

Intent:

Mathematics is essential to everyday life; from science and technology through to the financial literacy required in most forms of employment. Throughout all lessons, skills are broken down into key steps and we ensure that students master each step before moving on to the next. We then build these skills together towards the end of a topic to ensure students are able to make links between the skills they have studied and are able to apply them to more complex problem. This approach ensures that all students succeed and make rapid progress.

By following the national curriculum programme of study we ensure that our students study a breadth of mathematical concepts based around the key strands of number, algebra, ratio and proportion, geometry and measure and probability and statistics. Each strand is broken down into key topics which are then separated into a sequence of learning objectives which each class moves through at the correct pace for the students. During KS3 our students study all of these topics each year, in ever-increasing depth and complexity in order to develop fluency in the fundamentals of mathematics. Repetition and practice help to promote recall and application of knowledge which will be required in order to access more sophisticated problems in KS4.

By ensuring the fundamentals are embedded during KS3 we create a solid platform on which to build in KS4, with a focus on application of content to complex problems. For those that have not yet mastered the fundamentals there is a continued emphasis on repetition of key concepts. However, for the more able students, the SOW is designed so that key concepts are recapped quickly before spending more time exposing students to applied questions to develop depth of understanding and problem-solving techniques. From the SOW, teachers are able to choose the starting point for each unit depending on the needs and the ability of the class. This means that each year students revisit a topic, they start further along the progression through that topic. Class sizes get smaller as you move through the sets to provide the support that is needed for students to reach their target grades. In homework there is an emphasis on AO2/3 style questions to develop fluency and exam technique.

Implementation:

Year	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
7	<p>A good understanding of number and algebra underpins all processes in mathematics. As such, our focus this half term is about building on the number and algebra skills learnt in primary school to develop fluency and ensure solid foundations are in place.</p> <p>Content:</p> <ul style="list-style-type: none"> Calculations & negative numbers Powers, roots & BIRDMAS Collecting like terms Algebraic index laws Expanding brackets & factorising 	<p>Pupils continue to develop their number skills, whilst applying them to new contexts such as fractions and percentages. We also start to apply number skills to the essential concepts of ratio and proportion which are essential for developing mathematical reasoning skills. We end this half term by starting to look at some real-world applications of mathematics through the study of probability.</p> <p>Content:</p> <ul style="list-style-type: none"> Factors, multiples and primes Fractions 	<p>We revisit and further develop our algebra skills as we study more complex areas of algebra such as quadratic and simultaneous equations. We also deepen our understanding of number and start to make links between previous topics such as decimals and numerical index laws as we study standard form. We end this term by applying our algebra skills to graphs, looking at plotting coordinates and different types of graphs.</p> <p>Content:</p> <ul style="list-style-type: none"> Quadratic equations 	<p>We finish off our work on graphs, by studying straight line graphs in depth. After this, the focus for the remainder of the half term is geometry. All of the number and algebra skills which have been studied so far this year, can now start to be applied to topics such as perimeter, area and volume. We also start to introduce problem-solving skills when looking at complex geometric problems at the end of each topic.</p> <p>Content:</p> <ul style="list-style-type: none"> Straight line graphs Perimeter 	<p>The focus of this half term is applying the number skills developed so far to real-life contexts through the topics of compound measures, data and statistics. Pupils develop an understanding of how statistics and graphs can be used in the real-world to analyse and represent data. At the end of this half-term, we re-visit geometry, this time specifically looking at right-angled triangles and the topics of Pythagoras' Theorem and trigonometry.</p> <p>Content:</p> <ul style="list-style-type: none"> Compound measures (speed, 	<p>We start to make links between geometry and graphs through the study of transformations. We also revisit graphs through the topic of distance and velocity-time graphs, making links with the compound measures content that was studied last half term. This allows pupils to develop a deeper understanding of these topics, as well as studying them at a more complex level.</p> <p>Content:</p> <ul style="list-style-type: none"> Transformations Similarity & congruence Plans & elevations

