

Fractions and Decimals: Connecting Two Ways to Show Parts

Discover how fractions and decimals are two languages for the same idea.



Figure 1: A baker's kitchen with a mixing bowl on a counter

Learning intentions

We are learning to understand that fractions and decimals represent the same numbers and to convert between them.

Success criteria

I can express a fraction as a decimal number when the denominator is 10 or 100 ([Skills](#)).

I can express a decimal number as a fraction ([Skills](#)).

I can identify the place value of tenths and hundredths in a decimal number ([Skills](#)).

I can recognize that fractions and decimal numbers can represent the same number ([Knowledge](#)).

Curriculum alignment

Students apply place value to decimal numbers ([Outcome](#)).

Students apply equivalence to the interpretation of fractions ([Outcome](#)).

Decimal numbers are fractions with denominators of 10, 100, etc. ([Understanding](#), [Understanding](#)).

Fractions and decimal numbers can represent the same number ([Knowledge](#)).

Materials

- Base-10 blocks or grid paper (10×10 squares printed or drawn)
- Fraction strips (paper or card showing tenths and hundredths)
- Number line (0 to 2, marked in tenths) on poster or whiteboard
- Index cards with decimal and fraction pairs
- Coins (real or play) for money examples
- Worksheet with grid squares (hundredths grids)

Lesson sequence

1. Hook (5 minutes)

Show two containers of juice. One is labeled $\frac{1}{10}$ full. The other is labeled 0.1 full. Ask the class: Are these the same amount, or different?

Take responses. Do not confirm yet. Say: By the end of this lesson, you will know the answer and why.

2. Direct instruction: Tenths (8 minutes)

Draw a rectangle on the board. Divide it into 10 equal parts. Shade one part.

Say: This shape is divided into 10 equal parts. One part is shaded. We can write this as a fraction: $\frac{1}{10}$ (one-tenth). We can also write it as a decimal: 0.1.

Write both on the board side by side: $\frac{1}{10} = 0.1$

Shade 3 more parts. Say: Now we have 4 parts shaded out of 10. That is $\frac{4}{10}$ (four-tenths). As a decimal, we write 0.4.

Write: $\frac{4}{10} = 0.4$

Point to the decimal point. Say: The decimal point separates the whole number from the parts. In 0.4, there are zero wholes and four-tenths ([Knowledge](#)).

Ask: What fraction and decimal does this show? (Shade 7 parts.) Wait for responses. Confirm: $\frac{7}{10} = 0.7$.

3. Direct instruction: Hundredths (8 minutes)

Display a 10×10 grid (100 small squares).

Say: This grid has 100 equal squares. If we shade one square, we have $\frac{1}{100}$ (one-hundredth). As a decimal, we write 0.01.

Write: $1/100 = 0.01$

Shade 25 squares in a block.

Say: We have 25 squares shaded out of 100. That is $25/100$ (twenty-five hundredths). As a decimal, we write 0.25.

Write: $25/100 = 0.25$

Point to the decimal. Say: The first digit after the decimal point is tenths. The second digit is hundredths ([Skills](#)).

In 0.25, the 2 means two-tenths, and the 5 means five hundredths. Together they make twenty-five hundredths.

Shade 50 squares.

Ask: What fraction and decimal does this show? (Wait for responses.) Confirm: $50/100 = 0.50$.

Say: Notice that $50/100$ is the same as $5/10$. Both equal 0.5. Fractions and decimals that look different can be the same number ([Knowledge](#)).

4. Guided practice: Fraction to decimal (7 minutes)

Display a number line from 0 to 1, marked in tenths (0, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0).

Say: I will name a fraction. You point to where it sits on the number line and tell me the decimal.

Call out: $3/10$. (Students point to 0.3.) Confirm: $3/10 = 0.3$.

Call out: $6/10$. (Students point to 0.6.) Confirm: $6/10 = 0.6$.

Call out: $8/10$. (Students point to 0.8.) Confirm: $8/10 = 0.8$.

Now show a 10×10 grid on the board. Shade 35 squares.

Say: How many squares are shaded? (35.) How many squares are there altogether? (100.) So the fraction is $35/100$. What is the decimal?

Guide students to say: 0.35.

Write: $35/100 = 0.35$

Shade a different grid to show 72 squares shaded.

Ask: What is the fraction? ($72/100$.) What is the decimal? (0.72.) Confirm both.

5. Guided practice: Decimal to fraction (5 minutes)

Say: Now I will name a decimal. Students apply place value to decimal numbers.

Say: 0.4. What fraction is this? ($4/10$.) Confirm: $0.4 = 4/10$.

Say: 0.7. What fraction is this? ($7/10$.) Confirm: $0.7 = 7/10$.

Say: 0.15. What fraction is this? ($15/100$.) Confirm: $0.15 = 15/100$.

Say: 0.60. What fraction is this? ($60/100$.) Confirm: $0.60 = 60/100$. Can we simplify this? Yes, $60/100 = 6/10$.

6. Independent practice (5 minutes)

Hand out a worksheet with the following tasks:

Task 1: Draw a grid and shade it to show 0.3. Write the fraction.

Task 2: Write the decimal for $\frac{7}{10}$.

Task 3: Write the fraction for 0.45.

Task 4: Draw a 10×10 grid and shade it to show 0.82. Write the fraction.

Task 5: Look at this grid (show $\frac{6}{10}$ shaded). Write the decimal.

Circulate. Ask students to explain their thinking as they work.

7. Consolidation (2 minutes)

Gather the class. Numbers, including decimal numbers, can be composed in various ways by using place value.

Ask: Are $\frac{1}{10}$ and 0.1 the same? (Yes.) Why? (Because $\frac{1}{10}$ means one part out of ten, and 0.1 means one-tenth.)

Say: Fractions and decimals are two different ways to write the same number. When the denominator is 10 or 100, it is easy to change between them ([Skills](#), [Knowledge](#)).

Differentiation

Support

Provide pre-drawn grids (10×1 and 10×10) so students focus on counting and naming, not drawing.

Use only tenths (denominators of 10) in the first lesson. Introduce hundredths in a follow-up lesson.

Pair students with a peer or adult to read decimal notation aloud together. Emphasize the word "and" to mark the decimal point: "zero and four tenths" for 0.4 ([Knowledge](#)).

Extension

Ask: If $0.5 = \frac{5}{10}$, what other fractions equal 0.5? ($\frac{50}{100}$, $\frac{1}{2}$.) Discuss equivalent fractions.

Introduce money: \$0.35 is $\frac{35}{100}$ of a dollar, or 35 cents. Have students write amounts in dollars and cents using decimal notation.

Pose a comparison question: Which is larger, 0.6 or 0.59? Draw grids to show why ([Skills](#)).

Assessment

Formative check during independent practice:

Observe students completing Task 3 (write the fraction for 0.45).

What to look for:

Student writes $\frac{45}{100}$ (correct).

Student writes 0.45 as the fraction (misunderstanding; needs clarification that 0.45 is already a decimal).

Student writes $\frac{45}{10}$ (place-value error; review which position is tenths and which is hundredths).

If a student struggles, ask: How many parts is the grid divided into? (100.) How many are shaded? (45.) So the fraction is... ($\frac{45}{100}$).

Repeat the same process with a visual grid to anchor understanding.