

The Swindon Academy Mathematics department believe students should be encouraged to develop a deep understanding of all concepts taught; it is essential for students to develop mathematical thinking in and out of the classroom, to fully master mathematical concepts. Pupils should be encouraged to use mathematical language concisely and accurately as part of the wider school vocabulary curriculum to allow students to both communicate and flourish both in and out the classroom in order to be able to face the challenges of 21st century Britain and moreover the global employment market. We aim to educate our students not just for examinations but to be an active, confident and mathematically competent participants in society.

Our curriculum (based on the national curriculum), emphasises the retention of knowledge and depth of learning, carefully designed to interleave content, enabling pupils to revisit prior knowledge without having a spiral curriculum. The Curriculum focuses on teaching in a sequence that provides building blocks for pupils to access future topics. During KS3 students will be provided with the building blocks in the five key mathematical areas: Number, Algebra, Geometry, Statistics & Proportion. At KS4 students will be placed on either a Higher or Foundation learning pathway in preparation for their GCSE examinations and beyond that their AS and A2 examinations in either Core, Pure or Further Maths.

Throughout the Key Stages, students will be encouraged to develop high levels of Mathematical fluency and the ability to apply this fluency in order to solve problems both within Mathematics and in other curriculum areas. Opportunities to develop mathematical fluency and problem solving should be embedded in all lessons so that students can fulfil their potential regardless of starting point or background. As a faculty we have adapted our curriculum offer, it is fully adaptable for both our highest achieving students and our students that have the highest barriers to accessing our curriculum, both sets of students are provided with well differentiated curriculums with aim of providing them the best opportunities to achieve their potential.

Outside of the classroom students engage with an abundance of mathematical enrichment opportunities from Junior, Intermediate and Senior Maths Challenges to afterschool clubs like Chess and Board games club where students have an opportunity to develop and apply their fluency and problem-solving skills in real-life settings. As a faculty we are always searching for new and innovative ways to further enrich our student’s education outside the classroom.

Implementation – Rosenshine principles of instruction – please write one or two sentences to describe the implementation for each of the Rosenshine principles below these must be subject specific and observable in lessons.

<p>Daily Review Daily review is an important component of instruction. It helps strengthen the connections of the material learned. Automatic recall frees working memory for problem solving and creativity.</p>	<p>New Material in Small Steps Our working memory is small, only handling a few bits of information at once. Avoid its overload—present new material in small steps and proceed only when first steps are mastered.</p>	<p>Ask Questions The most successful teachers spend more than half the class time lecturing, demonstrating and asking questions. Questions allow the teacher to determine how well the material is learned.</p>	<p>Provide Models Students need cognitive support to help them learn how to solve problems. Modelling, worked examples and teacher thinking out loud, help to clarify the specific steps involved.</p>	<p>Guide Student Practice Students need additional time to rephrase, elaborate and summarise new material in order to store it in their long-term memory. More successful teachers build in more time for this.</p>	<p>Check Student Understanding Less successful teachers merely ask “Are there any questions?” no questions are taken to mean no problems. False. By contrast, more successful teachers check on all students.</p>	<p>Obtain High Success Rate A success rate of around 80% has been found to be optimal, showing students are learning and also being challenged. Better teachers taught in small steps followed by practice.</p>	<p>Scaffolds for Difficult Tasks Scaffolds are temporary supports to assist learning. They can include modelling, teacher thinking aloud, cue cards and checklists. Scaffolds are part of cognitive apprenticeship.</p>	<p>Independent Practice Independent practice produces “overlearning” - a necessary process for new material to be recalled automatically. This ensures no overloading of students’ working memory.</p>	<p>Weekly and Monthly Review The effort involved in recalling recently -learned material embeds it in long-term memory. And the more this happens, the easier it is to connect new material to such prior knowledge.</p>
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R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
<ul style="list-style-type: none"> At the start of every lesson – students complete a review of previously taught content. This applies to all lessons in all key stages 	<ul style="list-style-type: none"> Each lesson – new concepts are introduced or re-capped in the I do, we do & you do style. 	<ul style="list-style-type: none"> Each lesson staff utilise a range of assessment tools including cold call, mini whiteboards, turn and talk and other TLAC techniques. 	<ul style="list-style-type: none"> Each lesson staff utilise a range of TLAC modelling strategies 	<ul style="list-style-type: none"> Each lesson from Y7-Y10 staff introduce guided practice utilising the minimal change technique – allowing increased access and opportunities for curriculum links to be made. 	<ul style="list-style-type: none"> Staff circulate effectively to check student understanding and unpick misconceptions 	<ul style="list-style-type: none"> Staff work through the guided practice effectively. Aided by staff until a high success rate is achieved 	<ul style="list-style-type: none"> Staff will provide relevant scaffolds for further learning activities 	<ul style="list-style-type: none"> Staff will provide further learning activities, these will given a star rating of difficulty to allow staff to pick the correct task for their group 	<ul style="list-style-type: none"> KPI Tests and review occur after the completion of each KPI. Students are assessed twice a week in order to review learning