	<ul style="list-style-type: none"> • Substitution • Solving linear equations • Decimals • Units of measure • Rounding and estimation • Numerical index laws 	<ul style="list-style-type: none"> • Percentages • Converting between fractions, decimals and percentages • Ratio • Proportion • Probability 	<ul style="list-style-type: none"> • Inequalities • Sequences • Simultaneous equations • Standard form • Coordinates & plotting graphs • Quadratic, cubic & reciprocal graphs 	<ul style="list-style-type: none"> • Area • Circles • Surface area & volume • Angles & polygons 	<ul style="list-style-type: none"> • density, pressure) • Data collection & sampling • Averages • Frequency tables • Charts • Pie charts • Pythagoras • Trigonometry (SOHCAHTOA) 	<ul style="list-style-type: none"> • Constructions & loci • Bearings • Real-life graphs • Distance/velocity-time graphs • Vectors
8	<p>We revisit the number and algebra topics from Year 7, whilst aiming to recap the basic skills that were learnt and build fluency, before studying each topic to a greater depth, thus improving understanding and providing the opportunity to tackle more challenging concepts such as algebraic fractions.</p> <p>Content:</p> <ul style="list-style-type: none"> • Calculations & negative numbers • Powers, roots & BIRDMAS (extension to surds) • Collecting like terms • Algebraic index laws • Expanding brackets & factorising (extension to expanding triple brackets and algebraic fractions) • Substitution • Solving linear equations • Decimals (extension to recurring decimals) • Units of measure • Rounding and estimation • Numerical index laws 	<p>We revisit the essential number skills of fractions, percentages, ratio and proportion, whilst extending to more complex topics which also start to bring in algebra skills, such as algebraic proportion. Pupils will also start to look at more complex ideas within probability such as conditional probability.</p> <p>Content:</p> <ul style="list-style-type: none"> • Factors, multiples and primes. • Fractions. • Percentages (extension to reverse & compound percentages). • Converting between fractions, decimals and percentages. • Ratio. • Proportion (extension to algebraic proportion). • Probability (extension to conditional probability & algebraic probability) 	<p>We revisit the algebra topics such as inequalities and equations that were first met in Year 7. Pupils will recap the basic skills, before deepening their understanding by applying them to more challenging topics such as quadratic simultaneous equations.</p> <p>Content:</p> <ul style="list-style-type: none"> • Quadratic equations. • Inequalities (extension to quadratic inequalities) • Sequences (extension to quadratic sequences) • Simultaneous equations (extension to quadratic simultaneous equations) • Standard form • Coordinates & plotting graphs (extension to solving simultaneous equations graphically) 	<p>We revisit the geometry topics which were first met in Year 7. The emphasis is on building on the basic skills and formulae that were learnt, whilst bringing in more complex concepts such as algebra, and linking back to solving equations formed from geometric problems.</p> <p>Content:</p> <ul style="list-style-type: none"> • Straight line graphs (extension to parallel and perpendicular lines) • Perimeter • Area • Circles (extension to arcs and sectors) • Surface area & volume (extension to compound solids and frustums) • Angles & polygons 	<p>Pupils' data skills are honed further by revisiting topics first met in Year 7 and recapping them, before extending them to more complex situations such as histograms and cumulative frequency graphs. Similarly, the topics of Pythagoras' Theorem and Trigonometry are now extended to 3D scenarios and non-right-angled triangles.</p> <p>Content:</p> <ul style="list-style-type: none"> • Compound measures (speed, density, pressure) • Data collection & sampling • Averages • Frequency tables • Charts (extension to histograms cumulative frequency graphs) • Pie charts • Pythagoras (extension to 3D) • Trigonometry (extension to 3D, sine & cosine rules) 	<p>We revisit the topics studied at the end of Year 7, but start to apply them to more complex situations, building on the 3D work that was introduced last half term for example by studying similarity in 3D objects.</p> <p>Content:</p> <ul style="list-style-type: none"> • Transformations • Similarity & congruence (extension to 3D objects) • Plans & elevations. • Constructions & loci • Bearings (extension to include trigonometry) • Real-life graphs • Distance/velocity-time graphs • Vectors (extension to 2D problems)

