

Frequency tables and grouped data

CURRICULUM ALIGNMENT

DAT.DAT.4a

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

INTERACTIVES Tally Chart · challenge, display, explore

WHAT THIS LESSON TEACHES

A frequency table records how many times each value or group appears in a set of data.

→ Shoe size 36 appears 4 times and size 37 appears 6 times.

→ Ages grouped as 0-9, 10-19, 20-29.

MODEL THIS ON THE BOARD

TALLY AND COUNT SCORES

- 1 List the scores in order: 4, 6, 7, 8, 9, 11, 12, 13, 14, 15, 18, 19, 20, 21, 22, 24, 25, 27.
- 2 Draw three equal bands 0-9, 10-19, 20-29.
- 3 Tally each score into its band then write the total in the frequency column.

LESSON ARC

Open with a deliberately messy list of reaction-time scores on the IWB and let pupils suggest ordering or counting. Model tallying into a frequency table, then the grouped-data interactive pivots on two make-or-break ideas: equal band width, and non-overlapping edges (the 10 that belongs to two bands at once). Pupils tally a fresh 18-value set together, then build their own grouped table in copybook with a checking total. Maths-talk closes on the gain-versus-loss trade-off of grouping.

TEACHING MOVES

1. **Getting Started.** Display the untidy raw scatter as pupils settle. Take two or three hands-up suggestions, not open call-out — listen for 'put them in order' or 'count how many of each', both roads into a frequency table. Don't tidy it yourself yet; let the mess do the motivating.
2. **Watch and Notice.** Walk the three tables one at a time. On the third, point at the value 10 sitting in both 0-10 and 10-20 and ask the class which band it belongs to — the answer 'both' is the problem. Then show the fix to 0-9 and 10-19. Say 'equal AND non-overlapping' out loud so the rule is on the board, not just in your head.
3. **Try It Together.** Agree the three band edges (0-9, 10-19, 20-29) before any tallying starts — pupils jump to marking and then hit a value with no home. Watch the boundary value 20 and revoice 'each value has exactly one home.' A few pupils add tallies in turn while the class checks the running total reaches 18.
4. **Build the Table in Your Copy.** Pupils draw a three-band grouped table in copybook with tally and frequency columns. Walk the room glancing for equal band widths and tallies grouped in fives. The fastest catch for slips: does the bottom total match the full data set?
5. **Class Challenge.** Keep the board work brisk — pupils take turns, the class confirms each answer before moving on. Each set, ask 'how many bands does this width give us, and is that a useful number?' Aim for roughly four to six bands; let pupils reason from the too-narrow / too-wide tension on screen rather than re-explaining it.

6. What Did We Notice?. Pose the trade-off question and listen for pupils naming both sides. Revoice a strong answer: 'so we can see the shape of the data, but not the exact number any one person got.' Head off the idea that grouping is just tidying — it genuinely throws information away for clarity.

COMMON MISCONCEPTIONS

⚠ Pupils write overlapping bands like 0–10 and 10–20 and don't see the problem until a value of 10 needs a home.

Point at the 10 on the IWB and ask which band it goes in. When the class says 'both', that IS the fault — show the fix to 0–9 and 10–19 and have a pupil read where 10 now lives.

⚠ Pupils choose unequal band widths — a narrow first band and a wide last one — so the bands aren't comparable.

Hold the band widths up against each other on the board: '0–9 is ten years, but 20–40 is twenty — that's not a fair count.' Rebuild with equal widths and re-tally the affected band.

⚠ Pupils tally without grouping the strokes in fives, so totalling a busy band becomes a slow recount.

Stop at a band with seven or eight marks and ask a pupil to read the total fast — the recount is the point. Re-draw with every fifth stroke crossed through and read it again at a glance.

DIFFERENTIATION

EMERGING

- Give pupils the three band edges already drawn (0–9, 10–19, 20–29) so they tally into a ready-made structure rather than inventing the bands.
- Stay on the un-grouped frequency table — tally the small reaction-time set (values 5 to 9) into named columns before any band-width judgement is asked.

DEVELOPING

- After the copybook table, ask pupils to redo the same data with four bands instead of three — does the shape look different?
- Give a data set whose largest value lands exactly on a band edge and ask them to justify which band it belongs to.

PROFICIENT

- Hand a data set running 1 to 60 and ask: what band width gives a useful table, and how did you decide? Pupils narrate their reasoning at the board for the Class Challenge.
- Ask: 'if I only show you the grouped table, could you ever rebuild the exact original list?' Let them argue why not — it links straight to the maths-talk trade-off.

✚ **Cross-curricular:** Tie to PE — pupils time each other's reaction or sprint scores, then tally the class results into equal bands and read the busiest band.

ANSWER KEY

Scaffold: visual check on the page

Q1: 0–9: 5; 10–19: 0; 20–29: 0

Q2: 0–9: 0; 10–19: 5; 20–29: 0

Q3: 0–9: 0; 10–19: 2; 20–29: 3

Q4: 0–9: 0; 10–19: 0; 20–29: 3

- a) **Never** — Once grouped the exact scores inside each band are hidden.
- b) **Always** — 15 lies inside the interval 10–19.
- c) **Always** — Standard tally practice uses a gate of five.
- d) **Sometimes** — It works for many lists but not every list needs grouping.

EXTENSION SHEET · STRETCH ANSWERS

S1: 5 gate(s) and 1 singles

S2: 2 gate(s) and 2 singles

S3: 2 gate(s) and 2 singles

S4: 6 gate(s) and 0 singles