



THE BROMFORDS SCHOOL
ACHIEVE ENRICH PREPARE

The Bromfords School Maths Department. Intent of Curriculum



The intent of Mathematics to prepare the students for life after Bromfords. In doing so, students will develop numeracy and problem-solving skills. Students will learn to communicate mathematically with confidence and to apply what they have learnt to real life situations.

Achieve:

Students will develop conceptual and procedural knowledge through the application of mathematical processes, solving specific problems and investigating mathematical ideas. Students will be given the opportunity to engage in a variety of projects designed to mirror the real world. As students' progress they will develop an understanding and comprehension of mathematical operations, and relations - know what mathematical symbols, diagrams, and procedures mean.

They will further develop their computation skills through carrying out mathematical operations, such as adding, subtracting, multiplying, and dividing numbers flexibly, accurately, efficiently, and appropriately.

Enrich:

Students will leave school having developed an appreciation of how mathematics has shaped the world. They will be equipped to manage and deal with real life scenarios and the ability to apply independent thinking. They will be able to formulate problems using mathematical models and devise strategies for solving them using concepts and procedures appropriately. They will be able to use mathematical reasoning and demonstrate logic to explain and justify a solution.

Prepare:

Studying mathematics will ensure our students develop a good number sense and be able to apply the essential skills required for everyday life, such as money management, an appreciation of inflation verses deflation and mathematical modelling of the real world. Through the curriculum students will be made aware of the role mathematics plays within various professions and the different strands of mathematics. Our students will foster an enthusiasm for Mathematics by being positive role models and promoting a love of the subject.

Department: Mathematics		Curriculum Map What does Mathematics at Bromfords look like?				
Entry KS2	Year 7	Year 8	Year 9	Year 10	Year 11	Post-16
<u>Knowledge:</u> <ul style="list-style-type: none"> • Times tables • Written and mental calculations • Introduce to geometry • Time • Introduction to fractions, decimals and percentages <u>Skills:</u> Fluent in the fundamentals of mathematics. Developing reasoning skills and begin to understand mathematical relationships.	<u>Knowledge:</u> <u>Achieve:</u> <ul style="list-style-type: none"> • Number system – finding HCF and LCM. • Calculating with direct numbers involving decimals, powers and roots. • Approximating with significant figures • Visualising and constructing using a protractor and compass. • Investigating properties of shapes. • Algebraic proficient: tinkering – substitute values and simplify simple expressions • Exploring fractions, decimals and percentages • Proportional reasoning • Pattern sniffing – finding the term-to-term rule of linear and non-linear sequences • Measuring space – using angle facts • Solving simple equations 	<u>Knowledge:</u> <u>Achieve:</u> <ul style="list-style-type: none"> • Numbers and the number system including prime factorisation • Calculating – rounding values to an appropriate degree of accuracy • Understand risk 1 • Visualising and constructing – constructing triangles • Algebraic proficiency: tinkering – simplifying algebraic expressions • Exploring fractions, decimals and percentages • Proportional reasoning in real life contexts • Pattern sniffing – finding the nth term of linear sequences • Investigating angles in parallel lines 	<u>Knowledge:</u> <u>Achieve:</u> <ul style="list-style-type: none"> • Calculating with indices, roots, standard form and identify bounds • Algebraic proficiency: tinkering • Visualising and constructing • Pattern sniffing with Fibonacci and quadratic sequences • Solving equations and inequalities • Calculating space including surface area of prisms and cylinders • Conjecturing – congruency criteria for triangles • Algebraic proficiency visualising • Understanding risk – tree diagrams • Presentation of data in scatter diagrams and stem and leaf <u>Enrich:</u> <ul style="list-style-type: none"> • Numbers and the number system including prime factorisation • Calculating – rounding values to an appropriate degree of accuracy • Understand risk 1 • Visualising and constructing – constructing triangles • Algebraic proficiency: tinkering – simplifying algebraic expressions 	<u>Knowledge:</u> <u>Achieve:</u> <ul style="list-style-type: none"> • Trigonometry • Calculating • Solving equations and inequalities 1 • Transformation • Algebraic proficiency • Proportion • Solving equations and inequalities 2 • Calculating space • Conjecturing • Algebraic proficiency: visualising • Fractions, decimals and percentages • Solving equations and inequalities 3 • Understanding risk • Analysing statistics • Algebraic proficiency: visualising 2 • Mathematical movement <u>Enrich:</u> <ul style="list-style-type: none"> • Calculating • Constructing and visualising • Algebraic Proficiency 	<u>Knowledge:</u> <u>Achieve:</u> <ul style="list-style-type: none"> • Circles • Algebraic fraction • Functions and proofs • Proportion involving direct and inverse • Advanced trigonometry • Graph function <u>Enrich:</u> <ul style="list-style-type: none"> • Vectors, similarity and congruency • Plans and constructions • Quadratic equations • Area and volume involving complex 2D and 3D shapes • Fractions, indices and standard form • Non-linear graphs <u>Skills:</u> To be able to select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems; and to interpret their solution in the context of the given problem. To assess the validity of an argument and the accuracy of a given way of presenting.	<u>Knowledge:</u> <u>Achieve:</u> <u>Pure Maths</u> <ul style="list-style-type: none"> • Proof • Algebra and functions • Coordinate geometry in the (x, y) plane • Sequences and series • Trigonometry • Exponentials and logarithms • Differentiation • Integration • Numerical methods • Vectors <u>Statistics</u> <ul style="list-style-type: none"> • Statistical sampling • Data presentation and interpretation • Probability • Statistical distributions • Statistical hypothesis testing <u>Mechanics</u> <ul style="list-style-type: none"> • Quantities and units in mechanics • Kinematics • Forces and Newton's laws • Moments

