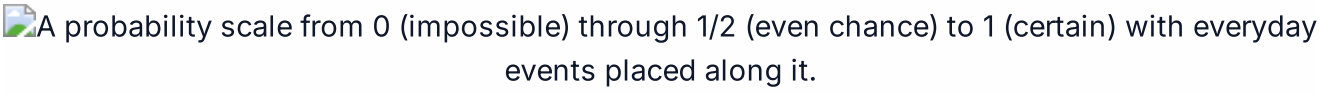
LESSON PLAN

Probability: The 0–1 Scale, Experiments & Simulations

Explicit teaching — I Do (~15 min)

1. The 0–1 chance scale WA6MPSP1



Every chance event sits somewhere from 0 to 1.

Draw a line from 0 (impossible) to 1 (certain), with $1/2$ (even chance) in the middle. Place everyday events: "the sun will rise tomorrow" (≈ 1), "I roll a 7 on a normal die" (0), "a coin lands heads" ($1/2$), "it rains today" (somewhere between). Connect to fractions and decimals from Lesson 1.

2. Expected vs observed WA6MPSP2

> **Worked example.** For a coin, the *expected* fraction of heads is $1/2$. Running 10 flips, the *observed* result might be 6 heads (0.6). Key idea: as the number of trials grows, the observed frequency tends to get closer to the expected.

Demonstrate setting up a tally for a simulation.

Guided practice — We Do (~20 min)

1. **Order the events.** As a class, place a set of event cards on the 0–1 scale and justify positions using fractions.
2. **Predict then test.** Predict the expected fraction for a die showing an even number ($1/2$). In pairs, roll 20 times and tally.
3. **Pool the data.** Combine all pairs' results into a class total (hundreds of trials) and compare the class observed fraction to $1/2$ — discuss why the larger sample is closer.
4. **Unequal spinner.** Examine a spinner with unequal sectors; reason about which outcome is more likely and where it sits on the scale.

Independent practice — You Do (~15 min)

Worksheet/task:

- place given events on a 0–1 scale and assign a fraction/decimal to each;

- run a chance experiment (coin, die or spinner), tally results, and record the observed fraction;
- compare observed with expected and write a sentence about variation;
- predict what would happen with many more trials.

> **Exit ticket.** A coin was flipped 100 times and showed 53 heads. Is the coin likely fair? Explain.

Teacher notes

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Curriculum links: WA6MPSP1, WA6MPSP2.

Materials: coins, dice, spinners (equal and unequal sectors), tally sheets, a digital random simulator (links to the digital tools in the outcome).

Common misconceptions

- "Gambler's fallacy" — thinking a run of heads makes tails "due".
- Expecting observed results to match expected *exactly*, especially in small samples.
- Placing events on the scale by gut feeling without reasoning about outcomes.

Assessment for learning: the class-pooled data discussion shows whether students grasp that more trials → closer to expected.

Approaches

DIGITAL · TECHNOLOGY-ENHANCED SIMULATION APPROACH

Technology-enhanced simulation approach

Use technology to run large numbers of trials that hand-rolling cannot reach.

Scale up digitally. After a short physical experiment, switch to a digital simulator (spreadsheet `RAND`, an online dice roller, or a coin-flip applet) to run 1,000+ trials instantly.

Graph the convergence. Have students graph observed frequency as trials increase and watch the line settle toward the expected value — a powerful visual of the law of large numbers at a Year 6 level.

Change the model. Let students set up a weighted die or an unequal spinner, predict the long-run frequency, then test how it shifts.

Connect explicitly to the curriculum's "use of digital tools" in WA6MPSP2.

Hands-On: The Probability Lab

This approach turns the classroom into an experiment station where students generate real data with physical equipment and compare it to theory. It suits learners who understand best by doing and observing.

Coin and dice stations. Pairs toss a coin 20 times and roll a die 30 times, tallying results. They write the experimental fraction (e.g. heads out of 20) and compare it to the theoretical $\frac{1}{2}$ or $\frac{1}{6}$.

Marble bag. Fill an opaque bag with known numbers of coloured counters. Students predict $P(\text{red})$, then draw-with-replacement 20 times to test the prediction, discussing why results vary.

Make-a-spinner. Using card and a split pin, students build a spinner to match a target probability (e.g. $P(\text{red}) = \frac{1}{3}$), then spin it many times to check it behaves as designed.

Class pooling. Combine every pair's results into one big class total. Students see the experimental fraction move closer to the theoretical value as the number of trials grows.

Why it works. Handling the equipment makes randomness real. Pooling results to watch the experimental probability settle towards the theory gives students a concrete reason to trust the 0-to-1 scale.