

Probability

How **likely** something is to happen.

Many events can't be predicted with total certainty. The best we can say is how **likely** they are to happen, using the idea of probability.

Tossing a Coin



When a coin is tossed, there are two possible outcomes:

- heads (H) or
- tails (T)

We say that the probability of the coin landing **H** is $\frac{1}{2}$

And the probability of the coin landing **T** is $\frac{1}{2}$

Throwing Dice

When a single die is thrown, there are six possible outcomes: **1, 2, 3, 4, 5, 6**.

The probability of any one of them is $\frac{1}{6}$

Probability

In general:

$$\text{Probability of an event happening} = \frac{\text{Number of ways it can happen}}{\text{Total number of outcomes}}$$

Example: the chances of rolling a "4" with a die

Number of ways it can happen: 1 (there is only 1 face with a "4" on it)

Total number of outcomes: 6 (there are 6 faces altogether)

So the probability = $1/6$

Example: there are 5 marbles in a bag: 4 are blue, and 1 is red.
What is the probability that a blue marble gets picked?

Number of ways it can happen: 4 (there are 4 blues)

Total number of outcomes: 5 (there are 5 marbles in total)

So the probability = $4/5 = 0.8$

Probability Line

We can show probability on a [Probability Line](#):



Probability is always between 0 and 1