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Maths Curriculum; Sequencing Overview



Academic Year <u>Year 10</u>	Content Unit title and brief outline of content. GCSE Syllabus	Skills taught in each unit	Assessment – what knowledge and skills will be assessed and how?
Autumn A	Unit 8: Transformations, Bearings, Loci and Constructions	Unit 8 develops the skills necessary to: draw and reflect shapes using coordinate axes and describe a reflection given the object and its image on coordinate axes, enlarge a shape using a scale factor that is a positive whole number and to describe an enlargement using this method, rotate a shape on coordinate axes and to describe a rotation, enlarge a shape using a fractional scale factor and to describe an enlargement this way, translate a shape using column vectors and describe combinations of translations. Unit 8 also develops the skills necessary to: Draw and use scales on maps and scale drawings, Solve problems involving bearings, Construct a perpendicular bisector of a line, bisect an angle using a ruler and compass and construct angles using a ruler and compass, Draw a locus and use Loci to solve problems.	Two 45-minute cumulative assessments mid-way through the term using exam questions. Assessments are half GCSE papers with questions selected to represent the grade distributions and AO of a public examination, but topics tested only include those covered on the curriculum. Two assessments follow the PiXL DTT cycle (initial test, marking and feedback, therapy week, followed by retest, mark and feedback).
Autumn B	Unit 9: Equations and Inequalities	Unit 9 develops the skills necessary to: Solve a quadratic equal to zero, Solve a quadratic using the formula, complete the square in the form $p(x+q)^2+r$, Solve quadratics by any means using a calculator if needed, Solve an inequality and use set notation, Solve simultaneous equations for real-life situations, Use real-life situations to construct quadratic and linear equations and solve them	Two 45-minute skills-based summative assessments using exam questions on units covered in Aut A and B.

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Maths Curriculum; Sequencing Overview

<p>Spring A</p>	<p>Unit 10: Probability Unit 11: Multiplicative Reasoning</p>	<p>Unit 10 develops the skills necessary to: Use the product rule for finding the number of outcomes for two or more events, List all the possible outcomes of two events in a sample space diagram, Identify mutually exclusive outcomes and events in complex cases, Solve complex problems involving probabilities of mutually exclusive outcomes and events, Solve complex problems involving probability of an event not happening, Work out the expected results for experimental and theoretical probabilities for complex problems, Compare real results with theoretical expected values to see if a game is fair for complex problems, Calculate probabilities of repeated events for complex cases, Draw and use complex probability tree diagrams, Draw and use more complex tree diagrams to calculate conditional probability, Use complex Venn diagrams to calculate conditional probability.</p> <p>Unit 11 develops the skills necessary to: Solve growth and decay problems, Convert between metric speed measures, Work out density, Find the relationship between two variables and use it to answer questions.</p>	<p>Two 45-minute cumulative assessments mid-way through the term using exam questions. Assessments are half GCSE papers with questions selected to represent the grade distributions and AO of a public examination, but topics tested only include those covered on the curriculum. Two assessments follow the PiXL DTT cycle (initial test, marking and feedback, therapy week, followed by retest, mark and feedback).</p>
<p>Spring B</p>	<p>Unit 12: Similarity and Congruence Unit 13: Trigonometry</p>	<p>Unit 12 develops the skills necessary to: Prove shapes are congruent, Use the ratio of corresponding sides to work out scale factors, Find missing lengths on similar shapes.</p> <p>Unit 13 develops the skills necessary to: Understand and use upper and lower bounds to a given decimal point or significant figure, Know the graph of the sine function and use it to solve equations, Know the graph of the cosine function and use it to solve equations, Know the graph of the tangent function and use it to solve equations, Use the sine rule to solve 2D problems, Solve bearings problems using trigonometry, Use Pythagoras' theorem and trigonometry to solve 3D problems, Understand the rotational symmetry of the cosine curve, Sketch the graphs of trigonometric functions</p>	<p>Two 45-minute skills-based summative assessments using exam questions on units covered from Aut A-Spr A.</p>

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Maths Curriculum; Sequencing Overview

<p>Summer A</p>	<p>Unit 14: Further Statistics</p>	<p>Unit 14 develops the skills necessary to: Understand how to take a stratified sample, Draw and interpret cumulative frequency tables and diagrams, Work out the median, quartiles and interquartile range from a cumulative frequency diagram, Compare boxplots, Draw histograms, Work out the frequency density of a histogram from its graph, Compare cumulative frequency graphs.</p>	<p>Two 45-minute cumulative assessments mid-way through the term using exam questions. Assessments are half GCSE papers with questions selected to represent the grade distributions and AO of a public examination, but topics tested only include those covered on the curriculum. Two assessments follow the PiXL DTT cycle (initial test, marking and feedback, therapy week, followed by retest, mark and feedback).</p>
<p>Summer B</p>		<p>Preparing for End of Year exams developing exam technique, interpreting questions and markschemes, timing, checking working, attention to detail, and approaching questions in a methodical way. End of Year therapy and consolidation completed following the exams.</p>	<p>End of year exams – two 90 minute papers (non-calculator and calculator) which assesses all content from Year 9 and 10.</p>



