

Grade 5 Mathematics

Full Syllabus

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

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

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Course Overview

Grade 5 of the Illustrative Mathematics K-5 curriculum is organized into 8 units. Students learn to find volume, reason about fractions as quotients and multiply fractions, multiply and divide fractions, master the standard algorithm for multi-digit multiplication, work with decimals and decimal operations through the thousandths, perform more decimal and fraction operations, plot shapes on the coordinate grid, and culminate with a Putting It All Together unit.

The unit sequence is:

- Unit 1: Finding Volume
- Unit 2: Fractions as Quotients and Fraction Multiplication
- Unit 3: Multiplying and Dividing Fractions
- Unit 4: Wrapping Up Multiplication and Division with Multi-digit Numbers
- Unit 5: Place Value Patterns and Decimal Operations
- Unit 6: More Decimal and Fraction Operations
- Unit 7: Shapes on the Coordinate Grid
- Unit 8: 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: Finding Volume

Unit Goal

Students find the volumes of right rectangular prisms and solid figures composed of two right rectangular prisms.

Unit Narrative

This unit introduces students to the concept of volume by building on their understanding of area and multiplication. Students learn that the volume of a solid figure is the number of unit cubes that fill it without gaps or overlaps. They measure volume by counting unit cubes and observe its additive nature. Next, students focus on right rectangular prisms: building them using unit cubes, analyzing their structure, and finding their volumes. They generalize that the volume of a rectangular prism can be found by multiplying side measurements or by multiplying the area of the base by its height. Later, they apply these understandings to find the volume of a solid figure composed of two non-overlapping rectangular prisms.

Section A: Unit Cubes and Volume

Section Goals

- Describe volume as the space taken up by a solid object.
- Measure the volume of a rectangular prism by finding the number of unit cubes needed to fill it.
- Use the layered structure in a rectangular prism to find volume.

Section Narrative

Students make sense of volume as a measure of a three-dimensional figure by building objects with unit cubes and counting the cubes. They experiment with different figures made from the same number of cubes and see them as having the same volume. They build right rectangular prisms and analyze images, looking at structure and relating the number of horizontal and vertical layers to the total number of cubes.

Lessons

1. **What Is Volume?** — Let's build and compare objects made of cubes.
2. **Measure Volume** — Let's count cubes.
3. **Volume of Prism Drawings** — Let's use layers to find volume.
4. **Use Layers to Determine Volume** — Let's relate multiplication to how we use layers to find volume.

Section B: Expressions for Finding Volume

Section Goals

- Describe the calculations from the previous section as $\text{length} \times \text{width} \times \text{height}$ or $\text{base area} \times \text{height}$.
- Find volume, using $\text{length} \times \text{width} \times \text{height}$ or $\text{base area} \times \text{height}$.

Section Narrative

Students relate side measurements to volume. They observe that multiplying the number of layers of cubes in a prism by the number of cubes in one layer gives its volume. Students generalize the volume of

a right rectangular prism as the product of its side lengths and as the product of the area of its base and its height. This work reinforces the associative property of multiplication.

Lessons

1. **Side Lengths of Rectangular Prisms** — Let's describe the side lengths of a prism and find the volume.
2. **Expressions for Volume** — Let's write expressions for the volume of rectangular prisms.
3. **Cubic Units of Measure** — Let's use different cubic units to measure volume.

Section C: Volumes of Solid Figures

Section Goals

- Find the volume of a figure composed of rectangular prisms.

Section Narrative

Students apply their understanding of volume to solve real-world and mathematical problems. They encounter solid figures composed of two or more right rectangular prisms, reinforcing the additive nature of volume. Students work with side lengths greater than those in earlier sections, prompting them to activate multiplication strategies.

Lessons

1. **Figures Made of Prisms** — Let's find the volumes of figures made of prisms.
2. **Measure Figures Made from Prisms** — Let's find the volumes of more figures.
3. **Represent Volume with Expressions** — Let's write expressions for the volumes of figures.
4. **All Kinds of Prisms** — Let's find the volume of all different kinds of prisms.
5. **Tons and Tons of Garbage (Optional)** — Let's investigate what happens to garbage.

