

Grade 4 Mathematics

Full Syllabus

Illustrative Mathematics® K-5 Math (v.360)

9 Units • Unit Goals • Section Goals • Lesson-by-Lesson Outline

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Course Overview

Grade 4 of the Illustrative Mathematics K-5 curriculum is organized into 9 units. Students work with factors and multiples, reason about fraction equivalence and comparison, extend operations to fractions (including tenths and hundredths), explore decimals and large numbers up to 1,000,000, study multiplicative comparison and measurement conversion, perform multi-digit multiplication and division, learn about angles and angle measurement, analyze properties of two-dimensional shapes, and culminate with a Putting It All Together unit.

The unit sequence is:

- Unit 1: Factors and Multiples
- Unit 2: Fraction Equivalence and Comparison
- Unit 3: Extending Operations to Fractions
- Unit 4: From Hundredths to Hundred-Thousands
- Unit 5: Multiplicative Comparison and Measurement
- Unit 6: Multiplying and Dividing Multi-digit Numbers
- Unit 7: Angles and Angle Measurement
- Unit 8: Properties of Two-dimensional Shapes
- Unit 9: Putting It All Together

Each unit is divided into lettered sections (A, B, C, D as applicable), and each section is a sequence of daily lessons. Optional lessons (often “Center Days” or extension activities) are noted.

Unit 1: Factors and Multiples

Unit Goal

Students apply understanding of multiplication and area to work with factors and multiples.

Unit Narrative

In this unit, students extend their knowledge of multiplication, division, and the area of a rectangle to deepen their understanding of factors and to learn about multiples. Students return to the concept of area to make sense of factors and multiples. They find as many pairs of whole-number side lengths as they can given a rectangle with a specific area. They make sense of those side lengths as factor pairs of the whole-number area, and the area as a multiple of each side length. Students also learn that a number can be classified as prime or composite based on the number of factor pairs it has.

Section A: Understand Factors and Multiples

Section Goals

- Determine if a number is prime or composite.
- Explain what it means to be a factor or a multiple of a whole number.
- Relate the side lengths and area of a rectangle to factors and multiples.

Section Narrative

Students revisit area and factors from grade 3 and encounter the idea of multiples. They build rectangles given specific side lengths and identify possible areas when only one side length is known. Students discover that for some whole-number values of area, only one rectangle can be built (prime numbers), and for other values, more than one rectangle is possible (composite numbers).

Lessons

1. **Multiples of a Number** — Let's build some rectangles.
2. **Factor Pairs** — Let's learn about factor pairs.
3. **Prime and Composite Numbers** — Let's identify prime and composite numbers.
4. **Multiplication Practice (Optional)** — Let's practice multiplication.

Section B: Find Factor Pairs and Multiples

Section Goals

- Apply multiplication fluency within 100 and the relationship between multiplication and division to find factor pairs and multiples.

Section Narrative

Students apply and deepen their understanding of factors and multiples as they play games and solve problems in context. The activities prompt students to look for patterns in factors, multiples, and prime and composite numbers, and use them to make predictions and generalize observations. In the last lesson, students use the ideas from this unit to create geometric art.

Lessons

1. **More Multiples** — Let's solve problems that involve factors and multiples.
2. **The Locker Problem** — Let's figure out what's happening in a game about lockers.
3. **Find Factors and Multiples** — Let's find factors and multiples of whole numbers from 1 to 100.
4. **Mondrian's Art (Optional)** — Let's make art with rectangles.

Unit 2: Fraction Equivalence and Comparison

Unit Goal

Students generate and reason about equivalent fractions and compare and order fractions with the following denominators: 2, 3, 4, 5, 6, 8, 10, 12, and 100.

Unit Narrative

In this unit, students extend their prior understanding of equivalent fractions and comparison of fractions. Students use fraction strips, tape diagrams, and number lines to make sense of the size of fractions, generate equivalent fractions, and compare and order fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. Students generalize that a fraction is equivalent to another fraction by partitioning each unit fraction into more equal parts. As the unit progresses, students use equivalent fractions and benchmarks (such as $\frac{1}{2}$ and 1) to reason about the relative location of fractions on a number line and to compare and order fractions.

Section A: Size and Location of Fractions

Section Goals

- Make sense of fractions with denominators 2, 3, 4, 5, 6, 8, 10, and 12 through physical representations and diagrams.
- Reason about the location of fractions on the number line.

