

YEAR 9, MASTERY, PROBABILITY, MATHS

Rationale and Context of Unit:	Core curriculum content:	Tier 2 & Tier 3 vocabulary explicitly taught:
<p>Prior key stage 3 content reviewed using pre-tests and whiteboard work at the start of each topic.</p> <p>UNDERSTANDING RISK 1</p> <p>Probability of a single event</p> <ul style="list-style-type: none"> • You will develop your understanding of probability and how it can be described, and outcomes • Know that probability is a way of measuring likeliness • Know and use the vocabulary of probability • Understand the use of the 0-1 scale to measure probability • Assess likeliness and place events on a probability scale • List all the outcomes for an event • Identify equally likely outcomes • Work out theoretical probabilities for events with equally likely outcomes • Know how to represent a probability • Recognise when it is not possible to work out a theoretical probability for an event 	<p>BASIC PROBABILITY</p> <ul style="list-style-type: none"> • Record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees • Apply the property that the probabilities of an exhaustive set of outcomes sum to one • Apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one • Construct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilities 	<p>Probability, outcome, experiment, frequency, frequency tree, exhaustive, mutually exclusive, theoretical, equally likely.</p> <p>Highlighted words MUST be explicitly taught, defined and recorded in student books as they are first met. Other listed words may be introduced verbally or written in a similar format.</p>



- Know that the sum of probabilities for all outcomes is 1
- Apply the fact that the sum of probabilities for all outcomes is 1

UNDERSTANDING RISK 2

Listing Outcomes

You will develop your understanding of probability by looking at combined events

- List all elements in a combination of sets using a Venn diagram
- List outcomes of an event systematically
- Use a table to list all outcomes of an event
- List outcomes of an event using a grid (two-way table)
- Use frequency trees to record outcomes of probability experiments
- Make conclusions about probabilities based on frequency trees
- Construct theoretical possibility spaces for combined experiments with equally likely outcomes
- Calculate probabilities using a possibility space

Theoretical and Experimental probability

You will use probability to make predictions

- Use theoretical probability to calculate expected outcomes
- Use experimental probability to calculate expected outcomes

Challenge and Support:

Probability

1. record describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees
2. apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments
3. relate relative expected frequencies to theoretical probability, using appropriate language and the 0 - 1 probability scale
4. apply the property that the probabilities of an exhaustive set of outcomes sum to one; apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one

World wide learning/ links to 21st century:

Software developers use probability when they build applications. Apps such as speech recognition, speech synthesis, key-word spotting and predictive text all rely on probability.



Cultural capital/ Industry/ Enrichment:

Search Algebra for all ages

NRICH website – access current articles and enrichment activities.

- NRICH provides thousands of free online mathematics resources for ages 3 to 18 - completely free and available to all via their website (nrich.maths.org/). These resources aim to:
 - Enrich and enhance the experience of the mathematics curriculum for all learners
 - Develop mathematical thinking and problem-solving skills

<p>5. <u>understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size</u></p> <p>6. enumerate sets and combinations of sets systematically, using tables, grids, Venn diagrams <u>and tree diagrams</u></p> <p>7. construct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilities</p> <p>8. <u>calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions</u></p> <p>9. calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams.</p>		<ul style="list-style-type: none"> ○ Offer challenging, inspiring and engaging activities ● Problem solving opportunities – Applied Mathematics. ● Challenge problems. ● Extension work. ● Assessment sections in texts
Historical, Social, Moral, Spiritual, Cultural context:	Cross curricular links/ literacy/numeracy:	Common misconceptions:
Mathematics is about patterns, and it tries to make sense of occurrences that at first seem to be random. Probability is the branch of Mathematics that tries to make sense of these events, and then predict what might happen	<ul style="list-style-type: none"> ● Probability gives rise to comparisons between theoretical and experimental outcomes. This naturally lends itself to 	<ul style="list-style-type: none"> ● When constructing a tree diagram for a given situation, some students may struggle to distinguish between how

next and how certain this is. This can underpin many areas of the real world including predicting outcomes on stock markets or during a pandemic.	<ul style="list-style-type: none">the experimental nature of the sciences.Probabilities are often expressed as decimals, percentages or fractions – whereby it's not always useful to simplify fractions to simplest form to make comparisons.	<ul style="list-style-type: none">events, and outcomes of those events, are representedSome students may muddle the conditions for adding and multiplying probabilitiesSome students may add the denominators when adding fractions
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Assessment timeline:

- Topic test assessments are conducted at the end of each topic. These are roughly after 2 weeks per topic, but this may vary.
 - Pre-checks are conducted at the start of the topic to test student prior knowledge. This informs lesson planning and delivery.
 - Tracking assessments are conducted once a term with end of year formal exams, for reporting and checking cumulative knowledge.
 - Testing data leads to discussions about setting, intervention groups and individual in-class intervention.
 - All students have access to a wide range of resources to develop their understanding.

Home learning

- Homework is set weekly for each group. This will often be via interactive websites with immediate feedback and support.
 - Teachers have the autonomy to use whichever resource they wish within the criteria set for the topic.
 - Students have access to lots of resources at home, including: Kerboodle, MyMaths, Mathswatch, PiXL Maths APP, PiXL Times Table App.

Feedback

- Feedback is given after each topic test, tracking assessment and end of year exams. After tracking and end of year exams, this will include “Formative Marking” sheets which give feedback question by question to help support the students with priorities for further work.

Length of unit (duration indicated in lessons)