Term	1	2	A	3	4	5	6	A	6
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Alternative	<p>Students will be developing their understanding of number and its applications Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> • Use Addition and Subtraction, including formal written methods, applied to integers and in some cases decimals • Calculate and solve problems involving perimeters of rectangles and in some cases compound shapes • Understand and use place value for integers and decimals of any size 	<p>Students will be developing their understanding of multiplication and division. Pupils will be expected to:</p> <ul style="list-style-type: none"> • Estimate calculations by rounding • Use Multiplication and Division, including formal written methods, applied to integers and in some cases decimals. 		<p>Students will be developing their understanding of fractions. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> • Use the concepts and vocabulary of prime numbers, factors, multiples, common factors, common multiples, highest common factor, lowest common multiple • Derive and apply formulae to calculate and solve problems involving area of triangles and rectangles 	<p>Students will be developing their understanding of algebra. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> • Express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1. • Use addition and subtraction, including formal written methods, applied to proper and improper fractions, and mixed numbers • Compare and order fractions by creating common denominators • Interpret fractions as operators. 	<p>Students will be developing their understanding of geometry. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> • Solve calculations requiring understanding of B-I-D-M-AS • Use the basic rules of algebra • Substitute into simple formulae 	<p>Students will be developing their understanding of statistics. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> • Simplify and manipulate algebraic expressions to maintain equivalence by multiplying a single term over a bracket or by taking out common factors • Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles
Standard	<p>Students will be developing their understanding of number and its applications Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> • Understand and use place value for decimals, measures and integers of any size • Use Addition and Subtraction, including formal written methods, applied to integers and decimals • Calculate and solve problems involving perimeters of rectangles and compound shapes (not circles) • Estimate calculations by rounding 	<p>Students will be continuing to develop their understanding of number and its applications. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> • Use Multiplication and Division, including formal written methods, applied to integers and decimals • Use the concepts and vocabulary of prime numbers, factors, multiples, common factors, common multiples, highest common factor, lowest common multiple • Derive and apply formulae to calculate and solve problems involving area of triangles and rectangles 		<p>Students will be developing their understanding of fractions. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> • Express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1. • Use addition and subtraction, including formal written methods, applied to proper and improper fractions, and mixed numbers • Compare and order fractions by creating common denominators • Interpret fractions as operators. 	<p>Students will be developing their understanding of algebra. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> • Solve calculations requiring understanding of B-I-D-M-AS (know that the inverse of squaring is 'square rooting') • Use the basic rules of algebra • Simplify and manipulate algebraic expressions to maintain equivalence by multiplying a single term over a bracket or by taking out common factors • Substitute into simple formulae 	<p>Students will be developing their understanding of geometry. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> • Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles • Derive, describe and illustrate properties of triangles, quadrilaterals and other plane figures [for example, equal lengths and angles] using appropriate language and technologies • Describe, sketch and draw regular polygons, and other polygons that are reflectively and rotationally symmetric • Read and plot coordinates in all 4 quadrants 	<p>Students will be developing their understanding of statistics. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> • Describe, interpret and compare observed distributions of a single variable through the use of the mean • Enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams
Vocabulary instruction	<ul style="list-style-type: none"> • Decimal • Perimeter • Sum • Negatives • Subtraction • Isosceles Triangle 	<ul style="list-style-type: none"> • Multiplication • Division • Factors • Multiples • Lowest Common Multiple • Highest Common Factor 		<ul style="list-style-type: none"> • Fraction • Improper Fractions • Numerator • Denominator • Mixed Numbers • Quantity 	<ul style="list-style-type: none"> • Algebra • BIDMAS • Terms • Expand • Factorise • Substitution 	<ul style="list-style-type: none"> • Quadrilaterals • Polygon • Regular Shape • Irregular Shape • Plane • Co-ordinate 	<ul style="list-style-type: none"> • Mean • Data Points • Quantative Data • Qualatative Data • Characteristics • Venn Diagram