Unit 2: Fractions as Quotients and Fraction Multiplication

Unit Goal

Students develop an understanding of fractions as the division of the numerator by the denominator, and solve problems that involve the multiplication of a whole number and a fraction, including fractions greater than 1.

Unit Narrative

Students learn that a fraction can represent: a division situation, where objects are being shared equally; a fraction of a group; or the area of a rectangle with a fractional side. Students interpret the product of a whole number and a fraction in terms of side lengths of a rectangle. The commutative and associative properties become evident as students connect different expressions to the same diagram. The distributive property is used as students multiply mixed numbers.

Section A: Fractions as Quotients

Section Goals

- Represent and explain the relationship between division and fractions.
- Solve problems involving division of whole numbers leading to answers that are fractions.

Section Narrative

Students learn to see a fraction as a quotient, a result of dividing the numerator by the denominator. They solve a sequence of problems about situations that involve sharing a whole number of objects equally. Through repeated reasoning, they notice regularity in the result of division.

Lessons

1. **Share Sandwiches** — Let's share sandwiches.
2. **Share More Sandwiches** — Let's use diagrams and expressions to represent division situations.
3. **Interpret Equations** — Let's use equations to show the relationship between division and fractions.
4. **Division Situations** — Let's solve and represent division problems.
5. **Relate Division and Fractions** — Let's explain the relationship between division and fractions.

Section B: Fractions of Whole Numbers

Section Goals

- Connect division to multiplication of a whole number by a non-unit fraction.
- Connect division to multiplication of a whole number by a unit fraction.
- Explore the relationship between multiplication and division.

Section Narrative

Students connect the two interpretations of a fraction—as a quotient and as a multiple of a unit fraction. They use diagrams and contexts to make sense of division situations that result in a fractional quotient. As they interpret and write expressions, students observe the commutative property of multiplication.

Lessons

1. **Relate Division and Multiplication** — Let's explore the relationship between multiplication and division.
2. **Divide to Multiply Unit Fractions** — Let's solve problems about multiplying whole numbers by unit fractions.
3. **Divide to Multiply Non-Unit Fractions** — Let's solve problems about multiplying whole numbers by fractions.

Section C: Area and Fractional Side Lengths

Section Goals

- Find the area of a rectangle when one side length is a whole number and the other side length is a fraction or mixed number.
- Represent and solve problems involving the multiplication of a whole number by a fraction or mixed number.
- Write, interpret, and evaluate numerical expressions that represent multiplication of a whole number by a fraction or mixed number.

Section Narrative

Students learn that they can reason about the area of a rectangle with a fractional side length the same way they had with rectangles with whole-number side lengths: using diagrams and multiplication. They work through fractional side lengths: a unit fraction, a non-unit fraction, a fraction greater than 1, and a mixed number. The distributive property is illustrated as students reason about the area of a rectangle where the side lengths involve a mixed number.

Lessons

1. **Relate Area to Multiplication** — Let's explore the area of rectangles with one side length that is a unit fraction.
2. **Fractional Side Lengths Less than 1** — Let's find the area of rectangles with a fractional side length.
3. **Fractional Side Lengths Greater than 1** — Let's find the area of more rectangles.
4. **Decompose Area** — Let's decompose rectangles to find their area.
5. **Area and Properties of Operations** — Let's write expressions to represent the area of rectangles.
6. **Area Situations** — Let's apply what we've learned about fraction multiplication.
7. **Multiply More Fractions** — Let's multiply mixed numbers.
8. **Estimate Products (Optional)** — Let's estimate products of a whole number and a fraction.
9. **Mosaic Pictures (Optional)** — Let's make a design for a mosaic.

Unit 3: Multiplying and Dividing Fractions

Unit Goal

Students extend multiplication and division of whole numbers to multiply fractions by fractions and divide a whole number and a unit fraction.

Unit Narrative

Students find the product of two fractions, divide a whole number by a unit fraction, and divide a unit fraction by a whole number. Students make sense of multiplication of two fractions through area diagrams. Through repeated reasoning, students notice regularity and generalize. Next, students make sense of division situations and expressions involving a whole number and a unit fraction. Later in the unit, students apply what they learned to solve problems.