	<ul style="list-style-type: none"> Calculating space – area of 2D shapes including circles Mathematical movement – translations and rotations. Measuring data – analysing and comparing data using averages <p><u>Enrich</u></p> <ul style="list-style-type: none"> Number system – direct numbers, factors, multiples and prime numbers Approximating – rounding to a given decimal place Calculating with four operations Visualising and constructing – draw angles using a protractor Investigating properties of shapes – identify key properties of 2D and 3D shapes Algebraic proficiency – tinkering – use vocabulary in algebra Proportional reasoning Exploring fractions, decimals and percentages Using formulae Pattern sniffing – finding next terms in a sequence Measuring space – area of triangles and parallelograms 	<ul style="list-style-type: none"> Calculating with fractions, decimals and percentages Solving equations and inequalities with unknown on one side Calculating space – area and circumference of a circle Algebraic proficiency: visualising – plotting linear and quadratic graphs Presentation of data in Venn diagrams, frequency tables and analyse data. <p><u>Enrich</u></p> <ul style="list-style-type: none"> Number system – finding HCF and LCM. Calculating with direct numbers involving decimals, powers and roots. Approximating with significant figures Visualising and constructing using a protractor and compass. Investigating properties of shapes. 	<ul style="list-style-type: none"> Exploring fractions, decimals and percentages Proportional reasoning in real life contexts Pattern sniffing – finding the nth term of linear sequences Investigating angles in parallel lines Calculating with fractions, decimals and percentages Solving equations and inequalities with unknown on one side Calculating space – area and circumference of a circle Algebraic proficiency: visualising – plotting linear and quadratic graphs Presentation of data in Venn diagrams, frequency tables and analyse data. <p><u>Skills:</u> To be able to develop their mathematical knowledge in part through solving problems and evaluating the outcomes, including multi-step problems.</p>	<ul style="list-style-type: none"> Proportional reasoning Pattern sniffing Solving equations and inequalities Calculating space Conjecturing Algebraic proficiency: visualising Solving equations and inequalities 2 Understanding risk Presentation of data <p><u>Skills:</u> Make and use connections between different parts of mathematics to solve problems. To select and use appropriate strategies to solve increasingly complex problems.</p>	<p>To use mathematical language and properties precisely.</p>	<p><u>Core Pure 1 and 2:</u></p> <ul style="list-style-type: none"> Proof Complex numbers Matrices Further Algebra and functions Further calculus Further vectors Polar coordinates Hyperbolic functions Differential equations <p><u>Decision 1:</u></p> <ul style="list-style-type: none"> Algorithms and graph theory Algorithms on graphs Algorithms on graphs II Critical path analysis Linear Programming. <p><u>Further mechanics 1:</u></p> <ul style="list-style-type: none"> Momentum and impulse Work and energy, Elastic strings and springs and elastic energy Elastic collisions in one dimension Elastic collisions in two dimensions (oblique impacts). <p><u>Skills:</u></p> <ul style="list-style-type: none"> Non-routine problem solving – developing expert thinking, metacognition and creativity. Systems thinking – developing decision making and reasoning.
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	<ul style="list-style-type: none"> • Calculating fractions, decimals and percentages • Investigating basic angle facts • Solving simple equations • Translate shapes on an axis • Presentation of data in pie charts, line graphs and frequency tables. <p><u>Skills:</u> Consolidate their numerical and mathematical capability from KS2 and extend their understanding of the number system and place value. Make connections between number relationships and their algebraic and graphical representation.</p>	<ul style="list-style-type: none"> • Algebraic proficiency: tinkering – substitute values and simplify simple expressions • Exploring fractions, decimals and percentages • Proportional reasoning • Pattern sniffing – finding the term-to-term rule of linear and non-linear sequences • Measuring space – using angle facts • Solving simple equations • Calculating space – area of 2D shapes including circles • Mathematical movement – translations and rotations • Measuring data – analysing and comparing data using averages <p><u>Skills:</u> To use language and properties precisely to analysis numbers, algebraic expressions, 2D and 3D Shapes, probability and statistics.</p>				<ul style="list-style-type: none"> • Critical thinking – analysing, synthesising, evaluation and reasoning skills. • Communication – Further develop the ability to construct an argument and communicate this through active listening, oral communication, written and non-verbal communication. • Adaptability – Developing the ability and willingness to cope with the uncertainty and unfamiliar scenarios and take appropriate action to derive a solution.
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**Enrichment,
Careers,
Real-world
Experience.**

Careers & Real-World: Mathematics develops students' confidence in identifying and solving problems and providing clear processes to support a statement. It allows students to interpret, evaluate and present data in a variety of ways. These transferrable skills support a variety of careers, including Medicine, engineering, astronomy, IT, game and film design, media and communication.

Year 7 Achieve – Intent:

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Scheme of work: Number system</p> <p>Learning intent: To extend students' knowledge of prime numbers, factors and multiples. To introduce finding the HCF and LCM and using it to solve problems. To develop confidence in using scientific calculator for power and routes.</p>	<p>Scheme of work: Calculating Approximating and estimating Counting and comparing Visualising and constructing</p> <p>Learning intent: To extend students' knowledge of the four operations involving integers and decimals and apply these skills to BIDMAS. To introduce rounding to a given significant figure and use this to estimate calculations. To compare integers, decimals and fractions including using inequality notation. To develop the skills of using rulers, protractors and compasses to construct shapes and understand key line and angle notation using in geometrical diagrams.</p>	<p>Scheme of work: Investigating properties of shapes Algebraic proficiency: thinking Exploring fractions, decimals and percentages Proportional reasoning</p> <p>Learning intent: To derive the properties of 3D shapes and 2D shapes such as triangles and quadrilaterals and use these properties to identify the shapes. To understand key terminology and concepts in algebra including simplifying expressions and substitution. To be able to convert between fractions, decimals and percentages. To understand what ratio is, simplify a ratio and share into a quantity when given a ratio.</p>	<p>Scheme of work: Pattern sniffing Measuring space Investigating angles Calculating with fractions, decimals and percentages.</p> <p>Learning intent: To be able to identify sequences linear and non-linear and find the term-to-term rule. To extend students knowledge of concerting between units of measure and solve problems with it. To investigate and use angle facts of angles on a straight line, around a point and vertically opposite angles. To extend students knowledge of fractions and the four operations. To be able to calculate percentage change, increasing/decreasing an amount by a percentage with and without a calculator.</p>	<p>Scheme of work: Solving equations and inequalities Calculating space</p> <p>Learning intent: To introduce students in solving equations algebraically involving multi-steps. To be able to derive, use and apply the area of 2D shapes such as triangles, parallelograms, trapeziums. To find the volume and surface area of cuboids.</p>	<p>Scheme of work: Mathematical movement Presentation of data Measuring data</p> <p>Learning intent: To solve geometrical problems on a coordinate axes and plot parallel lines to the y or x axis. To perform transformations such as rotations and translations. To represent data in pie charts, bar charts, frequency tables. To analyse data using averages.</p>
<i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i>	<i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i>	<i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i>	<i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i>	<i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i>	<i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i>

Year 7 Enrich – Intent:

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Scheme of work: Number system</p> <p>Learning intent: To extend students' knowledge of place value system. To apply the four operations to direct numbers. To identify multiples, factors and prime numbers and the connection between them.</p> <p>.</p>	<p>Scheme of work: Checking, approximating and estimating Calculating Calculating – division Visualising and constructing</p> <p>Learning intent: To round values to the nearest integer, 10, 100 or 1000 and to decimal places and to use this to approximate answers. To extend students' knowledge on the four operations and apply it to BIDMAS. To use bus stop method and long division to complete a division calculation and interpret them within context. To develop the skill of using a protractor to draw angles and 2D shapes. To identify 3D shapes and draw their nets.</p>	<p>Scheme of work: Investigating properties of shapes Algebraic proficiency: thinking Exploring fractions, decimals and percentages</p> <p>Learning intent: To derive the properties of 3D shapes and 2D shapes such as triangles and quadrilaterals and use these properties to identify the shapes. To understand key terminology and concepts in algebra including simplifying expressions and substitution. To be able to convert between fractions, decimals and percentages. To understand what ratio is, simplify a ratio and share into a quantity when given a ratio.</p>	<p>Scheme of work: Exploring fractions, decimals and percentages. Algebraic proficiency – using formulae</p> <p>Learning intent: To recognise 2D shapes and their properties including lines of symmetry and know if it is regular or irregular polygon. To introduce key terminology within a circle; circumference, radius, centre and diameter. To use the properties of triangles and quadrilaterals and calculate missing angles in these. To use factors and multiples to simplify fractions and compare them. To begin using simple formulae expressed in words and symbols.</p>	<p>Scheme of work: Proportional reasoning Pattern sniffing Measuring space Investigating angle facts Calculating fractions, decimals and percentages</p> <p>Learning intent: To introduce proportion and using in scale models, similar shapes, unequal sharing. To generate and describe linear sequences. To convert between metric standard units. To be able to derive angle facts such as angles at a point, on a straight line and vertically opposite angles and use this to find missing angles in geometrical diagrams. To review adding and subtracting mixed numbers, multiplying and dividing proper fractions. To calculate percentages of an amount. To multiply and divide decimals by an integer.</p>	<p>Scheme of work: Solving equations and inequalities Calculating space Mathematical movement Presentation of data</p> <p>Learning intent: To form a simple equation and solve these. To derive area of parallelograms and triangles and volume of cubes and cuboids. To read, plot co-ordinates in four-quadrant axis. To translate and reflect shapes on axes. To interpret and construct data in pie charts, line graphs.</p>
<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>

Year 8 Achieve – Intent:

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Scheme of work: Numbers and the number system Calculating</p> <p>Learning intent: To extend students knowledge of prime numbers, factors and multiples by using prime factorisation to find the HCF and LCM. To round any given value to an appropriate degree of accuracy. To introduce standard form and write large and small numbers in it. To extend students concept of direct numbers and four operations and challenge to include decimals, squared, cube and roots of direct numbers. To confidently use a scientific calculator with direct numbers.</p>	<p>Scheme of work: Visualising and constructing Understanding risk 1 Algebraic proficiency: tinkering</p> <p>Learning intent: To perform an enlargement transformation with a positive scale factor and use scale factors in scale drawings. To use and interpret bearings. To know and use probability scales, explore events and outcomes and calculate the probability of even happening. To simplify algebraic expressions by factorising, using the law of indices.</p>	<p>Scheme of work: Exploring fractions, decimals and percentages Proportional reasoning Pattern sniffing</p> <p>Learning intent: To identify the difference between terminating and recurring decimals. To expression a terminating decimal as a fraction and percentage. To apply ratio to real life contexts and to express proportional relationships. To explore linear sequences and find the nth term of a linear sequence.</p>	<p>Scheme of work: Investigating angles Calculating fractions, decimals and percentages Solving equations and inequalities</p> <p>Learning intent: To be introduced to angles in parallel lines and solve angle problems in geometric diagrams. To calculate the interior and exterior angles in polygons. To extend students' knowledge of percentage change when greater than 100%. To solve problems involving reverse percentages and simple interest. To solve linear equations with unknown on both sides and solve equations graphically.</p>	<p>Scheme of work: Calculating space Algebraic proficiency: visualising</p> <p>Learning intent: To be calculate the perimeter and area of a circle. To find the volume of 3D shapes including prisms and cylinders. To plot linear functions on a four-quadrant axis and interpret these. To plot quadratic functions. To plot and interpret distance-time graphs.</p>	<p>Scheme of work: Understanding risk 2 Presentation of data Measuring data</p> <p>Learning intent: To be able to record all possible outcomes of events in sample space diagrams, frequency trees, Venn diagrams and make predications. To represent and interpret grouped data and scatter diagrams. To find the averages and range from grouped frequency tables and analyse it.</p>
<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>

Year 8 Enrich – Intent:

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Scheme of work: Number system</p> <p>Learning intent: To extend students' knowledge of prime numbers, factors and multiples. To introduce finding the HCF and LCM and using it to solve problems. To develop confidence in using scientific calculator for power and routes.</p>	<p>Scheme of work: Calculating Approximating and estimating Counting and comparing Visualising and constructing</p> <p>Learning intent: To extend students' knowledge of the four operations involving integers and decimals and apply these skills to BIDMAS. To introduce rounding to a given significant figure and use this to estimate calculations. To compare integers, decimals and fractions including using inequality notation. To develop the skills of using rulers, protractors and compasses to construct shapes and understand key line and angle notation using in geometrical diagrams.</p>	<p>Scheme of work: Investigating properties of shapes Algebraic proficiency: thinking Exploring fractions, decimals and percentages Proportional reasoning</p> <p>Learning intent: To derive the properties of 3D shapes and 2D shapes such as triangles and quadrilaterals and use these properties to identify the shapes. To understand key terminology and concepts in algebra including simplifying expressions and substitution. To be able to convert between fractions, decimals and percentages. To understand what ratio is, simplify a ratio and share into a quantity when given a ratio.</p>	<p>Scheme of work: Pattern sniffing Measuring space Investigating angles Calculating with fractions, decimals and percentages.</p> <p>Learning intent: To be able to identify sequences linear and non-linear and find the term-to-term rule. To extend students' knowledge of concerting between units of measure and solve problems with it. To investigate and use angle facts of angles on a straight line, around a point and vertically opposite angles. To extend students' knowledge of fractions and the four operations. To be able to calculate percentage change, increasing/decreasing an amount by a percentage with and without a calculator.</p>	<p>Scheme of work: Solving equations and inequalities Calculating space</p> <p>Learning intent: To introduce students in solving equations algebraically involving multi-steps. To be able to derive, use and apply the area of 2D shapes such as triangles, parallelograms, trapeziums. To find the volume and surface area of cuboids.</p>	<p>Scheme of work: Mathematical movement Presentation of data Measuring data</p> <p>Learning intent: To solve geometrical problems on a coordinate axes and plot parallel lines to the y or x axis. To perform transformations such as rotations and translations. To represent data in pie charts, bar charts, frequency tables. To analyse data using averages.</p>
<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>

