

Curriculum Plan

Department/subject: Mathematics - Year 12 Further Summer 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	Summer 1	Summer 2
Knowledge to be taught	<p>Pure: Complex Numbers – exponential form of complex numbers, multiplying and dividing complex numbers, De Moivre's theorem, trigonometric identities, sums of series, nth roots of a complex number, solving geometric problems.</p> <p>Applied: Critical Path Analysis - modelling a project, dummy activities, early and late event times, critical activities, the float of an activity, Gantt charts, resource histograms, scheduling diagrams.</p>	<p>Pure: Series – the methods of differences, higher derivatives, Maclaurin series, series of expansions of compound functions Methods in Calculus – improper integrals, the mean value of a function, differentiating inverse trigonometric functions, integrating with inverse trigonometric functions, integrating using partial fractions.</p> <p>Applied: Transportation Problems – The north west corner method, unbalanced problems and degenerate solutions, finding an improved solution, the stepping stone method, linear programming. Allocation problems – the Hungarian algorithm, using a dummy, maximum profit allocation, managing incomplete data, linear programming</p>
Key Words	<p>Pure: Complex Numbers – exponential, modulus form, Euler's relation, de Moivre's theorem, basis, inductive, assumption, conclusion, sum, distinct, solutions, nth roots.</p>	<p>Pure: Series – general term, higher derivatives, Maclaurin series. Methods in Calculus – infinite, improper integrals, not defined, convergent, divergent, limits, average value, function, interval, improper fraction, partial fractions.</p>

	<p>Applied: Critical Path Analysis – maximum, minimum, dummies, flows.</p>	<p>Applied: Transportation Problems – capacity, supply, source, demand, unit cost, initial solution, north-west corner method, feasible, degenerate, shadow costs, improvement indices, stepping-stone method, optimal, objective function Allocation problems - tasks, relative, cost matrix, reduced, optimal, augmenting, dummy, minimise, maximise, coding, objective function.</p>
<p>Links to prior knowledge</p>	<p>Pure: Complex Numbers – Complex numbers and Argand Diagrams (Year 12 Autumn 1), binomial expansion (Year 12 Pure Spring 1)</p> <p>Applied: Critical Path Analysis - graphs and networks (Year 12 Autumn 1), algorithms on graphs (Year 12 Autumn 2)</p>	<p>Pure: Series – Equations and inequalities (Year 12 Pure Autumn 1), Trigonometric ratios (Year 12 Pure Spring 1), Series (Year 12 Autumn 1). Methods in Calculus – Algebraic Methods (Year 12 Pure Summer 2)</p> <p>Applied: Transportation Problems – linear programming (Year 12 spring 1) Allocation problems - linear programming (Year 12 spring 1)</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 ● 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</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 ● 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</p>

	<p>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>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 is teacher marked and feedback to students. This is based on all content covered so far.</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>Links to 'real life' maths will be made to give concept to mathematical skills. This is particularly clear in the applied mathematics involving Decision Maths where we are primarily looking at improving profit and loss, and how to move around a network in the most efficient manner.</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 Decision Maths where we are primarily looking at improving profit and loss, and how to move around a network in the most efficient manner.</p>