

Key Stage 3 Overview – Mathematics

	Unit 1 – Statistics (Handling Data)	Unit 2 – Basketball	Unit 3 – Number Patterns and Sequences	Unit 4 – Mental maths and BODMAS (Number)	Unit 5 - Polygons	Unit 6 – Personal Finance
Year 8	<p>With emphasis on <u>managing information, communication, working with others, making predictions, examining evidence and distinguishing fact from opinion.</u></p> <p>Pupils will: understand and learn about Data Handling; learn to tally raw data into tables, draw bar charts, pie charts and pictograms, draw scatter graphs; produce posters in groups; draw and discuss correlation.</p>	<p>With attention to <u>communication, working with others, listening actively, sharing opinions, representing information, justifying methods and making predictions.</u></p> <p>Pupils will: learn about different types of symmetry; recognise shapes which have a line of symmetry and find the line of symmetry; recognise shapes which have more than one line of symmetry and determine such lines; study mirror lines; explore line symmetry in everyday life; understand what is meant by rotational symmetry.</p>	<p>Focusing on <u>communication, working with others, thinking, problem solving, decision making, active listening, making predictions, justifying methods, opinions and conclusions.</u></p> <p>Pupils will: understand and learn about different types of patterns and sequences; recognise and describe number patterns (odd/even numbers, multiples and factors, prime numbers, square and triangular numbers); identify and describe sequences; apply knowledge of sequences; appreciate the significance of Fibonacci sequences; appreciate sequences in the natural world.</p>	<p>With attention to <u>mathematics, thinking and problem-solving skills, information management, making predictions, alternative approaches and evaluating outcomes.</u></p> <p>Pupils will: understand and learn about rounding to the nearest 10, 100, 1000 and 10000; revise multiplication and division; appreciate the need for estimation; use the rule of BODMAS to carry out a more complex calculation.</p>	<p>With emphasis on <u>managing information, working with others, thinking, problem-solving and decision making.</u></p> <p>Pupils will: understand and learn about language and properties of shapes; name polygons and use mathematical notation; explore symmetry properties of triangles and quadrilaterals; use compasses to construct triangles (given 3 sides); explore tessellations of polygons.</p>	<p>Focussing on <u>managing information, decision making, working with others, asking focused questions, comparing and evaluating information, examining options and active listening.</u></p> <p>Pupils will: understand and learn about savings, banks and money; investigate different methods of saving; calculation of simple percentages; investigate services offered by the banks; study home finance and decision making.</p>
Year 8	Unit 7 – Number (Decimals)	Unit 8 – 3D work (Shape, Space and Measures)	Unit 9 - Probability	Unit 10 – Algebra (Formulae)	Unit 11 – Angles and Constructions (Space, Shape and Measures)	Unit 12 – Directed Numbers
	<p>With attention to <u>working with others, sequence, order, making comparisons and mental maths skills.</u></p> <p>Pupils will: extend their understanding of decimals; recognise the need for accuracy in PLACE VALUE and position of decimal point as a means of ordering numbers; understand how decimal numbers are added, subtracted, multiplied and divided.</p>	<p>Focusing on <u>information management, creativity, focused questions and personal responsibility.</u></p> <p>Pupils will: understand and learn about 3D shapes; identify solids and draw prisms and pyramids; use isometric paper to draw cubes and cuboids; identify and draw nets; draw nets of prisms and pyramids.</p>	<p>With emphasis on <u>information management, working with others, focussed questions, making predictions, justifying methods, opinions and conclusions.</u></p> <p>Pupils will: explore the language of probability; understand theoretical probability, explore the use of relative frequency when theory does not apply.</p>	<p>With attention to <u>managing information, thinking, problem-solving, decision making, justifying methods, opinions and conclusions, and self-management.</u></p> <p>Pupils will: study and understand algebraic methods; understand the concept of mathematical formula; appreciate the simplicity of mathematical language in this context; apply the knowledge of basic algebraic rules; think logically in the application of algebraic rules.</p>	<p>Focusing on <u>communication, managing information, working with others, thinking, problem-solving and being creative.</u></p> <p>Pupils will: understand the rules of angles and constructions; identify different types of angle; measure and draw angles; problem solving using the rules of angles; study angles in triangles; calculate missing angles in triangles; practice drawing triangles using a ruler and a protractor.</p>	<p>With emphasis on <u>information management, thinking skills, focused questions and collaborative work.</u></p> <p>Pupils will: explore the language of directed numbers in a variety of real situations; introduce inequality symbols and number line; examine the difference between directed numbers using a number line; extend the Cartesian plane into four quadrants.</p>
