



Unit Plan

5.8 Putting It All Together

Chester / Littleville Elementary / Grade 5 / Mathematics

[^](#) Week 31 - Week 34 | 4 Curriculum Developers | Last Updated: Mar 26, 2024 by LeBlanc, Deanna[Style Guide](#)

What is the purpose of the unit? What are the major take-aways?

Standards

MA: Mathematics (2017)**MA: Grade 5****Operations & Algebraic Thinking****5.OA Write and interpret numerical expressions.**

- 1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols, e.g., $(6 \times 30) + (6 \times 1/2)$.
- 2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.
[Show Details](#)

5.OA Analyze patterns and relationships.

- 3. Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.
[Show Details](#)

Number & Operations in Base Ten**5.NBT Understand the place value system.**

- 3b. Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.
- 4. Use place value understanding to round decimals to any place.
- 3. Read, write, and compare decimals to thousandths.
- 1. Recognize that in a multi-digit number, including decimals, a digit in any place represents 10 times as much as it represents in the place to its right and $1/10$ of what it represents in the place to its left.
- 2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
- 3a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.

5.NBT Perform operations with multi-digit whole numbers and with decimals to hundredths.

- 5. Fluently multiply multi-digit whole numbers (include 2 digit \times 4 digit numbers and 3 digit \times 3 digit numbers) using the standard algorithm.
- 6. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
- 7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction and multiplication and division; relate the strategy to a written method and explain the reasoning used.

Number & Operations—Fractions**5.NF Use equivalent fractions as a strategy to add and subtract fractions.**

- 1. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. [Show Details](#)

5.NF Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

- 4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
- 3. Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. [Show Details](#)

Measurement & Data**5.MD Convert like measurement units within a given measurement system.**

- 1. Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.

5.MD Represent and interpret data.

- 2. Make a line plot (dot plot) to display a data set of measurements in fractions of a unit ($1/2, 1/4, 1/8$). Use operations on fractions for this grade to solve problems involving information presented in line plots (dot plot). [Show Details](#)

5.MD Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

- 3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
- 5. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
- 5a. Find the volume of a right rectangular prism with whole-number edge lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
- 5b. Apply the formulas $V = l \times w \times h$ and $V = B \times h$ (where B stands for the area of the base) for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.
- 5c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.
- 3a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.
- 3b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.
- 4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and non-standard units.

Geometry**5.G Graph points on the coordinate plane to solve real-world and mathematical problems.**

- 1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x -axis and x -coordinate, y -axis and y -coordinate).
- 2. Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

5.G Classify two-dimensional figures into categories based on their properties.

- 3. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.
- 4. Classify two-dimensional figures in a hierarchy based on properties. For example, all rectangles are parallelograms, because they are all quadrilaterals with two pairs of opposite sides parallel.

Enduring Understandings

1. Mathematical Operations and Grouping Symbols:
 - Students will understand that grouping symbols (parentheses, brackets, braces) are used to clarify which operations should be performed first in a numerical expression.
 - They will recognize that the rules of the order of operations must be followed to correctly evaluate expressions with these symbols.
 - The use of these symbols in expressions can change the outcome of the calculations, showing the importance of the correct application of the order of operations.
2. Expressing Calculations and Interpretation:
 - Students will understand that writing expressions is a way to record calculations succinctly and that these expressions can represent real-world situations or mathematical problems.
 - They will learn that interpreting expressions involves understanding the meaning behind the numbers and operations without necessarily calculating the final value.
 - This understanding helps recognize the structure and underlying concepts in numerical expressions, enabling them to analyze relationships between quantities.
3. Numerical Patterns and Coordinate Graphing:
 - Students will understand that numerical patterns follow specific rules and that these rules help to predict subsequent numbers in the pattern.
 - They will recognize the relationships between corresponding terms in two different patterns and represent these relationships as ordered pairs.
 - They will comprehend the concept of graphing ordered pairs on a coordinate plane and will see how visual representation can illustrate patterns and relationships between numbers.
4. Place Value Comprehension:
 - Students will understand that place value is a foundational concept in our number system, where the value of a digit is determined by its position within a number.
 - They will realize that each place represents 10 times more than the place to its right and $1/10$ of the place to its left, including when working with decimals.
 - This deeper comprehension enables them to read, write, compare, and manipulate both multi-digit and decimal numbers with confidence.
5. Mastery of Multiplication:
 - Students will understand that multiplying multi-digit numbers involves a series of simpler calculations that follow a standard algorithm.
 - They will become fluent in applying this algorithm, understanding how each step contributes to the final solution.
 - This fluency allows them to tackle real-world problems and more complex mathematical tasks that involve multiplication without the need for calculators, reinforcing their number sense and computational skills.