Section A: Fraction Multiplication

Section Goals

- Recognize that the product of two fractions can be found by multiplying numerators and multiplying denominators.
- Represent and describe multiplication of a fraction by a fraction using area concepts.

Section Narrative

Students reason about multiplication of two fractions. They begin by considering situations that involve finding a fraction of a fraction. Students connect the product of two fractions to the area of a rectangle with fractional side lengths. They extend insights to find the product of non-unit fractions, including fractions greater than 1.

Lessons

1. **One Piece of One Part** — Let's solve problems about unit fractions.
2. **Represent Unit Fraction Multiplication** — Let's write expressions to represent multiplication of unit fractions.
3. **Multiply Unit Fractions** — Let's solve equations.
4. **Situations about Multiplying Fractions** — Let's solve problems about multiplying a unit fraction and a non-unit fraction.
5. **Multiply a Unit Fraction by a Non-Unit Fraction** — Let's multiply a unit fraction and a non-unit fraction.
6. **Multiply Fractions** — Let's multiply two non-unit fractions using diagrams and expressions.
7. **Generalize Fraction Multiplication** — Let's use what we've learned to multiply any two fractions.
8. **Work with Mixed Numbers** — Let's use what we've learned to multiply mixed numbers.
9. **Apply Fraction Multiplication** — Let's solve problems about flags.

Section B: Fraction Division

Section Goals

- Divide a unit fraction by a whole number using whole-number division concepts.
- Divide a whole number by a unit fraction using whole-number division concepts.

Section Narrative

Students extend division ideas to divide a unit fraction by a whole number and divide a whole number by a unit fraction. They reason about situations, diagrams, and expressions that represent division. Students look for patterns and assess the reasonableness of the quotients they find.

Lessons

1. **Concepts of Division (Optional)** — Let's think about the size of quotients.
2. **Divide Unit Fractions by Whole Numbers** — Let's divide a unit fraction by a whole number.
3. **Represent Division of Unit Fractions by Whole Numbers** — Let's use diagrams to represent division of a unit fraction by a whole number.
4. **Divide Whole Numbers by Unit Fractions** — Let's divide a whole number by a unit fraction.
5. **Represent Division of Whole Numbers by Unit Fractions** — Let's solve problems by dividing a whole number by a unit fraction.
6. **Fraction Division Situations** — Let's write situations and solve problems involving division of whole numbers and unit fractions.
7. **Reason about Quotients** — Let's apply what we know about division to make sure our answers make sense.

Section C: Problem Solving with Fractions

Section Goals

- Solve problems involving fraction multiplication and division.

Section Narrative

Students solve problems involving multiplication and division of fractions. As they reason about situations and interpret tape diagrams, students see that the same situation or diagram can be expressed with multiplication or division.

Lessons

1. **Fraction Multiplication and Division Situations** — Let's solve problems involving multiplying and dividing fractions.
2. **Represent Situations with Multiplication and Division** — Let's represent problems with multiplication and division equations.
3. **Fraction Games** — Let's multiply and divide with fractions.
4. **Recipes and Fractions (Optional)** — Let's learn about how fractions relate to recipes.

Unit 4: Wrapping Up Multiplication and Division with Multi-digit Numbers

Unit Goal

Students use the standard algorithm to multiply multi-digit whole numbers. They divide whole numbers up to four digits by two-digit divisors, using strategies based on place value and the properties of operations.

Unit Narrative

Students multiply multi-digit whole numbers using the standard algorithm, and work toward end-of-grade fluency. They also find whole-number quotients with up to four-digit dividends and two-digit divisors. Students build on grade 4 strategies to make sense of the standard algorithm for multiplication, which records partial products in a condensed way. Students extend grade 4 division work to include two-digit divisors. As they build facility with multi-digit multiplication and division, students solve problems about area and volume.

Section A: Multi-digit Multiplication Using the Standard Algorithm

Section Goals

- Multiply multi-digit whole numbers, using the standard algorithm.

Section Narrative

Students revisit grade 4 strategies and representations but work with factors with more digits. They make connections between partial products in diagrams and previous algorithms to the numbers in the standard algorithm. They also learn the notation for recording new place-value units that result from finding partial products.

