4 **Module 10**

Core Focus

- Decimal fractions: comparing, ordering, and adding tenths, and exploring, writing, and adding hundredths

Decimal fractions

- Decimal fractions are fractions with denominators of multiples of ten. Decimals are used in many real-world applications and they are often easier to calculate with than common fractions. Students use their understanding of common fractions to begin learning about decimal fractions using area models.

10.1 Decimal fractions: Introducing decimal fractions

Step In 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 red 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?

I've seen a decimal point used for prices like $3.99.

Sometimes packets of food use a decimal point for masses, like 3.5 lb.

In this lesson, students are formally introduced to the idea of the decimal point as a mark that identifies the ones place.

- 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, and how they appear on an expander. Below are three examples of how $2\frac{4}{10}$ can be represented.

| 2 | ones | 4 | tenths | | 2 | 4 | tenths | | 2 . | 4 |

Ideas for Home

- Notice decimals in shopping circulars and in the news. Analyze the actual meaning of the numerals and practice saying them 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.

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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.

10.5 Decimal fractions: Writing hundredths (with teens and zeros)

Step In Each large square represents one whole. How much has been shaded?

Write the amount on each expander below.

How do these match the expanders above?

$\frac{137}{100}$ | $1 + \frac{37}{100}$ | $\frac{13}{10} + \frac{7}{100}$

- Students use what they already know about addition to add decimals. Rules and procedures (like lining up decimal points) are intentionally omitted to make sure students internalize the mathematical principles, including like quantities and equivalence (for example, $\frac{3}{10} = \frac{30}{100}$), behind decimal addition.

10.10 Decimal fractions: Adding hundredths

Step In A new downspout is being made to attach to the side of a building. This sketch shows the pipes that are needed.

How could you calculate the total length of straight pipe?

1.36 m

2.53 m

I would add the ones together, then the tenths, then the hundredths.

These two items are needed for the downspout.
What is their total cost? How could you figure it out?

$1.64

$4.05

It's easy to think about this. The whole numbers are dollars and the fractions are cents.

In this lesson, students consider how to add numbers that include hundredths.

Ideas for Home

- Create a set of cards showing the digits 0–9, mix the cards and place them facedown. Take turns with your child to draw three cards and use the digits in order of selection to write a decimal fraction in the form 0.___ ___ ___. Compare the two decimal fractions to see which is greater. Be sure to ask how they know.

- Using the same digit cards, take five of them and create a decimal fraction addition equation that is as close to 10 as possible (over or under). Using the digits 1, 2, 5, 6, and 9, one equation could be 9.6 + 0.521 = 11.21. Take turns with your child to see who can get the closest to 10.

- Shopping for food or ordering in a restaurant offers lots of practice adding decimal fractions. Ask your child to mentally add the price of two items, then ask which strategy they used.