Lesson 90 SHAPE & SPACE

Bar charts — choosing a scale

CURRICULUM ALIGNMENT

DAT.DAT.4a pose questions, collect, compare, summarise and represent data selectively to answer those questions.

INTERACTIVES Bar Chart Builder · challenge, display, explore

WHAT THIS LESSON TEACHES

A **bar chart** shows frequencies as bars. Every bar must have the **same width** with **equal gaps** between them. The vertical scale shows how many — choose a sensible step (e.g. 1, 2, 5, 10) so the tallest bar fits.

→ If the highest frequency is 18, a scale going up in **2s** to 20 fits cleanly.

→ If you only have one or two of each, a scale in **1s** is fine.

LESSON ARC

Open with a bar chart that visibly fails — one bar of 30 on a grid that only climbs to 12. Use the bar-chart-builder interactive to redraw the same Walk/Cycle/Bus/Car data at yStep 1, 2 and 5, naming the trade-off: too small and the chart is cluttered, too big and small bars flatten. Pupils sketch the same data at two scales in their copybook. The Class Challenge lands the dominant-bar punchline (Apples 30, others 4–8).

TEACHING MOVES

1. **Getting Started.** Show the broken chart and give five seconds of silent think-time before any hands go up. Take two or three answers only — no open call-outs. Revoice toward 'what could each square be worth instead of 1?' but don't name yStep yet.
2. **Watch and Notice.** Walk the four charts aloud one at a time; class watches, nobody at the board. Pause hardest on yStep 5 with the small data and ask 'can you tell Cycle 5 and Car 3 apart?' — the 'no' is the point. Don't move on until pupils can say in their own words that the yStep has to fit the biggest bar without flattening the small ones.
3. **Try It Together.** Before each yStep switch on the interactive, freeze the class and ask 'predict — does this scale work?' Only then send a pupil to the board. Revoice winners as 'so the smallest difference we want to see decides how small our step has to be.'
4. **Sketch the same data at two scales in your copy.** Glance down the rows for one specific failure: two charts that look identical because the pupil drew the bars the same height regardless of scale. Point at the y-axis numbers and ask 'is each square worth the same thing here as here?' — don't redraw it for them.
5. **Class Challenge.** Keep rotation brisk — predict yStep aloud as a class BEFORE the pupil at the board drags any bars. On the Apples-30 problem, stop the rotation and ask 'why does this one feel different from the others?' That's the dominant-bar moment; let pupils name it. Direct fast finishers to the extension bank on their device while you circulate.
6. **What Did We Notice?.** Display-only — nobody writes. Listen specifically for 'the biggest bar' and 'the smallest difference we want to see'. Revoice into the sandwich: the tallest bar tells us how big the step CAN be; the smallest gap we care about tells us how big it CAN'T be.

COMMON MISCONCEPTIONS

⚠ Pupils sketch both copybook charts with bars the same height, just changing the y-axis numbers underneath — they treat scale as a label change rather than a redraw.

Stand at the pupil's copy and put a finger on the Walk bar in chart 1 (reaches square 12) and chart 2 (should reach square 2 and a bit). Ask 'if every square is worth 5 now, how many squares does a bar of 12 need?' Don't redraw — make them recount.

⚠ Pupils pick the yStep with the biggest number assuming bigger is better — they go straight to yStep 10 for a data set whose biggest value is 12.

Send them back to the interactive on yStep 10 with the Walk/Cycle/Bus/Car data. The Cycle 5 and Car 3 bars both land on the same square. 'Can you see which is bigger?' The chart answers it for them — too coarse hides the story.

⚠ Pupils think the dominant bar means 'draw it smaller so it fits' rather than 'change the scale so it fits.'

On the bar-chart-builder, build Apples 30 against a yStep-of-1 grid that visibly cannot hold it. Then switch yStep to 5 — the bar fits without being squashed. Revoice: 'we didn't shrink the bar, we made each square count for more.'

DIFFERENTIATION

EMERGING

- Pre-draw the y-axis with labelled steps in their copybook before the sketch task, so pupils only place the bars, not invent the scale.
- Stay on the first data set (max 12) only — skip the second sketch with yStep 5 and have the pupil explain in one sentence why yStep 1 worked for these numbers.

DEVELOPING

- After the copybook task, give one extra value (Train: 24) and ask: does yStep 5 still work, or does the chart need yStep 2 now? Justify in one line.
- On the bar-chart-builder, ask them to find the data set where yStep 2 and yStep 5 BOTH work — what makes a data set scale-flexible?

PROFICIENT

- Direct fast finishers to the extension bank on their device while you circulate.
- Pose: 'design a data set where no clean yStep (1, 2, 5 or 10) is perfect — every choice loses something.' Pupils sketch the set and explain the trade-off in their copy.

Cross-curricular: Tie to SESE Geography — pupils count how their class travels to school (walk, cycle, bus, car) and choose a yStep that fits their own real numbers.

ANSWER KEY

a) Football bar to 18.

b) Hurling bar to 12.

c) Camogie bar to 8.

d) Soccer bar to 14.

e) Basketball bar to 4.

f) Yes, but bars would land between gridlines (e.g. 18 between 15 and 20). Step of 2 is tidier.

Q1: step of 5

Q2: step of 5

Q3: step of 10

Q4: step of 10

EXTENSION SHEET · STRETCH ANSWERS

S1: step of 10

S2: step of 5

S3: step of 5