Year 8 Alternative	<p>Students will be building on their understanding of number and its applications. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> Derive, describe and illustrate properties of triangles, quadrilaterals and other plane figures [for example, equal lengths and angles] using appropriate language and technologies Describe, sketch and draw regular polygons, and other polygons that are reflectively and rotationally symmetric Read and plot coordinates in all 4 quadrants 	<p>Students will be building on their understanding of algebra and its applications. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> Describe, interpret and compare observed distributions of a single variable through the use of the mean Enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams 	<p>Students will be building on their understanding of geometry and its applications. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> Use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, HCF, LCM, prime factorisation, including using product notation Round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places] 	<p>Students will be developing their understanding of ratio, proportion and its applications. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> Multiply and divide fractions and mixed numbers Manipulate negative numbers effectively 	<p>Students will be building on their understanding of geometry and its applications. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> Use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement) Use coordinates and develop algebraic relationships as necessary 	<p>Students will be building on their understanding of statistics and its applications. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> Use standard units of mass, length, time, money and other measures, including with decimal quantities Divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio
Standard	<p>Students will be building on their understanding of number and its applications. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> Use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, HCF, LCM, prime factorisation, including using product notation Round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places or significant figures] Multiply and divide fractions and mixed numbers Manipulate negative numbers effectively 	<p>Students will be building on their understanding of algebra and its applications. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> Use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement) Model situations or procedures by translating them into algebraic expressions or formulae and by using graphs Use coordinates and develop algebraic relationships as necessary 	<p>Students will be building on their understanding of geometry and its applications. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> Use standard units of mass, length, time, money and other measures, including with decimal quantities Understand and use the relationship between parallel lines and alternate and corresponding angles Calculate interior and exterior angles of (regular) polygons Calculate and solve problems involving perimeters of 2-D shapes (including circles) and composite shapes 	<p>Students will be developing their understanding of ratio, proportion and its applications. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction Solve problems involving percentage change, including percentage increase, decrease, original value problems and simple interest in financial mathematics Divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio 	<p>Students will be building on their understanding of geometry and its applications. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> Derive and apply formulae to calculate and solve problems involving area of triangles, parallelograms, trapezia and (part)circles Use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D Derive and apply formulae to calculate and solve problems involving volume of cuboids (including cubes) and other prisms (including cylinders) 	<p>Students will be building on their understanding of statistics and its applications. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts and vertical line (or bar) charts for ungrouped and grouped numerical data Describe, interpret and compare observed distributions of a single variable through appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers) Enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams
Vocabulary instruction	<ul style="list-style-type: none"> Index Power 	<ul style="list-style-type: none"> Axis Variable 	<ul style="list-style-type: none"> Parallel Exterior Angles 	<ul style="list-style-type: none"> Ratio Equivalent 	<ul style="list-style-type: none"> Parallelogram Describe 	<ul style="list-style-type: none"> Intersection Set Volume