Year 8	Unit 13 – Measures (Length, Measurement, Units, Scale Drawing)	Unit 14 - Algebra	Unit 15 – Area and Perimeter	Unit 16 – Number (Fractions)	Unit 17 – Statistics (Handling Data)	
	<p>With emphasis on <u>working with others, communication, active listening, sharing of ideas, and interpreting information.</u></p> <p>Pupils will: learn about the common units of length and understand scale drawings; research and recognise different units of measurement; appreciate the history and origin of Imperial Units; understand the methods of conversion between imperial and metric units; apply the concept of scale.</p>	<p>Focussing on <u>communication, thinking, problem-solving, decision making, active listening, sequence and justifying methods.</u></p> <p>Pupils will: revise the use of function machines, understand the meaning of an inverse operation; use inverse function machines; apply knowledge of inverse function machines to form and solve equations; change the subject of a formula.</p>	<p>With attention to <u>managing information, working with others, problem-solving, self-management, active listening and sharing opinions.</u></p> <p>Pupils will: revise perimeter and area as ‘number of squares’; estimate area of irregular shapes by counting squares; understand the use of formulae for calculating areas of rectangles, triangles and parallelograms; apply the above skills to compound shapes.</p>	<p>Demonstrating <u>working with others, thinking, problem-solving and decision making.</u></p> <p>Pupils will: understand and learn about fractions; learn to solve simple fraction problems using mental capability; use equivalent fractions to add and subtract; understand how to multiply and divide fractions; study fraction decimal and percentage equivalence; explore ordering of fractions.</p>	<p>With emphasis on <u>communication, managing information, thinking, problem-solving and decision making, active listening and trying alternative approaches.</u></p> <p>Pupils will: be able to understand and learn about finding the mean, mode and median; find the range; interpret misleading statistics.</p>	

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	Unit 1 – Graphs	Unit 2 – Indices and Estimation	Unit 3 – Statistical Diagrams	Unit 4 – Algebra	Unit 5 - Transformations	Unit 6 – Negative Numbers
Year 9	<p>With emphasis on <u>managing information, thinking, problem-solving, decision making, focused questions and self-management.</u></p> <p>Pupils will: practice using and drawing conversion graphs; perform calculations with regards to time; appreciate how to draw and use a travel graph.</p>	<p>With attention to <u>managing information, thinking, problem-solving, decision making and focused questions.</u></p> <p>Pupils will: understand and learn about the use of square and square roots; learn how to use a calculator to calculate higher powers and roots; learn use of indices, learn mental mathematics; study the use of rounding numbers to estimate calculations.</p>	<p>Focusing on <u>being creative, working with others, managing information, and self-management.</u></p> <p>Pupils will: draw and understand bar charts, pictograms and pie charts; learn about designing a questionnaire; identify weaknesses in a questionnaire.</p>	<p>Demonstrating <u>working with others, managing information, active listening and sharing of opinions.</u></p> <p>Pupils will: understand and identify number patterns and the rule followed; express the rule for a linear number pattern in terms of n; practice solving simple linear equations; substitute values in algebraic terms; know the difference between $2x^2$ and $(2x)^2$</p>	<p>With emphasis on <u>managing information, and selecting the most appropriate method for a task.</u></p> <p>Pupils will: understand and conduct the four formations; study simple reflections using lines like $x=2$, $y=3$ and $y=x$; be introduced to the idea of a translation using a descriptive method; study simple rotations about different centres using quarter turn or half turn; be introduced to the idea of an enlargement using scale factors which are positive whole numbers.</p>	<p>Focussing on <u>managing information, decision making, thinking, problem-solving, focused questions, sequence, order, classification and making comparisons.</u></p> <p>Pupils will: compare and order positive and negative numbers; use the four operations with positive and negative numbers; understand how to use negative numbers in simple algebraic expressions.</p>
Year 9	Unit 7 – Angles	Unit 8 – Probability	Unit 9 – Percentages and Fractions	Unit 10 – Straight Lines		Unit 11 - Ratio
