

**Year: 8**  
**Subject: Maths**

**Curriculum Intent:** The curriculum seeks to develop on prior learning and therefore students will continue to build upon their knowledge and skills across all elements of the curriculum. Students will be given the opportunity to solve problems and develop their reasoning skills, which encourages them to be more fluent in their mathematical thinking. This will develop their resilience whilst also igniting their curiosity for using mathematics outside of the curriculum.



	Term 1	Term 2	Term 3
<b>Number</b>	<p><b>Indices</b>  <b>All</b> – use positive integer indices to show repeated multiplication.            Calculate positive integer powers  <b>Most</b> – know and apply multiplication and division laws of indices including algebraic products  <b>Some</b> – Apply all the laws of indices using positive integers, including brackets</p>	<p><b>Rounding/Significant figures (Set 2 and 3)</b>  <b>All</b> – Round numbers to the nearest whole number, 10, 100, 1000            Round to 1 decimal place            Identify number of significant figures  <b>Most</b> – round to stated number of decimal places            Round to significant figures            Solve estimation problems            Estimate calculations to check answers            Recognise upper and lower bounds  <b>Some</b> – solve estimation problems with complex calculations            Recognise upper and lower bounds            Understand that upper and lower bounds represent an error interval</p>	
	<p><b>Standard Form</b>  <b>All</b> – multiply and divide by powers of 10  <b>Most</b> – convert to and from standard form  <b>Some</b> – multiply and divide with standard form without a calculator</p>	<p><b>Roots and Surds</b>  <b>All</b> – Recognise simple powers and their roots  <b>Most</b> – Calculate with simple integer powers and roots  <b>Some</b> - Estimate powers and roots to the nearest whole number</p>	
	<p><b>BIDMAS/Order of Operations</b>  <b>All</b> – carry out the four operations with integers and decimals in the correct sequence            Order positive and negative integers, decimals and fractions using a number line and inequality symbols            Add, subtract, multiply and divide positive and negative numbers in context  <b>Most</b> - understand the inverse operations for add and subtract to check calculations  <b>Some</b> – carry out the four operations as well as indices and roots with integers and decimals in the correct sequence</p>	<p><b>Percentages</b>  <b>All</b> – Understand percentage is part of a hundred            Convert between percentages, fractions, and decimals  <b>Most</b> – Calculate percentage of an amount            Increase/decrease by a simple percentage            Use simple decimal multipliers  <b>Some</b> - Carry out calculations with simple and compound interest/depreciation            Carry out calculations with reverse percentages</p>	

	<p><b>Decimals</b>  <b>All</b> – add and subtract decimals including negative decimals without a calculator  <b>Most</b> – Multiply and divide decimals by a whole number without a calculator  Use related calculations to derive an answer without a calculator  <b>Some</b> – Multiply and divide decimals by a decimal</p>		
	<p><b>Factors</b>  <b>All</b> – Use the bus stop method to divide any integer without a remainder  <b>Most</b> – Use the bus stop method to divide any number including with a remainder  Identify prime numbers and to be able to express a number as a product of primes  <b>Some</b> – To express a product of primes using index notation</p>		
	<p><b>Fractions</b>  <b>All</b> – recognise equivalent fractions both written and diagrammatically  Identify and shade a fraction and simple percentage of a shape  Write a fraction/percentage of a quantity  Compare or order simple fractions  Simplify fractions by finding a highest common factor  Find the fraction of an amount of simple quantities  Convert between simple fractions, decimals and percentages  <b>Most</b> – Simplify fractions by finding a highest common factor including algebra  Order fractions with different denominators and decimals  Add and subtract fractions  Find the fraction of an amount of complex quantities  Convert between complex fractions, decimals, and percentages  Multiply and divide fractions</p>		