	<ul style="list-style-type: none"> • Square Roots • Prime Numbers • Square • Cube 	<ul style="list-style-type: none"> • Solve • y axis • x axis • Midpoint 	<ul style="list-style-type: none"> • Interior Angles • Diameter • Circumference • Radius 	<ul style="list-style-type: none"> • Interest • Proportion • Of • Simplify 	<ul style="list-style-type: none"> • Construct • Construction • Compare • Grouped data 	<ul style="list-style-type: none"> • Vertex • Edge • Face
Year 9 Alternate	<p>Students will be building on their understanding of number and its applications. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> • Understand and use the relationship between parallel lines and alternate and corresponding angles • Calculate interior and exterior angles of (regular) polygons • Calculate and solve problems involving perimeters of 2-D shapes (including circles) and composite shapes 	<p>Students will be building on their understanding of number and its applications. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> • Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction • Solve problems involving percentage change, including percentage increase, decrease, original value problems and simple interest in financial mathematics 	<p>Students will be building on their understanding of algebra and its applications. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> • Divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio • Derive and apply formulae to calculate and solve problems involving area of triangles, parallelograms, trapezia and (part)circles 	<p>Students will be building on their understanding of algebra and geometry. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> • Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts and vertical line (or bar) charts for ungrouped and grouped numerical data • Describe, interpret and compare observed distributions of a single variable through appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers) 	<p>Students will be building on their understanding of geometry and its applications. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> • Use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D • Derive and apply formulae to calculate and solve problems involving volume of cuboids (including cubes) and other prisms (including cylinders) 	<p>Students will be building on their understanding of basic sequences and vectors. Pupils will be expected to be able to:</p> <ul style="list-style-type: none"> • Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts and vertical line (or bar) charts for ungrouped and grouped numerical data • Enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams
Standard	<p>Students will be consolidating their understanding of number topics previously taught. Where appropriate students will develop skills further, so they are able to</p> <ul style="list-style-type: none"> • Use index notation for integer powers of 10, including negative powers • Simplify and calculate the value of numerical expressions involving multiplication and division of integer powers, negative powers and powers of a power • Understand the term reciprocal • Error intervals using inequalities • Apply and interpret limits of accuracy 	<p>Students will be consolidating their understanding of fractions, decimals and percentages. Where appropriate students will develop skills further, so they are able to</p> <ul style="list-style-type: none"> • Interpret equations and graphs that describe direct and inverse proportion 	<p>Students will be consolidating their understanding of algebra. Where appropriate students will develop skills further, so they are able to:</p> <ul style="list-style-type: none"> • Understand what an 'identity' is • Add and subtract fractions with an algebraic numerator • Multiply, divide and simplify algebraic fractions • Expand double brackets • Factorise quadratics of the form $x^2 + bx + c$ • Difference of two squares • Use algebra to show expressions are equivalent • Know the difference between an equation and an identity; argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments 	<p>Students will be consolidating their understanding of algebra and geometry. Where appropriate students will develop skills further, so they are able to:</p> <ul style="list-style-type: none"> • Solve linear equations in one unknown algebraically, with unknowns on both sides • Form and solve algebraic equations and interpret the solution • Solving linear equations that require algebraic fraction manipulation • Solve linear inequalities in one variable e.g. $5x - 7 > 18$ • Represent and interpret solution sets to inequalities on a number line • Solve two inequalities in x, find the solution sets and compare them to see which value of x satisfies both • Convert between metric area measures • Pythagoras' theorem • Given 3 sides of a triangle, justify if it is right-angled or not • Calculate the length of a line segment AB given pairs of points 	<p>Students will be consolidating their understanding of geometry. Where appropriate students will develop skills further, so they are able to:</p> <ul style="list-style-type: none"> • Apply properties of angles in parallel lines to an algebraic context • Arc lengths, angles and areas of sectors of circles • Calculate exactly with multiples of π • Use rearranging to calculate missing lengths given the area or circumference • Surface area and volume of spheres, pyramids, cones and composite solids (hemispheres, frustums) • Convert between metric volume measures • Convert between metric measures of volume and capacity e.g. $1\text{ml} = 1\text{cm}^3$ 	<p>Students will be consolidating their understanding of sequences and vectors. Where appropriate students will develop skills further, so they are able to:</p> <ul style="list-style-type: none"> • Continue a geometric progression and find the term-to-term rule, including negatives, fraction and decimal terms • Continue a quadratic sequence and use the nth term to generate terms • Find the nth term of quadratic sequences • Recognise and use simple geometric progressions • Addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors • Be able to represent information graphically given column vectors • Identify two column vectors which are parallel