Essential Questions

1. Understanding Order of Operations and the Use of Symbols:
 - How does the use of parentheses, brackets, or braces change the outcome of a numerical expression?
 - In what ways do symbols like parentheses, brackets, and braces affect the operations performed in a mathematical expression?
 - Why is it important to follow a specific order when performing operations in an expression?
2. Expressing and Interpreting Numerical Expressions:
 - How can we write mathematical expressions to represent real-world situations?
 - What is the difference between evaluating an expression and interpreting it?
 - How can understanding numerical expressions help us in making calculations in everyday life?
3. Recognizing Patterns and Relationships:
 - How can we use rules to create numerical patterns?
 - What can patterns in numbers tell us about relationships between different quantities?
 - How can graphing ordered pairs on a coordinate plane help us visualize the relationship between two patterns?
4. Place Value and Decimals:
 - How does the place value system extend to decimals, and how is it related to whole numbers?
 - Why does each place to the left in a multi-digit number represent a value 10 times greater?
 - How do decimal numbers show parts of a whole, and how does their place value reflect their size?
5. Multiplication Proficiency:
 - Why is it important to understand and be fluent in multiplying multi-digit whole numbers?
 - How can breaking apart numbers into smaller parts simplify the process of multiplication?
 - How does the standard algorithm for multiplication help us solve complex multiplication problems?

Content

Skills

Section A Goals

In this unit, students revisit major work and fluency goals of the grade, applying their learning from the year.

In section A, students deepen their understanding of the standard algorithm for multiplication and practice using it to find the value of products. They also revisit algorithms that use partial quotients to divide whole numbers. In Section B, students solve real-world problems about volume and have opportunities to model with mathematics.

Section C focuses on operation with decimals and fractions. In the final section, students review major work of the grade as they create activities in the format of the warm-ups routines they have encountered throughout the year (Notice and Wonder, Estimation Exploration, Number Talk, True or False, and Which One Doesn't Belong?).

The sections in this unit are standalone sections, not required to be completed in order. Within a section, lessons can also be completed selectively and without completing prior lessons. The goal is to offer ample opportunities for students to integrate the knowledge they have gained and to practice skills related to the expected fluencies of the grade.

Throughout the unit

The warm-ups throughout the unit invite students to think about the topics addressed in each section. In Section A, the warm-ups invite students to think about important ideas related to multiplying and dividing multi-digit whole numbers that are revisited throughout the section. In section B, the warm-ups are related to applying multiplication of multi-digit whole numbers to volume concepts and extending concepts of volume to include further study of units used to measure volume. In section C, the warm-ups continue to push towards fluently adding and subtracting fractions and operating with decimals. In section D, each warm-up reflects the type of activity that students design that day.

- 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 B Goals

- Solve multi-step problems involving volume.

Section C Goals

- Operate with fractions and decimals.

Section D Goals

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

How will you gauge student learning?

Assessments

5.8 End-of-Course Assessment | Summative | Written Test

[Grade5-8-End-of-Course-Assessment-and-Resources-assessment.pdf](#)

22 State Standards Assessed

How will students learn?

Learning Activities

Section A:

In this section, students reinforce their understanding of the standard algorithm for multiplication and practice using it. They use estimation to determine the reasonableness of their answers, recognize and explain place-value patterns when multiplying multi-digit numbers, and learn how to use the algorithm when one or more of the factors has several zeros.

Students also practice dividing multi-digit whole numbers using an algorithm involving partial quotients, which they learned in unit 4.

Section B:

In this section, students revisit the meaning of volume and apply their understanding to solve problems. In each lesson, students estimate and calculate the volume of rectangular prisms in various contexts. The numbers used in this section are larger than the numbers students used in the opening unit, when they first learned how to calculate the volume of rectangular prisms.

The work here prompts students to make reasonable estimates, consider appropriate sizes of units in a given context, and take unit conversion into account in solving problems about volume.

Section C:

In this section, 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 begin with games that involve adding and subtracting fractions and in which the goal is to find the largest or the smallest sums or differences.

Next, students practice adding and subtracting decimals. The games here likewise prompt students to meet certain goals, such as finding the largest decimal or reaching 1, 0.1, or 0.01.

At the end of the section, students play a game that involves multiplying fractions. All the games about fractions invite students to consider the meaning of the numerator and the denominator and to make strategic choices about the numbers they use in those positions.

Section D:

Throughout the course, students have engaged in warm-up routines such as Notice and Wonder, Exploration Estimation, True or False, Number Talk, and Which One Doesn't Belong? This section enables them to apply the mathematics they have learned to design warm-ups that incorporate these routines.

Each lesson is devoted to a particular routine. Students begin by completing at least two partially created tasks, each with more missing parts to complete than the previous one. They practice anticipating responses that others might give to the prompts they pose.

Differentiated Instruction

Technology Integration

21st Century Skills

Positive Behavior

CASEL

Collaborative for Academic, Social, and Emotional Learning

Resources

Teacher Notes and Reflections
