Decimals
Topic 4 Overview

How is *Decimals* organized?

This topic builds on students' prior knowledge of decimal operations. Students begin by reviewing number skills developed in previous grades: plotting decimals on a number line and comparing and ordering decimal values. They then use place value strategies to establish the standard algorithm for adding and subtracting decimals.

To multiply decimals, students return to the area model to represent the product of two decimals. They practice using estimation and patterns to place the decimal point correctly in a product. This work culminates in the establishment of the standard algorithm for multiplication.

Finally, students explore strategies for completing whole number division: fact families, organized estimation, and partial quotients. This work leads to the development of the standard algorithm for long division. Students then divide decimals by whole numbers and finally divide decimals by decimals. They use long division to convert fractions to decimals, differentiating terminating and repeating decimals.

Throughout the topic, students use estimation strategies to develop number sense around the operations. Area and volume problems provide a context for students to solve real-world problems with decimals.

What is the entry point for students?

Students began learning about decimals in grades 4 and 5. They have experience using concrete models and place-value strategies to operate with decimals to the hundredths place. In the previous topic students reviewed representing, comparing and ordering fractions as a list or on a number line. They reviewed and developed strategies for operating with fractions. In this topic, students will build off of that foundation as they compare, order, and operate with decimals and analyze fraction and decimal equivalences.

In grade 5, students learned how to calculate the volume of a right rectangular prism by filling it with cubes and eventually by using the formulas $V = lwh$ and $V = Bh$. Students continue to build fluency in operating with positive rational numbers by solving area and volume problems with positive rational number dimensions.

How does a student demonstrate understanding?

Students will demonstrate understanding of the standards in this topic if they can:

- Locate the value of a decimal on a number line.

- Compare decimals to the thousandths using $>$, $=$, $<$.
- Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation with accuracy.
- Divide multi-digit whole numbers and decimals using the standard algorithm with accuracy.

Why is *Decimals* important?

This topic focuses on the fluency standards for grade 6 that students will practice throughout the course. The remaining modules require decimal operations, particularly as students work through problem-solving scenarios. As part of distributed practice, students will revisit decimal operations when they solve equations in a later module. Fractions and decimals are encountered more frequently than whole numbers in daily life, so students should be comfortable and confident solving problems that require operating with these numbers.

How do the activities in *Decimals* promote student expertise in the mathematical process standards?

All Carnegie Learning topics are written with the goal of creating mathematical thinkers who are active participants in class discourse, so elements of the mathematical process standards should be evident in all lessons. Students are expected to make sense of problems and work toward solutions, reason using concrete and abstract ideas, and communicate their thinking while providing a critical ear to the thinking of others.

Throughout this topic, students develop their attention to precision as they compute with whole numbers and decimals. They draw from strategies for computing with decimals as they make estimates and judge the reasonableness of their answers. For each decimal operation, students reason quantitatively as they consider each digit's value and the implications for the value of the result. They use repeated reasoning to look for methods for placing decimal points in the product or quotient of two decimals. Students analyze arguments stated by other students and distinguish correct logic from that which is flawed.

Materials Needed

- Calculator

Learning Together

ELPS: 1.A, 1.B, 1.C, 1.D, 1.E, 1.F, 1.G, 1.H, 2.C, 2.D, 2.E, 2.G, 2.H, 2.I, 3.A, 3.B, 3.C, 3.D, 3.E, 3.F, 3.G, 4.A, 4.B, 4.C, 4.D, 4.F, 4.G, 4.I, 4.K, 5.A, 5.B, 5.C, 5.D, 5.E, 5.F, 5.G

Lesson	Lesson Name	TEKS	Days	Highlights
1	You Have a Point: Plotting, Comparing, and Ordering Rational Numbers	6.2C 6.2D	1	In this lesson, students investigate place value by using a human number line to plot decimal values. They plot given decimals on a number line and identify other decimals that lie between them. Students create a rule to compare decimals and apply their rule in context. They use a number line to compare decimals and fractions.
2	Get in Line: Adding and Subtracting Decimals	5.3.K 6.3E	1	In this lesson, students use place value to estimate sums and differences of decimals and then develop standard algorithms. They solve real-world problems by first determining whether they need to add or subtract, using estimation to predict the magnitude of the answer, and then applying the standard algorithm. Students also play a calculator game to target place value in subtraction.
3	Product Placement: Multiplying Decimals	6.3E 6.8D	1	In this lesson, students use an area model on a hundredths grid to represent the multiplication of two decimals less than one. They use estimation to reason about the placement of the decimal point in multiplication problems and then analyze patterns to develop the algorithm for multiplying decimals. Students solve area and volume problems that require multiplying, adding, and subtracting decimals.
4	Dividend in the House: Dividing Whole Numbers and Decimals	6.3E 6.8D	3	In this lesson, students use the standard algorithm for long division with whole numbers. They demonstrate how the algorithm works for decimal dividends by relating it to a model and make sense of why the algorithm is modified to accommodate decimal divisors. Students solve area and volume problems requiring decimal division.

Suggested Topic Plan

*1 Day Pacing = 45 min. Session

Day 1	Day 2	Day 3	Day 4	Day 5
TEKS: 6.2C, 6.2D	TEKS: 5.3K, 6.3E		TEKS: 6.3E, 6.8D	TEKS: 6.3E, 6.8D
LESSON 1 **You Have a Point** GETTING STARTED ACTIVITY 1 TALK THE TALK	**LESSON 2** **Get in Line** GETTING STARTED ACTIVITY 1 ACTIVITY 2 TALK THE TALK	**MATHia**® Use LiveLab and Reports to monitor students' progress	**LESSON 3** **Product Placement** GETTING STARTED ACTIVITY 1 ACTIVITY 2 TALK THE TALK	**LESSON 4** **Dividend in the House** GETTING STARTED ACTIVITY 1 ACTIVITY 2

Day 6	Day 7	Day 8	Day 9
LESSON 4 continued ACTIVITY 3 ACTIVITY 4	**LESSON 4** continued ACTIVITY 5 ACTIVITY 6 TALK THE TALK	**MATHia**® Use LiveLab and Reports to monitor students' progress	**END OF TOPIC ASSESSMENT**

Assessments

There is one assessment aligned to this topic: End of Topic Assessment.