	<p><b>Some</b> – convert between mixed and improper fractions Multiply and divide fractions and mixed numbers</p> <p><b>Rounding/Significant figures (Set 1)</b> <b>All</b> – Round numbers to the nearest whole number, 10, 100, 1000 Round to 1 decimal place Identify number of significant figures <b>Most</b> – round to stated number of decimal places Round to significant figures Solve estimation problems Estimate calculations to check answers Recognise upper and lower bounds <b>Some</b> – solve estimation problems with complex calculations Represent upper and lower bounds as error intervals Use upper and lower bounds for max and min of calculations</p>		
<b>Algebra</b>	<p><b>Substitution</b> <b>All</b> – understand and use key vocabulary such as equivalence, equal, expression, formulae and substitute Collect like terms Use formulae expressed in words Construct and use simple formulae and expressions <b>Most</b> – construct expressions, express worded/shape problems in symbolic form Use formulae with 2 or more operations Substitute integers and decimals into expressions and formulae and round answers appropriately Use formulae to calculate surface area and volumes of pyramids, spheres and cones <b>Some</b> – Use formulae to calculate surface area and volumes of pyramids, spheres, cones and simple composite solids</p>		<p><b>Function machines, rearrangement and proof</b> <b>All</b> – Interpret simple expressions as functions with inputs and outputs Use input and output machines including two stage operations and fractions Be able to construct function machines given a function and vice versa Change the subject of a simple formula Identify a counter example Decide with a reason whether a statement is true or false <b>Most</b> – Understand and use the concepts and vocabulary of expressions, equations, formulae, inequalities, terms and factors Be able to construct function machines given a function and vice versa Rearrange formulae to change the subject, where the subject appears once only involving 2 simple steps Rearrange formulae to change the subject</p>

	<p>Use maths formulae for SUVAT equations (kinematics formulae)</p>		<p><b>Some</b> – Understand and use the concepts and vocabulary of expressions, equations, formulae, identities, inequalities, terms and factors Rearrange formulae to change the subject, including cases where a power, root or reciprocal of the subject appears Understand the difference between a demonstration and a proof, showing step-by-step deductions in providing a basic algebraic explanation</p>
	<p><b>Sequences</b> <b>All</b> – Describe and continue sequences in number and diagram form, both linear and nonlinear Tabulate results from diagrammatic sequences Find position to term rules for simple arithmetic sequences in words Generate sequences from term-to-term rule or by spotting a pattern Recognise triangular, square and cube numbers <b>Most</b> – generate a sequence given an algebraic term to term rule Given a sequence, find the nth term (position to term) of an arithmetic sequence (including with decimals/negative numbers) Find terms in a sequence from the nth term <b>Some</b> – Recognise a Fibonacci sequence Use the formula for the nth term of a simple quadratic sequence Justify an expression to describe the nth term of a sequence</p>		<p><b>Plotting and sketching graphs</b> <b>All</b> – Work with x and y coordinates in all four quadrants, generating pairs of coordinates to follow a rule given in words Use a table of values to plot graphs of linear functions. Appreciate the infinite nature of the set of real, rational numbers. Recognise and sketch the graphs of simple linear functions <b>Most</b> – Plot and interpret linear graphs. Interpret the gradient and intercept of straight lines, graphically and from a table of results. Identify how the equation of a line relates to the gradient and y intercept, with an introduction to the form <math>y=mx+c</math> Use a table of values to plot graphs of quadratic functions, other polynomial graphs and reciprocals <b>Some</b> – Recognise and sketch the graphs of simple linear and quadratic functions Use the form <math>y=mx+c</math> to find and sketch equations of straight lines</p>
	<p><b>Expanding and Factorising</b> <b>All</b> – understand the difference between expressions, equations, and inequalities Understand what terms and factors are Expand a single bracket Factorise a single bracket with a number and a letter <b>Most</b> – expand (simple and complex) more than one single bracket and collect like terms Expand two brackets</p>		<p><b>Real life Graphs</b> <b>All</b> – Construct and interpret graphs in real-world contexts such as money &amp; temperature conversion and distance-time relationships <b>Most</b> – Use multiplicative relationships to scale up Understand the relationship between gradient and ratio <b>Some</b> – Solve simple problems involving direct &amp; inverse proportion</p>

