

N2.9

Equivalence of fractions and decimals

objectives

- Count on and back in halves, fifths and quarters.
- Find fraction and decimal equivalents in simple cases.
- Use a calculator to convert simple fractions to decimals, and interpret the display.

starter

Vocabulary

halves
fifths
quarters
tenths

Resources

counting stick

Take a counting stick. Label one end with 0. Tell the class that you are going to ask them to count in fours.

Q What number will be at the end of the stick? Explain why.

Check their predictions by counting, pointing to the divisions as you go along: four, eight, twelve, ..., thirty-six, forty.

Say that the line is now numbered in tenths. Remind them of the ten intervals and count along the stick. Stress that the endpoint of ten tenths is the same as 1. Now point at random at half a dozen points on the stick. Each time that you point ask:

Q What is this number?

Check any incorrect responses by counting along the stick. Repeat with:

- halves (one half, one, one and a half, ..., four and a half, five);
- fifths (one fifth, two fifths, ..., one and four fifths, two);
- quarters (one quarter, one half, ..., two and a quarter, two and a half).

main activity

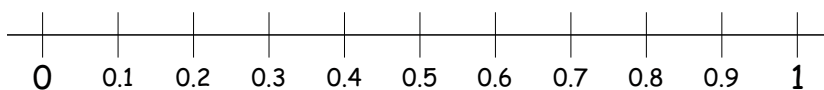
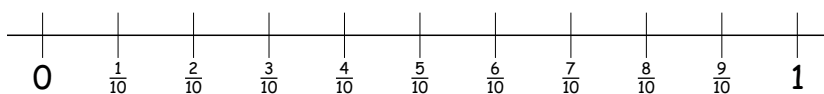
Vocabulary

fraction
decimal
equivalent
numerator
denominator

Resources

OHT N2.9a
OHP calculator

Draw on the board a fraction number line from 0 to 1, marked and numbered in tenths. Immediately below, draw a decimal number line from 0 to 1, marked and numbered in intervals of 0.1. Alternatively, use **OHT N2.9a**.



Point to the top line. Count together along to 1 and back to 0: one tenth, two tenths, three tenths, ... Point to the middle line, and repeat: nought point one, nought point two, nought point three, ...

Point to the top line. Remind the class that, like the counting stick, the line has ten intervals and is numbered in tenths. The end point is fixed at 1.

Q Where would one half be on this line?

Establish that, for halves, there would be two intervals, each equivalent to five tenths, and that $\frac{5}{10} = \frac{1}{2}$.

Q Where would one fifth be on this line?

Establish that, for fifths, there would be five intervals, each equivalent to two tenths, and that $\frac{2}{10} = \frac{1}{5}$. Repeat for $\frac{2}{5}$, $\frac{3}{5}$ and $\frac{4}{5}$.

Say that each fraction, has a decimal equivalent. Point to $\frac{7}{10}$ and ask for the decimal equivalent. Repeat for other numbers, switching between the two lines.

Q How can you use the top two lines to mark one half on the empty line?

Mark $\frac{1}{2}$ on the third line, stressing that $\frac{1}{2} = \frac{5}{10} = 0.5$. Write this at the side of the board.

Q How can you use the top two lines to mark one fifth on the empty line?

Mark $\frac{1}{5}$ on the third line, writing $\frac{1}{5} = \frac{2}{10} = 0.2$.

Q What other equivalents for fifths can you tell me?

Establish that $\frac{2}{5} = \frac{4}{10} = 0.4$, $\frac{3}{5} = \frac{6}{10} = 0.6$, $\frac{4}{5} = \frac{8}{10} = 0.8$, again writing these at the side of the board. Point again to the top line.

Q Where would $\frac{1}{4}$ be on this line?

Establish that, for quarters, there would be four intervals, each equivalent to two and a half tenths, or twenty-five hundredths, and that $\frac{1}{4} = 0.25$. Write this at the side of the board. Repeat for $\frac{3}{4} = 0.75$.

Q How can a calculator be used to convert fractions to decimals?

Remind pupils that the numerator is the 'top number' and the denominator is the 'bottom number' of a fraction. The line that separates the numerator from the denominator represents division. The fraction $\frac{1}{2}$ means one whole divided into two equal parts. Demonstrate this by calculating $1 \div 2$ on the OHP calculator and drawing attention to the decimal result.

Q How do we convert one fifth into a decimal using a calculator?

What do you think the calculator display will show?