	<p>With attention to <u>working with others, being creative, managing information, focused questions, active listening and sharing opinions.</u></p> <p>Pupils will: recognise acute, obtuse, right, reflex and straight line angles and use a protractor to draw them; learn angle facts – angles in a straight line, angles at a point, angles in a triangle; draw parallel lines and a transversal and study alternate, corresponding and interior angles; calculate interior and exterior angles of polygons; investigate relationships for various polygons; work with bearings.</p>	<p>Demonstrating <u>working with others, being creative, experimentation with ideas, active listening and sharing of opinions.</u></p> <p>Pupils will: revise basic probability; appreciate that probabilities always add up to 1; discuss probability using mathematical language; construct and use sample space diagrams.</p>	<p>With emphasis on <u>information management, focused questions, researching, team work and active listening.</u></p> <p>Pupils will: work with percentages, fractions and decimals; calculate percentage of a given number; convert between fractions, decimals and percentages; work out what percentage one number is of another; look at current issues which involve percentages e.g. oil price changes.</p>	<p>With attention to <u>managing information, thinking, problem-solving, decision making, working with others, sequence, order, classification and making comparisons.</u></p> <p>Pupils will: recognise and name horizontal, vertical and simple diagonal lines; recognise the pattern between coordinates of the points on the line and use to name the line; recognise the relationship between the equation of a line and its gradient and y-intercept; use equations to decide whether a point lies on a line, find missing x or y coordinates, draw straight line graphs and find point of intersection; compare graphs to find equations of lines.</p>		<p>With emphasis on <u>focused and varied questions, making connections between learning in different contexts, thinking, problem-solving, and decision making.</u></p> <p>Pupils will: revise the metric system and be introduced to ratio/proportion and maps/scales; convert units within the metric system; convert imperial units to metric units; apply the use of ratio to simplify real-life problems; learn to simplify ratio; learn how to share in a given ration; explore through discussion the concept of scale and apply this to real-life situations.</p>
Year 9	Unit 12 – Area	Unit 13 - Statistics	Unit 14 – Volume	Unit 15 – More or less	Unit 16 – The Crossing Point	
	<p>Demonstrating <u>communication, creativity, self-management, experimentation with ideas and questions, information management, thinking, problem-solving and decision making.</u></p> <p>Pupils will: work with a variety of two dimensional shapes and explore Perimeter and Area; find the perimeter of polygons; find areas of rectangle, triangle, parallelogram, trapezium, kite and rhombus; appreciate the connection between scale factor of enlargement and area.</p>	<p>Focusing on <u>researching, information management, making predictions, examining evidence, distinguishing fact from opinion, active listening, self-management and working with others.</u></p> <p>Pupils will: learn how to calculate the mean, median, mode and range for a list of values, for an ungrouped frequency table, a grouped frequency table; construct grouped frequency tables; interpret information from frequency polygon, construct a frequency table (ungrouped or grouped).</p>	<p>Using <u>information management, thinking, problem-solving skills, decision making skills and focused questions.</u></p> <p>Pupils will: estimate the volumes of container; appreciate the difference between volume and capacity; learn the definition of a prism; be able to calculate the volumes of prisms.</p>	<p>With emphasis on <u>problem-solving and self-management.</u></p> <p>Pupils will: be able to understand and learn about solving quadratic equations using trial and improvement; understand and use inequalities; illustrate inequalities on a number line; solve simple linear inequalities (including double inequalities);</p>	<p>With emphasis on <u>self-management, thinking, problem-solving and decision making.</u></p> <p>Pupils will: be able to draw simple straight line graphs (using table or intercepts on x, y axes); use 2 straight line graphs to solve simultaneous equations (which may need to be formed first); solve simultaneous equations by algebraic methods.</p>	

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	Unit 1 – Pythagoras	Unit 2 – Formulae	Unit 3 – Circles	Unit 4 – Statistics	Unit 5 - Accuracy	Unit 6 – Volume
Year 10	<p>Using a range of <u>mathematical methods, information management, thinking, problem-solving and decision making skills.</u></p> <p>Pupils will: begin to understand and use Pythagorean triples; construct right angled triangles; recognise concept of hypotenuse; discover relationship between 3 sides of a right angled triangle; perform calculations involving right angled triangles</p>	<p>With emphasis on <u>thinking, problem-solving, decision making and being creative.</u></p> <p>Pupils will: explore, through discussion, the use of formulae; practice finding formulae; practise using formulae; make correct use of basic calculator functions; learn to use bracket and square root functions on the calculator; be able to find the n^{th} term for linear sequences (omit quadratic formulae); use trial and improvement to solve equations.</p>	<p>Focusing on <u>thinking and problem-solving, working with others, managing information, and self-management.</u></p> <p>Pupils will: investigate the relationship between circumference and diameter; use the formula $C = \pi d$ rounding answers appropriately to find circumference use the formula $C = \pi d$ to find the diameter/radius given C use the formula $A = \pi r^2$ to find area use the formula $A = \pi r^2$ to find the radius given A use the formulae in compound shapes.</p>	<p>With emphasis on <u>decision making, managing information, focused questions, using a range of methods for representing information, and making appropriate method selections.