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Maths Curriculum; Sequencing Overview

Key Stage 2 content summary; fundamentals of the number system including addition, subtraction, multiplication and division, basic algebra, ratio and proportion and links to decimals, fractions and percentages, basic geometry including angles, shapes and measurements, time, representing data

<p>Year 7 Content <i>These units form the foundations of Maths. Without teaching these units, students would not have the basic knowledge to build upon over time.</i></p> <p>Factors and Multiples, Sequences, Perimeter and Area, Negative Numbers, Averages, Equivalent fractions, Algebraic Expressions, Angles, Decimals, Linear Graphs, Percentages, 3D shapes, Probability, Ratio, Proportion and Rate of Change, Symmetry, Solving Equations.</p>	<p>Skills taught. <i>Are the skills taught in a spiral curriculum? What is the rationale for your sequencing of skills</i></p> <p><i>Maths has a spiral curriculum for both knowledge and skills. The skills learned in KS3 are subsequently built upon as students move in to KS4. They do not exist in isolation from each other, rather each is a necessary step in order to build the complexity and understanding of the range of mathematical knowledge and understanding that is required.</i></p> <p>Year 7:</p> <ul style="list-style-type: none"> - define, list, calculate and solve problems with factors, multiples, primes as well as HCF and LCM - add, subtract, multiply and divide positive and negative integers and apply the rules of BIDMAS to calculations - square, cube, square root and cube root integers and link these skills to BIDMAS - form equations and expressions, simplifying them where necessary, solve the equations, and substitute in to formulae or expressions - expand brackets and factorise expressions - working with fractions, decimals and percentages including simplifying, adding, subtracting, multiplying and dividing, and conversion between forms. Expressing one amount as a quantity of another. - recognising, drawing and calculating with angles. Using parallel lines, triangles, quadrilaterals and other polygons. - simplifying and sharing terms in a given ratio. - calculating perimeter, area and volume of 2D and 3D shapes respectively, properties of 2D and 3D shapes
<p>Year 8 Content <i>These units build upon the foundations of KS2 and Year 7 content and deliver the basics that can then be layered</i></p>	

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Maths Curriculum; Sequencing Overview

<p><i>upon with more complexity in the next key stage.</i> Sequences, Percentages, Probability, Using Data, Pencil and Paper Calculations, Transformations, Working with Numbers, Percentage Change, Graphs, Congruence and Scaling, Algebraic Expressions, Working with Fractions, Circles, Finding Probabilities, Equations and Formulae, Expressions and Equations</p>	<ul style="list-style-type: none"> - recognising and continuing sequences, finding the nth term <p>Year 8:</p> <ul style="list-style-type: none"> - to be able to identify numbers in index form and apply the laws of indices - to be able to round numbers to appropriate degrees of accuracy based on significant figures or decimal places - to be able to estimate calculations using rounding to assist with reducing the complexity - to be able to simplify expressions using the index laws and apply to problem solving - to be able to substitute values and solve equations - recognise values are in direct proportion and interpret their meaning when put in context - to be able to recognise and perform transformations - to be able to work with terminating and recurring decimals - to be able to use percentages and calculate percentage change - to be able to calculate probabilities and draw and complete probability diagrams and tree diagrams - to be able to make scale drawings, use bearings and be able to draw and recognise congruent and similar shapes. To apply this to problem solving - to be able to plot linear graphs and use the equation $y=mx+c$, including working with parallel and perpendicular lines and inverse functions. <p>Year 9:</p> <ul style="list-style-type: none"> - extend calculations to those involving numbers in standard form, surds and indices (zero, negative and fractional) - use and implement the manipulation of algebra including sequences, expanding, factorising equations, expressions and formulae - summarise, infer, interpret and compare data with the use of statistical diagrams and with the calculation of averages and range - organise, outline and integrate skills of manipulation for fractions, decimals and percentages - develop the fluency to use all prior knowledge to integrate problem solving and ratio - apply the trigonometric ratios to solve problems with right angled triangles <p>Year 10:</p> <ul style="list-style-type: none"> - combine the skills of solving, completing the square, factorising, substituting in to formulae in order to solve quadratic equations
<p>Year 9 Content <i>These units map out the start of GCSE and use all of the KS3 content to deepen the complexity and understanding of Maths. The majority of students follow the higher tier content, those studying foundation tier will not study every topic listed.</i> Number, place value, factors, powers, standard form, surds, fundamentals of algebra (simplifying, solving, substitution, sequences), interpreting and representing data, fractions, ratio and percentages, angles and trigonometry, graphs (linear, quadratic, cubic, reciprocal,</p>	

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Maths Curriculum; Sequencing Overview

