

Mathematics

KS3

Year 7		Year 8		Year 9	
<p>HT1:</p>	<p>HT2: Fractions and Number Skills</p> <p>Pupils learn about equivalent fractions and how to do the four basic operations with fractions (+, -, x, ÷). Pupils build upon KS2, learning how to work with improper fractions and mixed numbers. Pupils carry out the four basic operations with integers and decimals, before learning about factors, multiples and primes.</p>	<p>HT1: Fractions, Decimals and Percentages, Lines and Angles</p> <p>Pupils apply skills developed in Year 7 to convert between fractions, decimals and percentages (including recurring decimals). Pupils develop further skills in finding percentages of amounts and practise increasing and decreasing by a required percentage. Pupils learn about angle properties and how to find missing angles in parallel lines, triangles, quadrilaterals and polygons.</p>	<p>HT2: Linear Graphs, Ratio and Proportion</p> <p>Pupils practise plotting co-ordinates, then draw straight line graphs, applying skills in substitution and plotting co-ordinates. Pupils learn to simplify ratios and share amounts in a ratio, applying these skills to problem solving and real-life application. Pupils learn the basics of direct and inverse proportion and apply to recipes and other real-life situations.</p>	<p>HT1: Probability and Indices and Standard Form</p> <p>Pupils will go on to consider probability of single events and combined events. Pupils will use Sample space diagrams, Two-way tables, Venn diagrams, Frequency Trees and Probability Trees. Pupils explore the rules of indices and learn how to convert numbers between standard form and ordinary numbers.</p>	<p>HT2: Data Handling 2 and Pythagoras</p> <p>Pupils build on the skills developed in Year 7 to analyse data using scatter graphs, cumulative frequency curves and box plots. Pupils will then be able to find more complex averages using these diagrams. Pupils learn how to find the length of a hypotenuse or side of a right-angled triangle using Pythagoras' theorem.</p>
<p>HT3: Number Skills and Basic Algebra</p> <p>Pupils explore mental and calculator methods for finding powers and roots in readiness for future units. Pupils learn the order of operations using Priority of Operations and revisit how to round to the nearest decimal place and significant figures. Pupils acquire basic skills in algebra: collecting like terms, simplifying expressions and using correct algebraic notation.</p>	<p>HT4: Basic Algebra and Data Handling 1</p> <p>Pupils learn how to expand brackets and factorise expressions. Pupils also learn how to solve linear equations including brackets and with the unknown on both sides and substitute into expressions and formulae. All of this is essential for future algebra units. Pupils learn how to collect and organise data.</p>	<p>HT3: Sequences and Circles 1</p> <p>Pupils explore how to continue and generate sequences, building on these skills to find the nth term of a sequence and understand special sequences. Pupils also learn to solve equations using skills gained in previous algebra units. Pupils then learn about parts of a circle and how to find the area and circumference of a circle and apply this to cylinders.</p>	<p>HT4: 2D Representation of 3D and Real-Life Graphs</p> <p>Pupils go on to drawing plans and elevations of 3D shapes, before exploring exchange rates and conversion graphs in Real Life Graphs.</p>	<p>HT3: Trigonometry, Circles 2 and Scale Drawings</p> <p>Pupils learn how to find missing angles and sides of right-angled triangles using trigonometry. Following this, pupils build on skills acquired during the circles unit in Year 8 to find area of sectors and lengths of arcs. Pupils learn how to interpret scale drawings and how to construct diagrams. This builds upon skills gained in the lines and angles unit.</p>	<p>HT4: Number Skills</p> <p>Pupils will revisit and practise using BIDMAS to solve problems, round numbers to a given decimal place and significant figure, understand the laws of indices, find primes, factors, multiples, including Highest Common Factor and Lowest Common Multiple and find the prime factors of a given number.</p>
<p>HT5: Data Handling 1 and Measures</p> <p>Pupils will practise displaying data in frequency tables, pie charts, pictograms, bar charts, line graphs and stem and leaf diagrams. Pupils learn how to find mean, mode, median and range from sets of data, including those in frequency tables. Pupils revisit the different units of length, mass, capacity and make conversions. Following this, pupils learn about speed, distance and time.</p>	<p>HT6: Perimeter, Area and Volume</p> <p>Pupils learn correct geometrical terms – properties of triangles, quadrilaterals etc. Pupils learn how to calculate the perimeter of 2D shapes including extending to algebraic expressions. Pupils find the area and volume of different 2D and 3D shapes including rectangles, triangles, circles, cuboids, and prisms, applying skills learnt in the Basic Algebra Unit (HT2).</p>	<p>HT5: Equations, Inequalities and Rearranging</p> <p>Pupils recap the basics of algebra and solving equations before moving on to learn how to use inequality symbols, how to list and illustrate values which satisfy inequalities and how to solve inequalities. Pupils learn to apply algebraic principles to rearrange formulae. Pupils also learn how to expand double brackets and factorise quadratics.</p>	<p>HT6: Transformations and Probability</p> <p>Transformation of Shapes – translation, reflection, rotation, enlargement. Pupils will be introduced to the basics of probability including scale, experimental vs theoretical probability, expected outcomes and bias.</p>	<p>HT5: General algebra</p> <p>Pupils will be learning to simplify expressions, including adding, subtracting, dividing and multiplying using the correct notation. They will learn to expand brackets, factorise expressions and substitute values into expressions and formulae.</p>	<p>HT6: Data</p> <p>Pupils will learn to derive formula from a worded problem. Pupils will then learn how to find the mean, median, mode and range from a data set. They will look at which is the most appropriate average to use in different contexts.</p>