9	<p>We begin Year 9 with a focus on algebra to ensure that pupils are fluent with all algebra skills as these are essential for all other topics at KS4. We revisit the algebra skills from KS3, but new concepts, such as completing the square, are also introduced. At the end of the half term, we move on to looking at how the number skills honed in KS3 can be applied to ratio and proportion.</p> <p>Content:</p> <ul style="list-style-type: none"> • Simplifying, expanding & factorising • Algebraic fractions • Solving equations • Completing the square • Solving inequalities • Numerical index laws • Ratio • Proportion (numerical and algebraic) 	<p>We go back to focussing on algebra, however the focus is on the application of algebraic skills to more complex contexts such as functions and rearranging formulae. In addition, pupils begin to explore the concept of proof, which is essential when studying maths to a higher level.</p> <p>Content:</p> <ul style="list-style-type: none"> • Sequences • Simultaneous equations • Rearranging formulae • Functions • Iteration • Algebraic proof 	<p>We predominantly focus on geometry topics, building on the foundations which were built in KS3, whilst also bringing in the algebra skills to help with topics such as the sine and cosine rules. Throughout this term we also develop problem-solving skills by attempting multi-step problems within each topic.</p> <p>Content:</p> <ul style="list-style-type: none"> • Pythagoras & Trigonometry (SOHCAHTOA) • Trigonometry: sine & cosine rules • Area & circles • Surface area & volume • Similar shapes • Primes, factors, multiples & estimation 	<p>We begin with deepening pupils' understanding of different representations of number, including standard form and surds. We also look at real-life applications of number such as compound measures (speed, density & pressure) and probability. Whilst studying probability, we also make links with algebra by using it to help solve complex probability problems.</p> <p>Content:</p> <ul style="list-style-type: none"> • Standard form • Surds • Fractions, decimals & percentages • Compound measures • Probability 	<p>We begin by revisiting number to look at the importance of bounds in problem solving. This also brings in links with other topics covered previously such as speed, distance, time. We then move on to building on the data and statistics topics which were covered in KS3, by revisiting averages, representing data and histograms in more depth. We end this term by revisiting geometry topics and deepening the understanding from KS3.</p> <p>Content:</p> <ul style="list-style-type: none"> • Accuracy & bounds • Averages • Representing data • Histograms • Angles in parallel lines • Angles in polygons • Transformations 	<p>We focus on applying number and algebra skills to graphs through the study of straight line graphs and equations of circles. We also start linking back to geometry and revisit angle facts through circle theorems. We continue on the geometric theme, considering geometric proof through the study of vectors and congruent triangles.</p> <p>Content:</p> <ul style="list-style-type: none"> • Coordinate geometry • Circle theorems • Equation of a circle • Graph transformations • Vectors • Congruent triangles • Construction, loci & bearings
Early entry GCSE	Pupils who are being entered for their GCSE early study the same topics in the same order but they move through the content more quickly to ensure there is plenty of time for revision before the exams in half term 5/6.					
10	<p>Throughout Year 10 the same topics are studied as in Year 9, with an aim to recapping the more basic skills, before moving on to applying the concepts to more challenging contexts. By revisiting each topic, our students will form stronger links between topics, and become more confident in applying their skills to unfamiliar situations.</p>					
	We revisit key number and algebra skills to ensure that strong foundations are in place so that these skills can start to be applied in other topics throughout the year.	We revisit key number and algebra skills to ensure that strong foundations are in place so that these skills can start to be applied in other topics throughout the year.	We revisit key number and algebra skills to ensure that strong foundations are in place so that these skills can start to be applied in other topics throughout the year.	We revisit key number and algebra skills to ensure that strong foundations are in place so that these skills can start to be applied in other topics throughout the year.	We revisit key number and algebra skills to ensure that strong foundations are in place so that these skills can start to be applied in other topics throughout the year.	We revisit key number and algebra skills to ensure that strong foundations are in place so that these skills can start to be applied in other topics throughout the year.