<p>real-life), area and volume of prisms, circles, cones and pyramids, transformations and constructions.</p>	<ul style="list-style-type: none"> - combine the skills of algebraic manipulation and substitution in order to solve simultaneous equations - represent solutions to inequalities on a number line and plot them on a graph - construct a frequency tree, tree diagram, Venn diagram and use it to calculate probabilities - prove geometrical identities using clear mathematical reasoning and language - plot histograms, cumulative frequency graphs, box plots and draw comparisons between data sets using the graphs to help
<p>Year 10 <i>These units are the culmination of content taught in previous years and require a firm grasp of skills and content before. They cannot be taught any earlier.</i> Quadratic equations, simultaneous equations, inequations, probability, compound measures, similarity and congruence, sine and cosine rules, further statistics, solving equations graphically.</p>	<p>Year 11:</p> <ul style="list-style-type: none"> - apply the circle theorems to problems using the angle rules, explaining reasoning clearly - balancing and rearranging equations and formulae - interpreting real-life data and graphs and calculating gradients of tangents, chords and the area under graphs - using mock exam to develop exam technique, interpreting questions and markschemes, timing, checking working, attention to detail, and approaching questions in a methodical way
<p>Year 11 Content – see above for rationale. Circle theorems, algebraic fractions, functions, proof, vectors, direct and inverse proportion, translating graphs of functions.</p>	
<p>Is all of the NC Ks3 content taught in Year 7 & 8? If not, where is this made up? <i>The NC KS3 content is delivered in Year 7-9 in Maths. In Year 9, students start the GCSE course with any KS3 gaps delivered then.</i></p>	

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Maths Curriculum; Sequencing Overview



SIXTH FORM CURRICULUM

SUBJECT: MATHS

SECTION 1

For subjects taught at KS5 that also exist at KS4, please fill in the table below identifying the content and skills taught at GCSE, which are of particular use for the delivery of the curriculum in the 6th form.

Academic Year <u>Year 11</u>	Content and rationale. Unit title and brief outline of content.	Skills taught in each unit.	Assessment – how will the knowledge and skills be assessed?
Summer term: End of KS4 readiness for the 6 th form	<p>Key Knowledge studied at KS4 that will be useful for the 6th form</p> <p>A Level Maths primarily relies on the Algebra knowledge and skills taught throughout KS4.</p> <p>This forms the foundation for study at A level and therefore requires a high level of competency and understanding of algebraic manipulation, the link between algebra and graphs.</p>	<p>Summary of the main core skills taught at KS4 that can be reactivated at KS5</p> <p>GCSE Unit 2 Unit 2 develops the skills necessary to: Expanding the product of two brackets and simplify the expression, Solve problems involving factorising, Solve linear equations with unknowns on both sides, Solve linear equations containing fractions, Derive an algebraic formula from information given, Change the subject of a formula, Find a general formula for the <i>n</i>th term of an arithmetic sequence, Determine whether a particular number is a term of a given arithmetic sequence, Find the <i>n</i>th term of a quadratic sequence.</p>	

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Maths Curriculum; Sequencing Overview



	<p>There is also an introduction to vectors at KS4 which is developed further in KS5.</p>	<p>Unit 6 Unit 6 develops the skills necessary to: Identify the gradient and y intercept from straight lines drawn on coordinate axes, Identify the equation of a straight line from pairs of coordinates and to identify the point where 2 lines intersect, Solve problems including exam questions on D/T graphs and other graphs, Plot scatter diagrams and identify the line of best fit and its equation, Work out the equation of parallel or perpendicular lines, Solve real life problems involving quadratic graphs and find graphical solutions, Plot a reciprocal function $y=k/x$, Plot a scatter graph and interpret it, Solve cubic graphs graphically, Interpret various graphs and to be able to draw a graph of a circle centre O with given radii</p> <p>Unit 15 Unit 15 develops the skills necessary to: Identify the gradient and y intercept from straight lines drawn on coordinate axes, Identify the equation of a straight line from pairs of coordinates and to identify the point where 2 lines intersect, Sketch quadratic graphs, Use an iterative formula to find the positive roots of an equation and its graph, Solve cubic equations using an iterative process, Plot scatter diagrams and identify the line of best fit and its equation, Work out the equation of parallel or perpendicular lines, Solve real life problems involving quadratic graphs and find graphical solutions</p> <p>Unit 17 Unit 17 develops the skills necessary to: Change the subject of a formula where the subject appears twice, Change the subject of a formula involving fractions where all the variables are in the denominators, simplify algebraic fractions, Add and subtract algebraic fractions, Multiply and divide algebraic fractions, Solve</p>	
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Maths Curriculum; Sequencing Overview

		<p>equations that involve algebraic fractions, Find composite functions, Find inverse functions, Prove a result using algebra</p> <p>Unit 18 Unit 18 develops the skills necessary to: find the magnitude of vectors, identify vectors as column matrices when they are given as diagrams and to multiply a vector by a scalar quantity, identify the mid-point of a vector, add / subtract column vectors and vectors given as letters, identify resultant vectors using combinations of other vectors</p>	
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