Section Narrative

Students revisit ideas and representations of fractions from grade 3, working with denominators that now include 5, 10, and 12. Students use physical fraction strips, diagrams, tape diagrams, and number lines to make sense of the size of fractions and fractional relationships. They reason about the relationship between fractions where one denominator is a multiple of the other denominator and compare fractions to benchmarks.

Lessons

1. **Representations of Fractions (Part 1)** — Let's name some fractions and represent them visually.
2. **Representations of Fractions (Part 2)** — Let's name some other fractions and represent them with diagrams.
3. **Same Denominator or Numerator** — Let's compare fractions with the same numerator or the same denominator.
4. **Same Size, Related Sizes** — Let's find some fractions that are the same size.
5. **Fractions on Number Lines** — Let's investigate equivalent fractions on a number line.
6. **Relate Fractions to Benchmarks** — Let's compare the size of fractions to $\frac{1}{2}$ and to 1.

Section B: Equivalent Fractions

Section Goals

- Generate equivalent fractions with the following denominators: 2, 3, 4, 5, 6, 8, 10, 12, and 100.
- Use visual representations to reason about fraction equivalence, including using benchmarks such as $\frac{1}{2}$ and 1.

Section Narrative

Students develop their ability to reason about and generate equivalent fractions, beginning with number lines as a tool for finding equivalent fractions and verifying equivalence. Through repeated

reasoning, students notice regularity in the visual representations and begin to make sense of a numerical way to determine equivalence and generate equivalent fractions. Students apply their knowledge of factors and multiples.

Lessons

1. **Equivalent Fractions** — Let's find some equivalent fractions.
2. **Equivalent Fractions on the Number Line** — Let's use number lines to reason about equivalent fractions.
3. **Explain Equivalence** — Let's talk about how we know whether two fractions are equivalent.
4. **Use Multiples to Find Equivalent Fractions** — Let's look at a way to find equivalent fractions without using diagrams.
5. **Use Factors to Find Equivalent Fractions** — Let's find equivalent fractions by working with numerators and denominators.

Section C: Fraction Comparison

Section Goals

- Use visual representations or a numerical process to reason about fraction comparison.

Section Narrative

Students have an expanded set of strategies for reasoning about the size of fractions and develop these skills to compare fractions with different numerators and different denominators. They may use visual representations, equivalent fractions, and their understanding of the size of fractions (relative to benchmarks). At the end of the section, students learn to write equivalent fractions with a particular denominator as a way to compare any fractions.

Lessons

1. **Ways to Compare Fractions** — Let's compare some fractions.
2. **Use Equivalent Fractions to Compare** — Let's compare fractions by writing an equivalent fraction.
3. **Fraction Comparison Problems** — Let's solve different kinds of fraction comparison problems.
4. **Use Common Denominators to Compare** — Let's compare fractions by writing equivalent fractions with the same denominator.
5. **Compare and Order Fractions** — Let's put some fractions in order.
6. **Paper Clip Games (Optional)** — Let's create a game about locating and comparing fractions on the number line.

Unit 3: Extending Operations to Fractions

Unit Goal

Students learn that a fraction is a product of a whole number and a unit fraction, and learn to add and subtract fractions with like denominators, and to add and subtract tenths and hundredths.

Unit Narrative

In this unit, students extend earlier understanding of multiplication to equal groups of fractional pieces, learn to add and subtract fractions with like denominators, and apply fraction equivalence to add tenths and hundredths. Students use number lines to represent the decomposition of fractions into sums, and to reason about addition and subtraction of fractions with the same denominator, including mixed numbers. Students apply these skills in the context of measurement and data, analyzing line plots showing fractional lengths. Lastly students use fraction equivalence to find sums of tenths and hundredths.

Section A: Equal Groups of Fractions

Section Goals

- Recognize that any fraction can be represented as a multiple of a unit fraction.
- Represent and solve problems involving multiplication of a fraction by a whole number.

Section Narrative

Students extend their earlier understanding of multiplication as equal groups to include equal groups of fractional pieces. Through repeated reasoning, they see regularity in the product of a whole number and a fraction. By circling diagrams in various ways, students visualize different combinations of groups, understand equivalence, and observe the associative property of multiplication.

