

Percent as "out of one hundred"

CURRICULUM ALIGNMENT

NUM.FRC.4a

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

NUM.PVT.4

investigate how decimals and percentages (and fractions) can be compared, ordered and expressed in related terms.

WHAT THIS LESSON TEACHES

The word percent means per hundred or out of one hundred. The symbol % stands for the two zeros and the slash of 100, so 50% means 50 out of every 100.

→ 50 of the 100 squares shaded on a hundred-square is 50%.

→ 25 squares shaded is 25% of the whole grid.

MODEL THIS ON THE BOARD

SHADE AND NAME 75%

- 1 A hundred-square grid has ten rows of ten, so **100** squares in all.
- 2 75% means **75** out of every 100.
- 3 Shade seven full rows (**70** squares) then five more squares in the next row.
- 4 Write the same amount three ways: 75%, 0.75 and 75/100.

LESSON ARC

Open with the half-shaded hundred-square from Getting Started and log pupils' fraction/decimal/percentage answers without settling them. Model 1%, 25%, 50% aloud, always naming percentage then decimal then fraction over 100. A pupil shades 30%, 7%, 75%, 100% at the board while the class predicts and reads three names. Pupils sketch and shade 75% in their copy, then work paper hundred-squares at their desks — three amounts, each written three ways.

TEACHING MOVES

1. **Getting Started.** Give five seconds of silent think-time before any hands, then take three answers for the half-shaded grid and just log fraction, decimal and percentage on the board. Resist settling which is 'right' — the whole lesson is that they're the same amount.
2. **Watch and Notice.** Walk each grid one at a time, always saying percentage, then decimal, then fraction — same order every time so the pattern locks. On the single square, stress the whole grid is one, not one hundred, so the square is a hundredth. Say verbatim: 'the number of shaded squares out of a hundred IS the percentage.' Keep every fraction over 100 — no simplifying yet.
3. **Try It Together.** Call a pupil up for each amount and have the class read all three names off the board. On 7%, stop and ask why it looks so much smaller than 30% — seven squares, not even one row. Shade 75% slowly (seven full rows, then five squares of the eighth) because that's the amount they copy next.
4. **Sketch the Grid in Your Copy.** Circulate glancing for exactly seven whole rows plus five squares on the eighth, and for 75%, 0.75, 75/100 written underneath. No marking. If time is tight, push 30% and 7% to homework rather than rushing.
5. **Class Challenge.** Everyone shades their own paper grids at the same time — 30%, then 7%, then 75% — while you circulate. After each amount, pause the room and have the class say all three names in unison before moving on. Keep it brisk; don't re-explain each one.

6. What Did We Notice?. Ask why one hundred keeps turning up. Revoice a strong answer: 'so percent really just means how many out of the hundred squares.' Head off 'the grid is a hundred' — it's one whole split into a hundred parts.

COMMON MISCONCEPTIONS

⚠ Pupils say the whole hundred-square 'is a hundred', so shading 25 squares is 'twenty-five out of a hundred' but they treat the grid's value as 100 rather than one whole.

Point at the full grid and say 'this whole thing is ONE — one grid, split into a hundred little parts'. Shade a single square: 'so this is one hundredth of the one, which is 0.01, which is 1%.' Re-anchor the whole as one every time the confusion surfaces.

⚠ Pupils write 7% as 0.7 instead of 0.07 — they map the digit straight to the tenths place and drop the hundredths thinking.

On the grid, shade 7 squares and 70 squares side by side and read both aloud. 7 squares is seven hundredths, 0.07; 70 squares is seven tenths, 0.7. Have the pupil count the squares to prove which is which before rewriting.

⚠ When shading 75% pupils count seven rows then jump to a full eighth row (80 squares) rather than stopping at five squares of the eighth.

Model it slowly at the board: fill seven whole rows, then count five squares of the eighth aloud with the class — 'seven and a half rows is seventy-five squares.' Have them recount their copy grid square by square on the eighth row.

DIFFERENTIATION

EMERGING

- Stay with the 'nice' amounts that fill whole rows — 10%, 30%, 50% — where shaded rows map cleanly to the percentage, before attempting 7% or the half-row of 75%.
- Pre-draw the 10 by 10 grid in their copy so they only shade and label, not construct the grid lines.

DEVELOPING

- After the three set amounts, give a chain on one grid: shade 30%, then ask what shading twenty more squares makes it — new percentage, decimal and fraction.
- Pose the reverse: 'I shaded 0.44 of a grid — how many squares, and what percentage?'

PROFICIENT

- For the favourite-percent finish, ask them to shade a percentage that ISN'T a whole number of squares — like 12.5% — and explain in their copy why it needs half a square.
- Ask them to explain to the teacher why 100% and one whole are the same thing, using the grid to prove it.

✓ **Cross-curricular:** Tie to Geography — read a rainfall or population chart and describe a slice as a percentage of the whole, e.g. '30% of Ireland's rain fell in the west'.

ANSWER KEY

Scaffold: visual check on the page

Q1: 40%

Q2: 7%

Q3: 25%

Q4: 100%

Q5: 50%

a) Always : Per cent means out of 100.

b) Always : Per cent means out of 100, so 60 squares out of 100 is 60%.

c) Never : 7% is 7 out of 100, not out of 10.

d) Always : A fifth of 100 squares is 20 squares, which is 20%.

EXTENSION SHEET · STRETCH ANSWERS

S1: 97 squares (97% of 100 = 97)

S4: 88 squares (88% of 100 = 88)

S2: 17 squares (17% of 100 = 17)

S5: 64% (64 out of 100)

S3: 17 squares (17% of 100 = 17)