

Ratio, proportion and percentage links

CURRICULUM ALIGNMENT

NUM.FRC.4a

explore (model, compare and convert) the relationships between fractions, decimals and percentages.

NUM.FRC.4b

investigate proportionality and ratios of quantities (sets).

INTERACTIVES **Phone Battery** · challenge, display, explore

WHAT THIS LESSON TEACHES

A ratio like 1:3 means the two parts add to 4 so the first part is one quarter or 25%.

→ A ratio of 1:3 means one part in every four – one quarter and three quarters.

→ 2:3 out of 5 total gives $\frac{2}{5}$ and $\frac{3}{5}$.

→ $\frac{3}{5} = 0.6 = 60\%$.

MODEL THIS ON THE BOARD

TURN 2:3 INTO FRACTION AND PERCENT

- 1 Add the parts: 2 plus 3 makes 5 total parts.
- 2 The first part is 2 out of 5 so the fraction is $\frac{2}{5}$.
- 3 To find the percent multiply $\frac{2}{5}$ by 100 to get 40%.

LESSON ARC

Open with the walk-to-school ratio 1:3 and hold both a fraction answer (a quarter) and a percentage answer (25%) as worth exploring. On the battery-slider interactive, count the parts and add them to find the whole before writing any fraction — 2:3 makes five parts, so $\frac{2}{5} = 40\%$. Pupils take turns at the board on 1:1, 1:4 and 3:2, then write the three forms for four ratios in copybook. The Student Activity Book page follows for solo written practice.

TEACHING MOVES

1. **Getting Started.** Give five seconds of quiet think-time, then take three hands-up answers — not open call-outs. Don't confirm or correct: you're listening for who thinks 'a quarter' and who jumps to '25%'. Hold both up as worth exploring.
2. **Watch and Notice.** Point to the battery slider and count the parts aloud first — 'two parts and three parts, that is five altogether, so one part is out of five' — before you ever write the fraction. On 2:3, take a hands-up prediction before the readout; the trap is reading it as 'two thirds'. Revoice any pupil who says 'they add back to the whole' — that's the reasoning to lock in.
3. **Try It Together.** No pencils here. Work 1:1, 1:4, 3:2 in that order; ask 'how many parts altogether?' before anyone touches the slider. On 3:2 the bar fills to the LARGER first part — hold out until the class notices $\frac{3}{5}$ is 60%, not a half — then ask what the empty part's readout must be so the two make 100%.
4. **Write the Three Forms in Your Copy.** Walk the room glancing for one thing: is the denominator the total of the parts, not the second number of the ratio? For 2:3 the denominator is 5, not 3. No individual marking — this is whole-class copybook practice.
5. **Class Challenge.** Keep it brisk — before each Check, ask the class to predict where the battery should sit, then confirm and move on. On 9:1, flag that the question now asks for the larger part, not the first-named smaller one. Send anyone reading 2:3 as 'two thirds' straight back to the total of 5 parts.

6. **What Did We Notice?** Listen for pupils naming the audience — a ratio suits a recipe or mix, a percentage is quick for comparing to 100. Revoice: 'so a percentage lets you compare straight away, but a ratio keeps the two parts visible.' Head off any 'one form is more correct' claim.

COMMON MISCONCEPTIONS

⚠ A pupil reads 2:3 as 'two thirds' and writes 67% — they've used the second number of the ratio as the denominator instead of the total.

Stop and count the parts on the slider: 2 and 3 makes 5, so it's 2 out of 5, not 2 out of 3. Show $2/5 = 40\%$ on the battery bar and let them see the fill sits below half.

⚠ Pupils expect the slider to fill to the smaller amount, so 3:2 throws them when the bar fills past half. Point to the key-point rule: the bar fills to the first-named part. On 3:2 the first part is 3 of 5, the bigger one — 60%. Set it on the slider and have the class name the empty part so the two make 100%.

⚠ Pupils treat the two percentages as independent and don't notice they must total 100%. After each reveal, ask a pupil to name the empty part before the readout confirms it. On 3:7, land it explicitly — 30% filled means 70% empty, and $30 + 70 = 100$.

DIFFERENTIATION

EMERGING

- Stay with the ten-square board bar for these pupils and shade the first part by hand — 1 of 4, 2 of 5 — so the total parts are countable boxes, not an abstract denominator.
- In the copybook, give just 1:3 and 1:4 (both easy tenths/quarters) and support the count-then-add step at the teacher table before the percentage.

DEVELOPING

- After the copybook four, hand them a three-part ratio like 1:2:2 and ask for the total parts and each fraction — does the count-then-add rule still hold?
- Ask them to check their four sums by adding the two percentages each time and explaining why the total is always 100.

PROFICIENT

- Pose: '30% of a class walk to school — write two different ratios of walkers to non-walkers that both fit.' Let them reason back from the percentage to the ratio and justify in copybook.
- Narrate a harder board variant during the Class Challenge — a ratio like 3:1 where they must decide whether the question wants the larger or smaller part, and predict the fill before the Check.

✚ **Cross-curricular:** Tie to Geography — pupils express how their class travels to school (walk : lift : cycle) as a ratio, then as percentages to compare with another class.

ANSWER KEY

Scaffold: visual check on the page

Q1: $1/10 = 10\%$

Q2: $1/5 = 20\%$

Q3: $2/5 = 40\%$

a) **Always** — By definition the parts make the total.

b) **Always** — One part out of four is always one quarter.

c) **Never** — Two fifths is always less than half.

d) **Never** — Three fifths is always 60% which is more than half.