Lessons

1. **Estimate and Find Products** — Let's estimate and calculate products.
2. **Partial Products in Diagrams** — Let's interpret diagrams that can help us find products.
3. **Partial Products in Algorithms** — Let's find partial products.
4. **Standard Algorithm: One-digit and Multi-digit Numbers, with Composing** — Let's use the standard algorithm to multiply multi-digit numbers by one-digit numbers.
5. **Standard Algorithm: Multi-digit Numbers, without Composing** — Let's use the standard algorithm to multiply three-digit numbers by two-digit numbers.
6. **Standard Algorithm: Multi-digit Numbers, with Composing** — Let's multiply with the standard algorithm and compose new units.
7. **Build Multiplication Fluency** — Let's multiply multi-digit whole numbers, using the standard algorithm.
8. **The Birds** — Let's solve multiplication problems.

Section B: Multi-digit Division Using Partial Quotients

Section Goals

- Divide multi-digit whole numbers, using strategies based on place value, the properties of operations, and the relationship between multiplication and division.

Section Narrative

Students extend grade 4 work to include quotients involving two-digit divisors. They begin with an exploration relating division of large numbers to a real-world context, then analyze and use different ways to decompose a dividend. Students see that some decompositions may be more helpful than others. The partial-quotients algorithms seen here are based on place value, which will allow students to make sense of the logic of the standard algorithm they'll learn in grade 6.

Lessons

1. **World's Record Folk Dance** — Let's explore division with multi-digit numbers.
2. **Different Partial Quotients** — Let's use what we know about multiplication and place value to find quotients.
3. **A Partial-Quotients Algorithm** — Let's make sense of a partial-quotients algorithm.
4. **Divide, Using Partial Quotients** — Let's use a partial-quotients algorithm to divide three-digit and four-digit dividends by two-digit divisors.
5. **Practice a Partial-Quotients Algorithm** — Let's practice using a partial-quotients algorithm.
6. **Find Unknown Side Lengths** — Let's use the relationship between multiplication and division to solve problems.
7. **World's Record Noodle Soup** — Let's solve a problem with large numbers, using division.
8. **Fractions as Partial Quotients (Optional)** — Let's use fractions to help us divide whole numbers.

Section C: Let's Put It to Work

Section Goals

- Multiply and divide to solve real-world and mathematical problems involving area and volume.

Section Narrative

The final section invites students to use multiplication and division of whole numbers to estimate large quantities and solve real-world and mathematical problems. Students encounter area and volume problems in the context of geography and everyday consumption. The section ends with an opportunity for mathematical modeling.

Lessons

1. **A Lot of Milk** — Let's make estimates with big numbers.
2. **Trash Talk** — Let's multiply to solve problems about the area of the Great Pacific Garbage Patch.
3. **Shipping Trash** — Let's estimate volumes.
4. **Food-Waste Journal (Optional)** — Let's use multiplication and division to think about food waste.

Unit 5: Place Value Patterns and Decimal Operations

Unit Goal

Students extend place value understanding to recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right. They use this to round, compare, order, add, subtract, multiply, and divide decimals.

Unit Narrative

Students expand knowledge of decimals to read, write, compare, and round decimals to the thousandths. They extend understanding of place value and numbers in base ten by performing operations on decimals to the hundredth. Students rely on diagrams and their understanding of fractions to make sense of decimals to the thousandths. They apply their understanding to add, subtract, multiply, and divide decimal numbers using strategies based on place value and properties of operations. Students see that the reasoning strategies and algorithms they used to operate on whole numbers are also applicable to decimals.

Section A: Numbers to Thousandths

Section Goals

- Compare, round, and order decimals through the thousandths place based on the value of the digits in each place.
- Read, write, and represent decimals to the thousandths place, including in expanded form.

Section Narrative

Students reason about decimals to the thousandths place. They begin by representing decimals on gridded area diagrams. The diagram highlights the relationships between place values. Students move on to using number lines to represent decimals and to compare, order, and round them.

