

# Maths

## KS3

Year 7		Year 8		Year 9	
<b>HT1:</b> 	<b>HT2: Fractions and Number Skills:</b> 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.	<b>HT1: Equations &amp; Formulae, Lines and Angles:</b> Pupils learn how to solve linear equations including brackets and with the unknown on both sides, building on Year 7 skills and progressing to rearranging formulae. Pupils learn more about notation and angle properties and learn how to find missing angles in parallel lines, triangles, quadrilaterals and polygons.	<b>HT2: Ratio, Sequences and Equations:</b> Pupils learn to simplify ratios and share amounts in a ratio, applying these skills to problem solving and real-life application. 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 in Y7 and 8.	<b>HT1: Analysing Data 2, Proportions:</b> 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 also learn how to use direct proportion to solve problems including the algebraic and graphical methods.	<b>HT2: Circles 2, Quadratic Equations, Accuracy:</b> Pupils build on skills acquired during the circles unit in Year 8 to find area of sectors and lengths of arcs. Pupils also learn how to expand brackets and factorise quadratics, before moving on to solving quadratics using factorising and drawing quadratic and cubic graphs. Pupils apply their knowledge of rounding to estimate calculations.
<b>HT 3: Powers &amp; Roots, Operations, Presenting Data:</b> Pupils explore mental & calculator methods for finding powers and roots in readiness for future units. Pupils learn the order of operations using BIDMAS and revisit how to round to the nearest decimal place and significant figures. Pupils will also practise displaying data in frequency tables, pie charts, pictograms, bar charts and line graphs.	<b>HT 4: Analysing Data, Basic Algebra, Formulae &amp; substitution:</b> Pupils learn how to find mean, mode, median and range from sets of data. Pupils acquire basic skills in algebra: collecting like terms, simplifying expressions, expanding brackets and factorising expressions. These skills will be essential to future algebra units. Pupils also learn how to use different formulae.	<b>HT 3: Formulae 2, Shapes &amp; Circles, Conversions &amp; Real Life Graphs:</b> Pupils develop skills to rearrange more complex formulae. Pupils then learn about parts of a circle and how to find the area and circumference of a circle. Pupils go on to drawing plans & elevations of 3D shapes, before exploring about exchange rates and conversion graphs in Real Life Graphs. Transformation of Shapes – translation, reflection, rotation, enlargement.	<b>HT 4: Fractions, Decimals &amp; Percentages; Constructions &amp; Loci:</b> Pupils apply skills developed in Year 7 to convert between fractions, decimals and percentages (including recurring decimals) and order fractions, decimals and percentages. Pupils then learn how to bisect lines and angles, construct perpendicular lines and how to draw loci.	<b>HT 3 Foundation only (Higher see Ks4) Pythagoras, trigonometry, Similarity &amp; Congruence:</b> Pupils learn how to find the length of a hypotenuse or side of a right-angled triangle using Pythagoras' theorem. Pupils also learn to find missing angles and sides of right angled triangles using trigonometry. Following this, pupils explore how to calculate lengths, area and volume in similar shapes and how to prove congruence.	<b>HT 4:</b> See KS4
<b>HT 5: Straight Line Graphs, Measurements, Speed, distance &amp; time:</b> Pupils practise plotting co-ordinates, then draw straight line graphs, applying skills in substitution and plotting co-ordinates. Pupils revisit the different units of length, mass, capacity and make conversions between metric & imperial units. Following this, pupils go on to learn more about speed, distance and time.	<b>HT 6: Area and Volume, Percentages:</b> Pupils find the area and volume of different 2D and 3D shapes including rectangles, triangles, circles, cuboids, prisms, applying skills learnt in the formulae and substitution unit. Pupils develop further skills in finding percentages of amounts and practise increasing and decreasing by a required percentage. This unit builds on number skills learnt in HT2.	<b>HT 5: Probability, Scale Drawings and Bearings:</b> Pupils will be introduced to the basics of probability including scale, single events and combined events. In Scale Drawings & Bearings, pupils learn how to interpret scale drawings and how to measure and calculate bearings. This builds upon skills gained in the line and angles unit.	<b>HT 6: Indices &amp; Standard Form, Inequalities:</b> Pupils explore the rules of indices and learn how to convert numbers between standard form and ordinary numbers, before moving on to learn how to use inequality symbols, how to list and illustrate values which satisfy inequalities and how to solve inequalities.	<b>HT 5:</b> See KS4	<b>HT 6:</b> See KS4

