

Probability — Experiment & Simulation Worksheet

Part A — The 0–1 scale, experiments & simulations

Every chance event sits somewhere on a scale from 0 (impossible) to 1 (certain), with $1/2$ an even chance. As we repeat an experiment more times, the **observed** fraction of an outcome tends to get closer to the **expected** fraction.



A probability scale from 0 (impossible) through $1/2$ (even chance) to 1 (certain) with everyday events placed along it.

The probability scale with everyday events.

Worked example. A coin landing heads has an *expected* probability of $1/2$ (0.5). In 10 flips you might get 6 heads (observed 0.6) — that variation is normal in a small sample and shrinks with more trials.

Place events on the 0–1 scale

Q1. Mark each event on a 0–1 line and give a fraction or decimal: (a) a coin lands tails (b) rolling a number ≤ 6 on a normal die (c) rolling a 7 on a normal die (d) the day after Monday is Tuesday.

Q2. Match the word to a value: *impossible, even chance, certain* $\rightarrow 0, 1/2, 1$.

Run a chance experiment

Q3. Flip a coin 20 times. Tally heads and tails. Write the **observed** fraction of heads. What was the **expected** fraction?

Outcome	Tally	Count	Fraction
Heads			
Tails			

Q4. Pool the whole class's results (hundreds of flips). Is the class fraction of heads **closer to $\frac{1}{2}$** than your 20 flips were? Why do you think that is?

Predict & reason

Q5. A spinner has 3 red and 1 blue equal sectors. What fraction of spins should land red? Where does "red" sit on the 0–1 scale?

Q6. A coin shows 53 heads in 100 flips. Is it likely a fair coin? Explain using the idea of variation.