Vocabulary instruction	<ul style="list-style-type: none"> Integer Reciprocal Significant Figures Surd Expression Interpret 	<ul style="list-style-type: none"> Inverse Convert Recurring Express Unitary Compounding 	<ul style="list-style-type: none"> Coefficients Functions Derive Product Identity Formulae 	<ul style="list-style-type: none"> Segment Linear Equation Trapezium Composite Hypotenuse 	<ul style="list-style-type: none"> Quadrants Sector Surface Area Chord Prisms Net 	<ul style="list-style-type: none"> Arithmetic Translation Vector Plane Magnitude Quadratic Sequence
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Term	1	2	3	4	5	6	6	
Year 10 Foundation	<p>Foundation students will be developing their proportionality skills. Students will be able to:</p> <ul style="list-style-type: none"> Use percentages in real-life situations e.g. price after VAT, value of profit or loss, simple interest, income tax Solve ratio problems involving the change of a ratio within a question Set up, solve and interpret the answers in growth and decay problems, including compound interest Identify the interest rate in compound interest questions Set up, solve and interpret the answers in growth and decay problems 	<p>Foundation students will be developing their statistical skills. Students will be able to:</p> <ul style="list-style-type: none"> Draw and Interpret Frequency tables, bar charts, composite bar charts, pie charts, pictograms, vertical line charts, stem and leaf (including back-to-back) Mean, mode, median, modal class Range and outliers Compare the mean, median, mode and range (as appropriate) of two distributions using bar charts, dual bar charts, pictograms and back-to-back stem and leaf 	<p>Foundation students will be developing their probability and number skills. Students will be able to:</p> <ul style="list-style-type: none"> Probability tree diagrams for independent and dependent events Convert large and small numbers into standard form and vice versa Multiply and divide numbers in standard form Plot Scatter graphs - draw estimated lines of best fit; Compare the mean, median, mode and range (as appropriate) of two distributions using bar charts, dual bar charts, pictograms and back-to-back stem and leaf Interpret and construct tables 	<p>Foundation students will be developing their algebra skills. Students will be able to:</p> <ul style="list-style-type: none"> Change the subject of a formula involving the use of square roots and squares Plot straight line graphs Identify and interpret gradients and intercepts of straight-line graphs Change between standard units e.g. time, mass, length, money, volume, area Recognise, sketch and interpret graphs of ... quadratic function. 	<p>Foundation students will be developing their algebra skills. Students will be able to:</p> <ul style="list-style-type: none"> Solve two simultaneous equations in two variables (linear/linear) algebraically Plot and interpret reciprocal graphs Find approximate solutions using a graph Identify roots, intercepts and turning points of a quadratic function 	<p>Foundation students will be developing their geometric skills. Students will be able to:</p> <ul style="list-style-type: none"> Construct plans and elevations of 3D shapes Given the front and side elevations and the plan of a solid, draw a sketch of the 3D solid Use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle) Construct equal distances from two points or two line segments 		
