

Ratio: the basic idea

CURRICULUM ALIGNMENT

NUM.FRC.4b investigate proportionality and ratios of quantities (sets).

INTERACTIVES **Ratio Bars** · challenge, display

WHAT THIS LESSON TEACHES

A ratio compares the sizes of two or more groups and is written with a colon, like 2:3. The first number is one group and the second is the other; read the colon as 'for every'.

→ 12 boys and 18 girls give the ratio 12:18, which is the same as 2:3.

→ 2:3 means 2 out of every 5 parts, so the fraction is $\frac{2}{5}$ not $\frac{2}{3}$.

MODEL THIS ON THE BOARD

BOYS AND GIRLS IN THE PHOTO

- ① Count the two groups: there are **12** boys and **18** girls.
- ② Write the ratio boys to girls as **12:18**.
- ③ Both numbers divide by 6, so simplify to **2:3**.
- ④ Check the total parts: $2 + 3 = 5$, so boys are 2 out of every 5.

LESSON ARC

Open on the line-up photo — 12 boys, 18 girls — and let pupils grope for a tidy phrase before the colon exists. Move to the ratio-bars interactive: read every ratio aloud as "two to three", building the word 'part' on the 3:5 example and totting the parts to 8. Pupils sketch three bar pairs in their copy, then build 2:5, 3:7, 4:1 with two-colour counters. The maths-talk settles ratio-versus-fraction; the Student Activity Book takes it into sharing a total next lesson.

TEACHING MOVES

1. **Getting Started.** Take three hands-up answers only — no open call-outs. Let pupils offer loose phrases like 'more girls than boys' and resist correcting or writing a colon. The whole point is that they feel how clumsy 'twelve boys and eighteen girls' is before you hand them the tidy version.
2. **Watch and Notice.** Read every ratio as 'two to three', never '2:3' silently. Slow right down on 3:5 (jam to butter): point at one square, say 'this is one part, one equal share', count the jam parts and butter parts aloud and add them to 8 in front of the class — the fraction argument in the maths-talk leans on this 8. On 1:1, ask pupils to predict the bars before the reveal.
3. **Try It Together.** Retype the parts and labels manually for each of the four stories — the interactive won't reset itself. Before each build, get the class to read the ratio aloud, then reveal. Hold 1:6 (goalkeeper to outfield) for last: ask pupils to predict how much longer the outfield bar looks before you show it — they routinely under-estimate. Revoice: 'one for every six means the second bar is six times as long.'
4. **Sketch the Bars in Your Copy.** Walk the room glancing for two things only — squares roughly equal in size, and labels matching the correct bar. A pupil who draws uneven squares has lost the 'one square per unit' idea; point back at the IWB bars rather than marking anything.
5. **Class Challenge.** Brisk table-building only — 2:5, 3:7, 4:1 in three two-colour piles, class confirms each before the next. Keep it inside 8 minutes; don't re-explain each ratio. As you circulate, ask 'how many

altogether?' at any table reading 2:5 as 'two out of five' — that flushes out the fraction slip before the maths-talk hits it head-on.

6. **What Did We Notice?** Put both pupil claims up — $2/3$ versus $2/5$ — and let the class settle it. Listen for the pupil who adds $2 + 3 = 5$ to find the whole. Revoice the winner: 'a fraction compares one part to the WHOLE, so we add the parts first.' Point back at the counter piles where the whole was obvious.

COMMON MISCONCEPTIONS

⚠ A pupil lays out 2:5 correctly with counters but then reads it as 'two out of five' — they've collapsed the ratio into a fraction and taken the second number as the total.

Ask 'how many counters altogether?' so they physically count 7, not 5. The second number of the ratio is the OTHER group, not the whole — the whole is the two groups added.

⚠ In the maths-talk a pupil insists boys are $2/3$ of the class in the ratio 2:3, matching the fraction to the two ratio numbers.

Go back to the counter piles: 2 boy-counters and 3 girl-counters make a pile of 5. Boys are 2 out of 5, so $2/5$. A fraction needs the whole first — add the parts.

⚠ On the 1:6 story pupils draw or predict the outfield bar only a little longer than the goalkeeper bar. Before the reveal, have them count '1, then 6' aloud and hold their hands apart to show six times the length. Then reveal the bars so the scale of the difference lands.

DIFFERENTIATION

EMERGING

- Stay on the 1:1 and 2:1 stories where the bars are easiest to eyeball; sketch just those two in the copy rather than all three.
- Give these pupils the counters pre-sorted into two colour cups so they place groups rather than sorting and counting at once.

DEVELOPING

- After the copy sketches, ask pupils to write the total number of parts under each ratio ($2:3 \rightarrow 5$ parts, $3:5 \rightarrow 8$ parts) as a bridge to the fraction idea.
- Swap the labels on a built ratio — 'if this is now 2:3 cats to dogs instead of boys to girls, does the bar change?' — to test that they grasp ratio as a relationship, not a fixed picture.

PROFICIENT

- Set the three-part 1:3:6 counter build as the Class Challenge stretch: build all three colours, then say what fraction of the whole the smallest group is ($1/10$) — a genuine step past the two-group lesson.
- Pose at the board: 'give me two different ratios that both mean equal groups' — pupils should reach 1:1, 2:2, 3:3 and explain why they're all the same split.

✚ **Cross-curricular:** Tie to the school's own numbers — pupils count adults to children on a real class outing and write the supervision ratio (e.g. 1:6).

ANSWER KEY

Scaffold: visual check on the page

Q1: 4:2

Q2: 1:4

Q3: 8:9

Q4: 4:7

a) Always : Both parts are doubled so the comparison stays equal.

b) Never : The total is 5 parts so the first group is $2/5$ of the total.

c) Always : That is exactly how a basic ratio is formed.

d) Never : 2:3 means something different from 3:2.

EXTENSION SHEET · STRETCH ANSWERS

S1: €15 + €30 + €45

S2: €24 + €36 + €60

S3: €20 + €30 + €50

S4: €26 + €39 + €65 + €91

S5: €18 + €27 + €45