Year 9 Achieve – Intent:

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Scheme of work: Calculating Visualising and constructing Algebraic proficiency: tinkering</p> <p>Learning intent: To calculate with roots and integer indices. To calculate with standard form. To apply and interpret limits of accuracy. To extend students use of compass and protractor to construct bisectors and solve loci problems. To construct plans and elevations of 3D shapes. To develop students' vocabulary within algebra. To factorise and expand quadratics. To construct algebraic statements and formulae.</p>	<p>Scheme of work: Proportional reasoning Pattern sniffing Solving equations and inequalities 1</p> <p>Learning intent: To be introduced to direct and inverse proportion graphically and through algebraic representations. Solve problems involving congruence and simple similar shapes. To extend students knowledge of sequences by recognising and use Fibonacci type sequences and quadratic sequences. To represent the solution to an inequality on a number and line and solve the algebraically.</p>	<p>Scheme of work: Calculating space Conjecturing Algebraic proficiency: visualising</p> <p>Learning intent: To calculate the area and perimeter of a sector. To extend students' knowledge of surface area by finding it of prisms and cylinders. To be introduced to Pythagoras Theorem and find lengths in right-angles triangles. To use congruence criteria for triangles. To find equations of the line through one or two points and identify parallel lines. To plot a range of non-linear graphs and recognise and interpret these.</p>	<p>Scheme of work: Solving equations and inequalities 2 Understanding risk</p> <p>Learning intent: To solve linear simultaneous equations graphically and algebraically. To understand and use tree diagrams to calculate probability.</p>	<p>Scheme of work: Presentation of data</p> <p>Learning intent: To construct and interpret time series graphs, stem and leaf diagrams. To interpret a scatter diagram via correlation and line of best fit.</p>	<p>Scheme of work: Exam revision</p> <p>Learning intent:</p>
<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>

Year 9 Enrich – Intent:

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Scheme of work: Numbers and the number system Calculating</p> <p>Learning intent: To extend students' knowledge of prime numbers, factors and multiples by using prime factorisation to find the HCF and LCM. To round any given value to an appropriate degree of accuracy. To introduce standard form and write large and small numbers in it. To extend students concept of direct numbers and four operations and challenge to include decimals, squared, cube and roots of direct numbers. To confidently use a scientific calculator with direct numbers.</p>	<p>Scheme of work: Visualising and constructing Understanding risk 1 Algebraic proficiency: tinkering</p> <p>Learning intent: To perform an enlargement transformation with a positive scale factor and use scale factors in scale drawings. To use and interpret bearings. To know and use probability scales, explore events and outcomes and calculate the probability of even happening. To simplify algebraic expressions by factorising, using the law of indices.</p>	<p>Scheme of work: Exploring fractions, decimals and percentages Proportional reasoning Pattern sniffing</p> <p>Learning intent: To identify the difference between terminating and recurring decimals. To expression a terminating decimal as a fraction and percentage. To apply ratio to real life contexts and to express proportional relationships. To explore linear sequences and find the nth term of a linear sequence.</p>	<p>Scheme of work: Investigating angles Calculating fractions, decimals and percentages Solving equations and inequalities</p> <p>Learning intent: To be introduced to angles in parallel lines and solve angle problems in geometric diagrams. To calculate the interior and exterior angles in polygons. To extend students' knowledge of percentage change when greater than 100%. To solve problems involving reverse percentages and simple interest. To solve linear equations with unknown on both sides and solve equations graphically.</p>	<p>Scheme of work: Calculating space Algebraic proficiency: visualising</p> <p>Learning intent: To be calculate the perimeter and area of a circle. To find the volume of 3D shapes including prisms and cylinders. To plot linear functions on a four-quadrant axis and interpret these. To plot quadratic functions. To plot and interpret distance-time graphs.</p>	<p>Scheme of work: Understanding risk 2 Presentation of data Measuring data</p> <p>Learning intent: To be able to record all possible outcomes of events in sample space diagrams, frequency trees, Venn diagrams and make predications. To represent and interpret grouped data and scatter diagrams. To find the averages and range from grouped frequency tables and analyse it.</p>
<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>	<p><i>Measuring Impact through: End of topic tests, homework which is retrieval based, recall and retrieval starters throughout the academic year and core assessments.</i></p>

Year 10 Higher – Intent: To further enhance and develop mathematical skills learnt at KS3. Students will build on their basic concepts and principles in number, algebra, geometry, proportion and statistics, helping them to secure an understanding of contextual problem-solving questions.

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Scheme of Work: Trigonometry Calculating Solving equations and inequalities</p> <p><u>Learning Intent:</u> To revise the areas and develop students' understanding of: Trigonometric ratios Bearings Exact trigonometric values Fractional and negative indices Surds Bounds Limits of accuracy Iteration Simultaneous equations</p>	<p>Scheme of Work: Transformations Algebraic proficiency Proportion</p> <p><u>Learning Intent:</u> To develop students understanding of: Congruence Similarity Scale factors Reflection Rotation Translation Enlargement Add and subtract algebraic fractions Multiply and divide algebraic fractions Quadratics and surds Direct and indirect proportion Graphically interpretation Compound measures</p>	<p>Scheme of Work: Solving equations and inequalities 2 Calculating space Conjecturing</p> <p><u>Learning Intent:</u> To revise areas and develop students understanding of: Set notation Solving inequalities of varying complexity Graphical representation of inequalities Surface area and volume of spheres, pyramids and cones Applying concept of Congruence and similarity Circle theorems and geometrical problems</p>	<p>Scheme of Work: Algebraic proficiency: visualising Fractions, decimals and percentages Solving equations and inequalities 3</p> <p><u>Learning Intent:</u> To revise the areas and develop students' understanding of: Plotting and interpreting graphs including non-standard graphs Gradients, area under a graph Roots and turning points Recurring decimals to fractions Compound interest Repeated percentage change Reverse percentages Exponential growth and decay Making links between a quadratic equation and a quadratic graph Solving quadratic equations by factorising and graphically</p>	<p>Scheme of Work: Understanding risk Analysing statistics Algebraic proficiency: visualising 2</p> <p><u>Learning Intent:</u> To revise and develop student's understanding of: Product rule for counting Theoretical and Conditional probability Two-way tables Venn diagrams Sampling and population size Grouped data-discrete and continuous Cumulative frequency graphs Box plots Capture-recapture Equation of Perpendicular lines Equation of a circle Equation of a tangent</p>	<p>Scheme of Work: Mathematical movement Exam revision</p> <p><u>Learning Intent:</u> To revise and develop student's understanding of: Vector notation and diagrammatical representation Vector addition and subtraction Vector multiplication and scale factors Geometrical problems involving vectors</p>
Measuring Impact through: End of topic tests and homework	Measuring Impact through: End of topic assessments, homework and core assessments	Measuring Impact through: End of topic assessments and homework	Measuring Impact through: End of topic assessments, homework and core assessments	Measuring Impact through: End of topic assessments, homework and core assessments	Measuring Impact through: End of topic assessments and homework

