Unit 5 Family Support Materials

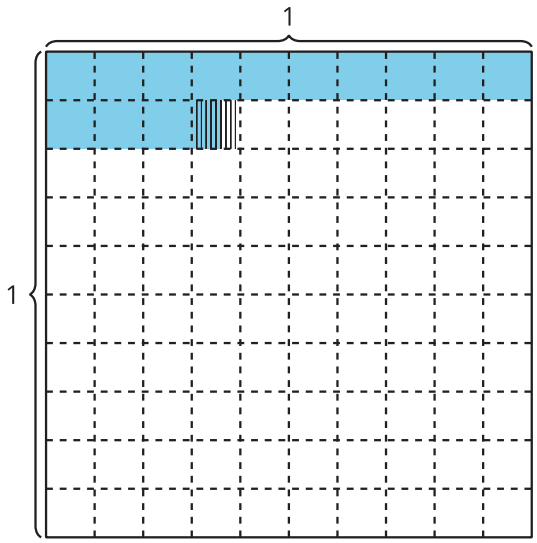
Place Value Patterns and Decimal Operations

In this unit, students use place-value understanding to round, compare, order, add, subtract, multiply, and divide decimals.

Section A: Numbers to Thousandths

In this section, students are introduced to the thousandths place. They represent decimals on gridded area diagrams for which the large square has a value of 1, and each small square within represents $\frac{1}{100}$.

Students learn that if they partition each small square into 10 equal parts, each of those parts represents 1 thousandth of the large square.



Students write decimals in expanded form, using sums of multiplication expressions. For example, 0.136 in expanded form can be written as $\left(1 \times \frac{1}{10}\right) + \left(3 \times \frac{1}{100}\right) + \left(6 \times \frac{1}{1{,}000}\right)$.

Students use this developing understanding of place value to the thousandths to locate decimals on a number line. They then use the number line to round, compare, and order decimals.

Section B: Add and Subtract Decimals

In this section, students add and subtract decimals to the hundredths. Initially, students add and subtract in ways that make sense to them. This allows students to relate addition

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and subtraction of decimals to operations with whole numbers. Students also use place-value reasoning to estimate the values of sums and differences.

Adding and subtracting decimals using the standard algorithm brings up a new question in terms of how the digits should be aligned. To highlight this consideration, students analyze a common error as shown here.

Elena

$$\begin{array}{r} 621.45 \\ +\ \ 72.3 \\ \hline 628.68 \end{array}$$

my answer makes sense because it is more than 621.

Andre

$$\begin{array}{r} 621.45 \\ +\ 72.30 \\ \hline 693.75 \end{array}$$

My answer makes sense because 620 + 70 = 690 and then I still have to add a little bit more than 3 to 690.

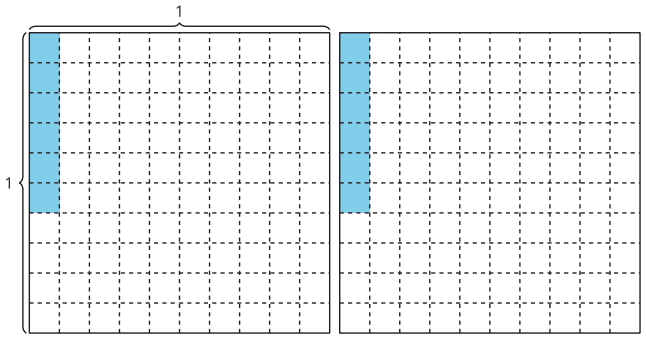
Before using the standard algorithm, students use place-value reasoning to decide whether sums and differences are reasonable and to ensure that the digits in the numbers are aligned correctly.