Lessons

1. **What Is a Thousandth?** — Let's make sense of thousandths.
2. **Thousandths on Diagrams and in Words** — Let's represent numbers on diagrams as decimals, fractions, and words.
3. **Thousandths in Expanded Form** — Let's represent thousandths.
4. **Explore Place Value Relationships (Optional)** — Let's explore place value relationships.
5. **Compare Decimals** — Let's compare decimals.
6. **Compare Decimals on the Number Line** — Let's locate and label decimals on number lines.
7. **Round Doubloons** — Let's explore rounding with decimals.
8. **Round Decimals** — Let's round decimals to the nearest whole, tenth, and hundredth.
9. **Order Decimals** — Let's put decimals in order.
10. **Solve Problems with Decimals** — Let's round and order decimals to solve problems.

Section B: Add and Subtract Decimals

Section Goals

- Add and subtract decimals to the hundredths using strategies based on place value.

Section Narrative

Students add and subtract decimals to the hundredths. They begin by adding and subtracting in ways that make sense to them. Adding and subtracting decimals using the standard algorithm brings up a question of how to align digits. Students use place-value reasoning to decide whether sums and differences are reasonable and to ensure alignment.

Lessons

1. **Make Sense of Decimal Addition** — Let's add decimals.
2. **Estimate and Add** — Let's add decimals and decide if our answers are reasonable.
3. **Analyze Addition Mistakes** — Let's use place value strategies to add decimals.
4. **Make Sense of Decimal Subtraction** — Let's subtract decimals.
5. **Estimate and Subtract** — Let's use place value to subtract decimals.
6. **Addition and Subtraction** — Let's use place value strategies to add and subtract decimals.

Section C: Multiply Decimals

Section Goals

- Multiply decimals with products resulting in the hundredths using place value reasoning and properties of operations.

Section Narrative

Students learn to multiply decimals, continuing to think in terms of place value, make connections with whole-number operations, and use diagrams to support reasoning. They begin by multiplying a whole number and a decimal, then reason about the product of two decimals.

Lessons

1. **Multiply Decimals and Whole Numbers** — Let's multiply whole numbers by tenths and hundredths.
2. **Use Whole Number Facts** — Let's multiply whole numbers and decimals.
3. **Use Properties to Multiply Decimals** — Let's interpret and find the value of multiplication expressions with decimals and whole numbers.
4. **Products in the Hundredths Place** — Let's multiply tenths by tenths.
5. **Multiply More Decimals** — Let's multiply decimals.

Section D: Divide Decimals

Section Goals

- Divide decimals with quotients resulting in the hundredths using place value reasoning and properties of operations.

Section Narrative

Students use the relationship between multiplication and division and the idea of equal groups to make sense of division of decimals. Students interpret division problems in terms of finding how many of one quantity are in another, or putting a quantity into equal groups. Later, students use equivalent expressions to find quotients.

Lessons

1. **Divide Whole Numbers by 0.1 and 0.01** — Let's divide whole numbers by one tenth and one hundredth.

2. **Divide Whole Numbers by Decimals** — Let's divide whole numbers by decimals.
3. **Divide Decimals by Whole Numbers** — Let's divide decimals by whole numbers.
4. **Divide Decimals by Decimals** — Let's divide decimals by decimals.
5. **Book Fair (Optional)** — Let's plan a book fair fundraiser.

Unit 6: More Decimal and Fraction Operations

Unit Goal

Students solve multi-step problems involving measurement conversions, line plots, and fraction operations, including addition and subtraction of fractions with unlike denominators. They also explain patterns when multiplying and dividing by powers of 10 and interpret multiplication as scaling.

Unit Narrative

Students deepen their understanding of place-value relationships of numbers in base ten, unit conversion, operations on fractions with unlike denominators, and multiplicative comparison. They extend the “ten times” insight to include decimals to the thousandths. They perform measurement conversions in metric units, including from smaller to larger units, observing how digits shift when multiplied or divided by a power of 10 and learning to use exponential notation. Students then add and subtract fractions with different denominators (finding common denominators), solve problems involving measurement data on line plots, and reason about the size of a product compared to its factors.

Section A: Measurement Conversions and Powers of 10

Section Goals

- Perform measurement conversions within the metric system, including from smaller units to larger units.
- Use exponential notation to represent powers of 10 and understand patterns when multiplying or dividing by powers of 10.