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Mathematics

KS4 – Higher GCSE

Year 10		Year 11	
<p>HT1: Analysing and Displaying Data, Fractions and percentages</p> <p>Pupils explore various ways of displaying data including bar charts, pie charts, frequency polygons and scatter graphs. Methods of analysing data, such as averages and measures of spread, are also explored. Pupils revisit and build upon skills from KS3 e.g. converting recurring decimals into fractions.</p>	<p>HT2: Ratio and Proportion</p> <p>Pupils further explore links between ratio and proportion, extending this to algebraic representations of direct and inverse proportion. Polygons and parallel lines are revisited as knowledge of these challenging aspects of angles will be needed for further study of geometry including Pythagoras and trigonometry.</p>	<p>HT1: Advanced trigonometry, Representing Data</p> <p>Pupils learn methods to deal with non-right-angled triangles, drawing upon algebraic skills and geometrical knowledge developed in Year 10. Pupils learn the Sine and Cosine rules and the trigonometric graphs. Pupils also learn how to construct, interpret and compare cumulative frequency curves, box plots and histograms. Cumulative frequency.</p>	<p>HT2: Graphs, Further Algebra</p> <p>Pupils revisit quadratic and cubic graphs in more detail, studying key features such as turning points using methods learned. Pupils learn the key features of circular graphs and how to combine these with previous methods to find the equation of a tangent. Pupils extend skills in algebra to algebraic fractions and rearranging formulae.</p>
<p>HT3: Graphs, Geometry</p> <p>Pupils learn to identify, plot and read values from linear and non-linear graphs - including real-life graphs - making links between the equation of a graph and its key features. Pupils explore perimeter and area of 2D shapes, then extend this learning to circles and sectors before progressing to 3D shapes, studying volume and surface area including real-life applications.</p>	<p>HT4: Accuracy, Transformations, Constructions, Loci and Bearings</p> <p>Pupils cement an understanding of rounding gained at KS3 and move on to study upper and lower bounds and their use in real-life calculations. Pupils look at combining the four transformations previously studied and extend these to negative and fractional scale factors. Constructions, loci and bearings will be introduced.</p>	<p>HT3: Surds and Proof, Functions and Vectors</p> <p>Pupils are introduced to the manipulation of surds including rationalising denominators, equipping pupils to move on to the study of formal proofs. Pupils will further develop skills in algebra by learning about function notation, inverse and composite functions. Pupils then move on to study vector notation for problem solving.</p>	<p>HT4: Other Graphs, Direct and Inverse Proportion</p> <p>Reciprocal and exponential graphs are plotted by pupils to identify key features of curves. Pupils learn how to find the area under a curve, particularly useful when dealing with the velocity-time graphs which pupils studied during KS3. Direct and inverse proportion is revisited and pupils now combine proportional relationships.</p>
<p>HT5: Further Algebra, Probability</p> <p>Pupils learn the key elements of quadratic and simultaneous equations, studying a range of methods for solving these, before moving on to solving inequalities. Pupils explore how to find probabilities from a range of data sets.</p>	<p>HT6: Multiplicative reasoning, Similarity and Congruence, Trigonometry</p> <p>Pupils convert between units including compound measures, e.g. speed. Proportional relationships, including best value problems, and real-life growth and decay models are explored. Similarity and congruence is revisited in greater detail (to include area and volume) as is Trigonometry, in readiness for Year 11 study.</p>	<p>HT5: Higher Level Problem Solving, Revision and Past Paper Practice</p> <p>The focus of this unit is to consolidate pupils' learning and strengthen understanding of the links between various topics. Strategies to break down complex problems are explored in greater depth. Pupils apply themselves to practising past examination papers.</p>	<p>HT6: Higher Level Problem Solving, Revision and Past Paper Practice</p> <p>Time to consolidate any areas where teachers have identified a lack of security or misconceptions.</p>

