

Representing situations as equations

CURRICULUM ALIGNMENT

ALG.EXP.4

articulate, represent and solve mathematical situations through the use of expressions and equations that include letter-symbols.

WHAT THIS LESSON TEACHES

Turn a word story into an equation with a letter for the unknown, then solve by working backwards.

→ Double a number, add 5, and get 17 becomes $2n + 5 = 17$.

→ Treble a number, take away 4, and get 11 becomes $3n - 4 = 11$.

MODEL THIS ON THE BOARD

SOLVE THE TAXI FARE PUZZLE

- 1 Start with the story: start fee 4 plus 2 per km equals 16.
- 2 Write the equation: $4 + 2k = 16$.
- 3 Undo by taking 4 from both sides: $2k = 12$.
- 4 Undo by halving both sides: $k = 6$.

LESSON ARC

Open with the number-trick hook — double a number, add 5, get 17 — and let pupils guess-and-check before any symbols appear. Work three stories live on the interactive, then turn the hook into $2n + 5 = 17$ and undo in reverse. Pupils solve the treble-and-take-away one together on the interactive, then two by hand on the board. Copybook practice lands the equation-steps-sentence habit before the Class Challenge Irish-context puzzles.

TEACHING MOVES

1. **Getting Started.** Give five seconds of silent think-time, then take three hands-up answers only — no open call-outs. Accept guess-and-check happily; resist showing the letter-symbol method, so the tidier way still feels wanted when it arrives.
2. **Watch and Notice.** Work each of the three stories live on the board, not off the screen. Label each undo aloud — 'take away 5 first, then halve'. On the pencils problem say 'work in cent so the numbers stay whole'; before the teams example, pick a pupil to name what got undone first in the pencils one so the two-undo teams story lands fresh.
3. **Try It Together.** Solve the treble-and-take-away trick on the interactive, then work the apples ($6b = 30$) and chairs ($4r + 3 = 27$) problems by hand with pupils calling each step. Before anyone moves, ask 'which operation do we undo first, and why?' The apples one is a deliberate breather; keep all three brisk — about eight minutes total.
4. **Write It in Your Copy.** Walk the room glancing for all three things on the page — equation, solving steps, and a sentence in words. The interpreting sentence is what pupils skip; nudge anyone who stops at the bare number. Everyone finishes the first problem well before the €5-notes extension.
5. **Class Challenge.** Brisk practice round — pupils take turns at the board, check each answer, class confirms before moving on. On the taxi puzzle ask 'what was added last?' so the €4 start comes off before the €2-per-km is undone. Fast finishers write their own puzzle quietly while you circulate.

6. **What Did We Notice?** Listen for pupils naming a checkable slip — 'minus 6 km' or '3.5 tickets' being obviously wrong. Revoice a strong answer: 'so the equation can be solved perfectly and still give a nonsense answer if we mixed up the story.'

COMMON MISCONCEPTIONS

⚠ On the taxi fare ($2k + 4 = 16$) pupils divide by 2 first, writing $16 \div 2 = 8$ then subtracting — they undo in the wrong order.

Ask 'what was added last?' before anyone writes. The €4 start was added last, so it comes off first ($16 - 4 = 12$), then undo the $\times 2$ ($12 \div 2 = 6$ km). Walk it back through the story on the board to show 8 km would give a €20 fare.

⚠ Pupils solve the equation, land on the right number, and stop — they never write what it means in the situation (' $n = 6$ ' with no 'the number was six').

During the copybook moment, point to a bare answer and ask 'six what?' Insist on the full sentence — 'So the number I thought of was six' — and connect it back to the maths-talk point that the story is the final judge.

⚠ On the pencils money problem pupils mix euro and cent, dividing €35 by 5 but treating a price given in cent as whole euro.

Say 'work in cent so the numbers stay whole' and keep one consistent unit on the board throughout. Convert once at the start, solve, then convert the answer back to euro when interpreting.

DIFFERENTIATION

EMERGING

- Stay on single-undo problems ($6b = 30$, €5-notes) while the class moves to two-step ones; these pupils name the unknown and do one operation.
- Give a pre-written equation with the letter already named, so the pupil only has to undo, not translate the words into symbols first.

DEVELOPING

- After the copybook problem, ask pupils to invent a two-step story of their own that solves to a given number, e.g. write a trick where the answer is 8.
- On the chairs problem, ask what changes if the 3 extra chairs became 3 fewer — does the first undo become an add instead of a subtract?

PROFICIENT

- While others finish the Class Challenge, pose: 'Write a taxi-fare puzzle where the fare is €16 but there are two different sensible answers depending on the start charge' — then explain in the copybook why only one fits.
- Ask them to write an equation that solves perfectly but gives a silly real-world answer (like 3.5 tickets), ready to share in the maths-talk.

✂ **Cross-curricular:** Tie to the taxi and fundraising puzzles — link to the money strand by having pupils phrase real Irish fares or class-trip collections as equations.

ANSWER KEY

a) $2n + 5 = 17$

b) 5

c) 7

Q1: 8

Q2: 9

Q3: 5 euro

a) **Always** — That is the rule for this lesson skill.

b) **Never** — You must undo by subtracting 5 first then halving.

c) **Sometimes** — It depends on the story numbers but stays in range.

d) **Always** — That is how we verify the solution for this skill.

EXTENSION SHEET · STRETCH ANSWERS

S1: $x = 9$

S2: $x = 15$

S3: $x = 12$

S4: $x = 11$