Year 10 Foundation – Intent: To further enhance and develop mathematical skills learnt at KS3. Students will build on their basic concepts and principles in number, algebra, geometry, proportion and statistics, helping them to secure an understanding of contextual problem-solving questions.

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Scheme of Work: Calculating Visualising and constructing</p> <p><u>Learning Intent:</u> To revise the areas and develop students' understanding of: Indices Standard form Rounding Perpendicular bisectors Angle bisectors Loci Plans and elevations Equations and identities</p>	<p>Scheme of Work: Algebraic proficiency Proportional reasoning Pattern sniffing</p> <p><u>Learning Intent:</u> To revise the areas and develop students' understanding of: Quadratic equations-expanding and factorising Construct a mathematical argument to show two expressions are equivalent Create an expression or equation to solve a problem Direct and inverse proportion both graphically and algebraically Solving complex ratio problems Solving problems involving compound measures Solve problems involving similarity and congruency Recognise and use Fibonacci type sequences Recognise and use quadratic sequences</p>	<p>Scheme of Work: Solving equations and inequalities Calculating space</p> <p><u>Learning Intent:</u> To revise the areas and develop students' understanding of: Inequality set notation Inequalities on a number line Solving simple and complex inequalities, involving problem solving Area and perimeter of sectors of a circle Surface area of prisms and cylinders Understanding and applying Pythagoras Theorem</p>	<p>Scheme of Work: Conjecturing Algebraic proficiency: visualising</p> <p><u>Learning Intent:</u> To revise the areas and develop students' understanding of: Understanding and using congruence criteria for triangles Use of congruence criteria and similarity of triangles and quadrilaterals to solve problems involving finding unknown lengths and angles Plot and interpret straight line graphs Equation of a line graph Plot and interpret non-linear graph</p>	<p>Scheme of Work: Solving equations and inequalities 2 Understanding risk</p> <p><u>Learning Intent:</u> To revise the areas and develop students' understanding of: Simultaneous equations both graphically and algebraically Understand and use tree diagrams to solve dependent and independent events</p>	<p>Scheme of Work: Presentation of data End of year revision</p> <p><u>Learning Intent:</u> To revise the areas and develop students' understanding of: Construct and interpret a range of graphs such as scatter graphs, time series, frequency polygons and stem and leaf diagrams To revise in preparation for the end of year progress exam</p>
Measuring Impact through: End of topic tests and homework	Measuring Impact through: End of topic assessments, homework and core assessments	Measuring Impact through: End of topic assessments and homework	Measuring Impact through: End of topic assessments, homework and core assessments	Measuring Impact through: End of topic assessments, homework and core assessments	Measuring Impact through: End of topic assessments and homework

Year 11 Higher – Intent: To further enhance and develop mathematical skills learnt at KS3. Students will build on their basic concepts and principles in number, algebra, geometry, proportion and statistics, helping them to secure an understanding of contextual problem-solving questions.

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Scheme of work: Transformations and constructions Similarity and congruence Vectors and geometric problems</p> <p><u>Learning Intents:</u> To understand and develop students understanding: Enlargements Rotations Reflections Translations Congruence Similarity 3D shapes Scale factors Contextual problems Vector notation Vector geometry To master the skills based in year 9 and year 10. To be confident to answer exam style questions of a higher order for all abilities.</p>	<p>Scheme of work: Circles Surd, Functions and proofs Algebraic fractions</p> <p><u>Learning Intents:</u> To develop and deepen students' understanding: Circles, including circle theorems Surd Algebraic fractions including quadratic fractions To master the skills based in year 9 and year 10. To be confident to answer exam style questions of a higher order for all abilities.</p>	<p>Scheme of work: Graph functions Advanced Trig</p> <p><u>Learning Intents:</u> To develop and deepen students' understanding: Exponential functions Non-linear graphs Area of non-right angles triangle Cosine rule 3D problem solving Exact trig function Sine, cosine and tangent graph function Graph transformations To master the skills based in year 9 and year 10. To be confident to answer exam style questions of a higher order for all abilities.</p>	<p>Scheme of work: Revision - Exam preparation</p> <p><u>Learning Intents:</u> To develop and deepen students' understanding: To master the skills based in year 9 and year 10. To be confident to answer exam style questions of a higher order for all abilities.</p>	<p>Scheme of work: Revision - Exam preparation</p> <p><u>Learning Intents:</u> To develop and deepen students' understanding: To master the skills based in year 9 and year 10. To be confident to answer exam style questions of a higher order for all abilities.</p>	<p>Scheme of work: Revision - Exam preparation</p> <p><u>Learning Intents:</u> To develop and deepen students' understanding: To master the skills based in year 9 and year 10. To be confident to answer exam style questions of a higher order for all abilities.</p>
Measuring Impact through: End of topic tests and homework	Measuring Impact through: End of topic assessments, homework and core assessments	Measuring Impact through: End of topic assessments and homework	Measuring Impact through: End of topic assessments, homework and core assessments	Measuring Impact through: GCSE Exams	Measuring impact through: GCSE exams

Year 11

Foundation – Intent: To further enhance and develop mathematical skills learnt at KS3. Students will build on their basic concepts and principles in number, algebra, geometry, proportion and statistics, helping them to secure an understanding of contextual problem-solving questions.