	<p>Factorise a single bracket  <b>Some</b> – Expand and simplify brackets and expressions including double negatives</p>		
	<p><b>Solving equations and inequalities</b>  <b>All</b> – Construct simple formulae from real world contexts  Solve simple equations  Solve linear equations with an unknown on one side  <b>Most</b> – Solve linear equations with negative and fractional answers  Solve linear equations including brackets  Find integers to satisfy algebraic inequalities and show on a number line  Formulate equations from diagrams and real-world contexts  Set up and solve equations with unknowns on both sides  Solve linear inequalities in one variable and on the number line  <b>Some</b> – Solve quadratic equations with coefficient of x squared being 1</p>		
<b>Geometry</b>		<p><b>Angles</b>  <b>All</b> – Understand basic angles and types of angles  Know basic angle facts  <b>Most</b> – Understand and use angles in parallel lines  Calculate interior and exterior angles of polygons  Measure and calculate bearings  <b>Some</b> – Understand the proof of the sum of angles in a triangle and quadrilateral</p>	<p><b>Trigonometry (Set 2)</b>  <b>All</b> – Not covered with all groups  <b>Most</b> – Introduction to the trigonometric ratios <math>\sin\theta</math>, <math>\cos\theta</math> and <math>\tan\theta</math>, and apply them to find lengths in right-angled triangles  <b>Some</b> – Know and apply the trigonometric ratios, <math>\sin\theta</math>, <math>\cos\theta</math> and <math>\tan\theta</math> and apply them to find angles in right-angled triangles.</p>
		<p><b>Measures</b>  <b>All</b> – Interpret scales on a range of measures  Convert standard units of length, mass, time, and money  Solve simple speed problems  <b>Most</b> – Understand readings can be inaccurate  Convert between metric units of area and volume  Solve simple problems involving speed, density and pressure using formulae  Convert simple compound units</p>	<p><b>Area and Volume</b>  <b>All</b> – Area of a triangles, parallelograms, trapeziums, kites, rectangles, including examples that involve basic algebraic lengths, and compound shapes made from rectangles, and other shapes  By identifying a rectangle cut into sections calculate the area as a whole and as two parts, relating to expanding single brackets  <b>Most</b> – Area of compound shapes made from rectangles including algebraic lengths</p>

		<p><b>Some</b> – Solve complex problems involving speed, density and pressure using formulae Understand error bounds from measurements</p>	<p>Area of a triangles, parallelograms, trapeziums, kites including algebraic lengths Relate calculating areas of rectangles with expanding brackets including squared terms Given a total area identify 2 separate rectangles and relate to factorising into a single set of brackets Calculate the volume of cuboids and other right prisms. Calculate the surface area of cuboids and composite prisms. Write expressions for volume and surface area of cuboids, including examples with algebraic lengths Calculate the volume of 3D composite prisms excluding cylinders <b>Some</b> – Calculate the area of any rectilinear shapes &amp; composite shapes including algebraic lengths Calculate the volume of 3D composite prisms and parts of cylinders, with links from volume to mass, capacity &amp; density.</p>
		<p><b>Pythagoras (Set 1 and 2)</b> <b>Most</b> – Know and apply Pythagoras/ theorem to find a length in 2D <b>Some</b> – Use Pythagoras to find the height of an isosceles triangle To solve practical problems using Pythagoras Use Pythagoras to find the distance between two co-ordinates</p>	<p><b>Circles</b> <b>All</b> – Understand and use the terms centre, radius, chord, diameter and circumference Introduction to <math>\pi</math> by practical measuring and deducing the relationship between the circumference and diameter of a circle Calculate the circumference of circles given their diameter <b>Most</b> – Calculate the circumference of circles given their diameter or radius Know and apply the formula to calculate the area of a circle given the diameter or radius Find areas of simple composite shapes that include semi-circles or quadrants Calculate the arclength and area of a sector of a circle given its angle and radius. <b>Some</b> – Use area &amp; circumference of circle to calculate perimeter of sectors, composite shapes involving circles, volume &amp; surface area of cylinders</p>

		<p><b>Scales/Similar Shapes</b>  <b>All</b> – Use multiplicative relationships to scale up where the value is beyond the scale of the graph  Use and interpret scale drawings  Use a scale to find distances or measurements on maps  Recognise similar shapes  Solve simple problems using scales of 2 and 10  <b>Most</b> – Identify the scale factor of an enlargement as a ratio of the lengths  <b>Some</b> – Include bearings in problems solving maps and models using scales or ratios  Similarity of length, area and volume</p>	<p><b>Plans and 3D shapes</b>  <b>All</b> – Construct plans and elevations of simple 3D solids. Representation (e.g. using isometric paper) of solids from plans and elevations.  Interpret plans and elevations of simple 3D solids  Solve simple surface area and volume problems from diagrammatic information provided in plan and elevation diagrams for cuboids and solids made from component cuboids  <b>Most</b> – Recognise and use vocabulary for 3D solids. Construct plans and elevations of simple 3D solids, and representations (e.g. using isometric paper) of solids from plans and elevations  Solve surface area &amp; volume problems from diagrammatic information provided in plan &amp; elevation diagrams for more complex solids given the appropriate measurements  <b>Some</b> – Draw diagrams from written descriptions  Sketch 3D solids on plain paper and represent composite solids composed of cubes on isometric paper</p>
		<p><b>Trigonometry (Set 1)</b>  <b>All</b>- Introduction to the Sin, Cos and Tan ratios  Find the missing sides of triangles using trigonometry functions  Find the missing angles of triangles using trigonometry functions</p>	<p><b>Shape Properties, Congruence and Loci</b>  <b>All</b> – Identify 2D and 3D shapes  Measure angles using a protractor correct to 1 degree of accuracy  Identify faces, surfaces, edges and vertices  Draw a line of a given length, an angle of a given size and an arc  Work out the order of rotational symmetry or number of lines of symmetry of a shape (as appropriate)  Understand the meaning of “loci” and construct simple loci  Use simple scales and construct simple scale drawings  <b>Most</b> – Give the properties of any 2D and 3D shapes including lines of symmetry and order of rotational symmetry (as appropriate)</p>