Higher	<p>Higher students will be further developing their algebra skills. Students will be able to:</p> <ul style="list-style-type: none"> Rearrangement complex formulae involving fractions, roots and powers and where the subject appears on both sides of the formula Plot and draw graphs of straight lines in the form $ax + by = c$ Find the equation of a straight line from a graph Use $y = mx + c$ to identify perpendicular lines Change between standard units and compound units e.g. density and pressure Find roots of a quadratic algebraically 	<p>Higher students will be further developing their algebra skills. Students will be able to:</p> <ul style="list-style-type: none"> Find roots of a quadratic algebraically by factorisation - with rearrangement needed Expanding more than two brackets Deduce turning points by completing the square Simplify algebraic fractions Multiply, divide, add, subtract algebraic fractions Draw circles, centre the origin, equation $x^2 + y^2 = r^2$ Sketch and interpret graphs of 	<p>Higher students will be further developing their probability and proportion skills. Students will be able to:</p> <ul style="list-style-type: none"> Unbiased samples and effects of increasing sample size Calculate the probability of independent and dependent combined events Calculate and interpret conditional probabilities: Use a tree diagram to calculate conditional probability Use a Venn diagram to calculate conditional probability Capture and recapture Identify direct proportion from a table of values, by comparing ratios of values, for x squared and x cubed relationships 	<p>Higher students will be further developing their numerical skills. Students will be able to:</p> <ul style="list-style-type: none"> Simplify surd expressions involving squares (e.g. $\sqrt{12} = \sqrt{4 \times 3} = \sqrt{4} \times \sqrt{3} = 2\sqrt{3}$) Rationalise denominators Change recurring decimals into their corresponding fractions Calculate the upper and lower bounds of numbers given to varying degrees of accuracy Find the upper and lower bounds in real-life situations using measurements given to appropriate degrees of accuracy Set up, solve and interpret the answers in growth and decay problems, including compound interest 	<p>Higher students will be further developing their statistical and proportionality skills. Students will be able to:</p> <ul style="list-style-type: none"> Use the Product rule for counting i.e. if there are m ways of doing one task and for each of these, there are n ways of doing another task, then the total number of ways the two tasks can be done is $m \times n$ ways Scatter graphs - draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends while knowing the dangers of so doing Sampling Solve ratio problems involving the change of a ratio within a question Relate ratios to fractions and to linear functions 	<p>Higher students will be further developing their geometry skills. Students will be able to:</p> <ul style="list-style-type: none"> Identify the scale factor of an enlargement of a similar shape as the ratio of the lengths of two corresponding sides, using integer or fraction scale factors Find missing areas and volumes in similar 3D solids Use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle) Trigonometry in right angled triangles Know the exact values of $\sin\theta$ and $\cos\theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90°. Know the 		
	Assessment 1					Assessment 2		
	Review and reteach							