Lessons

1. **Equal Groups of Unit Fractions** — Let's look at equal groups of fractions.
2. **Representations of Equal Groups of Fractions** — Let's look at diagrams and expressions that can help us multiply a whole number and a fraction.
3. **Patterns in Multiplication** — Let's look at patterns in multiplication of a fraction by a whole number.
4. **Equal Groups of Non-unit Fractions** — Let's multiply any fraction by a whole number.
5. **Equivalent Multiplication Expressions** — Let's write multiplication expressions in different ways.
6. **Problems with Equal Groups of Fractions** — Let's solve problems with fractions.

Section B: Addition and Subtraction of Fractions

Section Goals

- Create and analyze line plots that display measurement data in fractions of a unit.
- Represent and solve problems that involve the addition and subtraction of fractions and mixed numbers, including measurements presented in line plots.
- Use various strategies to add and subtract fractions and mixed numbers with like denominators.

Section Narrative

Students learn to add and subtract fractions by decomposing them into sums of smaller fractions, writing equivalent fractions, and using number lines. They see that a fraction greater than 1 can be

decomposed into a whole number and a fraction. Later students organize fractional length measurements on line plots and apply their ability to add and subtract fractions to solve problems about measurement data.

Lessons

1. **Fractions as Sums** — Let's write fractions as sums.
2. **Addition of Fractions** — Let's explore sums of fractions on a number line.
3. **Differences of Fractions** — Let's explore differences of fractions on a number line.
4. **The Numbers in Subtraction** — Let's subtract fractions from whole numbers.
5. **Subtract Fractions Flexibly** — Let's find all kinds of differences.
6. **Sums and Differences of Fractions** — Let's add and subtract fractions and analyze our strategies.
7. **Fractional Measurements on Line Plots** — Let's create line plots and analyze the data.
8. **Problems about Fractional Measurement Data** — Let's solve problems involving measurement data on line plots.

Section C: Addition of Tenths and Hundredths

Section Goals

- Reason about equivalence to add tenths and hundredths.
- Reason about equivalence to solve problems involving addition and subtraction of fractions and mixed numbers.

Section Narrative

Students apply their understanding of fraction equivalence to add tenths and hundredths. They use this reasoning to add tenths and hundredths by generating equivalent fractions and apply decomposition along with the associative and commutative properties to add three or more tenths and hundredths, including mixed numbers.

Lessons

1. **An Assortment of Fractions** — Let's find the heights of some stacked objects.
2. **Add Tenths and Hundredths Together** — Let's add some tenths and hundredths.
3. **Sums of Tenths and Hundredths** — Let's add more tenths and hundredths.
4. **A Lot of Fractions to Add** — Let's add more than two fractions.
5. **Flexible with Fractions (Optional)** — Let's solve all kinds of problems involving fractions.
6. **Sticky Notes (Optional)** — Let's make a design using sticky notes.

Unit 4: From Hundredths to Hundred-Thousands

Unit Goal

Students read, write and compare numbers in decimal notation. They also extend place value understanding for multi-digit whole numbers and add and subtract within 1,000,000.

Unit Narrative

In this unit, students learn to express both small and large numbers in base ten, extending their understanding to include numbers from hundredths to hundred-thousands. Students take a closer look at tenths and hundredths and learn to express them in decimal notation, comparing and ordering decimals. They explore large numbers using base-ten blocks and diagrams. Students see the “ten times” relationship between digit values. Students compare, round, and order numbers through 1,000,000, and use place-value reasoning to add and subtract numbers within 1,000,000 using the standard algorithm.

Section A: Decimals with Tenths and Hundredths

Section Goals

- Represent, compare, and order decimals to the hundredths by reasoning about their size.
- Write tenths and hundredths in decimal notation.

Section Narrative

Students learn to represent and reason about tenths and hundredths in decimal notation. They relate fraction notation to decimal notation and read 0.1 as “one tenth” and 0.01 as “one hundredth.” Students use benchmarks such as 0.5 and the relationship between tenths and hundredths to locate and label decimals on a number line. They compare and order decimals.

Lessons

1. **Decimal Numbers** — Let’s learn about decimals.
2. **Equivalent Decimals** — Let’s think about equivalent decimals.
3. **Decimals on Number Lines** — Let’s compare some decimals.
4. **Compare and Order Decimals** — Let’s put some decimals in order.
5. **Compare and Order Decimals in Different Notations** — Let’s put decimals in order.

