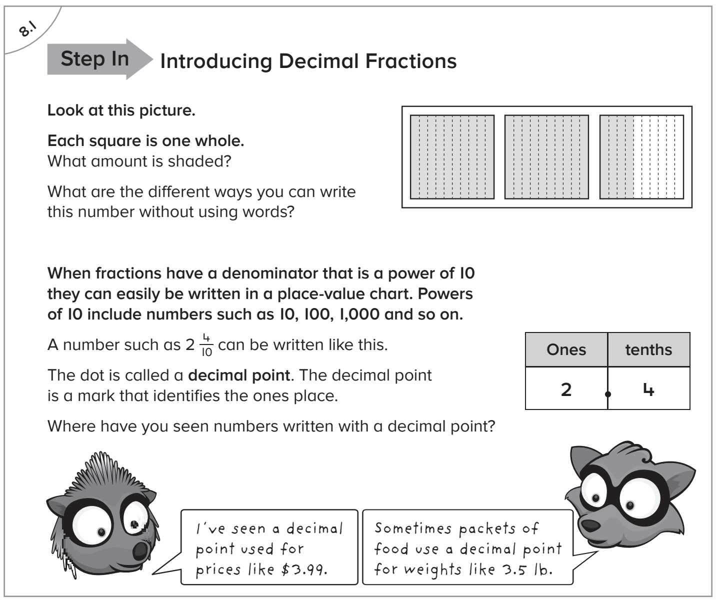
Core Focus

- Introducing decimal fractions and reviewing common fractions involving tenths and hundredths
- Introducing decimals with tenths and hundredths (by subdividing squares and by locating on a number line)
- Writing, comparing, and ordering decimals on a number line
- Developing rules for finding the area and the perimeter of rectangles

Fractions

- **Decimal fractions** are fractions with denominators of 10, 100, 1,000, etc. Decimals are used in many real-world applications and they are often easier to compute than **common fractions**. Students use their understanding of common fractions to begin learning about decimal fractions using area models.



8.1

Step In Introducing Decimal Fractions

Look at this picture.

Each square is one whole.
What amount is shaded?

What are the different ways you can write this number without using words?

When fractions have a denominator that is a power of 10 they can easily be written in a place-value chart. Powers of 10 include numbers such as 10, 100, 1,000 and so on.

A number such as $2\frac{4}{10}$ can be written like this.

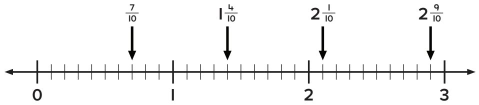
The dot is called a **decimal point**. The decimal point is a mark that identifies the ones place.

Ones	tenths
2 .	4

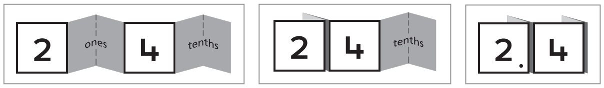
Where have you seen numbers written with a decimal point?

In this lesson, students are formally introduced to the idea of the decimal point, which separates the whole numbers in the ones place from the tenths.

- Students, familiar with decimals from working with money, see that these numbers are actually fractions. The position of a digit after the decimal point tells what the unwritten denominator of the fraction is. For example 1.4 (read as "one and four tenths") is the same as $1\frac{4}{10}$.



- **Numeral expanders** extend to decimal ideas. Students focus on numbers in their fraction form, their decimal form, their location on the number line (see above), and how they appear on an expander. Below is how $2\frac{4}{10}$ is represented.



Ideas for Home

- Notice decimals in shopping circulars and in the news. Analyze the actual meaning of the numerals and practice saying it as a decimal fraction. E.g. a toy priced $8.99 is "8 ones and 99 hundredths" or "8 ones plus 9 tenths plus 9 hundredths" or "8 + 0.9 + .09".
- Keep note of the above decimals and plot these quantities on a number line.

Glossary

- A **decimal fraction** is a fraction that is written with no denominator visible. The position of a digit after the decimal point tells what the invisible denominator is.
- **Fractions** describe equal parts of a whole. In this example of a common fraction, 2 is the **numerator** and 3 is the **denominator**.

