



Essential Knowledge

- Write probabilities using fractions, percentages or decimals;
- Understand and use experimental and theoretical measures of probability, including relative frequency to include outcomes using dice, spinners, coins, etc;
- Estimate the number of times an event will occur, given the probability and the number of trials;
- Find the probability of successive events, such as several throws of a single dice;
- List all outcomes for single events, and combined events, systematically;
- Draw sample space diagrams and use them for adding simple probabilities;
- Know that the sum of the probabilities of all outcomes is 1;
- Use $1 - p$ as the probability of an event not occurring where p is the probability of the event occurring;
- Work out probabilities from Venn diagrams to represent real-life situations and also 'abstract' sets of numbers/values;
- Use union and intersection notation;
- Find a missing probability from a list or two-way table, including algebraic terms;
- Understand conditional probabilities and decide if two events are independent;
- Draw a probability tree diagram based on given information, and use this to find probability and expected number of outcomes;
- Understand selection with or without replacement;
- Calculate the probability of independent and dependent combined events;
- Use a two-way table to calculate conditional probability;
- Use a tree diagram to calculate conditional probability;
- Use a Venn diagram to calculate conditional probability;
- Compare experimental data and theoretical probabilities;
- Compare relative frequencies from samples of different sizes.

Teaching Points

- Encourage students to work 'across' the branches, working out the probability of each successive event.
- Students should know the probability of the combinations of outcomes should = 1.
- Emphasise that, were an experiment is repeated, it will usually lead to different outcomes, and that increasing sample size generally leads to better estimates of probability and population characteristics.
- Use problems involving ratio and percentage, similar to:
 - A bag contains balls in the ratio 2:3:4. A ball is taken at random. Work out the probability that the ball will be....
 - In a group of students 55% are boys, 65% prefer to watch film A, 10% are girls who prefer to watch film B. One student picked at random. Find the probability that this is a boy who prefers to watch film A (P6).

Assumed Prior Knowledge/ Links / Interleaving

- Students should understand that a probability is a number between 0 and 1, and distinguish between events which are impossible, unlikely, even chance, likely, and certain to occur.
- Students should be able to mark events and/or probabilities on a probability scale of 0 to 1.
- Students should know how to add and multiply fractions and decimals.

<ul style="list-style-type: none"> Students should have experience of expressing one number as a fraction of another number. 	
<p style="text-align: center;">Potential Barriers to Access /Misconceptions</p> <ul style="list-style-type: none"> Probability without replacement is best illustrated visually and by initially working out probability 'with' replacement. Not using fractions or decimals when working with probability trees. 	<p style="text-align: center;">Opportunities for Reasoning/Problem Solving/Proofs</p> <ul style="list-style-type: none"> Students should be given the opportunity to justify the probability of events happening or not happening in real-life and abstract contexts.
<p>Key Mathematical Vocabulary</p>	<p>Probability, mutually exclusive, conditional, tree diagrams, sample space, outcomes, theoretical, relative frequency, Venn diagram, fairness, experimental</p>