Section B: Place Value Relationships through 1,000,000

Section Goals

- Read, represent, and describe the relative magnitude of multi-digit whole numbers up to 1 million.
- Recognize that in a multi-digit whole number, the value of a digit in one place represents ten times what it represents in the place to its right.

Section Narrative

Students make sense of whole numbers up to the hundred-thousands place, learn to read and write them, and deepen their understanding of place value. They use base-ten blocks and diagrams to represent and reason about multi-digit numbers. Students observe structure and begin to understand the value of the digit in each position, seeing the “ten times” relationship between digit values.

Lessons

1. **How Much Is 10,000?** — Let’s represent 10,000.

2. **Numbers Within 100,000** — Let's read, write, and represent multi-digit numbers.
3. **Beyond 100,000** — Let's read, write, and represent numbers beyond 100,000.
4. **Same Digit, Different Value** — Let's describe the relationship between the digits in multi-digit numbers.
5. **Ten Times As Much** — Let's write equations to show the relationship between the digits in multi-digit numbers.
6. **Large Numbers on a Number Line** — Let's locate multi-digit numbers on a number line.

Section C: Compare, Order, and Round

Section Goals

- Compare, order, and round multi-digit whole numbers within 1,000,000.

Section Narrative

Students extend grade 3 work to include numbers within 1,000,000. They place multi-digit numbers on a number line with increasing precision and then make comparisons. Students round numbers within 1,000,000 to the nearest multiples of 10, 100, 1,000, 10,000, and 100,000. They apply their understanding of place value and rounding to solve contextual problems.

Lessons

1. **Compare Multi-Digit Numbers** — Let's compare large numbers.
2. **Order Multi-Digit Numbers** — Let's put some multi-digit numbers in order.
3. **Multiples of 10,000 and 100,000** — Let's explore multiples of 1,000, 10,000, and 100,000 and how other numbers relate to them.
4. **The Nearest Multiples of 1,000, 10,000, and 100,000** — Let's find multiples of 1 thousand, 10 thousand, and 100 thousand that are the nearest to a number.
5. **Round Numbers** — Let's round some large numbers.
6. **Apply Rounding** — Let's round large numbers to learn about situations and solve problems.

Section D: Add and Subtract

Section Goals

- Add and subtract multi-digit whole numbers using the standard algorithm.

Section Narrative

Students build on previous strategies while also learning the standard algorithm for addition and subtraction. They begin working toward the end-of-grade expectation of fluency with addition and subtraction within 1,000,000. They compare an algorithm that uses expanded form and the standard algorithm, and observe the role of place value in both algorithms.

Lessons

1. **Standard Algorithm to Add and Subtract** — Let's find sums and differences of large numbers.
2. **Compose and Decompose to Add and Subtract** — Let's compose and decompose units to add and subtract.
3. **Add and Subtract within 1,000,000** — Let's use the standard algorithm to add and subtract.
4. **Zeros in the Standard Algorithm** — Let's subtract from numbers with several zeros.
5. **Solve Problems Involving Large Numbers** — Let's solve problems by adding and subtracting.
6. **Bees are Buzzing (Optional)** — Let's investigate insect populations.

Unit 5: Multiplicative Comparison and Measurement

Unit Goal

Students interpret, represent, and solve multiplicative comparison problems, using an understanding of the relationship between multiplication and division. They use this thinking to convert units of measure, within a given system, from larger to smaller units.

Unit Narrative

In this unit, students make sense of multiplication as a way to compare quantities (“how many times as many?”) and use this understanding to solve measurement problems. Initially, students reason using concrete manipulatives and discrete images. Later, they reason more abstractly using tape diagrams and equations. Next, students use the idea and language of multiplicative relationships to learn about various units of length, mass, capacity, and time, and to convert from larger units to smaller units, within the same system of measurement.

Section A: Multiplicative Comparison

Section Goals

- Analyze, describe, and represent multiplicative comparison situations.
- Solve one-step and two-step problems involving multiplicative comparison.

Section Narrative

Students learn to compare two quantities in terms of multiplication and to solve multiplicative comparison problems. They begin with comparisons involving lesser factors and familiar situations, using familiar multiplicative comparison language (“twice as many”). Students progress from concrete representations to discrete diagrams. They write multiplication equations to express comparisons.