Section C: Multiply Decimals

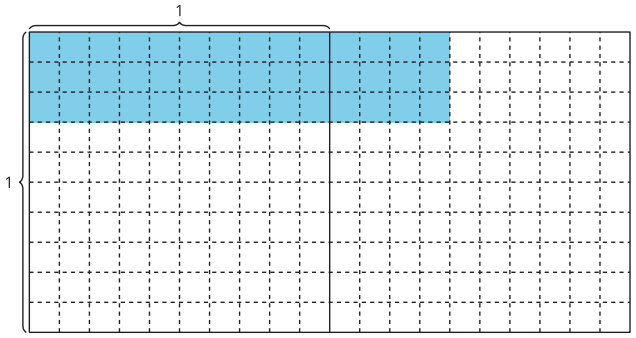
In this section, students multiply decimals with products up to hundredths. Students initially multiply decimals in ways that make sense to them. Area diagrams were used to make sense of fraction multiplication in earlier units, and they are used here as a familiar representation to make sense of decimal multiplication. Students use the diagrams to relate multiplying with whole numbers to multiplying with decimals.

For example, the diagram shown can represent 2 groups of 6 hundredths, or 12 hundredths, which can be written as the equation $2 \times 0.06 = 0.12$.

Students also may see this as 2 times 6 groups of 1 hundredth or $2 \times 6 \times 0.01 = 12 \times 0.01 = 0.12$.



To multiply tenths by tenths, students revisit area concepts from previous units. Using area diagrams, they find the area of the shaded region by multiplying side lengths. They use decimal notation to mark the side lengths. The diagram shows how the students would represent 0.3×1.4 to arrive at an answer of 0.42.

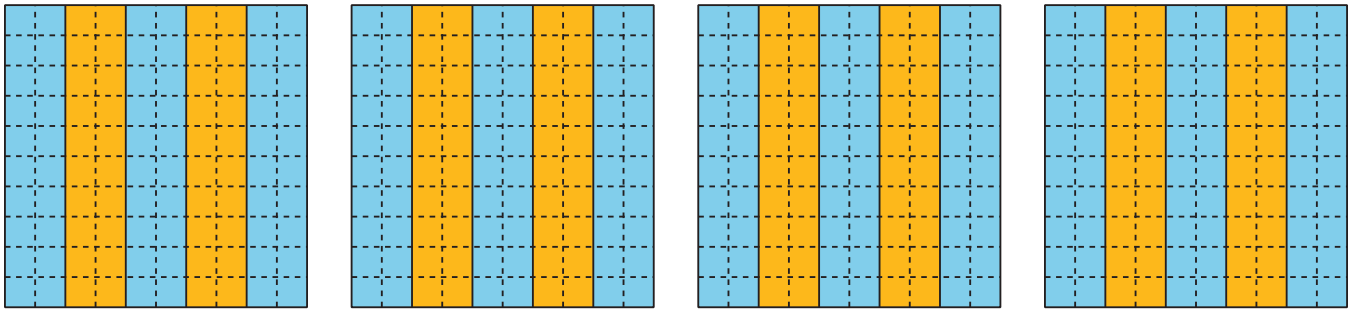


Section D: Divide Decimals

Just as with whole numbers and fractions, students use the relationship between multiplication and division to make sense of division with decimals. In this section, students consider how many tenths or hundredths are in whole numbers (that is, 10 tenths are in 1 whole, 100 hundredths are in 1 whole). This understanding provides a foundation for students to divide a whole number by any amount of tenths or hundredths. Students learn how to use diagrams to help them solve division problems.

The example shows how students can divide 4 into groups of 2 tenths. There are 20 groups of 2 tenths in 4 wholes.

$$4 \div 0.2 = 20$$



Try it at home!

Near the end of the unit, ask your fifth grader to solve the following problems:

- 1.8×0.2
- $12.1 \div 1.1$

Questions that may be helpful as they work:

- Can you draw a diagram to help you solve the problem? How does your diagram

show the solution?

- Can you explain the steps of your algorithm?

Solution:

- 0.36
- 11

Sample response:

- A diagram using hundredths grids that shows a rectangle with a length of 1.8 and a width of 0.2. There are 36 hundredths shaded.
- I know that $1.1 \times 10 = 11$. I subtracted 11 from 12.1 and got 1.1. This means I can make 1 more group of 1.1. In total I made 11 groups of 1.1 from 12.1. I also know that $11 \times 11 = 121$, which means that $11 \times 1.1 = 12.1$ or $12.1 \div 1.1 = 11$.

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