Section Narrative

Students extend grade 4 conversion work to converting from smaller to larger units. They observe how digits shift when multiplied or divided by a power of 10 and learn exponential notation. They see that the value of a digit in one place is $\frac{1}{10}$ the value of the same digit in the place to its left. (For complete lesson list, see the source URL — Section A typically covers 7 lessons including powers of 10, metric conversion in length, mass, and capacity.)

Lessons

1. **Section A lessons** — See source for full lesson-by-lesson list (Section A of Grade 5 Unit 6).

Section B: Add and Subtract Fractions with Unlike Denominators

Section Goals

- Add and subtract fractions with unlike denominators by finding common denominators.
- Solve problems involving measurement data displayed on line plots.

Section Narrative

Students add and subtract fractions with different denominators by finding common denominators and analyzing different techniques. They also solve problems involving measurement data (in halves, fourths, and eighths) displayed on line plots.

Lessons

1. **Add and Subtract Fractions** — Let’s add and subtract fractions.

2. **Use Expressions with the Same Value** — Let's use expressions with the same value to add and subtract fractions with unlike denominators.
3. **All Sorts of Denominators** — Let's find common denominators.
4. **Different Ways to Subtract** — Let's subtract fractions and mixed numbers.
5. **Solve Problems** — Let's solve more problems by adding and subtracting fractions with unlike denominators.
6. **Put It All Together: Add and Subtract Fractions** — Let's add and subtract fractions with unlike denominators.
7. **Representing Fractions on a Line Plot** — Let's make a line plot and analyze the data we collect.
8. **Problem Solving with Line Plots** — Let's solve problems, using a line plot.

Section C: The Size of a Product

Section Goals

- Interpret multiplication as scaling, by comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.

Section Narrative

Students reason about the size of a product of fractions and the sizes of the factors. This builds on the multiplicative comparison work in grade 4. Students reason about products of a whole number and a fraction without finding the value of each product, using diagrams and expressions. (For complete lesson list, see the source URL — Section C of Grade 5 Unit 6.)

Lessons

1. **Section C lessons** — See source for full lesson-by-lesson list (Section C of Grade 5 Unit 6).

Unit 7: Shapes on the Coordinate Grid

Unit Goal

Students plot coordinate pairs on a coordinate grid and classify triangles and quadrilaterals in a hierarchy based on properties of side length and angle measure. They generate, identify, and graph relationships between corresponding terms in two numeric patterns and represent and interpret real world and mathematical problems on a coordinate grid.

Unit Narrative

Students learn about the coordinate grid, deepen their knowledge of two-dimensional shapes, and use the coordinate grid to study relationships of pairs of numbers in various situations. They use insights about parallel and perpendicular lines, angles, and shape attributes to make sense of the hierarchy of shapes. Later students analyze and generate numerical patterns based on pairs of rules and graph pairs of numbers on the coordinate grid.

Section A: The Coordinate Grid

Section Goals

- Locate points on a coordinate grid.

Section Narrative

Students begin by drawing rectangles based only on verbal descriptions. They learn to use the numbers on the horizontal axis and vertical axis to describe the position of points and plot them on the coordinate grid. They practice plotting points given coordinates and identifying coordinates of points.

Lessons

1. **Explore the Coordinate Grid** — Let's explore the coordinate grid.
2. **Points on the Coordinate Grid** — Let's plot points on the coordinate grid.
3. **Plot More Points** — Let's locate and name points on the coordinate grid.

Section B: The Hierarchy of Shapes

Section Goals

- Classify triangles and quadrilaterals in a hierarchy based on angle measurements and side lengths.

Section Narrative

Students classify quadrilaterals and triangles into different categories and study relationships between categories. They focus on relating attributes of trapezoids, rectangles, parallelograms, squares, and rhombuses. Students use Venn diagrams to highlight understanding of relationships.

Lessons

1. **Sort Quadrilaterals** — Let's sort quadrilaterals.
2. **Trapezoids** — Let's explore trapezoids.
3. **Hierarchy of Quadrilaterals** — Let's explore the hierarchy of quadrilaterals.
4. **Rectangles and Squares** — Let's learn more about rectangles and squares.
5. **Sort Triangles** — Let's sort triangles.

