

Data and chance investigation: survey, display and conclude

CURRICULUM ALIGNMENT

DAT.DAT.3

pose questions of interest and collect, display and critically analyse data in a range of ways for a range of purposes and communicate the findings.

INTERACTIVES

Tally Chart · display, explore

Bar Chart Builder · challenge, display

WHAT THIS LESSON TEACHES

A survey starts with one clear question and a short fixed list of answers agreed before you collect. You tally each answer, write the frequency (how many marks in a row), then display it and read off the mode and range.

→ Question 'Favourite break-time game?' with answers Chasing, Football, Skipping, Handball.

→ If Football has 10 tally marks, the frequency for Football is 10.

MODEL THIS ON THE BOARD

FROM TALLY TO CONCLUSION

- Count each row of tally marks: Chasing **11**, Football **12**, Skipping **6**, Handball **3**.
- The tallest count is **12**, so the mode is Football.
- Range = largest – smallest: **12 – 3 = 9**.
- Conclusion: the most popular break-time game is Football.

Chasing		
Football		
Skipping		
Handball		

DISCUSSION STARTER

REFLECT

Which step of your investigation mattered most — the question, the display, or the conclusion?

LESSON ARC

Open with the school-travel question on the board and pull a small fixed set of categories from three hands-up before any counting. Show one finished tally-to-chart cycle, reading Walk's twelve marks straight up into a twelve-high bar. Pupils then run their own live survey — favourite break-time game — with rotating recorders at the board, record the tally and frequencies in their copy, build the bar chart in the Class Challenge, then finish the cycle by naming mode, working the range and writing an honest conclusion.

TEACHING MOVES

- Getting Started.** Take exactly three hands-up answers, not open call-outs, and steer to four clean categories (Walk, Cycle, Bus, Car). Head off the 'my mam drove me but then I walked a bit' answer on the spot — say it aloud: every pupil must fit exactly one box or the survey isn't fair.
- Watch and Notice.** Point at the tally first — run your finger down each gate, read it in fives plus the loose marks, say the one number aloud: that is the frequency. Then match Walk's twelve marks to the tallest

bar, 'twelve marks, twelve high'. Ask what the tallest and shortest bars tell us and hold out until a pupil says 'most' and 'fewest' before you name mode and range.

3. **Try It Together.** Lock the four game categories before a single vote. Rotate four recorders through the board so several pupils practise the gate, and watch for the fifth-mark slip — the fifth mark crosses the previous four, it is not a fifth upright. Jot the four final frequencies yourself so you can carry the real data into the chart later if you want.
4. **Record the Survey in Your Copy.** Walk the room glancing that each frequency matches the marks — this is copybook practice, not marking. Prompt anyone who launched straight into tallies to go back and write the data question at the top first.
5. **Class Challenge.** Brisk board work — pupils build to the target heights (4, then 8, then 12, then the four-bar set), check each with the class, move on. Don't re-explain each build. If you tallied real class figures earlier, swap those four counts in for 11, 8, 5, 3 here so the chart is the class's own.
6. **Finish the Cycle in Your Copy.** Circulate and watch that pupils read the range as one subtraction — largest minus smallest — not as 'the two numbers'. For the conclusion, push for an honest answer tied to the chart; if two games tie, the honest conclusion says so.
7. **What Did We Notice?.** Ask whether the chart actually answers the opening question. Revoice a strong answer — 'so the chart shows it, and the conclusion says it in words' — and head off the idea that one class speaks for the whole school.

COMMON MISCONCEPTIONS

⚠ When building the tally a pupil draws the fifth mark as a fifth upright stroke rather than a diagonal crossing the previous four, so gates get miscounted.

Freeze the board on the fifth vote of any row. Say 'the fifth one closes the gate' and draw it crossing the four. Have the recorder read that gate back as 'five' before the next vote.

⚠ Pupils give the range as 'eleven and three' or write both numbers instead of doing the subtraction. Point at the two bars on the chart and say 'range is one number — how far apart'. Do $11 - 3 = 8$ aloud together, then stress it is the same subtraction every time: largest count take away smallest count.

⚠ In the conclusion pupils just restate the mode ('Football is the tallest bar') instead of answering the original question in an honest sentence.

Send them back to the question written at the top of their copy. Ask 'does your sentence answer THAT?' and, if two games tie, insist the honest conclusion names the tie rather than picking a favourite.

DIFFERENTIATION

EMERGING

- Give these pupils a copy with the four category rows and the question already written, so they only add tally marks and the frequency number.
- For the range, cover all but the tallest and shortest bars with a sheet of A4 so the subtraction is just those two numbers, nothing to sort.

DEVELOPING

- After the conclusion, ask them to work out how many pupils voted in total by adding the four frequencies, and check it matches the class size.
- Ask 'which two categories would you merge if you could only have three bars, and why?' — a justification step on the same data.

PROFICIENT

- Pose at the board: 'if three more pupils joined tomorrow, what is the smallest number of Football votes that would still keep it the mode?' Let them reason it in their copy before anyone answers.
- Ask them to design a fair follow-up question for a whole-school survey and explain why one class's chart can't answer it — tie back to the What Did We Notice? talk.

➤ **Cross-curricular:** Tie to Geography — the 'how did you get to school' data links to local travel and road-safety around your own town's streets.

ANSWER KEY

b) 12, 7, 3

Q1: 12

Q2: Football

Q3: 32

Q4: 12

EXTENSION SHEET · STRETCH ANSWERS

S1: 23

S2: 20

S3: 116

S4: 5

S5: 14

Investigation: Chart a class favourite — open-ended; scan pupils' working for valid solution paths rather than a single answer.