Lessons

1. **Times as Many** — Let’s represent “times as many” situations.
2. **Interpret Representations of Multiplicative Comparison** — Let’s make sense of representations of problems with “times as many.”
3. **Solve Multiplicative Comparison Problems** — Let’s solve multiplicative comparison problems.
4. **Solve Multiplicative Comparison Problems with Large Numbers** — Let’s represent and solve multiplicative comparison problems, with greater numbers.
5. **One- and Two-Step Comparison Problems** — Let’s solve multiplicative comparison word problems.
6. **Ten Times as Many** — Let’s represent “10 times as many.”

Section B: Measurement Conversion

Section Goals

- Convert from larger units to smaller units, within a given system of measurement.
- Solve multi-step problems involving multiplicative comparison and measurement.
- Understand the relative sizes of kilometers, meters and centimeters, liters and milliliters, kilograms and grams, and pounds and ounces.

Section Narrative

Students convert measurements within the same system from larger units to smaller units. These conversions require an understanding of the multiplicative relationship between units. Students

develop a sense of the multiplicative relationship between centimeters and meters and convert meters to centimeters. They learn the relationships between grams and kilograms, milliliters and liters, ounces and pounds, and hours, minutes, and seconds.

Lessons

1. **Meters and Centimeters** — Let's explore lengths in meters and in centimeters.
2. **Meters and Kilometers** — Let's explore measurements in meters and in kilometers.
3. **Grams and Kilograms, Liters, and Milliliters** — Let's explore measurements in grams, kilograms, liters, and milliliters.
4. **Multi-Step Measurement Problems** — Let's solve multi-step measurement problems.
5. **Pounds and Ounces** — Let's explore measurements in pounds and ounces.
6. **Hours, Minutes, and Seconds** — Let's explore time in hours, minutes, and seconds.
7. **Multi-Step Measurement Problems with Fractions** — Let's solve multi-step measurement problems.

Section C: Let's Put It to Work

Section Goals

- Solve multi-step problems involving multiplicative comparison and measurement.

Section Narrative

Students use multiplicative comparison and measurement conversion strategies to solve multi-step problems. Students explore multiplicative relationships in geometric contexts, analyzing the relationship between the side lengths and the perimeters of quadrilaterals while performing unit conversions.

Lessons

1. **Weight and Capacity Measurements** — Let's solve problems about weight and about capacity.
2. **Length Measurements** — Let's solve problems about distances and lengths.
3. **Compare Perimeters of Rectangles** — Let's solve problems about rectangles of different sizes.
4. **More Perimeter Problems** — Let's solve problems about the perimeter of various shapes.
5. **Two Truths and a Lie (Optional)** — Let's compare facts about animals.

Unit 6: Multiplying and Dividing Multi-digit Numbers

Unit Goal

Students multiply and divide multi-digit whole numbers using partial products and partial quotients strategies, and apply this understanding to solve multi-step problems using the four operations.

Unit Narrative

Students extend their knowledge of multiplication and division to find products and quotients of multi-digit numbers. They begin by generating patterns, then move to reasoning about products of multi-digit numbers, transitioning from base-ten diagrams to algorithms to record partial products. Students then divide dividends up to four-digit by single-digit divisors using partial quotients. They apply expanded knowledge of operations to solve multi-step problems about measurement.

Section A: Features of Patterns

Section Goals

- Generate a number or shape pattern that follows a given rule.
- Identify apparent features of a number pattern that were not explicit in the rule itself.

Section Narrative

Students generate geometric and numerical patterns that follow a given rule and analyze features of these patterns. The section begins with more concrete patterns (such as shapes with features that change quantitatively) and moves toward patterns with repeating objects or numbers. Students connect Choral Count experiences to make sense of numerical patterns.

Lessons

1. **Patterns that Grow** — Let's create and describe growing patterns that follow a given rule.
2. **Patterns that Repeat** — Let's create and describe repeating patterns that follow a given rule.
3. **Numerical Patterns** — Let's explore numerical patterns.
4. **More Numerical Patterns** — Let's create and explore more numerical patterns that follow a rule.

Section B: Multi-Digit Multiplication

Section Goals

- Multiply a whole number of up to four digits by a one-digit whole number, and 2 two-digit numbers using strategies based on place value and the properties of operations.

Section Narrative

Students use their knowledge of multiplication, place value, and area of rectangles to multiply one-digit numbers and numbers up to four digits, and to multiply pairs of two-digit numbers. A key thread is the idea of decomposing factors by place value. Students encounter an algorithm that uses partial products, a way to record the reasoning used with diagrams. Algorithms using partial products prepare students for the standard algorithm.