Section C: Numerical Patterns

Section Goals

- Generate, identify, and graph relationships between corresponding terms in two patterns, given a rule.
- Represent and interpret real world and mathematical problems on a coordinate grid.

Section Narrative

Students apply the concepts of this unit to analyze numerical relationships between two quantities in different contexts. They examine patterns generated by following a pair of rules, record patterns in tables, and interpret relationships. Students form ordered pairs from corresponding terms and graph them on the coordinate grid.

Lessons

1. **Generate Patterns** — Let's explore rules and patterns.
2. **Interpret Relationships** — Let's find relationships between patterns.
3. **Patterns and Ordered Pairs** — Let's represent patterns on the coordinate grid.
4. **Represent Problems on the Coordinate Grid** — Let's represent problems on the coordinate grid.
5. **Perimeter and Area of Rectangles** — Let's explore the perimeter and area of rectangles on the coordinate grid.
6. **Copies of Figures (Optional)** — Let's use coordinate grids to make a copy of a figure.

Unit 8: 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

Students revisit major work and fluency goals. Section A: standard algorithm for multiplication and partial-quotient division. Section B: real-world problems about volume with opportunities for mathematical modeling. Section C: operations with decimals and fractions through games. Section D: review major work by creating warm-up routines. Sections are standalone and not required to be completed in order.

Section A: Multiply and Divide Whole Numbers

Section Goals

- Divide multi-digit whole numbers using place-value strategies and the properties of operations.
- Fluently multiply multi-digit whole numbers using the standard algorithm.

Section Narrative

Students reinforce their understanding of the standard algorithm for multiplication and practice using it. They use estimation to determine reasonableness, recognize place-value patterns, and learn how to use the algorithm when factors include zeros. Students also practice dividing multi-digit whole numbers using a partial-quotients algorithm.

Lessons

1. **Find the Greatest Product** — Let's look for patterns when we multiply multi-digit numbers.
2. **More Multiplication** — Let's practice using the multiplication algorithm.
3. **Factors as a Factor in Our Strategy Choice** — Let's reason about strategies we use to multiply.
4. **Dive Back into Division** — Let's estimate and divide.
5. **More Division** — Let's divide.

Section B: Apply Volume Concepts

Section Goals

- Solve multi-step problems involving volume.

Section Narrative

Students revisit the meaning of volume and apply their understanding to solve problems. They estimate and calculate the volume of rectangular prisms in various contexts. The work prompts students to make reasonable estimates, consider appropriate sizes of units, and take unit conversion into account.

Lessons

1. **Revisit Volume** — Let's solve problems about volume.
2. **Estimate the Volume of the World's Largest Wagon** — Let's solve problems about volume.
3. **Fill the World's Largest Wagon** — Let's solve more problems about volume.
4. **Problem Solving with Volume: Water (Optional)** — Let's solve problems about volume of water.

Section C: Fraction and Decimal Operations

Section Goals

- Add decimals to hundredths.
- Add, subtract, and multiply fractions.

Section Narrative

Students strengthen their understanding of operations with fractions and decimals by playing a variety of games. Each lesson is structured as a game day. Students play games to find greatest or least sums, differences, or products, considering meaning of numerator and denominator and making strategic choices.

Lessons

1. **Here Comes the Sum** — Let's play some games to practice adding fractions.
2. **What's the Difference?** — Let's subtract fractions.
3. **Decimal Game Day** — Let's play some games and practice adding decimals.
4. **Multiply Fractions Game Day** — Let's multiply a fraction or whole number by a fraction.

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 incorporating routines used throughout the course (Notice and Wonder, Estimation Exploration, Number Talk, True or False?, Which Three Go Together?). Each lesson is devoted to a particular routine.

Lessons

1. **Notice and Wonder** — Let's create a Notice and Wonder.
2. **Estimation Exploration** — Let's create an Estimation Exploration.
3. **Number Talk** — Let's create a Number Talk.
4. **True or False?** — Let's create a True or False? activity.
5. **Which Three Go Together?** — Let's create a Which Three Go Together? activity.

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-5?a=teacher>