**KEVICC Key Stage 4 Curriculum Subject:** Mathematics

**Summer Half-Term**

**Term:** Year 10 Summer Term – Block Five | **Topic: Probability – Tree and Venn Diagrams**

**What is the essential knowledge from this unit?**
**What do students need to remember and understand?**

| | **Specification content** | **Specification notes** |
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| P2 | Apply ideas of randomness, fairness, and equally likely events to calculate expected outcomes or multiple future experiments | |

Students should be able to:
- use lists or tables to find probabilities
- understand that experiments rarely give the same results when there is a random process involved
- appreciate the 'lack of memory' in a random situation, for example a fair coin is still equally likely to give heads or tails even after five heads in a row.

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| P3 | Relate relative expected frequencies to theoretical probability, using appropriate language and the 0 – 1 probability scale |

Students should be able to:
- understand and use the term relative frequency
- consider differences where they exist between the theoretical probability of an outcome and its relative frequency in a practical situation
- recall that an ordinary fair dice is an unbiased dice numbered 1, 2, 3, 4, 5 and 6 with equally likely outcomes
- estimate probabilities by considering relative frequency.

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| P5 | Understand that empirical unbiased samples tend towards theoretical probability distributions with increasing sample size |

Students should be able to:
- understand that experiments rarely give the same results when there is a random process involved
- appreciate the 'lack of memory' in a random situation, for example a fair coin is still equally likely to give heads or tails even after five heads in a row
- understand that the greater the number of trials in an experiment, the more reliable the results are likely to be

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| P6 | Enumerate sets and combinations of sets systematically using tables, grids, Venn diagrams and tree diagrams |

Students should be able to:
- complete tables and/or grids to show outcomes and probabilities
- complete a tree diagram to show outcomes and probabilities
- understand that P(A) means the probability of event A
- understand that P(A′) means the probability of event **not** A
- understand that P(A ∪ B) means the probability of event A or B or both
- understand that P(A ∩ B) means the probability of event A and B
- understand a Venn diagram consisting of a universal set and at most two sets, which may or may not intersect
- shade areas on a Venn diagram involving at most two sets, which may or may not intersect
- solve problems given a Venn diagram
- solve problems, where a Venn diagram approach is a suitable strategy to use but a diagram is not given in the question.

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| P8 | Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions | know when to add and when to multiply two or more probabilities |

Students should be able to:
- determine when it is appropriate to add probabilities
- determine when it is appropriate to multiply probabilities
- understand the meaning of independence for events
- calculate probabilities when events are dependent
- understand the implications of with or without replacement problems for the probabilities obtained
- complete a tree diagram to show outcomes and probabilities
- use a tree diagram as a method for calculating probabilities for independent or dependent events.

**Key Vocabulary and notation.**

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| Numerator | Two-way tables |
| Denominator | Venn diagram |
| Exact value | Frequency trees |
| Lowest common multiple | Universal set |
| Simplest form | Sample space |
| Equally likely | Systematic |
| Outcome | Array |
| Event | Independent events |
| Complement | Product |
| Venn diagram | Outcomes |
| Intersect | At least one |
| Union | Dependent events |
| Relative frequency | Tree diagram |
| Estimate | Conditional probability |
| Expectation | Given |
| Expected value | Show |
| Sample | Set |
| Probability | Union |
| Chance | Region |
| Equally likely | And / Or |
| Unbiased | |
| Possibilities | |

Mathematical questioning should be designed to unpick the structure of the maths and deepen the student's understanding. When students talk about mathematical concepts, they should develop the vital mathematical language that helps them explain their ideas fully.

Students are expected and encouraged to use terminology during all discussions, verbal feedback and in written content.

| **What prior learning supports understanding of this content?** | **How does this content link to future learning?** |
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| • Record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees.<br>• Apply the property that the probabilities of an exhaustive set of outcomes sum to one.<br>• Apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one.<br>• Construct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilities. | • Consolidate understanding of probability experiments using tables, frequency trees and Venn diagrams from key stage 4.<br>• Consolidate calculating the probability of independent and dependent combined events using a variety of representations from key stage 4.<br>• Revise and explore subject content through examination questions and in context. |
| **Reading**: *Where in the unit are students supported to read complex academic text?*<br>• Reading and understanding mathematical questions and problems' – teacher input.<br>• Decoding complex examination questions - explain what they are asking the student to do' – teacher input.<br>• Following instructions to solve problems - break down the tasks – teacher input.<br>• Recognising terminology, numbers, and symbols. | **Writing:** *Independent writing tasks and how they are structured*<br>• Using the correct subject specific terminology for numbers and symbols – examination papers, class books.<br>• Responding to questions that ask for an explanation or a reason – examination papers, class books.<br>• Self-evaluation, reviewing, reflecting and analysis of own work – class books, personalised learning checklists and analysis.<br>• Creating notes that can be used later for revision purposes - class books, revision cards, mind maps etc. |
| **Key assessments:**<br>How will do students review the information learned?<br>End of block assessments.<br>AQA end of block assessments provide a quick progress check at the end of each block of learning to make sure students have understood the content being covered. These are available for both foundation and higher tiers.<br>End of term/year assessments and mock examinations.<br>End of term assessments assessing the students' progress towards targets and provide diagnostic information to modify future teaching.<br>End of year 9 and 10 examinations assessing the students' progress towards targets and provide diagnostic information to modify future teaching.<br>Two mock examinations seasons take place during year 11 using previous years AQA 8300 examination papers. Students to experience the full suite of papers at both Foundation and higher tiers using Non-calculator and Calculator requirements.<br>All examinations will explore the three examination papers at both foundation and higher tiers using non-calculator and calculator requirements.<br>How will feedback be seen?<br>Marked end of block, term assessments and mock examinations.<br>Personalised learning checklists for all assessments identifying strengths and areas of development.<br>Written teacher feedback and marking in compliance with faculty and College Marking Policies. Student responses to marking. Students self-mark using purple pen. Verbal feedback given every lesson from teacher and peers as appropriate. Teacher and student self-assessment of presentation of class books will be completed to ensure written work is of high standard and students are achieving their potential. | |