

Lesson 17 **NUMBER**

Mental addition strategies: partitioning and compensating

CURRICULUM ALIGNMENT

NUM.OPS.4

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

ALG.PRR.4a

identify, explain and apply generalisations, including properties of operations, mathematical models and patterns.

INTERACTIVES Number Line Jumps · challenge, display, explore

WHAT THIS LESSON TEACHES

Partitioning means splitting one addend into tens and units then adding each part in turn. Compensating means adding a nearby round number then adjusting by taking back or adding the difference.

→ $47 + 38$: partition as $+30$ then $+8$ to reach 85

→ $47 + 38$: compensate as $+40$ then take back 2 to reach 85

MODEL THIS ON THE BOARD

ADDING $56 + 27$ BY PARTITIONING

- 1 Split 27 into **20** and **7**.
- 2 Start at 56 and jump **+20** to land on **76**.
- 3 Then jump **+7** from 76 to land on **83**.
- 4 So $56 + 27 = 83$.

LESSON ARC

Put $47 + 38$ on the board with no columns and take three quiet-think routes before naming anything. On the empty-number-line interactive, walk all three as jump arcs — partition ($+30, +8$), compensate ($+40, -2$), bridge ($+3$ to 50, $+35$). The class then drives $56 + 27$ live, choosing the strategy before a pupil draws. Pupils work $47 + 38$ three ways in their copy, then the Class Challenge pushes into three-digit sums where compensating wins.

TEACHING MOVES

1. **Getting Started.** Hold $47 + 38$ up with no paper allowed and give a silent five-count before any hands. Take exactly three hands, not call-outs, and listen for the different routes — note who adds 30 first and who rounds to 40, because you'll name those as strategies next. Don't reveal 85 yet.
2. **Watch and Notice.** Draw each route as jump arcs on the number-line interactive, one at a time, and point to 85 landing the same place every time. On $235 + 198$, stop and ask 'why was adding 200 easier than adding 198?' — that's the moment compensating earns its keep.
3. **Try It Together.** Let the class agree the strategy for $56 + 27$ BEFORE a pupil touches the board. Some partition ($+20, +7$), some bridge to 60 ($+4, +23$) — let both run, then revoice 'different routes, same answer of 83.' Clear the line and take a fresh class-called sum if time allows.
4. **Work It Three Ways in Your Copy.** Pupils write $47 + 38$ three ways down the page with the jumps beside each. Walk the room checking all three land on 85 — if one doesn't, the jumps don't yet sum to 38, so point at that route and ask them to total their own jumps.

5. **Class Challenge.** Pupils take turns at the board working the four sums for fewest jumps; class confirms each before moving on. Keep it brisk. If someone reaches the target in extra jumps, accept it, then ask the class for a shorter route rather than re-explaining the strategy.
6. **What Did We Notice?.** Pose the 'partitioning is always best' versus 'compensating wins for $235 + 198$ ' disagreement and make pupils settle it with the numbers, not a favourite. Revoice: 'so the numbers decide — when one addend sits just under a round ten or hundred, compensate.'

COMMON MISCONCEPTIONS

⚠ Pupils crown one strategy 'the best' and use partitioning for everything, including $235 + 198$ where they slog through $+100, +90, +8$.

Run $235 + 198$ both ways on the number line side by side — partition's four arcs against compensate's two ($+200, -2$). Let the class count the jumps. The picture, not your word, makes the case that the numbers pick the strategy.

⚠ When compensating, pupils add the round number but forget to jump back, leaving $47 + 38$ as 87, or they jump back the wrong amount.

On the interactive, draw the $+40$ overshoot to 87 deliberately, then ask 'how far past did we go?' Let them spot it's 2 too far because 38 is 2 less than 40. Make the take-back arc its own clear backward jump.

DIFFERENTIATION

EMERGING

- Stick to partitioning only for these pupils — one strategy done well beats three half-formed. Pre-draw the empty number line in their copy so they place arcs, not the whole structure.
- Stay with two-digit sums when the rest move to $235 + 198$; the three-digit row is teacher-supported at your table.

DEVELOPING

- After the copybook, ask which of their three routes for $47 + 38$ used the fewest jumps and why — push them to justify, not just complete.
- Hand them $268 + 197$ early and ask them to predict the fewest jumps before drawing anything.

PROFICIENT

- During Class Challenge, narrate a harder variant from the front: $396 + 248$. Ask them to find a compensating route AND a bridging route, then argue which the numbers favour.
- Pose: 'invent an addition where partitioning beats compensating' — they have to reason backwards about what kind of numbers each strategy suits.

✂ **Cross-curricular:** Tie to geography — pupils add the distances between two pairs of Irish towns on a road map and pick the quickest mental strategy for each pair.

ANSWER KEY

Scaffold: visual check on the page

Q1: 88 pencils

Q2: 82 books

Q3: 92 crayons

Q4: 465 worksheets

Q5: 633 bottle tops

a) Always : The parts add up to the original number so the sum is unchanged.

b) Always : An addend ending in 8 is 2 less than the next ten, so the adjustment is always take back 2.

c) Sometimes : True for $38 + 25$, where 38 is close to 40; false for $32 + 25$, which partitions easily.

d) Never : You can partition hundreds, tens and units for larger numbers within the ceiling.

EXTENSION SHEET · STRETCH ANSWERS

S1: 14024

S2: 10296

S3: 11914

S4: 1662

S5: 1043