	by factorisation - with rearrangement needed.	exponential functions $y = kx$ for positive values of k and integer values of x	<ul style="list-style-type: none"> Use $y = kx$ to solve direct proportion problems, including questions where students find k, and then use k to find another value 	<ul style="list-style-type: none"> Set up, solve and interpret the answers in growth and decay problems 	<ul style="list-style-type: none"> Solve complex multi-step problems involving fractions and probability 	exact value of $\tan\theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ$ and 60° <ul style="list-style-type: none"> Construct plans and elevations of 3D shapes
Vocabulary instruction	<ul style="list-style-type: none"> Subject Inverse Proportion Terms Perpendicular Gradient Line Segment 	<ul style="list-style-type: none"> Root Quadratic Origin Turning Point Simultaneous Approximate 	<ul style="list-style-type: none"> Probability Relative Frequency Mutually Exclusive Independent Standard Form Direct Proportion 	<ul style="list-style-type: none"> Irrational Rationalise Terminating Upper Bound Lower Bound Exponential 	<ul style="list-style-type: none"> Continuous Discrete Average Correlation Outlier Sample 	<ul style="list-style-type: none"> Enlargement Plan Elevation Locus Bisect Scale Factor

Term	1	2	3	4	5
Year 11	Foundation students will be developing their geometric skills. Students will be able to: <ul style="list-style-type: none"> Given 3 sides of a triangle, justify if it is right-angled or not Apply Pythagoras' Theorem with a triangle drawn on a coordinate grid Calculate the length of a line segment AB given pairs of points Trigonometry in right angled triangles Know the exact values of $\sin\theta$ and $\cos\theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90°. Know the exact value of $\tan\theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ$ and 60° Use three-figure bearings to specify direction Given the bearing of a point A from point B, work out the bearing of B from A Solve locus problems including bearings 	Foundation students will be further developing their geometric skills. Students will be able to: <ul style="list-style-type: none"> Transformations - rotation, reflection, translation, enlargement (with a positive scale factor) Solve angle problems involving congruence Addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors Identify two column vectors which are parallel Solve problems to find missing lengths in similar shapes Understand the effect of enlargement on perimeter of shapes 	Revision and past paper practice to embed knowledge and apply skills	Revision and past paper practice to embed knowledge and apply skills	Revision and past paper practice to embed knowledge and apply skills

	<p>Higher students will be further developing their algebraic skills. Students will be able to:</p> <ul style="list-style-type: none"> Solve 'Show that' and proof questions using consecutive integers ($n, n + 1$), squares a^2, b^2, even numbers $2n$, odd numbers $2n + 1$ Solve linear/quadratic simultaneous equations Composite functions - for two functions $f(x)$ and $g(x)$, find $gf(x)$ Find the inverse of a linear function Find approximate solutions to equations numerically using iteration Use iteration with simple converging sequences Solve quadratic inequalities in one variable, by factorising and sketching the graph to find critical values Sketch a graph of a quadratic function, by factorising or by using the formula, identifying roots, y-intercept and turning point by completing the square Represent the solution set for inequalities using set notation, i.e. curly brackets and 'is an element of' notation e.g. the solution set of $x^2 - 3x - 10 < 0$ as $\{x: x < -3\} \cup \{x: x > 5\}$ 	<p>Higher students will be further developing their statistical and geometric skills. Students will be able to:</p> <ul style="list-style-type: none"> Draw and interpret Histograms Cumulative frequency graphs Draw, interpret and compare Box plots Enlargement - negative scale factors Solve geometric problems in 2D where vectors are divided in a given ratio Produce geometrical proofs to prove points are collinear and vectors/lines are parallel Congruence criteria for triangles (SSS, SAS, ASA, RHS) Solve angle problems involving congruence 	<p>Higher students will be further developing both algebra and number skills. Students will be able to:</p> <ul style="list-style-type: none"> Recognise and use the equation of a circle with centre at the origin Find the equation of a tangent to a circle at a given point, by: Estimate area under a quadratic or other graph by dividing it into trapezia. Interpret the results in cases such distance–time graphs, velocity–time graphs and graphs in financial contexts Use kinematics formulae from the formulae sheet to calculate speed, acceleration, etc. (with variables defined in the question) Apply to the graph of $y = f(x)$ the transformations $y = -f(x), y = f(-x)$ for linear, quadratic, cubic functions Apply to the graph of $y = f(x)$ the transformations $y = f(x) + a, y = f(x - a)$ for linear, quadratic, cubic functions 	<p>Revision and past paper practice to embed knowledge and apply skills</p>	
Vocabulary instruction					

Term	1	2	A s	3	A	5	6
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Year 12 Core Maths	In term 1 students study the following topics: <ul style="list-style-type: none"> Data Analysis Cumulative Frequency Box Plots Histograms 	In term 2 students will study the following topics: <ul style="list-style-type: none"> Personal Finance including taxation, national insurance, APR and AER Fermi-Estimation and Critical analysis 	Assessment 1	In term 3 students will study the following topics: <ul style="list-style-type: none"> Further critical analysis of statistical models Normal Distribution Confidence Intervals 	Assessment 2	In term 4 students will study the following topics: <ul style="list-style-type: none"> Further statistical analysis of statistical models Correlation Regression 	In Term 5 & 6 students will be preparing for their AS Core Maths examination.	Assessment 3	Review and reteach	

