

Mental strategies for addition and subtraction

CURRICULUM ALIGNMENT

NUM.OPS.4

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

INTERACTIVES **Number Line Jumps** · challenge, display, explore

WHAT THIS LESSON TEACHES

Splitting a number into its place-value parts so each part can be added or subtracted on its own.

→ $3,450 + 2,780$ becomes $+2,000$, then $+700$, then $+80$.

→ $4,997 + 386$ becomes $+3$ to reach $5,000$, then $+383$.

MODEL THIS ON THE BOARD

PARTITION ON A NUMBER LINE

- 1 Start at 4,997 and jump $+3$ to land on 5,000.
- 2 Then jump $+300$ to 5,300, $+80$ to 5,380 and $+6$ to 5,383.
- 3 The total is 5,383.

LESSON ARC

Open with $1,998 + 2,005$ as a head-only puzzle and harvest the rounding move pupils already use. On the empty-number-line interactive, model compensation ($4,997 + 386$), round-and-adjust ($8,012 - 1,995$) and partition ($3,450 + 2,780$), tracing arcs. Pupils try three together at the board, then note strategy names beside three sums in their copy. Class Challenge: bridge to 10,000 in fewest jumps. Maths-talk weighs mental versus column method.

TEACHING MOVES

1. **Getting Started.** Pose $1,998 + 2,005$, give five seconds of silent think-time, then take three hands — no call-outs. Listen for pupils who rounded to 2,000 and adjusted; re-voice that move aloud as the hook: 'you made it tidy first.'
2. **Watch and Notice.** Trace each arc on the number line and say the strategy name as you point to its header. On $8,012 - 1,995$, stress the wording 'we come forward 5 because we took 5 too many' and draw the $-2,000$ leftward but the $+5$ clearly rightward — this is the slip-point.
3. **Try It Together.** Before each calculation, ask the class which strategy fits — is a number near a tidy figure, or do we break it apart? Make pupils say the first jump aloud before anyone draws. Only $5,996 + 247$ is on the interactive; hand-draw a line beside it for the other two.
4. **Note Your Strategy in Your Copy.** Leave the three strategy names visible on the board. Walk the room glancing at whether the named strategy actually matches the working — flag any $8,012 - 1,995$ where the $+5$ went the wrong way. No marking; this is practice, not assessment.
5. **Class Challenge.** Keep it brisk — pupils take turns at the board reaching 10,000 in fewest jumps, class confirms each before moving on. Push the route-plan question first: 'which tidy number do we bridge to before we land on 10,000?' Don't re-explain each one.

6. What Did We Notice?. Steer pupils off 'which is always faster' towards 'which fits these numbers'. Re-voice a strong answer: mental wins when a number sits close to a tidy figure; columns win when nothing rounds neatly.

COMMON MISCONCEPTIONS

⚠ On $8,012 - 1,995$, pupils subtract the adjustment too: they do $-2,000$ then -5 , landing on $6,007$ instead of $6,017$.

Stop and re-trace on the number line. 'We took away $2,000$, but we only owed $1,995$ — we took 5 too many, so we hand 5 back.' Draw the $-2,000$ jump leftward, then the $+5$ jump rightward (forward) and say 'forward' aloud as you draw it.

⚠ Pupils use compensation but forget to add the leftover: on $4,997 + 386$ they jump $+3$ to $5,000$ and stop, giving $5,000$ rather than carrying the 383 on.

Point to the strip of 386 still unspent on the board. 'You've only spent 3 of your 386 — where do the other 383 go?' Have them draw the second arc before reading any answer.

DIFFERENTIATION

EMERGING

- Stick to compensation only on the number line — one strategy at a time — and keep the second addend small ($4,997 + 25$) so the leftover jump is manageable.
- Pre-label the tidy bridging number ($5,000$, $6,000$, $10,000$) on the line so pupils only have to size the jumps, not spot the target.

DEVELOPING

- After the copybook three, hand them a calculation that could go two ways (e.g. $6,005 - 2,998$) and ask them to solve it by two different strategies and say which felt cleaner.
- On the $10,000$ challenge, ask them to beat their own jump-count — can they reach it in two jumps instead of three?

PROFICIENT

- Narrate a harder live variant at the board: $12,003 - 4,997$, where both compensation and round-and-adjust are tempting — ask them to justify their pick aloud to the class before drawing.
- Pose: write a starting number that reaches $10,000$ in exactly one jump, and one that genuinely needs three. Explain what makes the difference.

✚ **Cross-curricular:** Tie to Geography — pupils estimate distances between Irish towns (e.g. Dublin to Galway ≈ 208 km) and add legs of a journey using round-and-adjust.

ANSWER KEY

a) compensation: $+3 \rightarrow 5,000 + 386 = 5,386 - 3 = 5,383$

b) round-and-adjust: $8012 - 2000 + 5 = 6017$

c) partition: $5,000 + 1,100 + 130 = 6,230$

Q1: 3,462

Q2: 6,910

Q3: 6,243

Q4: 7,455

Q5: 6,755

a) Sometimes — You can split into any place-value parts that help, not always all three.

b) Never — Compensation is often chosen exactly when numbers end in nines.

c) Sometimes — You can round just one number and adjust the other part.

d) Always — Any number can be split into place-value parts.

EXTENSION SHEET · STRETCH ANSWERS

S1: 14024

S2: 5644

S3: 5142

S4: 10296

S5: 1499