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Maths

KS4 – Foundation GCSE

Year 10		Year 11	
<p>HT1: Analysing and Displaying Data</p> <p>Pupils consolidate and expand on knowledge gained in KS3 to use timetables appropriately, use and create two way tables; draw and read from bar charts, histograms, pictograms and line graphs; draw and read from stem and leaf diagrams and pie charts; understand correlation and draw and read from scatter graphs.</p>	<p>HT2: Fractions, Decimals and Percentages</p> <p>Pupils develop understanding of the use of equivalent fractions, decimals and percentages, learning to change between each one and to order them. Pupils consolidate understanding of the four operations of fractions, understanding how to add and subtract mixed numbers and whether denominators are the same or different. Problem solving skills are revisited.</p>	<p>HT1: Pythagoras' Theorem, Trigonometry</p> <p>Pupils revisit and deepen learning from Year 9, using Pythagoras to find missing sides, determine if a triangle is right-angled, and to solve worded real-life problems. Pupils use trigonometry and Pythagoras to find missing sides and angles and undertake further study of circles, cylinders and cones, securing and embedding skills and knowledge.</p>	<p>HT2: Probability, Compound Measures and Percentages</p> <p>Pupils build on knowledge of probability to find probabilities using sample space, Venn and frequency trees diagrams. Pupils learn the difference between mutually exclusive and exhaustive events. Formulas for speed, density and force are learned and pupils use knowledge from Year 10 to solve simple and compound interest problems.</p>
<p>HT3: Equations, Inequalities and Sequences</p> <p>Pupils solve equations and inequalities involving unknowns on one side and both sides, using number lines to find integer solutions for inequalities. Pupils use sequences to find the next terms, using the nth term to find any given term, finding the nth term of a sequence and using knowledge of sequences to determine if a term is in a sequence.</p>	<p>HT4: Shapes and Angles, Analysing Data</p> <p>Pupils show understanding of the properties of shapes and use of angles on a straight line, in a triangle or quadrilateral. Pupils find angles in polygons and use knowledge of alternate, corresponding and supplementary angles in parallel lines to solve problems. Pupils use sampling and averages in context from discrete and continuous data from lists and tables.</p>	<p>HT3: Shape, Loci and Bearings, Quadratic Equations</p> <p>Pupils use knowledge from previous units to draw nets, plans and elevations of 3D shapes. Pupils learn the rules of congruency and find missing sides in similar triangles. Knowledge of loci and bearings is applied to solving real-life problems. Pupils deepen learning and knowledge of algebra gained in Year 10 - expanding, factorising and solving quadratic equations.</p>	<p>HT4: Circles, Indices, Similarity and Congruence</p> <p>Pupils apply knowledge of circles from Years 8 and 9 to find area, circumference, arc length and area of sectors, deepening this learning to find the surface area and volume of cylinders. Pupils use learning from Year 9 to solve problems with indices and standard form. Pupils use knowledge of similarity and congruence from Year 11 HT3 to solve more complex problems.</p>
<p>HT5: Geometry and Measures</p> <p>Pupils apply knowledge of converting units to change from one metric unit to another and from metric to imperial. Pupils find the perimeter of a given shape and areas of triangles, rectangles, squares, parallelograms, trapeziums and compound shapes, using this knowledge to find the volume and surface area of prisms. Straight line graphs are also explored.</p>	<p>HT6: Graphs, Transformations, Ratio and Proportion</p> <p>Pupils read and draw real-life graphs and linear graphs. Using knowledge from Year 8, pupils also draw and describe the four transformations (reflections, rotations, translations and enlargements). Pupils solve problems with ratio and proportion, before going on to complete the end of year assessment, which allows pupils to demonstrate their understanding and knowledge.</p>	<p>HT5: Vectors, Simultaneous Equations and Algebraic Graphs</p> <p>Pupils use column vectors to add, subtract, multiply and divide. Pupils solve simultaneous equations and re-arrange formulae to make a given letter the subject. Pupils also develop understanding of what a non-linear graph is and sketch quadratic and cubic graphs.</p>	<p>HT6: Complex Problem Solving, Revision and Past Paper Practice</p> <p>Pupils apply knowledge from all areas to explore more complex problem solving questions and practise examination questions using past exam papers. Pupils develop their understanding of the examinations and practise examination skill in preparation for the GCSE examinations.</p>

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