

Year 7 - Unit 15: Probability

Learning Journey:

Prior Learning

- Read and interpret fractions, decimals and percentages.
- Organise information using tables and Venn diagrams.

Next Steps

- Solve probability problems involving tree diagrams and Venn diagrams.
- Apply probability reasoning to GCSE multi-step and conditional probability questions.



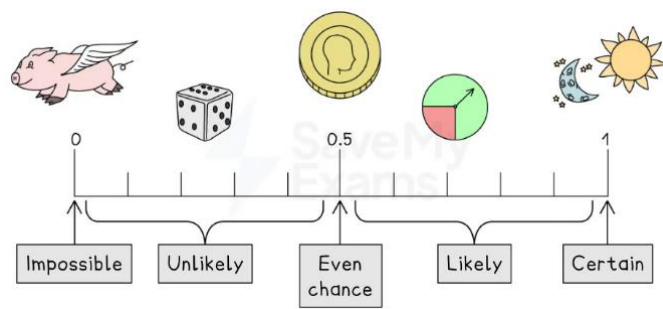
By the end of this unit, you should be able to:

- Calculate and interpret probabilities using the probability scale, sample space diagrams and simple events.
- Identify mutually exclusive events and use probability rules to solve problems.

Keywords:

- Probability** – The chance of an event happening.
- Outcome** – A possible result of an experiment.
- Event** – One or more outcomes of an experiment.
- Mutually exclusive** – Events that cannot happen at the same time.
- Sample space** – All possible outcomes of an experiment.
- Probability scale** – A scale from 0 (impossible) to 1 (certain).

Intro to Probability



- If all outcomes are **equally likely** then the probability for each outcome is the same
 - The probability for each outcome is $\frac{1}{\text{Total number of outcomes}}$
 - If there are 50 marbles in a bag then the probability of selecting a specific one is $\frac{1}{50}$
- The **theoretical probability** of an event can be calculated by dividing the number of outcomes of that event by the total number of outcomes
 - $P(A) = \frac{\text{Total number of outcomes for the event}}{\text{Total number of outcomes}}$
 - This can be calculated without actually doing the experiment
- If there are 50 marbles in a bag and 20 are blue, then the probability of selecting a blue marble is $\frac{20}{50}$

Probability of mutually exclusive events

Mutually Exclusive: can't happen at the same time.

Examples:

- Turning left and turning right are Mutually Exclusive (you can't do both at the same time)
- Tossing a coin: Heads and Tails are Mutually Exclusive

What's **not** Mutually Exclusive:

- Turning left and scratching your head can happen at the same time

Example: A fair die is tossed. Find the probability of obtaining either 1 or 4;

Solution

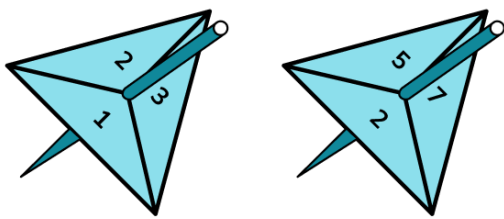
i) A dice cannot show both 1 or 4 at the same time so obtaining 1 and obtaining 4 from a die throw are mutually exclusive events. A dice roll has a $\frac{1}{6}$ chance of landing on each face.

$$= \frac{1}{6} + \frac{1}{6} = \frac{2}{6}$$

Sample Space Diagrams

To find a probability using a sample space diagram:

1. Use information provided to decide whether to write a list or create a table to find all possible outcomes.
2. Systematically write the list or fill in the table by either listing outcomes or performing operations with values.



The scores on the spinners are added together. Find the probability that the total score is a prime number.

+	2	5	7
1	3	6	8
2	4	7	9
3	5	8	10

$$P(\text{Total score is prime}) = \frac{3}{9} = \frac{1}{3}$$