	Content: <ul style="list-style-type: none"> • Simplifying, expanding & factorising. • Algebraic fractions • Solving equations • Completing the square • Solving inequalities • Numerical index laws • Ratio • Proportion (numerical and algebraic) 	Content: <ul style="list-style-type: none"> • Simplifying, expanding & factorising • Algebraic fractions • Solving equations • Completing the square • Solving inequalities • Numerical index laws • Ratio • Proportion (numerical and algebraic) 	Content: <ul style="list-style-type: none"> • Simplifying, expanding & factorising • Algebraic fractions • Solving equations • Completing the square • Solving inequalities • Numerical index law • Ratio • Proportion (numerical and algebraic) 	Content: <ul style="list-style-type: none"> • Simplifying, expanding & factorising. • Algebraic fractions • Solving equations • Completing the square • Solving inequalities • Numerical index laws • Ratio • Proportion (numerical and algebraic) 	Content: <ul style="list-style-type: none"> • Simplifying, expanding & factorising • Algebraic fractions • Solving equations • Completing the square • Solving inequalities • Numerical index laws • Ratio • Proportion (numerical and algebraic) 	Content: <ul style="list-style-type: none"> • Simplifying, expanding & factorising • Algebraic fractions • Solving equations • Completing the square • Solving inequalities • Numerical index laws • Ratio • Proportion (numerical and algebraic)
GCSE Further Maths	<p>Those students who have been entered early for their GCSE have the opportunity to study GCSE Further Maths in Year 10 or 11. This qualification provides an excellent introduction to some key A-level Maths and Further Maths topics and helps set students up to be successful at A-level. This provides more challenge for our high achieving students by assessing their higher order mathematical skills, particularly algebraic reasoning, in greater depth, thus preparing them fully to maximise their potential in further studies at Level 3. This content covered whilst studying for this qualification places an emphasis on higher order technical proficiency, rigorous argument and problem solving skills.</p>					
	<p>Students will revisit some algebra and number topics from GCSE to ensure that fluency has been acquired, but also extend them to new concepts, for example, solving simultaneous equations with three unknowns. Students will also develop their understanding of functions, an important A-level topic, as they study domain and range. They will also extend topics such as coordinate geometry from GCSE and look at the equations of circles which are not centred on the origin.</p>	<p>Students meet the topic of calculus; an essential A-level topic which builds on their understanding of algebra and its applications. In addition, students deepen their understanding of trigonometry and make links with solving equations as they are introduced to key concepts of trigonometric graphs and solving trigonometric equations. They also further their understanding of transformations from GCSE as we look at how matrices can be used in transformations.</p>	<p>In the remaining time before the exams at the end of the year, those students who are re-sitting their GCSE will now study a SOW targeted at achieving a grade 9 through the study of challenging GCSE topics. Those who have already achieved a grade 9 will continue to revise and develop their understanding of GCSE Further Maths concepts and practice their problem solving skills when applying the content to new scenarios. Students also complete weekly mocks which their teachers mark and give feedback on. Any areas which need more focus are then targeted through revision lessons to ensure that students become more confident and able to tackle exam-style questions.</p>	<p>During this half term, those students who are re-sitting their GCSE continue to follow a SOW targeted at achieving a grade 9 through the study of challenging GCSE topics. Those who have already achieved a grade 9 will continue to revise and develop their understanding of GCSE Further Maths concepts and practice their problem solving skills when applying the content to new scenarios. Students continue to sit weekly mocks to ensure they become familiar with the style of questions in the exam and constantly receive feedback on their progress.</p>	<p>In this half term, the focus continues to be on revision, to ensure that students are fully prepared for their exams. Students continue to complete weekly mocks which their teachers mark and give feedback of areas of strength and areas which need more focus. These areas are then targeted through revision lessons to ensure that students become more confident and able to tackle exam-style questions.</p>	<p>Exams</p>

	<p>Content:</p> <ul style="list-style-type: none"> • Product rule for counting • Surds • Algebraic fractions • The factor theorem • Binomial expansion • Sketching functions • Domain and range • Composite & inverse functions • Solving equations & inequalities • Simultaneous equations (3 unknowns) • Algebraic proof • Sequences • Equations of straight lines & circles 	<p>Content:</p> <ul style="list-style-type: none"> • Differentiation • Tangents & normals • Increasing & decreasing functions • Stationary points • Matrices • The identity matrix • Matrix transformations • Geometric proof • Pythagoras & trigonometry in 3D • Trigonometric graphs • Trigonometric identities • Solving trigonometric equations • Integration 	<p>GCSE resit content:</p> <ul style="list-style-type: none"> • Accuracy & bounds • Functions • Histograms • Probability • Vectors • Circle Theorems • Congruent proofs 	<p>GCSE resit content:</p> <ul style="list-style-type: none"> • Venn diagrams • Graph transformations • Coordinate geometry • Regions • Velocity-time graphs • Constructions, loci and bearings 		
11	<p>Throughout Year 11 the same topics are studied as in Year 10, but at a faster pace to ensure there is plenty of time for revision during half term 5 to prepare for the exams at the end of the year. There is a continued aim of ensuring that strong foundations are in place for each topic, before building on these with ever-increasing depth and a particular focus on application to unfamiliar contexts and developing problem-solving techniques.</p>					
	<p>In the first half term of Year 11, we revisit key number and algebra skills to ensure that strong foundations are in place from which to develop problem solving skills and fluency in applying these concepts to other contexts.</p> <p>Higher Content:</p> <ul style="list-style-type: none"> • Simplifying, expanding & factorising • Algebraic fractions • Solving equations • Completing the square • Solving inequalities • Numerical index laws • Ratio • Proportion (numerical and algebraic) • Sequences • Simultaneous equations • Rearranging formulae <p>Foundation Content:</p> <ul style="list-style-type: none"> • Calculations & negative numbers 	<p>During this half term there is a strong focus on applying number and algebra skills to geometric scenarios in trigonometry, area and volume. Numerical and proportional reasoning skills are also applied to complex contexts in similar shapes. Students further develop their problem solving skills through the study of algebraic proof and percentages.</p> <p>Higher Content:</p> <ul style="list-style-type: none"> • Functions • Iteration • Algebraic proof • Pythagoras & Trigonometry (SOHCAHTOA) • Trigonometry: sine & cosine rules • Area & circles • Surface area & volume • Similar shapes 	<p>In this half term we revisit probability and statistics to ensure that students are finely tuning their data interpretation and analysis skills. We also recap key geometric topics and further develop students' problem solving skills when working with real-life contexts when studying bounds.</p> <p>Higher Content:</p> <ul style="list-style-type: none"> • Compound measures • Probability • Accuracy & bounds • Averages • Representing data • Histograms • Angles in parallel lines • Angles in polygons • Transformations <p>Foundation Content:</p> <ul style="list-style-type: none"> • Area • Circles 	<p>During this half term we further hone students' application and problem solving skills through the study of complex coordinate geometry problems involving straight lines and circles. Students also further develop their proof and deduction skills through the study of vectors and congruent triangles.</p> <p>Higher Content:</p> <ul style="list-style-type: none"> • Coordinate geometry • Circle theorems • Equation of a circle • Graph transformations • Vectors • Congruent triangles • Construction, loci & bearings <p>Foundation Content:</p> <ul style="list-style-type: none"> • Trigonometry (SOHCAHTOA) • Transformations • Similarity & congruence • Plans & elevation 	<p>In this half term, the focus shifts to revision, to ensure that students are fully prepared for their GCSE exams. Students complete fortnightly mocks which their teachers mark and give feedback of areas of strength and areas which need more focus. These areas are then targeted through revision lessons to ensure that students become more confident and able to tackle exam-style questions.</p>	Exams