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Scheme of Work: Area and Volume Plans and construction</p> <p><u>Learning Intent:</u> To develop and deepen students' understanding of: Circles Area of composite shapes and cylinders Pyramids, cones and spheres Plans Construction To master the skills based in KS3 and year 10. To be confident to answer exam style questions of a higher order for all abilities.</p>	<p>Scheme of Work: Quadratic equations Plans and construction Similarity and congruence Fractions, indices and standard form</p> <p><u>Learning Intent:</u> To develop and deepen understanding: Plans Construction Similarity Congruence Quadratic equations (expanding, factorising and solving) Fractions Indices Standard form Plotting quadratic graphs To master the skills based in KS3 and year 10. To be confident to answer exam style questions of a higher order for all abilities.</p>	<p>Scheme of Work: Pythagoras and trigonometry Graphs</p> <p><u>Learning Intent:</u> To develop and deepen understanding: Pythagoras Trigonometry Cubic and reciprocal graphs Non-Linear graphs Simultaneous equations Rearranging formulae To master the skills based in KS3 and year 10. To be confident to answer exam style questions of a higher order for all abilities.</p>	<p>Scheme of Work: Algebraic Proof Vectors</p> <p><u>Learning Intent:</u> To develop and deepen understanding: Proof Vectors To master the skills based in KS3 and year 10. To be confident to answer exam style questions of a higher order for all abilities.</p>	<p>Scheme of work: Revision - Exam preparation</p> <p><u>Learning Intents:</u> To develop and deepen students' understanding: To master the skills based in year 9 and year 10. To be confident to answer exam style questions of a higher order for all abilities.</p>	<p>Scheme of work: Revision - Exam preparation</p> <p><u>Learning Intents:</u> To develop and deepen students' understanding: To master the skills based in year 9 and year 10. To be confident to answer exam style questions of a higher order for all abilities.</p>
<p><i>Measuring Impact through: End of topic tests and homework</i></p>	<p><i>Measuring Impact through: End of topic assessments, homework and core assessments</i></p>	<p><i>Measuring Impact through: End of topic assessments and homework</i></p>	<p><i>Measuring Impact through: End of topic assessments, homework and core assessments</i></p>	<p><i>Measuring Impact through: GCSE Exams</i></p>	<p><i>Measuring impact through: GCSE exams</i></p>

Year 12– Intent: To secure an understanding in a problem-solving context question involving the context used.

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Scheme of Work: Pure: Quadratics Equations and inequalities Graphs and transformations Straight line graphs Circles Trigonometric ratios</p> <p>Learning Intent: - Expand the product of two or three expressions - Factorise linear, quadratic and simple cubic expressions - Know and use the laws of indices - Simplify and use the rules of surds - Rationalise denominators - Solve quadratic equations using factorising, the quadratic formula and completing the square - Read and use the $f(x)$ notation when working with functions - Sketch the graph and find the turning point of a quadratic function - Find and interpret the discriminant of a quadratic - Use and apply models that involve quadratic functions - Solve linear simultaneous equations using elimination: one linear and one quadratic</p>	<p>Scheme of Work: Pure: Circles Algebraic methods Trigonometric ratios Trigonometric identities and equations Vectors Statistics: Probability Statistical distribution</p> <p>Learning Intent: Know how to find the equation of a circle - Solve geometric problems involving straight lines and circles - Use circle properties to solve problems on coordinates grids - Find the angle in a semi-circle and solve other problems involving circles and triangles Cancel factors in algebraic fractions - Divide a polynomial by a linear expression - Use the factor theorem to factorise a cubic expression - Construct mathematical proofs using algebra - Use proof by exhaustion and disproof by counter-example - To understand and interpret trigonometric identities and equations</p>	<p>Scheme of Work: Pure: Vectors Mechanics: Modelling in mechanics Constant acceleration Statistics: Data collection</p> <p>Learning Intent: - Use vectors in two dimensions - Use column vectors and carry out arithmetic operations - Calculate the magnitude and direction of a vector - Understand and use the position vectors - Use vectors to solve problems in context - Understand and use fundamental quantities and units in the S.I. system: length, time, and mass. Understand and use derived quantities and units: velocity, acceleration, force, weight. Understand and use the language of kinematics. Understand, use and interpret graphs in kinematics for motion in a straight line. Understand, use and derive the formulae for constant acceleration for motion in a straight line - To understand the terminology used within data collection and understanding the advantages and disadvantages of sampling</p>	<p>Scheme of Work: Pure: Differentiation Mechanics: Forces and Motion Statistics: Measures of location and spread Representation of data</p> <p>Learning Intent: - To understand and apply differentiation - Model real life situations with differentiation - Understand the Use and concept of: <ul style="list-style-type: none"> Newton's first law. Newton's second law (restricted to forces in two perpendicular directions or simple cases of forces given as 2-D vectors). Newton's third law; equilibrium of forces on a particle and motion in a straight line and connected particles - To understand the measures of spread and locations. To understand the use of coding - To represent and interpret data by using box plots, histograms and cumulative frequency graphs.</p>	<p>Scheme of Work: Pure: Differentiation Integration Exponentials and logarithms Statistics: Representation of data Correlation Hypothesis testing</p> <p>Learning Intent: - To understand and apply differentiation - Model real life situations with differentiation - To understand and apply integration - To evaluate a definite integral - Find the area bounded by curves, x axis and straight lines - To understand exponentials and interpret models that use exponential functions - Recognise the relationship between exponents and logarithms - Use logarithms to estimate the values of constraints in nonlinear models. - Use calculus to solve kinematics problems</p>	<p>Scheme of Work: Pure: Integration Exponentials and logarithms Mechanics: Variable acceleration</p> <p>Learning Intent: - To understand and apply integration - To evaluate a definite integral - Find the area bounded by curves, x axis and straight lines - To understand exponentials and interpret models that use exponential functions - Recognise the relationship between exponents and logarithms - Use logarithms to estimate the values of constraints in nonlinear models. - Use calculus to solve kinematics problems</p>

<ul style="list-style-type: none"> - Interpret algebraic solutions of equations graphically - Solve linear inequalities - Solve quadratic inequalities - Interpret inequalities graphically - Represent linear and quadratic inequalities graphically - Sketch cubic graphs - Sketch quartic graphs - Sketch reciprocal graphs of the form $y = \frac{a}{x}$ and $y = \frac{a}{x^2}$ - Use intersection points of graphs to solve equations - Translate graphs - Sketch graphs - Transform graphs of unfamiliar functions - Calculate the gradient of a line joining a pair of points - Understand the link between the equation of a line and its gradient and intercept - Find the equation of a line given the gradient and one point on the line or two points on the line - Find the point of intersection for a pair of straight lines - Know and use the rules for parallel and perpendicular gradients - Solve length and area problems on coordinate grids - Use straight line graphs to construct mathematical methods - Find the midpoint of a line segment 	<ul style="list-style-type: none"> - To solve trigonometric equations that produce quadratics - Use vectors in two dimensions - Use column vectors and carry out arithmetic operations - Calculate the magnitude and direction of a vector - Understand and use the position vectors - Use vectors to solve problems in context - To understand the terminology used in probability - To describe and interpret probability diagrams - To describe and interpret statistical distributions - To understand and use binomial distribution 			<ul style="list-style-type: none"> - To understand the language and concept of hypothesis testing 	
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<ul style="list-style-type: none"> - Find the equation of the perpendicular bisector to a line segment - Know how to find the equation of a circle - Solve geometric problems involving straight lines and circles - Use circle properties to solve problems on coordinates grids - Find the angle in a semi-circle and solve other problems involving circles and triangles <p>Use the cosine and sine rule to find a missing side or angle</p> <ul style="list-style-type: none"> - Find the area of a triangle using an appropriate formula - Sketch problems involving triangles - Sketch the graphs of the sine cosine and tangent functions and sketch the transformations. 					
<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i>	<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i> <i>Progress exams</i>	<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i>	<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i> <i>Progress exams</i>	<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i>	<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i> <i>Progress exams</i>