Lessons

1. **Products Beyond 100** — Let's find products beyond 100.
2. **Multiply Two-Digit Numbers and One-Digit Numbers** — Let's multiply two-digit and one-digit numbers.
3. **Multiply Three- and Four-Digit Numbers by One-Digit Numbers** — Let's multiply three- and four-digit numbers by one-digit numbers.

4. **Multiply 2 Two-Digit Numbers** — Let's multiply 2 two-digit numbers.
5. **Recording Partial Products: One-Digit and Three- or Four-Digit Factors** — Let's analyze and try an algorithm that uses partial products.
6. **Using Algorithms with Partial Products: 2 Two-Digit Numbers** — Let's try to multiply two-digit numbers with an algorithm that uses partial products.
7. **Partial Products and the Standard Algorithm** — Let's compare multiplication algorithms.
8. **Solve Problems Involving Multiplication** — Let's solve problems using what we learned about multiplication of whole numbers.

Section C: Multi-Digit Division

Section Goals

- Divide numbers of up to four digits by one-digit divisors to find whole-number quotients and remainders, using strategies based on place value, properties of operations, and the relationship between multiplication and division.

Section Narrative

Students find quotients from larger dividends (up to four digits), investigate new division strategies and ways to represent them, and interpret division situations that involve remainders. They reason about division problems in any way that makes sense, then use base-ten representations. Students learn to use a series of equations and a vertical recording method to organize partial quotients.

Lessons

1. **Situations Involving Equal-Size Groups** — Let's solve division problems.
2. **Situations Involving Area** — Let's divide to find the side length of a rectangle.
3. **Base-Ten Blocks to Divide** — Let's use base-ten blocks to divide.
4. **Base-Ten Diagrams to Represent Division** — Let's make sense of base-ten diagrams that represent division.
5. **An Algorithm with Partial Quotients** — Let's make sense of and use an algorithm that uses partial quotients.
6. **Use an Algorithm with Partial Quotients** — Let's find quotients using an algorithm that uses partial quotients.
7. **Divide with Remainders** — Let's solve problems involving division including interpreting remainders.
8. **Interpret Remainders in Division Situations** — Let's solve problems involving division and interpret remainders.
9. **Problems with Remainders** — Let's think about remainders to solve problems.

Section D: Let's Put It to Work: Problem Solving with Large Numbers

Section Goals

- Use the four operations to solve problems that involve multi-digit whole numbers and assess the reasonableness of answers.

Section Narrative

Students engage with a variety of contextual problems that involve multi-digit numbers and all four operations. The problems can be approached in many ways. Many problems involve multiple steps and justifications, prompting students to construct logical reasoning and critique the reasoning of others.

Lessons

1. **Different Ways to Solve Problems** — Let's reason about and solve multi-step problems.
2. **Problems about Perimeter and Area** — Let's solve situations involving perimeter and area.
3. **Solve Problems with Many Operations** — Let's solve multi-step problems involving the four operations.
4. **Assess the Reasonableness of Solutions** — Let's solve problems and assess the reasonableness of solutions.
5. **Paper Flower Decorations (Optional)** — Let's make patterns with paper flowers.

Unit 7: Angles and Angle Measurement

Unit Goal

Students learn to draw and identify points, rays, segments, angles, and lines, including parallel and perpendicular lines. They use a protractor to measure angles and identify acute, obtuse, right, and straight angles in two-dimensional figures.

Unit Narrative

In this unit, students deepen their understanding of geometric figures and measurement. They formalize their intuitive knowledge about geometric features, identify some building blocks of geometry (points, lines, rays, line segments), and develop concepts and language to more precisely describe and reason about other geometric figures. Students analyze cases where lines intersect and where they don't (parallel lines). They learn that angles can be measured in degrees and use a protractor to measure angles in whole-number degrees. Students also learn that angles are additive, and use these insights to classify and solve problems about unknown angle measurements.

Section A: Points, Lines, Segments, Rays, and Angles

Section Goals

- Draw and identify points, lines, rays, segments, and parallel and intersecting lines in geometric figures.
- Recognize that angles are formed wherever two rays share the same starting point, and identify angles in two-dimensional figures.