<ul style="list-style-type: none"> • Powers, roots & BIRDMAS. • Collecting like terms • Algebraic index laws • Expanding brackets & factorising • Substitution • Solving linear equations • Decimals • Units of measure • Rounding and estimation • Numerical index laws • Factors, multiples and primes • Fractions • Percentages • Converting between fractions, decimals and percentages • Ratio 	<ul style="list-style-type: none"> • Primes, factors, multiples & estimation • Standard form • Surds • Fractions, decimals & percentages <p>Foundation Content:</p> <ul style="list-style-type: none"> • Proportion • Probability • Quadratic equations • Inequalities • Sequences • Simultaneous equations • Standard form • Coordinates & plotting graphs • Quadratic, cubic & reciprocal graphs • Straight line graphs • Perimeter 	<ul style="list-style-type: none"> • Surface area & volume • Angles & polygons • Compound measures (speed, density, pressure) • Data collection & sampling • Averages • Frequency tables • Charts • Pie charts • Pythagoras 	<ul style="list-style-type: none"> • Constructions & loci • Bearings • Real-life graphs • Distance/velocity-time graphs • Vectors 		
<p>Additional Maths FSMQ</p>	<p>For those students who have completed their GCSEs in Maths and Further Maths we provide the opportunity to gain a third maths qualification: Additional Maths FSMQ. This is a challenging specification which builds on the content studied in GCSE Further Maths, bringing in more A-level Maths and Further Maths content to help prepare students for studying maths at a higher level.</p>				
<p>During the first half term of studying for the Additional Maths FSMQ, students build on their algebraic knowledge from GCSE Further Maths and learn how to solve more complex equations such as cubics.</p> <p>In addition, they learn about the Binomial distribution, the first of the statistical distributions met at A-level.</p> <p>Content:</p> <ul style="list-style-type: none"> • Algebraic manipulation • Solving equations and inequalities • Solving cubic equations • Recurrence relations • Binomial expansion • The Binomial distribution 	<p>In the second half term, students deepen their understanding of calculus from GCSE Further Maths. They recap the key skills before applying them to more complex situations and starting to look at how they can be used to model real-life scenarios, such as variable acceleration and maximising/minimising problems.</p> <p>Content:</p> <ul style="list-style-type: none"> • Differentiation • Tangents & normals • Increasing & decreasing functions • Stationary points • Integration • Using integration to find areas • Kinematics (constant & variable acceleration) 	<p>During this half term, we take students above and beyond the content required for Additional Maths, and start teaching students some important new concepts, such as complex numbers, which are essential for A-level Further Maths. We also re-visit matrices, which students first learnt when studying GCSE Further Maths in Year 10 and give students a deeper understanding of how matrices can be used to tackle complex problems</p> <p>Content:</p> <ul style="list-style-type: none"> • Introduction to complex numbers • Argand diagrams: modulus & argument • Matrices • Determinants & inverse matrices • Matrices & simultaneous 	<p>In half term 4, we continue to explore higher level maths content, to pique students' interest in studying Further Maths at A-level. We extend students' knowledge of proof from GCSE by looking at proof induction, and we also build on their mechanics knowledge from half term 2 by looking at energy & momentum.</p> <p>Content:</p> <ul style="list-style-type: none"> • Proof by induction • Energy & momentum • Number theory • Group theory 	<p>In this half term, the focus shifts to revision, to ensure that students are fully prepared for their Additional Maths exam. Students complete weekly mocks which their teachers mark and give feedback of areas of strength and areas which need more focus. These areas are then targeted through revision lessons to ensure that students become more confident and able to tackle exam-style questions.</p>	<p>Exams.</p>