Year 12 Further – Intent: To secure an understanding in a problem-solving context question involving the context used

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Scheme of Work: Decision: Algorithms Graphs and networks Algorithms on graphs Core pure: Complex numbers Argand diagrams Series</p> <p>Learning Intent: Students will: -Use and understand algorithms, Flow charts, bubble sorts, quick sorts and bin-packing algorithms -Understand modelling with graphs, graph theory, special types of graphs -Be able to represent graphs and networks using matrices - understand and use Kruskal's, Prim's and Floyd's algorithms</p>	<p>Scheme of Work: Decision: Algorithms on graphs Route inspections Linear programming Critical Path analysis Core pure: Proof by induction Vectors Statistics: Discrete random variables</p> <p>Learning Intent: Students will - Understand Kruskal's and Prim's algorithms - To apply and use Prim's and Dijkstra's algorithms - Floyd's algorithms - To understand Eulerian graphs - Using the route inspection algorithm - To understand linear programming problems and graphical methods - Locating the optimal point and finding solutions with integer values</p>	<p>Scheme of Work: Core Pure: Roots of polynomials Statistics: Poisson distribution Hypothesis testing Decision: Critical Path analysis</p> <p>Learning Intent: Students will - Understand roots of quadratic, cubic and quartic equations - Understand expressions relating to roots of polynomials - Linear transformations of roots - To understand and use the Poisson distribution and to find the mean and variance of a Poisson distribution - To find the mean and variance of the binomial distribution - To be able to use the Poisson distribution to approximate the binomial distribution</p>	<p>Scheme of Work: Core Pure: Matrices Linear transformations Statistics: Chi-squared tests Geometric and negative binomial distribution</p> <p>Learning Intent: Students will - Understand matrices and matrix multiplication - To be able to find determinants - Inverting matrices - To solve equations using matrices - To understand linear transformations in two dimensions and three dimensions - To be able to explain reflections, rotations, stretches and enlargements using linear transformations - To find and understand the goodness of fit</p>	<p>Scheme of Work: Core Pure: Linear transformations Volumes of revolution Statistics: Geometric and negative binomial distribution Central Limit Theorem Probability generating functions Decision: The travelling salesman problem</p> <p>Learning Intent: Students will - To understand linear transformations in two dimensions and three dimensions - To be able to explain reflections, rotations, stretches and enlargements using linear transformations - To understand the volume of revolution around the x-axis and the y-axis - To be able to add and subtract volumes</p>	<p>Scheme of Work: Decision: The simplex algorithm Statistics: Quality of tests</p> <p>Learning Intent: Students will - To be able to formulate real life problems as linear programming problems - To understand and use the simplex method - To solve problems requiring integer solutions - To use two-stage simplex method and the Big-M method - Understanding type I and type II errors in hypothesis testing - Finding type I and type II errors using the normal distribution - Calculate the size and power of a test - To draw a graph of the power function for a test</p>

<ul style="list-style-type: none"> - Understand and use complex numbers to solve problems involving quadratic, cubic and quartic equations -To be able to represent a complex number on an argand diagram -to calculate the modulus and argument of a complex number and to find loci and regions on an argand diagram -To be able to find the sum of natural numbers, squares and cubes 	<ul style="list-style-type: none"> - Modelling a project and understanding dummy activities - Understanding early and late event times and critical activities - Determining the float of an activity and how to construct and use Gantt charts - Understand proof by mathematical induction - Be able to prove divisibility results - Understand proving statements using matrices - To find the expected value and variance of a discrete random variable - To find the expected value and variance of a function of X - To solve problems involving random variables 	<ul style="list-style-type: none"> - To be able to test for the mean and find the critical value of a Poisson distribution - Modelling a project and understanding dummy activities - Understanding early and late event times and critical activities - Determining the float of an activity and how to construct and use Gantt charts 	<ul style="list-style-type: none"> - To understand the degree of freedom and the family of Chi-squared distributions - Testing a hypothesis and the goodness of fit with discrete data - Using contingency tables - Understanding the geometric and negative binomial distributions - To be able to find the mean and variance of both a geometric and negative binomial distribution 	<ul style="list-style-type: none"> - To model with volumes of revolutions - Understanding the geometric and negative binomial distributions - To be able to find the mean and variance of both a geometric and negative binomial distribution - To understand the central limit theorem and to apply it to other distributions - To understand and use probability generating functions and apply to standard distributions - To find the mean and variance of a distribution and the sums of random variables - To understand and solve the classical and practical travelling salesman problems - To use a minimum spanning tree method to find the lower and upper bound - To use the nearest neighbour algorithm to find an upper bound 	
<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i>	<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i> <i>Progress exams</i>	<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i>	<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i> <i>Progress exams</i>	<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i>	<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i> <i>Progress exams</i>

Year 13– Intent: To secure an understanding in a problem-solving context question involving the context used