</u></p> <p>Pupils will: recognise discrete and continuous data; draw bar charts for continuous data and make comparisons between different results; find mean, mode and median for a list of numbers; determine range and use to make comparisons; calculate the mean, mode and range for grouped data; draw and use cumulative frequency curves.</p>	<p>Using a range of <u>methods for representing information, information management, thinking, problem-solving and decision making skills.</u></p> <p>Pupils will: round numbers to a given level of accuracy; use significant figures and decimal places; use rounding to estimate calculations; appreciate the limits of measurement; use calculator to solve problems using standard form; use indices.</p>	<p>With emphasis on <u>managing information, decision making, thinking, problem-solving, working with others, focused questions, active listening and self-management.</u></p> <p>Pupils will: recognise prisms, calculate volume of prisms; calculate unknown dimensions of prisms given volume; use formula to calculate volumes of cylinders; discuss $V = \pi r^2 h$ using model cylinder; discuss converting metric units of volume $\text{cm}^3 \rightarrow \text{m}^3$; use dimensions to decide whether an expression represents a length, area or volume;</p>
Year 10	Unit 7 – Number revision	Unit 8 – Algebra	Unit 9 – Statistics	Unit 10 – Trigonometry	Unit 11 - Probability	
	<p>Focusing on <u>thinking, problem, decision making, and managing information.</u></p> <p>Pupils will: covert between fractions, decimals and percentages; calculate percentage increase and decrease and apply to everyday problems; learn simplifying ratio, sharing in a given ratio, expressing in the form 1: n or n: 1; discover how to use the formulae for speed and density.</p>	<p>With emphasis on <u>working with others, thinking, problem-solving and decision making.</u></p> <p>Pupils will: learn to collect like terms and simplify expressions with the use of brackets; learn to multiply out brackets; factorise an expression in algebra; learn to solve equations some of which contain brackets; learn to change the subject of a formula.</p>	<p>Using a <u>range of methods for representing information, information management, thinking, problem-solving and decision making skills.</u></p> <p>Pupils will: learn how to draw scatter diagrams with line of best fit and investigate correlation; estimate the percentages in pie charts, construct pie charts using percentages and also awkward group numbers; examine statistical diagrams that may be misleading and draw diagrams to support a particular view.</p>	<p>Demonstrating <u>thinking, problem-solving and decision making skills.</u></p> <p>Pupils will: draw a variety of right angled triangles and examine the links between the ratios of the sides and the trigonometrical ratios; use trigonometry to find the lengths of the sides and angles in a right angled triangle; explore problem solving in real life situations including bearings and angles of elevation and depression.</p>	<p>With attention to using a <u>range of methods for representing information, thinking, problem-solving, and decision making, managing information and working with others.</u></p> <p>Pupils will: appreciate the concepts of probability and relative frequency; experiment with dice to evaluate relative frequency; produce detailed sample space diagrams; construct relevant tree diagrams.</p>	
Year 10	Unit 12 – Algebra	Unit 13 - Graphs	Unit 14 – Transformations	Unit 15 – Polygons and symmetry		
	<p>With emphasis on <u>working with others, information management, active listening and sharing of opinions.</u></p> <p>Pupils will: revise straight line graphs; develop their understanding of the equation of a straight line; given an equation draw graphs by making a table or finding intercepts on x and y axes; compare and discuss graphs using their equations; use a graph to determine its equation; use equations to find missing coordinates; solve simultaneous equations by algebraic methods, begin to understand how to represent inequalities graphically.</p>	<p>Focussing on <u>experimenting with ideas, good communication, using ICT, being creative, thinking, problem-solving and decision making.</u></p> <p>Pupils will: identify different shapes of graphs; learn to draw graphs of $y = x^2$, $y = x^3$, $y = \sqrt{x}$ and $y = 1/x$ on paper and using omnigraph; sketch and interpret graphs of real life situations; appreciate the meaning of the gradient of a curve.</p>	<p>Demonstrating <u>self-management, thinking, problem-solving and decision making skills.</u></p> <p>Pupils will: revise year 9 transformation work through discussion; draw and transform shapes on squared paper; learn how to reflect a shape in a given line, translate a shape, rotate a shape, combine transformations, enlarge a shape; calculate missing sides in similar triangles.</p>	<p>With attention to <u>self-management, managing information, thinking, problem-solving and decision making.</u></p> <p>Pupils will: work with regular and irregular polygons and calculate the exterior angle; recognise the sum of the exterior angles of any polygon is 360° recognise that at a vertex the exterior and interior angles add to give 180°; identify lines and planes of symmetry; identify nets of prisms and pyramids.</p>		

