

The mean as a measure of centre

CURRICULUM ALIGNMENT

DAT.DAT.4a

pose questions, collect, compare, summarise and represent data selectively to answer those questions.

INTERACTIVES Stats Overlay (Mean / Median / Mode / Range) · display

WHAT THIS LESSON TEACHES

The mean is the value each item would have if the total were shared equally. Add all values then divide by how many values.

→ The mean of 4, 6 and 8 is $(4 + 6 + 8) \div 3 = 6$.

→ Towers of 4, 6, 8 cubes level off to three towers of 6.

MODEL THIS ON THE BOARD

WORKED EXAMPLE: TOTAL FROM THE MEAN

- 1 Two GAA players scored a mean of 5 points across 2 games.
- 2 Multiply the mean by the number of games: $5 \times 2 = 10$.
- 3 The total points scored is 10.

LESSON ARC

Open with five uneven cube towers on the IWB and take three quiet guesses at their levelled height. Build 4, 6, 8 physically — cubes come off the tall towers onto the short until all three sit at 6 — then show the add-and-divide line meeting the same answer. Pupils level 5, 7, 3, 9 at their desks and check by dividing, then write the total-and-divide in their copy. The Class Challenge round works four mean problems, ending on a reverse missing-value one.

TEACHING MOVES

1. **Getting Started.** Five seconds of quiet think-time, then take three hands-up guesses at the levelled height — not open call-outs. Don't confirm or correct; the guessing is the hook. Note anyone landing near the middle so you can revoice their reasoning next.
2. **Watch and Notice.** Level 4, 6, 8 physically as you narrate — the tall towers give cubes to the short until all sit at 6 — then say the total aloud (18) and share it into three piles so both routes visibly meet. On the third set (0, 3, 6), hold out for the point that the empty tower still counts: divide by 3, not 2. Revoice 'an empty tower is still a tower.'
3. **Try It Together.** Pupils level 5, 7, 3, 9 with their own cubes while you circulate for alignment slips. Watch for groups stopping too early or forgetting to count all four towers when dividing. Have one group show their levelled towers and another show the $24 \div 4 = 6$ line, then confirm the two match.
4. **Work the mean in your copy.** Glance at the division line and the count of values as you walk — this is copybook practice, not marking. The one thing to catch: nobody divides by 3 instead of 4.
5. **Class Challenge.** Pupils take turns at the board, checking each answer before moving on. Keep the first three problems brisk to protect two or three minutes for the missing-sweets problem. Before revealing that one, ask the class to predict whether the third friend has more or fewer than 8.

6. What Did We Notice?. Listen for pupils calling the mean the equal height every tower reaches; revoice as 'the fair-share amount.' For the reverse problem, listen for anyone who spotted that mean $\times$ count gives the total back, and revoice that link out loud for the class.

COMMON MISCONCEPTIONS

⚠ Given towers of 0, 3, 6 a pupil says the mean is $4\frac{1}{2}$ — they ignored the empty tower and divided by 2 because 'there's nothing there to count.'

Point at the empty spot on the IWB: 'that's still one of our values — it counts as a tower with zero cubes.' Rebuild all three towers and share 9 cubes across three bases, not two, so the class sees the divisor is 3.

⚠ On the missing-sweets problem a pupil tries to guess the third value or average the two they know, rather than working backwards from the mean.

Go back to the top worked example: mean 8×3 friends = 24 total. Write 24, subtract the known 6 and 11 on the board, and let the 7 fall out. Say 'the mean and the count together give the total; the total gives the missing piece.'

DIFFERENTIATION

EMERGING

- Keep this group on three towers with a friendly total (e.g. 4, 6, 8) while the class moves to four values — level physically first, then write the divide.
- Pre-write the ' $\div 4$ ' in their copy so they focus on the total and the count matches the number of towers in front of them.

DEVELOPING

- After the copybook line, add a fifth tower to 5, 7, 3, 9 and ask them to predict whether the mean goes up or down before recomputing.
- Give the savings set (2, 3, 0, 4, 6) early and ask them to explain in a sentence why the zero changes the divisor.

PROFICIENT

- Pose at the board: 'four towers have a mean of 6 and three of them are 5, 8 and 4 — build the fourth.' Let them reason from total back to the missing height before the class reaches the missing-sweets problem.
- Ask them to invent a data set of four values whose mean is exactly 5, then a second set that also means 5 but looks completely different — explain what stays fixed.

✓ **Cross-curricular:** Tie to the STE strand — pupils log rainfall in mm across a school week and find the mean daily rainfall, zero days included.

ANSWER KEY

c) 10

Q1: 14

Q2: 18

Q3: 60

a) Always — Always add all values and divide by the count.

b) Never — The mean is often not one of the numbers, like mean of 1 and 2 is 1.5.

c) Always — Total equals mean times count, always.

d) Sometimes — Sometimes true, like 2 and 4 mean 3 which is odd.

EXTENSION SHEET · STRETCH ANSWERS

S1: 35.5

S2: 34.5

S3: 32.5

S4: 25

S5: 17