			<p>Complete a drawing of a shape demonstrating a given symmetry</p> <p>Use correct notation when drawing, labelling and referring to shapes</p> <p>Construct triangles (SSS, ASA and SAS) with an appropriate method</p> <p>Construct the perpendicular bisector and midpoint of a line segment</p> <p>Construct the bisector of an angle formed from two lines</p> <p><b>Some</b> – Construct the perpendicular from a point to a line</p> <p>Construct the perpendicular to a line at a point</p> <p>Know that the perpendicular distance from a point to a line is the shortest distance to the line</p>
			<p><b>Transformations</b></p> <p><b>All</b> – Define what transformations are in Mathematics</p> <p>Explain what reflection, rotation and enlargement mean</p> <p>Reflect a basic shape with a given mirror line</p> <p>Rotate a basic shape with the centre of rotation in the centre of the shape</p> <p>Introduction to translation using right/left and up/down</p> <p>Enlarge a basic shape with a scale factor of 2 and/or 3</p> <p><b>Most</b> – Rotate a simple shape clockwise or anti-clockwise through a multiple of <math>90^\circ</math> about a given centre of rotation</p> <p>Enlarge a simple shape using a whole number positive scale factor, and identify the scale factor of an enlargement</p> <p>Introduce the concept of fractional scale factors; investigate resizing images to objects</p> <p>Use x and y coordinates in plane geometry problems, including transformations of simple shapes.</p> <p><b>Some</b> – Use a column vector to describe a translation of a simple shape, and perform a specified translation</p>



			<p>Perform a sequence of isometric transformations (reflections, rotations or translations) on a simple shape</p> <p>Describe the sequence of isometric transformations (reflections, rotations or translations) needed to transform object to image and the changes and invariance achieved</p>
<b>Ratio and Proportion</b>		<p><b>Percentages</b></p> <p><b>All</b> – Understand a percentage is part of a 100 Convert between basic fractions, decimals and percentages without a calculator</p> <p><b>Most</b> – Calculate percentage of a quantity using non calculator methods Increase and decrease a quantity by a simple percentage Identify simple multipliers Be able to use a multiplier in percentage calculations, including depreciation and compound interest and finding the original value</p> <p><b>Some</b> – Solve more complex problems involving percentages</p>	
		<p><b>Proportion, Ratio and Proportionality</b></p> <p><b>All</b> – Write and find simple ratios Understand what a ratio means Compare amounts as ratio notation Understand equivalent ratios Use ratio in scaling problems including finding original quantities Express and divide a quantity in two parts as a ratio</p> <p><b>Most</b> – Apply ratio to real contexts and problems Simplify ratios and write their fraction equivalents Use ratio in recipe problems</p> <p><b>Some</b> – Convert between equivalent forms of ratio and fractions Simplify ratios into the form 1: n or n:1 Ensuring constant units of measure in ratio calculations</p>	
<b>Probability and Data</b>		<p><b>Probability</b></p> <p><b>All</b> – Use the probability scale and understand it goes from 0 to 1. Calculate probability of simple combined events</p>	<p><b>Collecting and representing discrete data</b></p> <p><b>All</b> – Gather information and produce frequency tables, lists and tally charts from discrete data</p>

