

Curriculum Plan

Department/subject: Mathematics - Year 12 Spring Term

Our Vision: **We take opportunities and aspire to excellence**

Our Intent:

- All students will experience a curriculum richness, breadth and depth
- The curriculum equips every student with the knowledge and skills for the future in our local area and beyond
- The curriculum builds on prior knowledge and creates a ‘web of knowledge’
- Gaps in knowledge and skills are identified and addressed quickly

Year	Spring 1	Spring 2
Knowledge to be taught	<p>Pure: The binomial Expansion – pascals triangle, factorial notation, the binomial expansion, solving binomial problems, binomial estimation Trigonometric ratios – the cosine rule, sine rule, area of triangles, solving triangle problems, graphs of cosine, sine and tangent, transforming trigonometric functions Trigonometric identities and equations – angles in all four quadrants, exact values of trig ratios, trig identities, simple trig equations, hard trig equations, equations and identities.</p> <p>Applied: Modelling in Mechanics – constructing a model, modelling assumptions, quantities and units, working with vectors Constant Acceleration - Displacement-time graphs, velocity time graphs, constant acceleration formulae. Vertical motion under gravity.</p>	<p>Pure: Vectors – vectors, representing vectors, magnitude and direction, position vectors, solving geometric problems, modelling with vectors Differentiation – gradients of curves, finding the derivative, differentiating x to the n, differentiating quadratics, differentiating function with two or more terms, gradients, tangents and normal, increasing and decreasing functions, second order derivatives, stationary points, sketching gradient functions, modelling with differentiation.</p> <p>Applied: Probability – calculating probabilities, venn diagrams, mutually exclusive and independent events, tree diagrams. Statistical Distributions – probability distributions, the binomial distribution, cumulative probabilities.</p>
Key Words	<p>Pure: The Binomial Expansion – pascals, adjacent, factorial, Trigonometric Ratios – sine, cosine, tangent, adjacent, opposite, hypotenuse, periodic, exact.</p>	<p>Pure: Vectors – segments, parallel, triangle law, magnitude, direction, scalar, column, i, j, position vector Differentiation – gradient, derivatives, first principles, limit, quadratic, tangent, normal, increasing, decreasing,</p>

	<p>Trigonometric Identities and Equations - Unit circle, CAST, quadrants, identities, principal value, inverse.</p> <p>Applied: Modelling in Mechanics – mechanics, particle, rod, lamina, uniform body, light object, inextensible string, smooth surface, rough surface, wire, smooth and light pulley, bead, peg, air resistance, gravity, centre of mass, SI Units, weight, normal reaction, friction, tension, compression, thrust, buoyancy, air resistance, vector, scalar, magnitude, Constant Acceleration – velocity, speed, distance, displacement, acceleration, gravity, force</p>	<p>maximum, minimum, local, stationary, rate of change.</p> <p>Applied: Probability – experiment, outcomes, event, sample space, equally likely, regions, union, intersection, universal set, complement, mutually exclusive, independent Statistical Distributions – random, sample space, discrete, trials, outcomes, fixed.</p>
<p>Links to prior knowledge</p>	<p>Pure: The Binomial Expansion – expanding triple brackets is expanded to any number of brackets. Trigonometric Ratios – sine rule, cosine rule, area of a non-right angle triangle, graphs of these functions are all recapped topics from GCSE. Trigonometric Identities and Equations – exact trig values is recap of GCSE. Builds upon trigonometric ratios chapter.</p> <p>Applied: Modelling in Mechanics – vectors links to GCSE. Constant Acceleration – Displacement-time graphs, velocity-time graphs both develop GCSE.</p>	<p>Pure: Vectors – development of GCSE vectors. Links to modelling in mechanics (Year 12 Spring 1). Differentiation – Gradient of curves (Autumn 1), turning points of graphs (Autumn 1), sketching functions (Autumn 1)</p> <p>Applied: Probability – calculating probabilities, venn diagrams, mutually exclusive and independent events, tree diagrams all recap of GCSE Statistical Distributions – binomial distribution (Year 12 Spring 1 Pure)</p>
<p>How knowledge is assessed</p>	<p>Knowledge is assessed through both a formative and a summative approach. Teachers will use some of the following:</p> <ul style="list-style-type: none"> ● Baseline assessments ● Quizzes ● Retrieval Starter questions 	<p>Knowledge is assessed through both a formative and a summative approach. Teachers will use some of the following:</p> <ul style="list-style-type: none"> ● Baseline assessments ● Quizzes ● Retrieval Starter questions

	<ul style="list-style-type: none"> • Teacher questioning throughout the lessons • Mini white boards • True or false activities • Student's discussion and presentations <p>At the end of teaching every topic students complete a fundamentals test that is either self, peer or teacher assesses. This highlights gaps in knowledge so that these can be recapped prior to their end of topic test.</p> <p>Teachers mark and feedback the challenge test which is recorded on SIMs. Students sit a mock exam which is teacher marked and feedback to students. This is based on all content covered so far.</p>	<ul style="list-style-type: none"> • Teacher questioning throughout the lessons • Mini white boards • True or false activities • Student's discussion and presentations <p>At the end of teaching every topic students complete a fundamentals test that is either self, peer or teacher assesses. This highlights gaps in knowledge so that these can be recapped prior to their end of topic test.</p> <p>Teachers mark and feedback the challenge test which is recorded on SIMs.</p>
How gaps will be addressed	<p>Staff analyse fundamentals test results and will provide in lesson intervention where necessary to develop students understanding of the key concepts.</p> <p>Staff highlight areas of concern and discuss focus points with students following their challenge tests.</p> <p>Staff provide re-tests for students that needed to do more work on a given topic.</p>	<p>Staff have students mock results which gives an indication of where students currently are and identifies students who will need more support and this support is provided in the form of intervention.</p> <p>Staff analyse fundamentals test results and will provide in lesson intervention where necessary to develop students understanding of the key concepts.</p> <p>Staff highlight areas of concern and discuss focus points with students following their challenge tests.</p> <p>Staff provide re-tests for students that needed to do more work on a given topic.</p>
Cultural capital lessons	<p>Problem solving will be embedded into lessons where students will learn to UNPACK problems pulling together different mathematical skills.</p>	<p>Problem solving will be embedded into lessons where students will learn to UNPACK problems pulling together different mathematical skills.</p>



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