	<ul style="list-style-type: none"> Product rule for counting Permutations and combinations Equations of straight lines Equations of circles Linear programming Pythagoras & trigonometry in 3D Trigonometric graphs Trigonometric identities Solving trigonometric equations 	<ul style="list-style-type: none"> Iteration Trapezium rule Exponential graphs Logarithms Solving equations using logarithms 	<p>equations</p> <ul style="list-style-type: none"> Matrix transformations 			
12 Maths	<p>The first half term of AS maths content recaps crucial algebra skills and concepts from GCSE which become the building blocks for all other A-level topics. Students develop fluency with algebraic techniques before covering new content such as binomial expansion and solving trigonometric equations.</p>	<p>In this half term, we finish off the remaining pure content, building on the understanding students have developed of algebra and functions and applying it to new topics such as differentiation and integration. We also continue to develop students' problem solving skills from GCSE by looking at how differentiation and exponentials can be used in modelling real-life scenarios.</p>	<p>In this half term, students encounter the applied topics of mechanics and statistics. They start to see how topics covered in the pure content such as differentiation and integration have real-world applications and links to displacement, velocity and acceleration.</p>	<p>In this term, we finish the applied content, building on the statistics and probability content students learnt at GCSE, and starting to make links between the two. Through their study of statistics, students further develop their analytical skills from GCSE by learning about statistical distributions and hypothesis testing, an essential element of many science & social science degree courses.</p>	<p>In this half term, the focus shifts to revision, to ensure that students are fully prepared for their AS exams. Students complete weekly mocks which their teachers mark and give feedback of areas of strength and areas which need more focus. These areas are then targeted through revision lessons to ensure that students become more confident and able to tackle exam-style questions.</p>	<p>After the students have finished their AS exams, we finish this half term by starting to study some key A2 maths content. We build on the knowledge that students already have of trigonometry and differentiation, for example in trigonometry we introduce new identities and look at how they can be used to solve more complex trigonometric equations. In differentiation, we introduce the methods needed to differentiate more complex functions.</p>
	<p>Content:</p> <ul style="list-style-type: none"> Surds & indices. Quadratics & the discriminant Simultaneous equations & inequalities Sketching graphs Graph transformations Equations of straight lines & circles The factor theorem Binomial expansion Proof 2D trigonometry Trigonometric equations and identities Vectors 	<p>Content:</p> <ul style="list-style-type: none"> Differentiation. Tangents & normals Stationary points Increasing and decreasing functions Differentiation from first principles Integration Using integration to find areas Exponential functions Logarithms 	<p>Content:</p> <ul style="list-style-type: none"> Velocity-time graphs Constant acceleration & SUVAT Forces and Newton's Laws Connected particles Variable acceleration Statistical sampling Data presentation and interpretation 	<p>Content:</p> <ul style="list-style-type: none"> Probability The binomial distribution The discrete uniform distribution Hypothesis testing 		<p>Content:</p> <ul style="list-style-type: none"> Radians, arcs & sectors Trigonometric identities, addition formulae & double angles Rcos/sin (x+a) Partial fractions Differentiation: chain rule, product & quotient rules Implicit differentiation Second order derivatives