$\frac{2}{3}$ 

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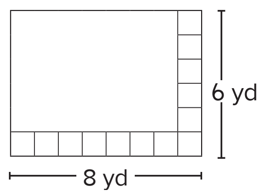
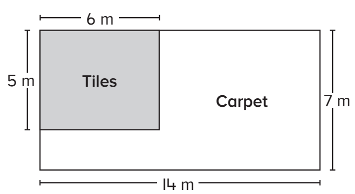
- Area models and the numeral expander are also used to help students explore, write, and read decimals involving tenths and hundredths.

Measurement

- Extending the learning about **area** and **perimeter** from Grade 3, students now investigate and then develop rules for finding the area and perimeter of rectangles.
- Using the **dimensions** of a rectangle (length and width), students find its area by multiplying as they do with arrays. If students know how many squares are in each row, and how many rows there are, they can multiply to find how many squares in total. This is where the familiar formula $A = L \times W$ for area of a rectangle comes from.



- Finding the area of rectangles reinforces the use of the partial products to multiply. The example below involves finding the area of the carpeted floor by decomposing the rectangles.



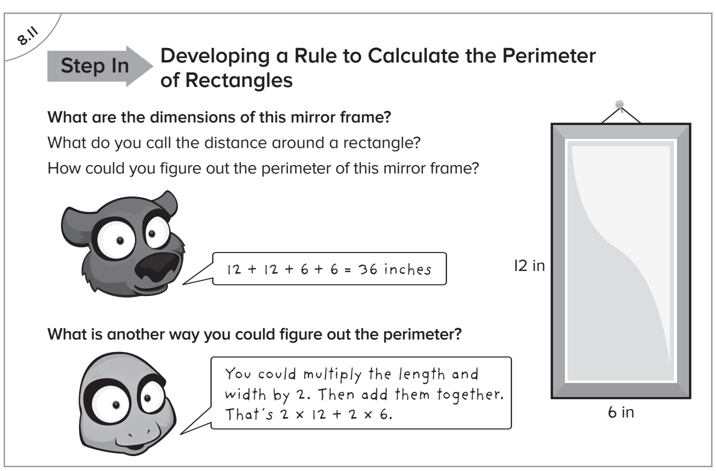
Kamen figured it out like this.

$7 \times 10 = 70$
$7 \times 4 = 28$
so $7 \times 14 = 98$ m^2
and $6 \times 5 = 30$ m^2
$98 - 30 = 68$ m^2

Oscar figured it out like this.

$14 - 6 = 8$ m
$8 \times 7 = 56$ m^2
$7 - 5 = 2$ m
$2 \times 6 = 12$ m^2
$56 + 12 = 68$ m^2

- Students also find the perimeter of two-dimensional geometric figures by adding the distances around the rectangle. Students discover that since the two lengths are the same and the two widths are the same, the formula P = (2 × L) + (2 × W) or P = 2 × (L + W) can be used.



In this lesson, students measure perimeter and develop rules to be used for finding the perimeter of any rectangle.

Ideas for Home

- Using a measuring tape, work together to find the area and perimeter of smaller rectangular shapes and spaces in your home: e.g. a cupboard, a table top, a book, picture frames, or rugs. Use the L X W formula to find the area. Use the (2 × L) + (2 × W) formula to find perimeter.
- When in a store, notice boxes and labels that have length X width dimensions listed, e.g. carpets, photo frames or furniture. Determine the area and perimeter together using the dimensions listed. (E.g. "A 5 ft × 7 ft rug is 35 square feet and has a perimeter of 24 ft.")

Glossary

- **Area** is a measure of the space inside a closed geometric figure and is determined by the number of squares needed to cover the space.
- **Perimeter** is the distance measured around a shape. The word "rim" is contained in the word "perimeter." This is a way to avoid confusion between area and perimeter.
- **Dimensions** are the side measurements of a rectangle that can be used to calculate **area** and **perimeter**.