

Multi-step word problems and operation choice

CURRICULUM ALIGNMENT

NUM.OPS.4

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

WHAT THIS LESSON TEACHES

A multi-step word problem needs more than one calculation before you reach the answer. Signal words like each or change tell you which operation to choose first.

→ Buy 4 sandwiches at €3 each then split between 2 people: first multiply then divide.

→ Buy 6 buns at €2 each and pay with €20: multiply then subtract for change.

MODEL THIS ON THE BOARD

PLAN EACH STEP BEFORE CALCULATING

- 1 Read the problem and name the first operation using signal words.
- 2 **Calculate** the first step and write the result.
- 3 Use that result for the second operation to finish.

DISCUSSION STARTER

REFLECT

How do you decide which operation a word problem is really asking for?

LESSON ARC

Open with the sandwich bill on the board — 4 at €3 each, split between 2 — and take hands-up only on which calculation comes first, not the answer. Model three money problems (shared buns, change from €50, then a three-step trip), sketching a bar for each total and pausing for a rough estimate before every reveal. Pupils plan steps aloud in Try It Together, then write named-operation plans with bar sketches in their copybooks. Class Challenge chains three clues where each answer feeds the next.

TEACHING MOVES

1. **Getting Started.** Give five seconds of quiet think-time, then take three hands-up only. Fish for the order — multiply the sandwich cost first, then divide — and stop anyone who blurts €6. Revoice: 'good, but which sum got you there, and what came before it?'
2. **Watch and Notice.** Before each of the three board examples, take two hands-up naming the operations, then pause for a class prediction. Sketch a ratio bar so the total is the bridge into step two. Run the estimate beat slowly on the buns (€1 each → about €6 → about €2 shared) so €2.40 landing near €2 confirms the plan; ask why 'change' flips the second operation to subtract.
3. **Try It Together.** Surface one problem at a time so pupils aren't holding three number sets. Model the pencils estimate first ($8 \times 60c \approx €5$, shared 4 ways $\approx €1$), then work strand by strand: name step-1 operation, take the answer, name step-2. On the trip, force the class to name all three operations in order before anyone calculates.
4. **Plan the Steps in Your Copy.** Walk the room glancing for a named operation beside each step and a bar sketch — not bare numbers. This is whole-class copybook practice, not marking; nudge anyone who jumps straight to working.

5. **Class Challenge.** Keep board turns brisk: Clue 1 single-step warm entry, Clue 2 two named operations, Clue 3 three chained steps. Check each answer before carrying it forward — an early slip shows up at the end. No re-teaching; just confirm and move.
6. **What Did We Notice?.** Listen for the estimate named as a safety net on the plan, not just the arithmetic. Revoice: 'so the estimate checks your operations, not only your sums.' Head off the idea that mistakes only hide in the last step — a wrong step one carries all the way through.

COMMON MISCONCEPTIONS

⚠ Pupils jump straight to a final number (e.g. blurting €6 for the sandwich bill) without naming which operation came first.

Stop and revoice: 'which sum got you there, and what was the step before it?' Make them say multiply-then-divide before any further working.

⚠ Pupils pick the wrong second operation — dividing when the signal is 'change', or subtracting when the signal is 'share' — because they latch onto the first number they see.

Underline the signal word on the board. Ask: 'does change mean we split, or take away from what we paid?' Rebuild the step with a quick bar: total paid vs total cost.

⚠ Pupils think mistakes only hide in the last step, so they sense-check the final answer without checking whether step one used the right operation.

Show how a wrong step-one total poisons every later answer. Re-run the trip with a deliberately wrong first multiply and watch the final per-pupil cost land nowhere near the estimate.

DIFFERENTIATION

EMERGING

- Give two-step problems only and pre-write the operation names (Step 1: $\times$, Step 2: $\div$); pupils fill amounts and sketch the bar.
- Stay in whole euro amounts first so trailing-cent zeros don't block the plan.

DEVELOPING

- After the copybook plans, blank one operation and ask which signal word forces it back.
- Swap the stickers' €10 for €20 and ask how the change step shifts — same plan, new estimate.

PROFICIENT

- On Clue 3, ask them to invent a fourth clue that needs the mystery answer as its starting amount, still using only the four operations.
- Pose: 'where would a rough estimate first catch a swapped step-one operation?' — one sentence in the copy.

➤ **Cross-curricular:** Link to a real class trip budget — bus hire plus entry per pupil, then cost each family pays.

ANSWER KEY

Scaffold: visual check on the page

Q1: €9

Q2: €8

Q3: €52

a) Sometimes : True for '3 apples at 50c, then 20c off'; false for '€2 off each €8 ticket, then buy 3 tickets', where you subtract first.

b) Always : Estimates catch errors like missing a zero.

c) Sometimes : True for 'buy 3 at €4, pay with €20'; false for the harder clues, which need three steps.

d) Always : $€12 + €6 = €18$, and $€18 \div 3 = €6$ each. Dividing each price first and then adding also gives €6.

EXTENSION SHEET · STRETCH ANSWERS

S1: 11914

S2: 272

S3: 321

S4: 34

S5: 1398

Investigation: Plan a class trip — open-ended; scan pupils' working for valid solution paths rather than a single answer.