Term	1	2	Assessment 1	3	Assessment 2	4	5	6	Assessment 3	Review and reteach
Year 12 Pure Maths	In term 1 students study the following topics: <ul style="list-style-type: none"> Algebraic Expressions Quadratics Equations/Inequalities Graph Transformations Straight Line Graphs Circle Geometry 	In term 2 students will study the following topics: <ul style="list-style-type: none"> Algebraic Methods Differentiation Integration Logarithms Functions and Graphs 		In term 3 students will study the following topics: <ul style="list-style-type: none"> Trigonometric Ratios Trigonometric Identities and Equations Further Integration Parametric Equations Radians 		In term 4 students will study the following topics: <ul style="list-style-type: none"> Sequences and Series Trigonometry and Modelling Further Differentiation 	In term 5 & 6 students will study the following topics: <ul style="list-style-type: none"> Numerical Methods Vectors Modelling in Mechanics Constant Acceleration Forces and Motion Data Collection Measures of Spread and Location Representations of data 			
Year 12 Further Maths	In term 1 students study the following topics: <ul style="list-style-type: none"> Complex Numbers Argand Diagrams Series Number Theory Groups 	In term 2 students will study the following topics: <ul style="list-style-type: none"> Roots of Polynomials Matrices Transformations Conic Sections 		In term 3 students will study the following topics: <ul style="list-style-type: none"> Vectors Recurrence Relations Matrices Algebra Vectors T-Formulae 		In term 4 students will study the following topics: <ul style="list-style-type: none"> Proof by Induction Volumes of Revolution Conic Sections 2 Inequalities 	In term 5 & 6 students will study the following topics: <ul style="list-style-type: none"> Further Complex Numbers Series Hyperbolic Functions Taylor Series Further Methods in Calculus 			
Vocabulary instruction	<ul style="list-style-type: none"> Surd Rationalise Polynomial Quadratic Cubic 	<ul style="list-style-type: none"> Curve Function Inequality Region Reciprocal 		<ul style="list-style-type: none"> Enlargement Stretch Parallel Perpendicular Circle 		<ul style="list-style-type: none"> Normal Chord Theorem Axiom Binomial 	<ul style="list-style-type: none"> Identity Vector Position vector Geometry Differentiation 	<ul style="list-style-type: none"> Increasing function Decreasing Function Stationary point Integration Indefinite integration 		

	• Quartic	• Translation	• Tangent	• Trinomial	• Derivative	• Definite integration	
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Term	1	2	3	4	5
Year 13 Pure Maths	In Term 1 students will study the following topics: <ul style="list-style-type: none"> • Pure Mathematics Revision • Correlation • Probability • Variable Acceleration • Moments 	In Term 2 students will study the following topics: <ul style="list-style-type: none"> • Pure Mathematics Revision • Hypothesis Testing • Projectiles • Application of Forces • Further Kinematics 	In Term 3 students will study the following topics: <ul style="list-style-type: none"> • Pure Mathematics Revision • Regression, Correlation & Hypothesis • Conditional Probability • Normal Distribution 	Revision and Past Papers	Revision and past paper practice to embed knowledge and apply skills
Year 13 Further Maths	In Term 1 students will study the following topics: <ul style="list-style-type: none"> • Methods in differential equations • Modelling with differential equations • Integration Techniques • Polar Coordinates 	In Term 2 students will study the following topics: <ul style="list-style-type: none"> • Further Series • Further Number Theory • Further Recurrence Relations • Further Volumes of Revolutions 	Revision and Past Papers	Revision and Past Papers	
Vocabulary instruction	<ul style="list-style-type: none"> • Radian • Sequence • Series • Arithmetic sequence • Geometric sequence • Recurrence relation 	<ul style="list-style-type: none"> • Parametric Curve • Measures of location • Measures of spread • Correlation • Normal distribution • Hypothesis test 	<ul style="list-style-type: none"> • Force • Equilibrium • Moments • Friction • Projectile • Resolving 		