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Scheme of Work: Pure: Algebraic methods Sequences and series Statistics: Normal distribution Mechanics: Moments Forces and frictions Projectiles</p> <p>Learning Intent: Students will: - understand and use the structure of mathematical proof, proceeding from given assumptions through a series of logical steps to a conclusion; use methods of proof, including proof by deduction. Proof by contradiction (including proof of the irrationality of $\sqrt{2}$ and the infinity of primes, and application to unfamiliar proofs - use the modulus of a linear function - understand and use composite functions; inverse functions and their graphs</p>	<p>Scheme of Work: Pure: Functions and graphs Sequences and series Binomial expansion Differentiation Statistics: Regression, correlation and hypothesis testing Conditional probability</p> <p>Learning Intent: Students will: - be able to simplify rational expressions including by factorising and cancelling, and algebraic division (by linear expressions only - decompose rational functions into simple partial fractions with no more than 3 terms. - use the modulus of a linear function - understand and use composite functions; inverse functions and their graphs - understand the effect of simple transformations on the graph of $y = f(x)$ including sketching associated graphs; and combinations of these transformations.</p>	<p>Scheme of Work: Pure: Functions and graphs Radians Trigonometric functions Differentiation Numerical methods</p> <p>Learning Intent: Students will: - use the modulus of a linear function - understand and use composite functions; inverse functions and their graphs - understand the effect of simple transformations on the graph of $y = f(x)$ including sketching associated graphs; and combinations of these transformations. - use of functions in modelling, including consideration of limitations and refinements of the models. - understand the definition of a radian and be able to convert between radians and degrees; - know and be able to use exact values of sin, cos and tan; - be able to derive and use the formulae for arc length and area of sector</p>	<p>Scheme of Work: Pure: Trigonometric functions Numerical methods Integration Trigonometry and modelling</p> <p>Learning Intent: Students will: - be able to prove and use the addition formulae - understand and use the double angle formulae - solve trigonometric equations - write expressions of the form $a\cos\theta \pm a\sin\theta$ in the forms $R\cos(x \pm \alpha)$ or $R\sin(x \pm \alpha)$; - be able to construct proofs involving trigonometric functions and previously learnt identities. - be able to integrate standard mathematical functions. - use trigonometric identities in integration - use the reverse chain rule to integrate more complex functions. - use integration to find the area under a curve. - model real life situations with differential equations.</p>	<p>Scheme of Work: Pure: Integration Parametric equations Vectors Mechanics: Application of forces</p> <p>Learning Intent: Students will: - be able to integrate standard mathematical functions. - use trigonometric identities in integration - use the reverse chain rule to integrate more complex functions. - use integration to find the area under a curve. - model real life situations with differential equations. - be able to understand and use the parametric equations of curves and conversion between Cartesian and parametric forms -Use parametric equations in modelling in a variety of contexts. - be able to understand Cartesian coordinates</p>	<p>Scheme of Work: Mechanics: Further Kinematics</p> <p>Learning Intent: Students will: - extend the constant acceleration formulae of motion to 2 dimensions using vectors. - use calculus in kinematics for (variable acceleration) motion in a straight line. Extend to 2 dimensions using vectors.</p>

<ul style="list-style-type: none"> - understand the effect of simple transformations on the graph of $y = f(x)$ including sketching associated graphs; and combinations of these transformations. - use of functions in modelling, including consideration of limitations and refinements of the models. - understand and use the Normal distribution as a model; find probabilities using the Normal Distribution. - able to link to histograms, mean, standard deviation, points of inflection and the binomial distribution. - be able to select an appropriate probability distribution for a context, with appropriate reasoning. - be able to conduct a hypothesis test for the mean of the Normal distribution. - be introduced to moments in simple static contexts, understanding that the moment of a force, is a measure of its turning effect on a body. <ul style="list-style-type: none"> - develop ideas of modelling real life situations: uniform and non-uniform mass. Introducing and developing the ideas of resolving and equilibrium (vertically only). - be able to resolve forces in 2 dimensions. - solve problems involving inclined planes 	<ul style="list-style-type: none"> - use of functions in modelling, including consideration of limitations and refinements of the models. - be able to understand and use a binomial expansion and how it can be used to find polynomial approximations. - further develop the skills required to work with sequences and an appreciation of the differences in increasing, decreasing and periodic sequences. - differentiate from first principles for $\sin x$ and $\cos x$ - understand and use the second derivative as the rate of change of gradient; connection to convex and concave sections of curves and points of inflection - differentiate using the product rule, the quotient rule and the chain rule, including problems involving connected rates of change and inverse functions. - differentiate simple functions and relations defined implicitly or parametrically. - construct simple differential equations in pure mathematics and in context. - be able to understand exponential models in bivariate data. - Understand and apply the language of statistical hypothesis testing, extend to correlation coefficients as measures of how close data 	<ul style="list-style-type: none"> - understand and use the definitions of sine, cosine and tangent for all arguments. - be taught the skills to work confidently with radians and their applications. - understand and use the definitions of secant, cosecant and cotangent and of arcsin, arccos and arctan; their relationships to sine, cosine and tangent. - differentiate from first principles for $\sin x$ and $\cos x$ - understand and use the second derivative as the rate of change of gradient; connection to convex and concave sections of curves and points of inflection - differentiate using the product rule, the quotient rule and the chain rule, including problems involving connected rates of change and inverse functions. - differentiate simple functions and relations defined implicitly or parametrically. - construct simple differential equations in pure mathematics and in context - be able to locate roots of $f(x) = 0$ by considering changes of sign of $f(x)$ in an interval of x. - solve equations approximately using simple iterative methods; be able to draw associated cobweb and staircase diagrams. - solve equations using the Newton-Raphson method and other recurrence relations. - use numerical methods to solve problems in context 	<ul style="list-style-type: none"> - be able to locate roots of $f(x) = 0$ by considering changes of sign of $f(x)$ in an interval of x. - solve equations approximately using simple iterative methods; be able to draw associated cobweb and staircase diagrams. - solve equations using the Newton-Raphson method and other recurrence relations. - use numerical methods to solve problems in context 	<ul style="list-style-type: none"> - use vectors in three dimensions. - use vectors to solve geometric problems - model 3D - be able to find an unknown force when a system is in equilibrium. - solve statics problems involving weight, tension and pulleys. - understand and solve problems limiting equilibrium. - solve problems involving motion on an inclined plane. - solve problems involving connected particles that require the resolution of forces. 	
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<ul style="list-style-type: none"> - understand and use the $F \leq$ are model for friction; coefficient of friction; motion of a body on a rough surface; limiting friction and limiting equilibrium. - be able to model motion under gravity in a vertical plane using vectors. - solve problems involving particles projected at an angle. 	<ul style="list-style-type: none"> points lie to a straight line and be able to interpret a given correlation coefficient using a given p-value or critical value (calculation of correlation coefficients are excluded) - understand and use mutually exclusive and independent events when calculating probabilities - be able to link to discrete and continuous distributions. - understand and use conditional probability, including the use of tree diagrams, Venn diagrams, two-way tables. 				
<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i>	<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i> <i>Progress exams</i>	<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i>	<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i> <i>Progress exams</i>	<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i>	<i>Measuring Impact through: Homework based on Exam questions</i> <i>End of chapter assessments</i> <i>A-Level exams</i>