Section Narrative

Students are introduced to building blocks of geometric figures and the language to describe them. Students learn to distinguish points as locations, rays as lines bounded by one point, and line segments as lines bounded by two points. They identify parallel lines and learn that an angle is a figure made up of two rays sharing the same starting point (vertex).

Lessons

1. **How Would You Describe These Figures?** — Let's draw and describe geometric figures.
2. **Points, Lines, Rays, and Segments** — Let's draw points, lines, line segments, and rays.
3. **Two or More Lines** — Let's look at lines that cross and lines that don't.
4. **Points and Lines All Around** — Let's find parallel and intersecting lines all around us.
5. **What Is an Angle?** — Let's look for angles and find out ways to describe them.

Section B: The Size of an Angle

Section Goals

- Recognize that angles can be measured in degrees and found, using addition and subtraction.
- Use a protractor to measure and draw angles, and recognize that perpendicular lines create 4 right angles.

Section Narrative

Students learn two main ideas: angles can be measured in degrees, and angles can be composed and decomposed (and are therefore additive). They also learn to use a protractor to measure and draw angles. Students compare angles visually, then explore time-based descriptions using clocks. They learn a full turn is 360 degrees and use benchmark angles to estimate and measure other angles.

Lessons

1. **Compare and Describe Angles** — Let's think about how to compare and describe angles.
2. **The Size of an Angle on a Clock** — Let's describe angles, using the hands of a clock.
3. **The Size of An Angle, in Degrees** — Let's describe the size of an angle, using degrees.
4. **Use a Protractor to Measure Angles** — Let's use some tools to measure angles.
5. **Angle Measurement and Perpendicular Lines** — Let's measure all kinds of angles.
6. **Use a Protractor to Draw Angles** — Let's draw some angles.

Section C: Angle Analysis

Section Goals

- Draw and identify acute, obtuse, right, and straight angles in two-dimensional figures.
- Write equations to represent angle relationships, and reason about and find unknown measurements.

Section Narrative

Students draw and analyze angles and reason about their measurements. They classify angles by size and identify acute, obtuse, and straight angles. They develop the idea that angles are additive by composing and decomposing angles, and writing expressions or equations. Students solve problems about angles in different contexts using their understanding of a right angle and a straight angle.

Lessons

1. **Types of Angles** — Let's look at different types of angles.
2. **Find Angle Measurements** — Let's compose and decompose angles to find their measurements.
3. **Reasoning about Angles (Part 1)** — Let's find the size of an angle on the clock.
4. **Reasoning about Angles (Part 2)** — Let's figure out missing angle measurements.
5. **Angles, Streets, and Steps (Optional)** — Let's investigate streets and steps.

Unit 8: Properties of Two-dimensional Shapes

Unit Goal

Students classify triangles and quadrilaterals based on the properties of their side lengths and angles, and learn about lines of symmetry. They use their understanding of these attributes to solve problems, including problems involving perimeter and area.

Unit Narrative

In this unit, students analyze and categorize two-dimensional shapes—triangles and quadrilaterals—by their attributes. They classify shapes based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Students also learn about symmetry. They identify line-symmetric figures and draw lines of symmetry. The second half of the unit gives students opportunities to apply their understanding of geometric attributes to solve problems about measurements.

Section A: Side Lengths, Angles, and Lines of Symmetry

Section Goals

- Classify triangles (including right triangles), parallelograms, rectangles, rhombuses, and squares based on the properties of their side lengths and angles.
- Identify and draw lines of symmetry in two-dimensional figures.

Section Narrative

Students consider different ways of looking at two-dimensional figures: by the number of sides, length of sides, size of angles, presence of parallel or perpendicular lines, and symmetry. They examine these attributes, classify figures, and explain their classifications. In studying symmetry, students characterize figures based on whether they can be folded into two equal halves that match up exactly.

Lessons

1. **Ways to Look at Figures** — Let's sort flat figures.
2. **Ways to Look at Triangles** — Let's sort and analyze triangles.
3. **Ways to Look at Quadrilaterals** — Let's sort and identify quadrilaterals.
4. **Symmetry in Figures (Part 1)** — Let's describe symmetry in flat figures.
5. **Symmetry in Figures (Part 2)** — Let's draw some figures that have lines of symmetry.
6. **All Kinds of Attributes (Optional)** — Let's use what we know about attributes of figures to create drawings.

Section B: Reason about Attributes to Solve Problems

Section Goals

- Solve problems involving unknown side lengths, perimeter, area, and angle measurements using the known attributes and properties of two-dimensional shapes.