		<p>Use probability language (impossible, even, certain)</p> <p>Use tables and grids to list outcomes of single events and simple combined events</p> <p>Calculate theoretical probabilities</p> <p>Use sample spaces diagrams for two events</p> <p>Calculate probabilities expressed as fractions, decimals and percentages</p> <p>Understand that <math>P(A)+P(\text{Not } A) = 1</math></p> <p>Complete Venn and Carroll diagrams and calculate probabilities from these</p> <p>Understand relative frequency and use frequency trees</p> <p>Use expected probability</p> <p>Complete and read two-way tables</p> <p><b>Most</b> – Understand the idea of randomness and fairness</p> <p>Use systematic listing strategies</p> <p>Understand and apply <math>P(A \text{ or } B) = P(A)+P(B)-P(A \text{ and } B)</math></p> <p>Draw and calculate probabilities from tree diagrams</p> <p><b>Some</b> – Draw and use sample space diagrams for more complex events</p>	<p>Draw line graphs, bar charts and pictograms, and identify the frequency</p> <p>Find the median and mode for categorical data</p> <p>Find the range for a list of numbers</p> <p>Find the mean and mode for a set of discrete data and compare datasets</p> <p>Collect and record discrete data</p> <p>Construct frequency diagrams and simple vertical line graphs for ungrouped discrete numerical data</p> <p>Extract and interpret information presented in simple tables, lists, bar charts and pictograms, including finding the mode</p> <p>Interpret pie charts where each segment represents a simple fraction</p> <p>Understand the meaning of “population” and “sample”, and explain obvious bias in sampling</p> <p><b>Most</b> – Confident in finding the mean, median, mode and range for discrete data, and using to compare two distributions</p> <p>Extract and interpret information presented in tables, lists, bar charts and pictograms</p> <p>Construct frequency table from diagrams</p> <p>Find mode/median/range and mean from frequency tables</p> <p>Recognise graphical misrepresentation through incorrect scales, labels etc.</p> <p>Use multiple and composite bar charts to compare two sets of data</p> <p>Interpret graphs and diagrams, including pie charts, drawing conclusions</p> <p>Create and interpret line graphs where the intermediate values have meaning</p> <p>Construct and interpret a pie chart</p> <p>Identify the population and explain potential bias in sampling</p> <p>Know how to conduct a random sample</p> <p>Plot and interpret scatter diagrams for bivariate data</p> <p>Recognise types of correlation</p> <p>Identify outliers in simple cases</p> <p>Draw a line of best fit by eye</p>
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			<p>Use a line of best fit to interpolate and extrapolate from data, and be aware of the limitations of these techniques</p> <p>Interpret highs and lows for time series data in context and identify trends over time.</p> <p><b>Some</b> – Rapidly calculate the mode, median, mean and range for ungrouped data and use to describe sets of data (using terms average/spread) identifying which average is most appropriate</p> <p>Interpret multiple and composite bar charts</p> <p>Review calculation of averages and range for ungrouped data presented in bar charts</p> <p>Identify impact of graphical misrepresentation through incorrect scales, labels etc</p> <p>Construct tables for large discrete and continuous sets of raw data, choosing suitable class intervals</p> <p>Design and use two-way tables</p> <p>Interpret line graphs where the intermediate values have meaning, and use to estimate intermediate values</p> <p>Interpret and construct Pie Charts</p> <p>Appreciate there may be errors in data from outliers and recognise outliers on a scatter graph.</p>
			<p><b>Interpreting grouped data</b></p> <p><b>All</b> – Group data, where appropriate, in equal class intervals</p> <p>Find the mode and range from discrete frequency tables</p> <p>By writing pictograms/ bar charts / frequency tables as list of numbers, find the mean and median</p> <p><b>Most</b> – Calculate the mean median and mode using single digits</p> <p>find the mean from pictograms, bar charts, and discrete frequency tables</p> <p>Find the modal class from grouped frequencies</p> <p>Estimate the mean, median and range of a set of grouped data in frequency table, and explain why it is necessarily an estimate</p>

			Compare two or more distributions and make inferences, using the shape of the distributions and measures of average and range <b>Some</b> – find the mean from a discrete frequency table
<b>Assessment</b>	Weekly Maths skills (5 questions) – completed as an entry task Homework – at least 3 homeworks per half term Topic Tests (2 per half term) – Students will receive written feedback and a percentage (not a grade)		
	Progress Test: Core Paper – all students – decides the tier of the main test. Main test - Higher or Foundation tier.	Progress Test: Core Paper – all students – decides the tier of the main test. Main test - Higher or Foundation tier.	End of Year Test: Core Paper – all students – decides the tier of the main test. Main test - Higher or Foundation tier.