

Testing chance with dice and spinners

CURRICULUM ALIGNMENT

DAT.CHN.3 describe and test predictability and (un)certainty in events.

INTERACTIVES [Dice Roller · display, explore](#) [Probability Spinner · explore](#)

WHAT THIS LESSON TEACHES

One roll of a die or one spin of a spinner has a result that cannot be known in advance. On a fair die or spinner, each outcome comes up about the same after many trials.

→ Rolling the die once and getting a 4.

→ After 4 fair spins red and blue show about the same count.

MODEL THIS ON THE BOARD

TESTING ONE ROLL IN A GAME

- 1 Take the fair die for the board game.
- 2 Roll it just one time on the table.
- 3 Note the face that lands up, such as 4.
- 4 Nobody could know that 4 would show before the roll.

LESSON ARC

Roll a single die on the dice-roller interactive so pupils feel that one roll can't be called, then run the many-rolls version and watch the bar chart even out. The lesson pivots on 'one trial is chance, many trials show a pattern'. Pupils predict-and-tally twelve rolls in their copy, then test the same idea on the fair spinner. The wrap separates 'unlucky' from 'impossible' and bridges to next lesson's survey investigation.

TEACHING MOVES

1. **Getting Started.** Take exactly three hands-up guesses for which number wins — no open call-outs — and write them on the board without confirming any. Leave it open; the whole lesson exists to test these. Note quietly which pupil says 'they'll all be about the same'.
2. **Watch and Notice.** Roll the single die on the interactive first and ask 'did anyone know it would land on that?' — hold out for 'no'. Then run the many-rolls version, pause it partway, and point at the lumpy bars: 'one number's ahead now — watch what happens as we keep rolling.' Let the bars even out before you say a word.
3. **Try It Together.** Take a whole-class show-of-hands prediction for each number before any rolling. One pupil rolls twelve times at the board, another tallies on the IWB, the rest call the running count. When the prediction 'loses', revoice it as expected: 'twelve rolls isn't many — anything can win. We'd need far more rolls to see the even pattern.'
4. **Write Your Prediction in Your Copy.** Glance round to check every pupil has a prediction written down BEFORE the rolling starts, and a tidy tally growing beside it. This is copybook practice, not assessment — don't mark, just keep the prediction locked in so the comparison at the end is honest.
5. **Class Challenge.** Take a quick red-or-blue prediction, then keep the spinning brisk — pupils take turns spinning at the board and the class confirms each count. Don't re-explain the pattern each time; let the

two bars settle close together. Save your breath for the final question: if a colour didn't show, was it impossible or just unlucky?

6. **What Did We Notice?** Ask directly: 'if red never came up in ten spins, does that prove red is impossible?' Listen for pupils separating 'impossible' (not on the spinner at all) from 'unlucky' (still there, just didn't turn up). Revoice a strong answer and ask what more spins would show.

COMMON MISCONCEPTIONS

⚠ A pupil argues a number is 'due' — 'it hasn't come up yet, so it has to be next.'

Stop and stress that the die has no memory: every roll starts fresh with the same chance for each number. Point back at the many-rolls chart — the evening-out comes from lots of independent rolls, not from any number 'owing' a turn.

⚠ After twelve rolls a different number wins, and a pupil concludes 'our prediction was wrong' or 'the die isn't fair.'

Revoice that twelve rolls is a small test where any number can win — that doesn't break the prediction. Contrast the lumpy twelve-roll tally on the IWB with the smooth many-rolls bar chart from Watch and Notice: same die, more rolls, clearer pattern.

⚠ A pupil says a colour that never appeared in ten spins is 'impossible.'

Ask: 'is red still painted on the spinner?' It is — so it's unlucky, not impossible. Spin a few more times there and then; when it turns up, the point makes itself.

DIFFERENTIATION

EMERGING

- Let these pupils be the ones calling the running tally count aloud during the twelve rolls — they stay in the pattern without having to predict abstractly first.
- In the copy, offer a ready-drawn tally frame with the six numbers labelled so they only add marks, not build the chart.

DEVELOPING

- After the twelve rolls, ask them to predict what the tally would look like if we rolled sixty times instead — would it get more even or less?
- On the spinner round, ask them to justify their red-or-blue guess in one sentence before spinning: why that colour?

PROFICIENT

- Pose: 'design an unfair spinner where blue wins most — how would you colour it, and what would the bar chart look like?' Have them sketch it in the copy and explain their reasoning to the class.

➤ **Cross-curricular:** Tie to PE — before a match, discuss why teams toss a coin to pick sides: one toss is chance, and that's exactly what makes it fair.

ANSWER KEY

Scaffold: visual check on the page

Q1: No

Q2: No

a) Never : A single trial result cannot be known in advance.

b) Always : Fair means equal chance so the counts end up roughly equal.

c) Never : The outcome of one spin cannot be known in advance.

d) Always : That is what fair means for a die over many trials.

EXTENSION SHEET · STRETCH ANSWERS

Investigation: Dice or spinner — which is fairer? — open-ended; scan pupils' working for valid solution paths rather than a single answer.