<p>12 Further Maths</p>	<p>In this half term, students are introduced to some key ideas of Further Maths such as complex numbers and matrices, which form the base of many future topics. In addition, they build on the knowledge from AS maths and make links between matrices and geometrical transformations in the plane.</p> <p>Content:</p> <ul style="list-style-type: none"> • Introduction to complex numbers • Argand diagrams: modulus & argument. • Matrices • Determinants & inverse matrices • Matrices & simultaneous equations • Matrix transformations 	<p>This half term, students build on many of the topics covered in AS maths, but look at them in more depth and detail, for example they also look at the concept of proof in greater detail and start to consider vectors in 3D as well as 2D. They apply the integration skills from AS maths to look at the volume created when shapes are rotated around the axes.</p> <p>Content:</p> <ul style="list-style-type: none"> • Roots of polynomials • Series • Proof by induction • Vectors in 3D & dot product • Volumes of revolution 	<p>This half term, we cover the Further Pure 1 content with students, building on some key concepts from the pure maths they have covered thus far. We explore more complex functions such as parabolas and hyperbolas, and also build on students' existing knowledge of trigonometry, to see how the t-formulae can be used to solve more complex trigonometric equations.</p> <p>Content:</p> <ul style="list-style-type: none"> • Reciprocal inequalities • Graphical inequalities • Numerical methods for different equations • Vector products • Conic sections: parabolas & hyperbolas • T-formulae • Momentum & impulse 	<p>During this half term, we finish the AS Further Maths content by studying the Further Mechanics 1 module. This builds on the work that students saw in half term 3 of AS maths when they studied the mechanics module.</p> <p>Content:</p> <ul style="list-style-type: none"> • Collisions • Elastic collisions in one dimension • Newton's Law of Restitution • Work, energy & power 	<p>In this half term, the focus shifts to revision, to ensure that students are fully prepared for their AS exams. Students complete weekly mocks which their teachers mark and give feedback of areas of strength and areas which need more focus. These areas are then targeted through revision lessons to ensure that students become more confident and able to tackle exam-style questions.</p>	<p>After the students have finished their AS exams, we continue to build on their knowledge of Further Mechanics. For the most part these are direct extensions of the further mechanics covered in half term 3 & 4, but extending to more complex scenarios, such as elastic collisions in two dimensions.</p> <p>Content:</p> <ul style="list-style-type: none"> • Impulse in two dimensions • Elastic collisions in two dimensions • Hooke's law • Elastic energy
<p>13 Maths</p>	<p>In the first half term of Year 13, we revise the key trigonometry and differentiation content that was covered at the end of Year 12, before moving on to more complex integration and extending students' current knowledge of functions and introducing the modulus function.</p> <p>Content:</p> <ul style="list-style-type: none"> • Radians, arcs & sectors • Trigonometric identities, 	<p>During the second half term, we finish of the A2 pure content, before moving on to the A2 mechanics content. The pure content revisits the GCSE topic of sequences, but goes into more detail, looking at geometric sequences as well as arithmetic. We finish this term by building on the work on forces in AS maths by looking at forces on inclined planes.</p> <p>Content:</p> <ul style="list-style-type: none"> • Sequences & series 	<p>This half term we finish off the A2 mechanics content before moving on to the statistics content. In mechanics we look at applying the knowledge from forces and kinematics covered so far to more complex situations such as ladders and hinges. In statistics we look at how regression lines can be used to forecast outcomes and we also revisit hypothesis testing, this time using the Product Moment Correlation Coefficient.</p>	<p>During this half term we finish off the A2 statistics content. We revisit and build upon key ideas from AS, further developing students' understanding of probability and hypothesis testing, this time with the normal distribution.</p> <p>Content:</p> <ul style="list-style-type: none"> • Probability & set notation • Conditional probability • The normal distribution & hypothesis testing 	<p>In this half term, the focus shifts to revision, to ensure that students are fully prepared for their A2 exams. Students complete weekly mocks which their teachers mark and give feedback of areas of strength and areas which need more focus.</p> <p>These areas are then targeted through revision lessons to ensure that students become more confident and able to tackle exam-style questions.</p>	<p>Exams</p>