Repeat with $\frac{3}{5}$, $\frac{4}{5}$, $\frac{1}{100}$, $\frac{25}{100}$, $\frac{75}{100}$.

other tasks

Springboard 7

Units 5, 13 and 15

Unit 5 section 1: Fractions

5 Number lines

page 178

Unit 5 section 4: Common fractions and decimals

3 Halves, quarters and three quarters

page 189

4 Mix and match

page 190

Unit 13 section 4: Ordering fractions and decimals

1 Tenths and hundredths

page 432

Unit 15 section 2: Mental calculations – division

3 Common equivalent fractions and decimals

page 479

plenary

Resources

Resource N2.9b
mini-whiteboards

Draw on the board an empty number line from 0 to 1. Ask pupils to copy it on their whiteboards. Call out 'one fifth', and ask pupils to estimate its position and mark it on their line. Choose one pupil to come and mark it on the line on the board. Continue with these numbers:

0.4 (nought point four), three quarters, 0.5, four fifths, 0.2, one quarter, 0.75, two fifths, 0.25, one half, 0.8

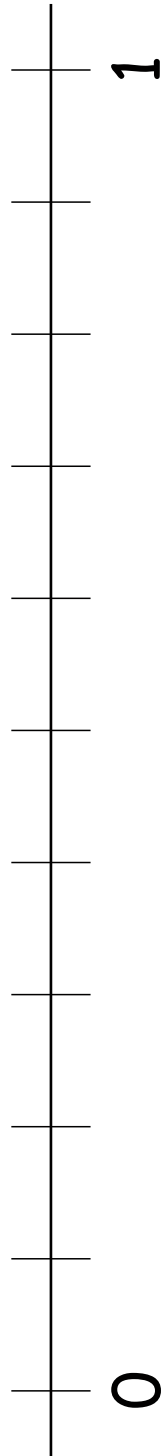
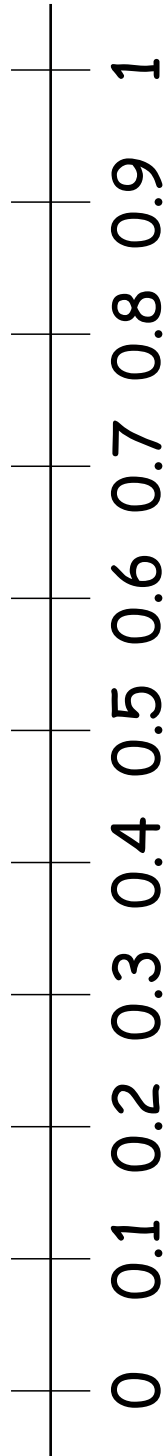
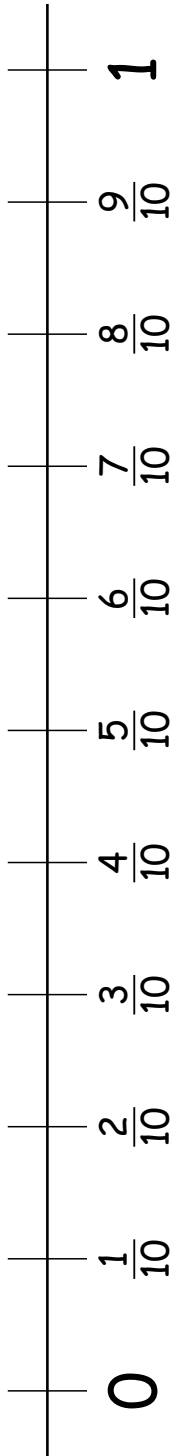
Finish by asking a series of questions.

Q How many hundredths is ... one half, one quarter, one tenth, seven tenths, three quarters, four fifths, one and a half?

Finish with a selection of mental arithmetic questions taken from National Curriculum tests, using **Resource N2.9b**.

Remember

- Fractions can be represented as points on a number line.
- Equivalent fractions are represented by the same decimal number and by the same point on the number line.
- You can convert a fraction to a decimal by dividing the numerator by the denominator. You can use a calculator to do this.



- 1 Write the number twenty thousand and sixty-nine in figures.
- 2 Each side of a pentagon is twelve centimetres.
What is the perimeter of the pentagon?
- 3 Subtract forty from one hundred and twenty.
- 4 What is three quarters of two hundred?
- 5 How many five-pence coins make forty-five pence?
- 6 Divide three hundred and ninety by ten.
- 7 What is three quarters as a decimal?
- 8 What is two hundred and seventy-six centimetres to the nearest metre?
- 9 Multiply five by nine.
- 10 One third of a number is twelve. What is the number?
- 11 What number should you subtract from twenty to get the answer thirteen?
- 12 What number is nine squared?
- 13 In a group of sixty-three children, twenty-nine are boys.
How many are girls?
- 14 What is one quarter of thirty-two?
- 15 Subtract one hundred from six thousand and three.