

Expressing probability as fraction, decimal and percentage

CURRICULUM ALIGNMENT

DAT.CHN.4b

represent and express probability in different forms.

NUM.FRC.4a

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

INTERACTIVES Probability Spinner · display, explore

WHAT THIS LESSON TEACHES

Probability is favourable outcomes over total outcomes, written as a fraction then changed to decimal and percentage.

→ A 4-colour spinner has 1 red out of 4 so probability of red is $\frac{1}{4} = 0.25 = 25\%$.

→ On an 8-segment spinner with 3 prizes the chance of a prize is $\frac{3}{8} = 0.375 = 37.5\%$.

MODEL THIS ON THE BOARD

WRITE THE PROBABILITY THREE WAYS

- 1 Count the favourable segments and the total segments to make the fraction.
- 2 Divide the top by the bottom to get the decimal.
- 3 Multiply the decimal by 100 to get the percentage.

LESSON ARC

Open with a four-colour spinner on the IWB and take three hands-up answers for the chance of red — hold 'one out of four', 'a quarter' and '25%' up as a puzzle, don't resolve it. Watch and Notice works three spinners, dividing top-by-bottom then $\times 100$ on the board, climbing from a tidy quarter to $\frac{2}{5}$. Pupils write three forms per row in their copy, then the class works an eight-segment spinner together. Class Challenge is the practice bank; the maths-talk lands on outcomes summing to 1.

TEACHING MOVES

1. **Getting Started.** Take three hands-up answers only, not open call-outs. Deliberately fish for the three different forms — 'one out of four', 'a quarter', 'twenty-five per cent' — and write all three on the board side by side. Say nothing about which is right; leave them as the puzzle the lesson solves.
2. **Watch and Notice.** Work the first spinner's division out loud — $1 \div 4 = 0.25$, then $\times 100 = 25\%$ — and land that a quarter, 0.25 and 25% are one amount. On the third spinner, pause before the decimal appears and ask the class to predict: $\frac{2}{5} = 0.4 = 40\%$ deliberately breaks the quarter-or-half habit, so let a wrong prediction surface before you reveal.
3. **Write Each Chance Three Ways in Your Copy.** Walk the room glancing that each row's three forms agree — no marking. Watch for $\frac{3}{6}$ left unsimplified and for the decimal-to-percentage slip where 0.4 gets read as 4% instead of 40%.
4. **Try It Together.** Set the spinner to eight segments, three prizes. Because $\frac{3}{8}$ is the first probability needing a thousandths decimal, work $3 \div 8 = 0.375$ visibly on the board before revealing 37.5%. Pupils take turns at the board and the class agrees or corrects out loud; keep the spinning short.

5. **Class Challenge.** Brisk practice — pupils take turns at the board, check each answer, class confirms, move on. Change the spinner segments for each problem. Only slow down for the last one: work $1 \div 8 = 0.125$ on the board so the awkward eighth is done properly rather than rushed.
6. **What Did We Notice?.** Ask what you always get when you add every colour's chance. Revoice a strong answer: 'if one colour is more likely, another has to be less likely — the whole thing only adds up to one spin.' Head off the idea that a rare outcome is a zero chance — unlikely is not impossible.

COMMON MISCONCEPTIONS

⚠ A pupil works out $2/5$ as a decimal and writes ' $0.4 = 4\%$ ' — they read the decimal straight across as a percentage without the $\times 100$.

Stop and put $0.25 = 25\%$ next to $0.4 = 4\%$ on the board. Ask which pattern is right, then re-run both $\times 100$ out loud. Anchor it: 0.4 is nearly half, so 4% cannot be right — half would be 50% .

⚠ A pupil writes the chance of an even number on the six-spinner as $3/6$ and converts that, rather than simplifying to $1/2$ first.

It isn't wrong, just harder — show $3 \div 6$ and $1 \div 2$ both give 0.5 on the board. Link to the fraction-strips visual: three sixths and one half cover the same length, so they're the same chance.

⚠ A pupil predicts the third spinner will be a 'tidy' quarter or half and is thrown when $2/5$ lands on 0.4 . That's the built-in surprise of the step — welcome the wrong prediction rather than skipping past it. Show that not every chance sits on a familiar landmark, then divide $2 \div 5$ out fully so the method, not the guess, gives the answer.

DIFFERENTIATION

EMERGING

- Keep these pupils on the tidy landmarks only — quarters, halves, tenths — while the class tackles fifths and eighths. Give them the fraction-strips visual alongside the spinner so $1/4$ and 0.25 are seen as the same length.
- Pre-write the three column headings (fraction / decimal / percentage) in their copy so they fill the amounts rather than build the layout.

DEVELOPING

- After the copybook rows, hand them a spinner where the fraction needs simplifying first ($4/8$, $5/10$) and ask them to show the simpler form before converting.
- Ask them to check a row backwards: turn the percentage back into a fraction and confirm it matches the one they started with.

PROFICIENT

- Run the Class Challenge extension as a teacher-narrated stretch: 'a chance of exactly 0.2 — how many favourable out of how many segments?' Draw out that $1/5$ and $2/10$ both work, and have them prove one converts back to 0.2 .
- Pose: on a four-colour spinner, if red is $1/2$, what could the other three chances be so the total is still 1 ? More than one answer — ask them to find two.

✚ **Cross-curricular:** Tie to the data-and-chance link with money — a €1 raffle where 3 of 8 tickets win: same $3/8 = 37.5\%$ as the prize spinner.

ANSWER KEY

Scaffold: visual check on the page

Q1: $1/4 = 0.25 = 25\%$

Q2: $5/10 = 0.5 = 50\%$

a) **Always** : Every probability has these three forms.

b) **Sometimes** : True for uncertain events. False when the event is certain and equals 1 .

c) **Sometimes** : True for heads on a coin; false for rolling a 6 , which is about 0.17 .

d) **Always** : The colours cover every possible outcome on the spinner.

EXTENSION SHEET · STRETCH ANSWERS

S1: 80%

S2: 62.5%

S3: 0.75

S4: 0.5

