

Mixed-operation problem solving: which operation?

CURRICULUM ALIGNMENT

NUM.OPS.3

understand and apply flexibly the four operations; and the relationships between operations.

WHAT THIS LESSON TEACHES

The words in a story tell you which operation to use on the numbers. Look for clues like altogether (add), left (take away), teams of or each (multiply), and shared (divide).

→ 'How many altogether' points to adding; 'how many are left' points to taking away.

→ '6 teams of 4 players' is equal groups so we multiply; 'share 12 between 3' is a fair share so we divide.

MODEL THIS ON THE BOARD

CAMOGIE CLUB PLAYERS

- 1 Read the story: a camogie club has 6 teams and every team has 4 players. How many players are there?
- 2 Underline the action words 'every team has': these show equal groups.
- 3 Equal groups means we multiply, so the number sentence is $6 \times 4 = ?$
- 4 Work it out: 6 groups of 4 make **24** players in total.

DISCUSSION STARTER

REFLECT

Which words in a story help you choose add, take away, times or share?

LESSON ARC

Open with the camogie-teams story on the IWB and ask only which operation it needs — not the answer — so pupils hunt the action word, not the numbers. Read five stories aloud, underlining the action word each time and writing the matching number sentence, building to a two-step story with both sentences stacked. Pupils work four more at the board, then commit one to copybook with units. Class Challenge is five board turns rising to a two-step finisher.

TEACHING MOVES

1. **Getting Started.** Read the camogie story aloud slowly and take three hands-up answers, not call-outs. Block anyone shouting the total — this beat is only 'add, take away, times or share?'. Revoice the answer that points to '6 teams OF 4', not to the numbers themselves.
2. **Watch and Notice.** Underline the action word on the board before you name each operation. At Story 3 ('each team has 4'), pause and make the class predict the operation before you reveal it. At Story 5, ask 'how many things happen here?' and write both number sentences stacked so the halfway answer 17 visibly feeds the second step.
3. **Try It Together.** Four board turns, roughly two minutes each. Before each pupil writes, put 'which word told you which operation?' to the whole room and take two hands, then the pupil at the board underlines it and says the operation aloud. Watch Story 2 (change) — some will do $50 - 40$, which is right; the error to catch is anyone adding.
4. **Write It in Your Copy.** Leave the four Try It Together stories visible on a board section you don't wipe. Walk the room checking two things only: the correct sign in the number sentence, and units in the final full sentence (points, euro, cones). Don't collect in.

5. **Class Challenge.** Five board turns, brisk — name the operation, write the sentence, class confirms the answer, move on. At Story 2 watch for pupils adding $60 + 42$ by reflex. Before the two-step finisher, ask 'how many steps does this one need?' so pupils expect two number sentences rather than one.
6. **What Did We Notice?.** Put both 30-and-12 stories up together and ask how identical numbers can need different operations. Listen for pupils naming the action word ('joined' vs 'went home') as the decider. Revoice one strong answer and shut down 'you always add when there are two numbers'.

COMMON MISCONCEPTIONS

⚠ Pupils grab the two numbers and add by reflex — for 'a club has 60 tickets and has sold 42', they write $60 + 42 = 102$ without reading what's happening.

Cover the numbers with your hand on the IWB and read the story again for the action only. 'Are tickets arriving or going away? What's the question — how many are LEFT to sell.' Only uncover the numbers once the class has named take-away.

⚠ In the two-step story pupils do one operation and stop — for '45 apples, sell 28, then get 20 more' they write $45 - 28 = 17$ and call 17 the answer.

Ask 'have we used every number in the story yet?' — the leftover 20 flags the missing step. Keep both number sentences stacked on the board so the 17 visibly carries down into $17 + 20 = 37$.

⚠ Pupils confuse equal-groups stories with division, saying 'share' when they see '5 rows of 6 cones'. Contrast the two Watch-and-Notice stories side by side: 'rows OF' is equal groups building up (times), 'shared BETWEEN' is one lot split down (share). Point to the action word in each, not the numbers.

DIFFERENTIATION

EMERGING

- Give these pupils only the plain add and take-away stories from the Class Challenge; hold the equal-groups and two-step ones back until the single operations are secure.
- Provide a strip listing the four action-word families (altogether → add, left → take away, each/rows of → times, shared → share) so pupils match rather than recall.

DEVELOPING

- After a board turn, ask the pupil to write a second story of their own that uses the same operation but different numbers.
- Give the change story and ask them to solve it two ways — subtract ($50 - 40$) and count up from 40 — and say which matched the action better.

PROFICIENT

- Hand them the two 30-and-12 stories and challenge them to invent a third that uses 30 and 12 but needs times or share — then narrate to the class why the action word forces it.
- Pose a three-step story orally and ask them to write all three number sentences stacked before touching an answer.

✓ **Cross-curricular:** Tie to PE — after a laps or relay drill, pupils turn the day's counts into 'rows of' and 'shared between' stories using the yard's real numbers.

ANSWER KEY

Scaffold: visual check on the page

Q1: 63 points

Q2: 43 sliotars

Q3: 18 players

Q4: 4 jerseys

Q5: 17 fans

Spot: The story is about equal groups, so she should multiply. $6 \times 4 = 24$ players.

EXTENSION SHEET · STRETCH ANSWERS

Investigation: Invent four stories — open-ended; scan pupils' working for valid solution paths rather than a single answer.