parts of lines and types of angles.

Understanding Angles and Unit Angles
Students will use unit angles and fractions of a circle to find angle measures.

Measuring with Unit Angles
Students will use a smaller angle to measure a larger angle by repeating the unit.

Measuring Angles
Students will be able to measure and draw angles.

Adding and Subtracting Angle Measures
Students will find unknown angle measures by adding and subtracting.

Polygons
Students will learn to identify polygons.

Triangles
Students will learn to identify and classify triangles.

Quadrilaterals
Students will learn to identify quadrilaterals.

Line Symmetry
Students will determine if a plane figure has line symmetry and, if so, how many lines of symmetry it has.

Problem Solving: Make and Test Generalizations
Students will solve problems by making and testing generalizations.

Unit: Number and Operations - Fractions

Duration: 40 Day(s)

Unit Overview
- Basic Facts and Algorithms
- The Base-Ten Numeration System
- Comparison and Relationships
- Equivalence
- Number Uses, Classification, and Representation
- Numbers and the Number Line
- Operation Meanings and Relationships
- Practices, Processes, and Proficiencies

Materials and Resources
Envision Math Program:

Topic 11 - Fraction Equivalence and Ordering
Topic 12 - Adding and Subtracting Fractions and Mixed Numbers with Like Denominators
Topic 13 - Extending Fraction Concepts

Manipulatives found in the classroom.

Academic Vocabulary
Topic 11 - prime number, composite number, fraction, equivalent fractions, numerator, denominator, benchmark fractions

Topic 12 - mixed number, improper fraction

Topic 13 - unit fraction, decimal point, hundredth, tenth

Summative Assessment
End of Topic Envision Assessment

Topic: Fraction Equivalence and Ordering

Duration: 10 Day(s)

Topic Overview
The student will identify factors, prime and composite numbers, multiples, and equivalent fractions. The student will use number lines to find equivalent fractions and to compare and order fractions.

Learning Targets
Factors
Students will learn how to factor whole numbers.

Prime and Composite Numbers
Students will learn to identify prime and composite numbers.

Multiples
Students will find the multiples of a number.

Equivalent Fractions
Students will use models and computation to show equivalent fractions.

Number Lines and Equivalent Fractions
Students use a number line to identify and write equivalent fractions.

Comparing Fractions
Students will use benchmark fractions to compare fractions with unlike denominators.

Ordering Fractions
Students will use common denominators and equivalent fractions to order fractions with unlike denominators.

Problem Solving: Writing to Explain
Students will write to explain whether an answer is correct or not.

Topic: Adding and Subtracting Fractions and Mixed Numbers with Like Denominators	**Duration:** 13 Day(s)

Topic Overview
The student will model addition and subtraction of fractions with like denominators. The student will add and subtract fractions using a number line. The student will identify and write mixed numbers as improper fractions and improper fractions as mixed numbers. The student will add and subtract mixed numbers. The student will compose and decompose fractions.

Learning Targets
Modeling Addition of Fractions
Students will use models to add fractions with like denominators.

Adding Fractions with Like Denominators
Students use computational procedures to add fractions with like denominators and solve problems.

Modeling Subtraction of Fractions
Students will use mondels to subtract fractions with like denominators.

Subtracting Fractions with Like Denominators.
Students use computational procedures to subtract fractions with like denominators and solve problems.

Adding and Subtracting on the Number Line
Students use the number line to add and subtract fractions with like denominators.

Improper Fractions and Mixed Numbers
Students will identify and write mixed numbers as improper fractions and improper fractions as mixed numbers.

Modeling Addition and Subtraction of Mixed Numbers
Students will use models to add and subtract mixed numbers.

Adding Mixed Numbers
Students will use mondels and computational procedures to add mixed numbers.

Subtracting Mixed Numbers
Students will use models and computational procedures to subtract mixed numbers.

Decomposing and Composing Fractions
Students decompose fractions and represent them as compositions of fractions in a variety of ways.

Problem Solving: Draw a Picture and Write and Equation
Students will draw a picture and write an equation to solve a problem.

Topic: Extending Fraction Concepts	**Duration:** 12 Day(s)

Topic Overview
The student will use models and symbols to multiply a fraction by a whole number. The student will identify fractions and decimals on a number line and understand how to write fractions as decimals and decimals as fractions.

The student will understand decimal place value. The student will compare and order decimals, and use money to understand decimals.

Learning Targets
Fractions as Multiples of Unit Fractions: Using Models
Students will use unit fractions and multiplicastion to describe fractions that are multiples of the unit fractions.

Multiplying a Fraction by a Whole Number: Using Models
Students will multiply a fraction by a whole number using models.

Multiplying a Fraction by a Whole Number: Using Symbols
Students will multiply a whole number and a fraction to solve problems.

Fractions and Decimals
Students will understand how to write fractions as decimals and decimals as fractions.

Fractions and Decimals on the Number Line
Students will learn to locate and name fractions and decimals on a number line.

Equivalent Fractions and Decimals
Students will understand how to use equivalent fractions to write fractions as decimals.

Decimal Place Value
Students will use models and place value charts to represent decimals to hundredths. They will read and write decimals in expanded, standard, and word form.

Comparing and Ordering Decimals
Students will use models and place-value charts to compare decimals to hundredths. They will use greater-than and less-than symbols to orders numbers.

Using Money to Understand Decimals
Students will use place-value charts to read, write, and compare decimals in tenths and hundredths using money.

Problem Solving: Draw a Picture
Students will solve problems using the strategy Draw a Picture.