	<p>addition formulae, double angles & $\text{Rcos}/\sin(x+a)$</p> <ul style="list-style-type: none"> • Partial fractions • Differentiation: chain rule, product & quotient rules • Implicit differentiation • Second order derivatives • Integration by recognition & partial fractions • Integration by substitution • Integration by parts • The trapezium rule • Functions: domain & range • Composite & inverse functions • The modulus function • Graph transformations • Parametric equations • Differentiating & integrating parametric equations • Differential equation 	<ul style="list-style-type: none"> • Iteration • Newton-Raphson method • Vectors in 3D • Proof • Moments • Forces at any angle • Projectiles 	<p>Content:</p> <ul style="list-style-type: none"> • Further kinematics • Application of forces: ladders & hinges • Regression and correlation • Product Moment Correlation Coefficient and hypothesis testing 			
<p>13 Further Maths</p>	<p>During the first half term of A2 Further Maths, students begin the Core Pure 2 module and increase their understanding of functions as they are introduced to hyperbolic functions and learn how to integrate them, building on their understanding of integration developed thus far. In addition, they study differential equations in more detail, extending their knowledge to second order differential equations.</p> <p>Content:</p>	<p>During this half term, students finish the Core Pure 2 content, before moving on to the A2 Further Pure 1 content. During this time, we revisit and build upon concepts from AS Further Maths by building the t- formulae into our expanding integration toolkit. Maclaurin series are developed more fully into Taylor series which allows for a more fine-grained understanding of the functions they represent.</p> <p>Content:</p> <ul style="list-style-type: none"> • First & second order differential equations • Reducible differential 	<p>In this half term, we finish the pure content required for A2 Further Maths, before revising the Further Mechanics content which was covered at the end of Year 12. Students also study two areas of AS Further Maths in more depth. Conic sections are treated in much more generality and students deepen their understanding of co-ordinate geometry as a result. The cross product is also revisited in further vectors and used to simplify lengthier calculations they would have seen in their AS studies.</p> <p>Content:</p>	<p>In this half term, the focus shifts to revision, to ensure that students are fully prepared for their A2 exams. Students complete weekly mocks which their teachers mark and give feedback of areas of strength and areas which need more focus. These areas are then targeted through revision lessons to ensure that students become more confident and able to tackle exam-style questions.</p>	<p>In this half term, the focus remains on revision, to ensure that students are fully prepared for their A2 exams. Students continue to complete weekly mocks which their teachers mark and give feedback of areas of strength and areas which need more focus. These areas are then targeted through revision lessons to ensure that students become more confident and able to tackle exam-style questions.</p>	<p>Exams</p>

<ul style="list-style-type: none"> • Complex numbers: Euler's relation • Method of differences • Hyperbolic functions • Differentiating hyperbolic & inverse trigonometric functions • Maclaurin Series • Polar coordinates • Integrating inverse trigonometric & hyperbolic functions • Improper integrals • First & second order differential equations • Further vectors 	<p>equations</p> <ul style="list-style-type: none"> • Taylor series • L'Hopital's and Leibnitz's rule • Further t-formulae 	<ul style="list-style-type: none"> • Inequalities with the modulus function • Further vectors • Conic sections • Simpson's Rule • Further Mechanics revision 			
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Enrichment Opportunities:

We run a range of extra-curricular clubs which all students are encouraged to attend to help promote and develop a love of mathematics and problem solving in our students. Students in Year 7, 8 & 9 have the opportunity to attend 'Road to Team maths challenge' which provides students with challenging logic and problem-solving activities which they tackle both individually and in teams. UKMT is hugely popular across all year groups in both the individual and teams challenges, and many of our students have been awarded Bronze, Silver and Gold certificates, some even progressing to the Kangaroo and Olympiad rounds. We also offer a Chess club to our students providing them with the opportunity to learn how to play the game, and to play games against each other. In addition, we offer Rubik's cube club where students are taught different methods of solving a Rubik's cube efficiently.

The most-able students who achieve grade 8s and 9s in their early-entry GCSE in Year 9 or Year 10 go on to study extra maths qualifications such as Further Maths GCSE and Additional Maths FSMQ. These qualifications provide students with the opportunity to study some A-level Maths and Further Maths content early to promote interest in studying the subject to a higher level.

Impact:

Formative assessment is an integral part of our approach to Teaching and Learning. Over the course of their study, we will use weekly/fortnightly cumulative formative diagnostic assessments (in class or for homework) to ensure that students are consistently retrieving their knowledge of different components. The purpose of this is to ensure all knowledge is retained (and any gaps are identified and addressed promptly) and also to inform teachers' planning. Using this style of assessment, we will make use of the advantages of spaced practice as well as allowing pupils to be able to apply their knowledge to a wide variety of contexts.

Students will also sit a summative assessment every term. This assessment will be cumulative and will assess not only what the students have learned over the previous term, but also their understanding of all relevant material previously taught. Staff are supported to mark these accurately and post assessment moderation also takes place to ensure the validity of the data. All data is analysed centrally (not by teachers) and each Subject Leader is given a report outlining the areas of strength and weakness. This is used to inform future planning, support with additional interventions and set changes.