


# 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  $\leq 6$  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.