

Mode, range and choosing a measure

CURRICULUM ALIGNMENT

DAT.DAT.4b

critically analyse and evaluate findings; and communicate inferences, conclusions and implications from the findings.

DAT.DAT.4a

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

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

WHAT THIS LESSON TEACHES

The mode is the number that appears most often in a data set. Use the mode instead of the mean when outliers make the mean misleading. The range is largest minus smallest.

→ In GAA goals {2, 2, 2, 8, 100} the mode is 2.

→ For scores {6, 6, 6, 9} the range is $9 - 6 = 3$.

MODEL THIS ON THE BOARD

FINDING THE MODE OF GAA SCORES

- 1 List the scores: 3, 5, 5, 5, 8.
- 2 Count how often each appears.
- 3 The mode is 5 because it appears three times.

DISCUSSION STARTER

REFLECT When you describe a data set, why can the range matter just as much as the average?

LESSON ARC

Open with the five-match scores 2, 2, 2, 8, 100 on the IWB — the mean of 22.8 fits no real match, and that surprise is the hook. Build each data set as a dot plot: read the mode off the tallest stack, the range off the width. The fourth set pays off the hook — cover the outlier, then reveal it so the range jumps while the mode holds. Pupils order a set and record mode, range and mean in copy. Class Challenge summarises four sets.

TEACHING MOVES

1. **Getting Started.** Put 2, 2, 2, 8, 100 up and give five seconds of quiet think-time before three hands. Don't work out the mean or resolve anything yet — hold the tension. When a pupil says 'they mostly score 2', revoice it but flag the wild 100 is still unexplained.
2. **Watch and Notice.** Read each dot plot live — mode off the tallest stack, range as the width from leftmost to rightmost dot. On the fourth set cover the 30 with your hand so the class sees range 2, then reveal it and let them watch range leap to 25 while the tallest stack stays put. Ask 'which measure jumped and which stayed still?'
3. **Try It Together.** Only the first set is preloaded — type the next two in live at the board. Save {8, 8, 9, 9, 9, 40} for last and ask which measure the 40 stretched and which it left alone, so the outlier idea lands before the challenge.

4. **Order It and Compare in Your Copy.** Walk the room checking the set is genuinely ordered and the three measures sit side by side — this is copybook practice, not marking. There's no single right answer to the circle: accept any measure a pupil can justify out loud.
5. **Class Challenge.** Brisk board turns — read the measure asked, Check, class confirms, move on. On the last outlier set, ask the class to predict whether the range will be big or small before they Check, then let the 45 make the point.
6. **What Did We Notice?.** Steer pupils toward 'it depends what you want to know' rather than one winner. Revoice a strong answer: 'so a wide range tells us to be careful trusting the average.'

COMMON MISCONCEPTIONS

⚠ Pupils say a set must have exactly one mode, so on {12, 4, 15, 4, 20} they hunt for a single most-common value and miss that 4 repeats, or on a two-mode set they name only one.

On the two-mode dot plot, point to both equal-height stacks and say 'both are the tallest — this set has two modes.' Contrast with a set where every value is different: 'no repeats, so no mode at all.'

⚠ Pupils read the range as just the highest value — they write range = 20 for {12, 4, 15, 4, 20} instead of $20 - 4 = 16$.

Point to the leftmost and rightmost dots on the plot and trace the gap between them with a finger. 'Range is the width from lowest to highest — highest minus lowest.' Rebuild it: 20 take away 4.

⚠ Pupils assume the outlier drags the mode up too — after the 40 in {8, 8, 9, 9, 9, 40} they think the mode changed.

Point back to the tallest stack (still the 9s) — the 40 is a single lonely dot, it can't beat three 9s. 'One wild dot stretches the range but can't move the tallest stack.'

DIFFERENTIATION

EMERGING

- On the copybook set, hand the ordering back to them but do the mean together at the board — divide 30 by 5 as a class in unison so the arithmetic doesn't block the comparison.
- Stick to the small preloaded set {6, 6, 6, 9} for reading mode and range; the two harder Try It Together sets are teacher-supported.

DEVELOPING

- After the copybook set, ask: change one value so the mode stays 5 but the range grows to 10 — which value would you move and to what?
- On the outlier set in the challenge, ask them to state the range with the outlier removed, then with it in, and say the difference in one number.

PROFICIENT

- Pose: invent a five-match set where the mode is 3 but the mean is over 20 — then explain in your copy which measure describes the team more honestly and why.
- Narrate a harder variant at the board for fast finishers: a set with two modes AND an outlier — ask them which single measure they'd trust to warn a reader the data is spread out.

✓ **Cross-curricular:** Tie to PE — pupils record five of their own long-jump or skipping counts, then find the mode and range of the set.

ANSWER KEY

Scaffold: visual check on the page

Q1: 10

Q2: 16

Q3: 3

Q4: 6

- a) **Sometimes** — It is often better but not always the only choice.
- b) **Never** — It can have one, more than one or none.
- c) **Always** — The range uses the largest and smallest so an outlier changes it.
- d) **Sometimes** — Only if the outlier matches the mode or creates a new one.

EXTENSION SHEET · STRETCH ANSWERS

S1: 9

S2: 143

S3: 157

S4: 136

S5: 23