# Maths

## KS4 – Higher GCSE

Year 9		Year 10		Year 11	
<b>HT1:</b> Click or tap here to enter text.	<b>HT2:</b> Click or tap here to enter text.	<b>HT1:</b> <b>Analysing &amp; Displaying Data, Fractions &amp; percentages:</b> 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.	<b>HT2:</b> <b>Ratio and proportion:</b> 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.	<b>HT1:</b> <b>Advanced trigonometry, Representing Data:</b> 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.	<b>HT2:</b> <b>Graphs, Further Algebra:</b> 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.
<b>HT 3:</b> <b>Are you ready for GCSE?</b> Pupils revisit and consolidate learning in readiness for the GCSE course.  Pupils also develop knowledge of metacognition to support their learning in maths and are provided with an overview of their pathway to GCSE maths.	<b>HT 4:</b> <b>Number &amp; calculation, Indices &amp; Standard Form, Algebra:</b> Pupils develop key number skills including how to work with decimals and negatives, study the correct order of operations and learn how to round numbers to various degrees of accuracy. Pupils then move on to indices and standard form. General algebra is also introduced in preparation for algebraic manipulation.	<b>HT 3:</b> <b>Graphs, Geometry:</b> 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 & surface area including real life applications.	<b>HT 4:</b> <b>Accuracy, Transformations, Constructions, Loci &amp; Bearings:</b> Pupils cement an understanding of rounding gained at KS3 and move on to study upper & lower bounds and their use in real life calculations. Pupils look at combining the 4 transformations previously studied and extend these to negative and fractional scale factors. Constructions, loci and bearings will be introduced.	<b>HT 3:</b> <b>Surds &amp; Proof, Functions &amp; Vectors:</b> 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.	<b>HT 4:</b> <b>Other Graphs, Direct &amp; Inverse Proportion:</b> 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.
<b>HT 5:</b> <b>General algebra, Factors, Multiples &amp; Primes:</b> Pupils build upon KS3, learning the notation and methods required for algebraic manipulation, including collecting like terms, expanding brackets and factorising expressions. These are essential skills for units of study in Years 10 and 11. Pupils also build on learning on factors from Year 8 and apply their methods to real life problems.	<b>HT 6:</b> <b>Sequences:</b> Pupils learn to identify arithmetic, quadratic and geometric sequences, considering how to discover nth term rules which allow them to find any term in a given sequence. Assessments will also take place during this half term providing the opportunity for many key areas to be revisited, deepening and securing pupils' knowledge and skills.	<b>HT 5:</b> <b>Further Algebra, Probability:</b> 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.	<b>HT 6:</b> <b>Multiplicative reasoning, Similarity &amp; Congruence, Trigonometry:</b> Pupils convert between units including compound measures, e.g. speed. Proportional relationships, including best value problems, and real life growth & decay models are explored. Similarity & congruence is revisited in greater detail (to include area and volume) as is Trigonometry, in readiness for Year 11 study.	<b>HT 5:</b> <b>Higher Level Problem Solving, Revision and Past Paper Practice:</b> 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.	<b>HT 6:</b> <b>Higher Level Problem Solving, Revision and Past Paper Practice:</b>

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## KS4 – Foundation GCSE

Year 9		Year 10		Year 11	
<b>HT1:</b> Click or tap here to enter text.	<b>HT2:</b> Click or tap here to enter text.	<b>HT1:</b> <b>Analysing &amp; Displaying Data:</b> 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.	<b>HT2:</b> <b>Fractions, Decimals &amp; Percentages:</b> 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.	<b>HT1:</b> <b>Pythagoras' Theorem, Trigonometry:</b> 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.	<b>HT2:</b> <b>Probability, Compound Measures &amp; Percentages:</b> 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.
<b>HT 3:</b> Click or tap here to enter text.	<b>HT 4:</b> <b>Operations, Factors, Multiples and Primes:</b> Pupils revisit and practise a range of number skills including using BIDMAS to solve problems, rounding numbers to a given decimal place and significant figure, understanding the laws of indices, and finding primes, factors, multiples, including highest common factor and lowest common multiple and prime factors of a given number.	<b>HT 3:</b> <b>Equations, Inequalities and Sequences:</b> 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.	<b>HT 4:</b> <b>Shapes &amp; Angles, Analysing Data:</b> 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 & averages in context from discrete & continuous data from lists and tables.	<b>HT 3:</b> <b>Shape, Loci &amp; Bearings, Quadratic Equations:</b> 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.	<b>HT 4:</b> <b>Circles, Indices, Similarity &amp; Congruence:</b> Pupils apply knowledge of circles from Years 8 & 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 & standard form. Pupils use knowledge of similarity & congruence from Year 11 HT3 to solve more complex problems.
<b>HT 5:</b> <b>General Algebra:</b> Pupils revisit and consolidate prior learning to embed skills. This includes simplifying expressions, including adding, subtracting, dividing and multiplying using the correct notation.	<b>HT 6:</b> <b>Algebra &amp; Formulae:</b> Pupils build on learning in previous units at KS3 to substitute numbers into expressions and formula, expand single brackets, factorise expressions and derive formula from a worded problem. Pupils complete a summer assessment, which provides the opportunity to demonstrate knowledge and skills developed over a number of units.	<b>HT 5:</b> <b>Geometry &amp; Measures:</b> 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.	<b>HT 6:</b> <b>Graphs, Transformations, Ratio &amp; Proportion:</b> 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.	<b>HT 5:</b> <b>Vectors, Simultaneous Equations &amp; Algebraic Graphs</b> 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.	<b>HT 6:</b> <b>Complex Problem Solving, Revision &amp; Past Paper Practice:</b> Pupils apply knowledge from all areas to explore more complex problem solving questions and practice examination questions using past exam papers. Pupils develop their understanding of the examinations and practice examination skill in preparation for the GCSE examinations.

## Notes

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