Section Narrative

Students apply their knowledge of geometric attributes to reason about measurements in various two-dimensional figures. They find the perimeter of figures where the side lengths are all given, then move on to cases where the side lengths are not explicitly given but can be deduced. The last two lessons use symmetry to solve problems related to perimeter and unknown angle measurements; these lessons are optional.

Lessons

1. **Ways to Find Unknown Length (Part 1)** — Let's find the perimeter of different shapes.
2. **Ways to Find Unknown Length (Part 2)** — Let's find the unknown lengths in figures.
3. **Symmetry in Action (Optional)** — Let's investigate symmetry and perimeter in folded figures.
4. **Ways to Find Angle Measurements (Optional)** — Let's find angle measurements in figures with line symmetry.
5. **Symmetry in Sports (Optional)** — Let's use symmetry to think about sports.

Unit 9: Putting It All Together

Unit Goal

Students consolidate and solidify their understanding of various concepts and skills related to major work of the grade. They also continue to work toward fluency goals of the grade.

Unit Narrative

In this unit, students revisit major work and fluency goals of the grade, applying their learning from the year. Section A: comparing, adding, and multiplying fractions. Section B: standard algorithm for addition and subtraction; multiply and divide by place value. Section C: making sense of situations and solving problems with multiplication and division. Section D: review major work by creating activities in the format of the Warm-up routines. Sections stand alone and are not required to be completed in order.

Section A: Reason with Fractions

Section Goals

- Solve problems involving fraction equivalence and operating with fractions.

Section Narrative

Students solve problems requiring multiplying fractions by whole numbers and adding and subtracting fractions with the same denominator. They apply their understanding of fractions and equivalence to compare fractions, add and subtract whole numbers and fractions (including mixed numbers), and find sums and differences of tenths and hundredths.

Lessons

1. **Add, Subtract, and Multiply Fractions** — Let's practice solving problems involving fractions.
2. **Sums and Differences of Fractions** — Let's practice solving problems involving fractions.
3. **Stories with Fractions** — Let's add and subtract mixed numbers.

Section B: Whole-Number Operations

Section Goals

- Add, subtract, multiply, and divide multi-digit numbers, using place value understanding.

Section Narrative

Students deepen their understanding of place value and build fluency in performing operations on multi-digit numbers. They practice the standard algorithm for addition and subtraction. Next, they practice multiplying and dividing multi-digit numbers using algorithms that involve partial products and partial quotients.

Lessons

1. **Another Look at the Standard Algorithm** — Let's subtract from numbers with zeros.
2. **Multiplication of Multi-digit Numbers** — Let's multiply multi-digit numbers.
3. **What's the Quotient?** — Let's find some quotients of multi-digit numbers.

Section C: Solve Problems with Multiplication and Division

Section Goals

- Solve problems involving measurement comparison.

Section Narrative

Students practice solving real-world problems using multiplication and division. Throughout, students reason in different ways, look for ways to compare quantities using addition or multiplication, make estimates to simplify problems or assess reasonableness, and reason with diagrams and equations.

Lessons

1. **Solve Multiplicative Comparison Problems** — Let's solve real-world multiplicative comparison problems.
2. **Solve Problems with Multiplication and Division** — Let's make sense of situations and solve word problems.
3. **Create Word Problems** — Let's write our own word problems.

Section D: Creation and Design

Section Goals

- Review the major work of the grade by creating and designing instructional routines.

Section Narrative

Students apply the mathematics they have learned to design warm-ups that incorporate some of the routines used throughout the course (Estimation Exploration, Number Talk, Which Three Go Together?). Each lesson is devoted to a particular routine.

Lessons

1. **Estimation Exploration** — Let's design an Estimation Exploration activity.
2. **Which Three Go Together** — Let's create a Which Three Go Together.
3. **Number Talk** — Let's create our own Number Talks.

About This Syllabus

This syllabus was compiled from the publicly available Illustrative Mathematics K-5 v.360 curriculum at accessim.org. Unit and section narratives, goals, and lesson titles are sourced from the teacher view. Optional lessons (typically Center Days and culminating tasks) are labeled “(Optional).” Assessments (checkpoints and end-of-unit assessments) are referenced in the source curriculum but require a Kendall Hunt educator account to view; they are not included here.

<https://accessim.org/k-5/grade-4?a=teacher>