Can I solve multi-step problems involving percentages and/or fractions?
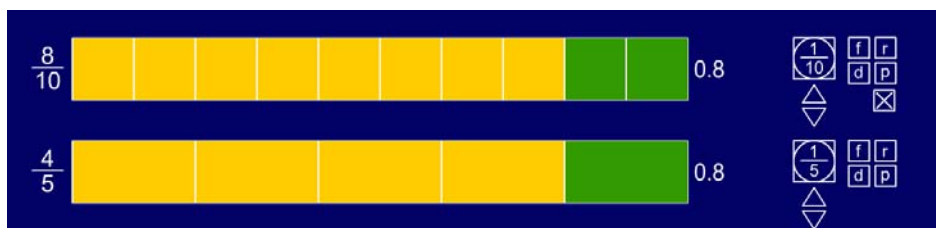
Teaching guidance

Key vocabulary

per cent, hundredth, fraction, proper, numerator, denominator, equivalent, proportion

Models and images and resources

Fractions ITP

This ITP can be used to compare fractions and find equivalent fractions. It can also show equivalence between fractions, decimals and percentages.
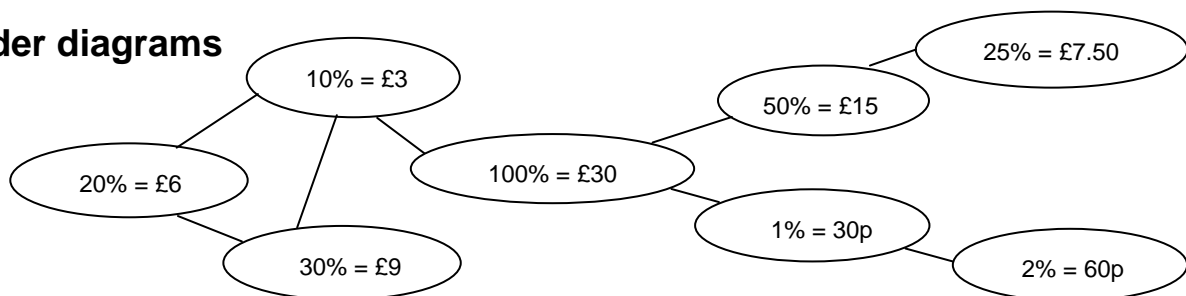
Counting sticks and number lines

Placing fractions, decimals and percentages on counting sticks and number lines helps children to understand that these are different ways of representing numbers.

They provide a visual means of comparing and ordering fractions, decimals and percentages, and of identifying equivalents.

Spider diagrams

These can help children use known percentages or fractions of numbers to generate other percentages or fractions through scaling and combining.

Teaching tips

- When finding fractions of amounts, encourage children to find the unit fraction first and then to scale this up to find a non-unit fraction if required. For example, to find $\frac{3}{5}$ of 40:

$$\times 3 \left(\begin{array}{c} \frac{1}{5} \text{ of } 40 = 8 \\ \\ \frac{3}{5} \text{ of } 40 = 24 \end{array} \right) \times 3$$

- Encourage children to draw diagrams to represent situations or problems involving fractions. Model how to do this, for example:

$\frac{2}{5}$ of a number is 20. What is the number?

- When finding percentages of amounts, encourage children to work out key percentages such as 50% and 10% to help them to find the required percentage.
  For example, to find 15% of £40:

  10% of £40 = £4
  halving gives 5% of £40 = £2
  adding these gives 15% of £40 = £6

- Model how to record the steps in a multi-step problem so that each stage is clear. Encourage children to develop confidence by writing down every calculation they do, even when they work them out mentally or on a calculator.

  For example: Charlie has saved £15 towards buying a computer game. This is $\frac{3}{5}$ of the cost of the game. How much does the game cost?

  - We know that $\frac{3}{5}$ of the cost = £15

  - So $\frac{1}{5}$ of the cost = £15 ÷ 3 = £5

  - If $\frac{1}{5}$ of the cost is £5, then the whole cost = £5 × 5 = £25

  - The game costs £25

- Help children to be aware that there are two main types of problems involving fractions or percentages of amounts:

  (a) You are asked to find a given fraction or percentage of an amount.
  For example Ian scores 80% in a test. There were 40 questions. How many did he get right?

  Whole test = 100% = 40 questions
  10% = 4 questions
  80% = 32 questions

  (b) You are told an amount and asked to work out what fraction or percentage it is of another amount.
  For example, I score 30 out of 50 in a test. What percentage is this?

  Whole test = 50 questions = 100%
  5 questions = 10%
  30 questions = 60%

- Both types can be solved by writing what you know and then using proportional reasoning as shown above.