

Pie charts: first encounter

CURRICULUM ALIGNMENT

DAT.DAT.4a

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

NUM.FRC.4a

explore (model, compare and convert) the relationships between fractions, decimals and percentages.

INTERACTIVES

Pizza Slicer · display

Pie Chart Builder · challenge, display, explore

WHAT THIS LESSON TEACHES

A pie chart is a circle split into slices. The whole circle stands for the whole set of data and each slice's size shows that category's share.

→ 12 of 24 pupils choosing apples fills exactly half the pie.

→ A slice covering half the pie is 50%; a slice covering a quarter is 25%.

MODEL THIS ON THE BOARD

FRUIT SURVEY PIE SLICES

- 1 Add the fruit votes to find the whole: $12 + 6 + 4 + 2 = 24$.
- 2 Apples are 12 out of 24, so work out $12 \div 24 = 1/2$.
- 3 Half the data means the apple slice fills exactly half the circle.
- 4 Bananas are 6 out of 24, so $6 \div 24 = 1/4$ and that slice is a quarter of the pie.

LESSON ARC

Open by putting an equal-slice pizza beside a favourite-fruit pie on the IWB and asking what's different about the slice sizes. Model the fruit pie (12 apples, 6 bananas, 4 oranges, 2 pears) so pupils see the 12-vote apple slice fill exactly half. Together, build the how-we-get-to-school pie and reshape it live so slices squeeze each other. Pupils sketch the fruit pie in their copy, labelling counts and percentages, then work the four-target Class Challenge at the board.

TEACHING MOVES

1. **Getting Started.** Put the equal-slice pizza and the uneven fruit pie side by side and take two or three hands-up answers only. Steer toward the word 'size' — the pizza is equal because we cut it fairly, the survey is uneven because the data made it so. Hold back the term 'pie chart' until the noticing lands.
2. **Watch and Notice.** Point to the apple slice — 12 of 24 votes — and let the class see it fills exactly half before you say so. Ask them to predict the banana slice (6 of 24, a quarter) before you reveal it. Don't chase exact decimals for oranges and pears — call them 'about a sixth' and 'a small slice, less than a tenth'. Keep half and quarter as the numbers they read exactly.
3. **Try It Together.** Pupils take turns entering the school-travel counts (8 walk, 4 cycle, 6 bus, 4 car) at the board, with the class predicting each biggest slice out loud. The key move is the reshape: bump walk from 8 to 14 and ask what happens to every other slice BEFORE the pie redraws. Revoice: 'the whole circle is always full, so if one slice grows the rest must shrink to fit.'
4. **Sketch the Slices in Your Copy.** As pupils sketch the fruit pie, glance for whether the apple slice is drawn as a genuine half — a rough freehand circle is fine. Check they've labelled each slice with both its count and its percentage. This is copybook practice, not marking.

5. **Class Challenge.** Keep the board work brisk — pupils take turns, check each answer, class confirms, move on. Open with the 10:10 target (two equal halves) as a confidence-builder, then 15:5 (a familiar three-quarters). Before each Check, ask the class to predict the biggest slice; use the ✓ as part of your narration — 'yes, that's it.'
6. **Read the Slice as a Percentage.** Point to the 3 shaded slices of 8 and ask what fraction of the whole circle they cover. Connect it straight back to reading a pie slice as a share — a bit more than a third, less than a half. Keep it short; this isn't a fraction-to-percentage lesson.
7. **What Did We Notice?.** Listen for pupils naming the pie chart's strength — it shows shares of a whole at a glance. Revoice: 'the pie is best when we care about the share, not the exact number.' Then draw out the weakness (hard to read an exact count, hard to compare near-equal slices) and head off the idea that one chart is simply 'better'.

COMMON MISCONCEPTIONS

⚠ When one count rises, pupils expect the other slices to stay the same size — they treat each slice as a fixed drawing rather than a share of a full circle.

Use the reshape moment in Try It Together: pause before the pie redraws and ask the class to predict what every other slice does. Then let it redraw and revoice — 'the circle was already full, so growing one slice has to squeeze the rest.'

⚠ Pupils read a slice by counting how many slices the circle is cut into rather than by its size — e.g. seeing four slices and calling each one 'a quarter' even when the apple slice is clearly bigger.

Go back to the equal pizza versus the fruit pie. Ask 'are these four fruit slices the same size as the four pizza slices?' Trace the apple slice against the half-circle line so they see size, not slice-count, is what's read.

DIFFERENTIATION

EMERGING

- Stick to the friendly targets only — the 10:10 two-halves pie and the 15:5 three-quarter pie — so these pupils read half and quarter before meeting the four-way sweet survey.
- In the copybook sketch, ask only for the apple slice drawn as a half and shaded; the smaller three slices can be labelled with counts alone, no percentage.

DEVELOPING

- After the drinks survey, ask: water is 11 of 20 — is that more or less than half, and by how many votes?
- Give a missing-slice puzzle at the board: three slices of a pie are 25%, 25% and 30% — what percentage is the fourth?

PROFICIENT

- Hand these pupils the break-time drinks counts and ask them to work the exact percentage of the water slice, then explain to the class why it 'wins' the circle even though it's only just over half.
- Pose: 'could two different surveys ever make the exact same pie chart?' Let them reason it out in a copybook moment before sharing.

✓ **Cross-curricular:** Tie to Geography — run a real class survey of how pupils travel to school, then build the live pie together and read off the biggest share.

ANSWER KEY

Scaffold: visual check on the page

Q1: $\frac{1}{3}$

Q2: $\frac{3}{10}$

Q3: 500

a) **Always** : Slice size matches share of the data so the largest slice is always the biggest category.

b) **Always** : The whole circle is the full set so half the circle is always half the data.

c) **Sometimes** : True when four groups are the same size; false for most data, where the slices differ.

d) **Sometimes** : Slices differ when the counts differ but equal counts make equal slices.

EXTENSION SHEET · STRETCH ANSWERS

S1: 164°

S2: 136°

S3: 142°

S4: 60°

S5: 90°