Lesson 46 NUMBER

Ratio and proportion problem-solving

CURRICULUM ALIGNMENT

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

NUM.OPS.4 build upon, select and make use of a range of operation strategies.

INTERACTIVES Ratio Bars · display, explore

WHAT THIS LESSON TEACHES

To solve ratio problems add the parts to find the total, work out one part then build each share. Choose sharing for totals split by ratio, unitary when finding one then multiply, or scaling to change amounts.

→ Share 36 cookies in 4:5: 9 parts, one part 4 cookies so 16 and 20.

→ A recipe for 3 uses 5 strawberries, scale by 4 for 12 people.

MODEL THIS ON THE BOARD

SHARING 36 COOKIES IN RATIO 4:5

1. Add the parts of the ratio: 4 plus 5 equals 9 parts.
2. Work out one part: 36 divided by 9 equals 4 cookies per part.
3. Build each share: 4 parts is 16 cookies and 5 parts is 20 cookies.

DISCUSSION STARTER

REFLECT When is a ratio more useful than a fraction for describing a situation?

LESSON ARC

Open with the cookie puzzle and fish for one first step — the total parts (9) — not the whole answer. On the ratio-bars interactive, work the sharing and unitary families live, then contrast which fits the cookies versus the tickets. Try It Together is a mixed scaling-then-sharing problem, read straight from the bars. Pupils name their method at the top of each copybook problem, then the five-clue chained mystery is the Class Challenge practice.

TEACHING MOVES

1. **Getting Started.** Take two or three hands, not call-outs. Most pupils leap to the full answer — redirect hard: 'not the answer, the first thing you must know before you share one cookie.' You want someone to name the total parts, 9.
2. **Watch and Notice.** Work both families live on the ratio-bars interactive — don't read the numbers as a script. For sharing, ask 'what is one part worth?' before revealing 4. For the unitary bars cut into five ticket-units, point and say aloud: one unit is €3.50, so eight is €28. Then make the class name which method the cookie hook needs versus the tickets — that contrast is the lesson.
3. **Try It Together.** Pupils take turns at the board while the class agrees or corrects aloud. Insist they name the method before each step — scaling first (×3 → 15 strawberries), then sharing (15 split 2:3 → shares of 6 and 9). Head off the classic slip by asking 'what else in the recipe changes when we scale?'

4. **Note Your Method in Your Copy.** Walk the room checking the method-name written at the top, not the arithmetic. If a pupil has jumped straight to working, stop them and have them add the method label first — that naming is the skill.
5. **Class Challenge.** Brisk board work — pupils take turns, class confirms each answer, move on. Before each clue, ask which of the three methods it needs. Keep the running chain visible (€15 → 30 buns → 45 buns → 18 buns → 24 guests) so pupils see each answer feeds the next.
6. **What Did We Notice?.** Listen for pupils spotting that the question decides the method, not habit. Revoice a strong answer: 'so you read the problem first, then pick the tool that fits it.' Settle the two claims by testing each against the cookie and ticket problems.

COMMON MISCONCEPTIONS

⚠ Asked to feed 9 people instead of 3, a pupil triples only the strawberries and leaves the other ingredients unchanged.

Pause at the scaling step and ask 'what else in the recipe changes?' Show on the ratio bars that every quantity grows by the same ×3 — scaling keeps the whole recipe in proportion, not one ingredient.

⚠ A pupil reaches for the same method every time — 'I'll just share it' — regardless of what the problem asks, so a cost-per-one question gets forced into sharing.

Hold the cookie problem and the ticket problem side by side on the board. Ask 'is there a fixed total being split, or are we finding what one is worth?' Let the wording, not the habit, choose the tool.

DIFFERENTIATION

EMERGING

- Keep these pupils on straight sharing problems (fixed total + ratio) before mixing in scaling; the mystery's clue 1 is their entry point.
- On the ratio bars, pre-set the parts count so the pupil only works out what one part is worth and builds the shares, not the whole structure.

DEVELOPING

- After the copybook problems, hand back a solved share and ask them to work backwards: given the two shares are 6 and 9, what was the original total and ratio?
- Swap the smoothie scale factor to a non-whole jump (recipe for 4, feed 10) so they meet a ×2.5 scaling that still keeps proportion.

PROFICIENT

- Steer them into clue 5 of the mystery, which deliberately chains scaling then the unitary method — have them narrate to the class which tool each half needs and why.
- Pose: write your own five-clue chain where each answer feeds the next, using all three methods once. Box the intended answer at the bottom.

↗ **Cross-curricular:** Tie to Home Economics — pupils scale a real recipe up or down for the whole class and list every adjusted ingredient quantity.

ANSWER KEY

Scaffold: visual check on the page

Q1: 24 apples and 16 apples

Q2: 24 euro

Q3: 36 euro

a) Always — This is the first step in the sharing method.

b) Always — You find the cost of one then multiply.

c) Always — Scaling multiplies every ingredient by the same factor.

d) Sometimes — It depends if you have a quantity for several and need for one or more.