

Curriculum Plan

Department/subject: Mathematics - Year 13 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: Differentiation – differentiating sin, cos, exponentials and logs, chain rule, product rule, quotient rule, differentiating trigonometric functions, parametric differentiation, using second derivatives, rates of change. Numerical Methods – locating roots, iteration, Newton-Raphson method, Applications to modelling.</p> <p>Applied: Projectiles – horizontal projection, horizontal and vertical components, projection at any angle, projectile motion formulae Application of forces – static particles, modelling with statics, friction and static particles, static rigid bodies, dynamics and inclined planes, connected particles</p>	<p>Pure: Integration - integrating standard functions, using trig identities, reverse chain rule, integration by substitution and parts, partial fractions, finding areas, trapezium rules, solving differential equations, modelling with differential equations Vectors – 3D coordinates, Vectors in 3D solving geometric problems, application to mechanics.</p> <p>Applied: Further kinematics – vectors in kinematics, vector methods with projectiles, variable acceleration in one dimension, differentiating vectors, integrating vectors Normal distribution recap - The normal Distribution - the normal distribution, finding probabilities for normal distributions, the inverse normal distribution function, the standard normal distribution, finding μ and σ, approximating a binomial distribution, hypothesis testing with the normal distribution.</p>
Key Words	Differentiation – first principles, exponentials, logarithms, chain, function, product, quotient, parameter, implicitly, concave, convex, inflection	Integration – constant, integration, partial fractions, bounded, boundary solution, particular solution Vectors –origin, Pythagoras, unit vector.

	<p>Numerical Methods – continuous, iterative, staircase, cobweb, converge, diverge.</p> <p>Applied: Projectiles – constant, projectile, angle, resolve, components, range, greatest height Application of forces – rigid, static, equilibrium, frictional force, stationary, resultant</p>	<p>Applied: Further kinematics – constant, variable. Normal distribution recap - discrete, continuous, bell-shaped curve, inverse, standardise.</p>
Links to prior knowledge	<p>Differentiation - trigonometry (Year 12 Spring 1, Year 13 Autumn 2), differentiation (Year 12 summer 1) Numerical Methods – iteration in GCSE.</p> <p>Applied: Projectiles – modelling in mechanics (Year 12 spring 1), constant acceleration (year 12 spring 1) Application of forces - modelling in mechanics (Year 12 spring 1), constant acceleration (year 12 spring 1), forces and motion (Year 12 summer 1), forces and friction (Year 13 (Autumn 2).</p>	<p>Integration – trigonometry (Year 12 Spring 1, Year 13 Autumn 2), integration (year 12 summer 1) Vectors – vectors (Year 12 spring 2).</p> <p>Applied: Further kinematics – modelling in mechanics (Year 12 spring 1), constant acceleration (year 12 spring 1), forces and motion (Year 12 summer 1), variable acceleration (year 12 Summer 2), projectiles (year 13 Spring 1), differentiation (Year 12 spring 2, Year 13 Spring 1), integration (Year 12 summer 1, Year 13 Spring 2) Normal distribution recap - – binomial distribution (year 12 summer 1), normal distribution (year 13 Autumn 1)</p>
How knowledge is assessed	<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 ● Teacher questioning throughout the lessons ● Mini white boards ● True or false activities ● Student’s discussion and presentations 	<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 ● 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>	<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> <p>Students sit a mock exam which the teacher marks and feeds back to students</p>
How gaps will be addressed	<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>	<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>Links to 'real life' maths will be made to give concept to mathematical skills. This is particularly clear in the applied mathematics involving statistics and mechanics.</p>	<p>Problem solving will be embedded into lessons where students will learn to UNPACK problems pulling together different mathematical skills.</p> <p>Links to 'real life' maths will be made to give concept to mathematical skills. This is particularly clear in the applied mathematics involving statistics and mechanics.</p>