

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 a hands-up 'which sum first?' shopping moment — order only, no numbers. Sketch a bar model for 6 buns at €1.20 shared between 3: one whole bar for the total, then partitioned into three. The estimate beat (about €6 total, about €2 each) lands before every reveal. Pupils plan-then-solve three problems in their copy, naming the operation and sketching a bar per step, then work the shopping-mystery clue chain at the board.

TEACHING MOVES

1. **Getting Started.** Give five seconds of quiet think-time, then take three hands-up answers — not open call-outs. Fish only for the order (multiply first, then divide). If a pupil blurts '€6', revoice: 'good, but which sum got you there, and what came before it?'
2. **Watch and Notice.** Sketch the bar model for the buns on the board — one whole bar for the total cost, then split into three — so the two steps read as a picture. Model the estimate aloud (about €6 total, about €2 each) BEFORE revealing €2.40, then name the exact answer landing near the estimate as the confirmation. On the change example, ask 'why subtract here when the last one divided?' and take a hands-up prediction before the reveal.
3. **Try It Together.** Surface each problem on the board only as the class reaches it, not all three at once. Model a quick estimate on the pencils problem first (about €5, shared four ways is about €1 each) so the estimate carries over from Watch and Notice. Watch for pupils dropping the cent trailing zero on €4.80 and €7.00.
4. **Plan the Steps in Your Copy.** Walk the room glancing for a named operation beside each step and an actual bar sketch — not just a column of numbers. This is copybook practice, not marking; a missing bar is the thing to nudge, not the arithmetic.

5. **Class Challenge.** Keep the clue chain brisk — pupils take turns at the board, check each answer, class confirms, move on. On Clue 3 have the class name all three operations in order before anyone calculates, so an early slip is caught before it chains through. Don't re-explain each clue.
6. **What Did We Notice?.** Listen for the estimate framed as a safety net — 'if my answer's nowhere near my estimate, I picked the wrong operation somewhere.' Revoice a strong one: 'so the estimate checks your plan, not just your arithmetic.' Then head off the idea that errors hide in the last step.

COMMON MISCONCEPTIONS

⚠ Pupils think a mistake is most likely in the last step, so they only double-check the final calculation. Point at the trip bar model: a wrong operation in step one (say adding instead of multiplying) carries all the way to the per-pupil answer. That's exactly why the rough estimate up front is the real safety net, not a last-step recheck.

⚠ Pupils reorder the steps — dividing before finding the total, e.g. sharing €1.20 between 3 before multiplying by 6. Return to the bar: you cannot split a bar into three equal parts until the whole bar (the total cost) exists. The total is the bridge into step two — build it first, always.

⚠ Pupils drop the trailing cent zero, writing €4.8 or €3 instead of €4.80 or €3.00. Stop and line the amounts up in money columns on the board. Two places after the point every time — €4.80, not €4.8. Have the pupil read it back as 'four euro eighty'.

DIFFERENTIATION

EMERGING

- Give the two-step problems only; hold the three-step trip until the pupil is secure, so they're never planning three operations at once.
- Pre-print the plan sheet with 'Step 1: ____' and 'Step 2: ____' boxes and an empty bar outline, so the pupil fills in the operation and count rather than inventing the structure.

DEVELOPING

- After the stickers problem, change the note to €20 and ask how the change step shifts — same plan, bigger subtraction.
- Ask them to write the trip problem as a single number sentence with brackets showing which step happens first.

PROFICIENT

- Hand them the trip answer (€10 per pupil) and ask them to work backwards: invent a set of numbers for a different trip that also lands on €10 each, and explain why their steps have to stay in order.
- Pull them ahead into the Student Activity Book while the class finishes the clue chain, and ask them to spot one problem where a rough estimate would catch a wrong operation.

➤ **Cross-curricular:** Tie to a real school-tour cost: pupils plan a class trip with a bus fee plus per-pupil entry and work out the cost each.

ANSWER KEY

Scaffold: visual check on the page

Q1: €9

Q2: €8

Q3: €52

a) **Never** — The order depends on the signal words not a fixed rule.

b) **Always** — Estimates catch errors like missing a zero.

c) **Never** — Some need three steps as in the harder clues.

d) **Always** — Adding items then dividing is common when splitting a bill.

EXTENSION SHEET · STRETCH ANSWERS

S1: 11914

S3: 819

S2: 1662

S4: 34

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