

KS3 Curriculum

CURRICULUM INTENT?

What does Maths help young people achieve at KS3? Why have you made these curriculum choices?

At KS3 we want students to develop an appreciation of mathematics and a sense of enjoyment, curiosity about the subject and an understanding of it's place in modern society. A firm grasp of the key concepts and processes in mathematics is essential to equip our young people to thrive in day to day settings by providing them with the skills and confidence to carry-out everyday tasks with greater ease. This could include Financial literacy to understanding links and connections between other subjects. Students who are comfortable and confident with mathematics are able to develop critical thinking skills enabling them to effectively problem-solve . Young people that leave school with these skills are better equipped to be numerate in multiple settings across society and are able to flourish in a variety of fields. Our KS3 curriculum lays down the foundations for further life.

TERM BY TERM BREAKDOWN – Knowledge acquired and skills developed:

	Year 7 Course Outline	Year 8 Course Outline	Year 9 Course Outline	Opportunities beyond the classroom
--	-----------------------	-----------------------	-----------------------	------------------------------------

Autumn Term	<p><i>Knowledge:</i></p> <ul style="list-style-type: none"> • Sequences • Using algebraic notation • Equality and Equivalence • Place value and Ordering • Fraction, decimal and Percentage equivalence <p><i>Key Skills:</i></p> <ul style="list-style-type: none"> – Be able to describe and continue sequences in diagram and number forms – Use function machines with numbers, models and letters – Use and interpret algebraic notation – Understand and use inverse operations – Form and substitute into expressions including generating sequences – Represent functions graphically – Understand equivalence – Use fact families – Form and solve one step equations – Understand equivalence of algebraic expressions – Collect like terms. 	<p><i>Knowledge:</i></p> <ul style="list-style-type: none"> • Ratio and Scale • Multiplicative change • Multiplying and dividing fractions • Working in the cartesian plane • Representing data • Probability <p><i>Key Skills:</i></p> <ul style="list-style-type: none"> – Understand ratio and its link to multiplication – Use ratio notation – Reduce ratios to simplest form – Solve ratio problems – Calculate the circumference of a circle – Use scale factors linking to ratio to solve problems – Convert between currencies, including using graphs – Draw and interpret scale diagrams and maps – Multiply and divide a fraction by an integer – Multiply and divide a fraction by a fraction – Understand and use the reciprocal – Plot and interpret straight line graphs – Understand and use e equations of a straight line including lines parallel to the axis – Make links between direct proportion and straight lines of the form $y = kx$ – Model situations by translating them into expressions formulae and graphs – Draw and interpret scatter graphs – Understand correlation – Draw and use lines of best fit – Understand grouped, ungrouped, discrete and continuous data – Design and use one and two way tables – List outcomes using sample space diagrams for one and two events – Find probabilities using tables and Venn diagrams. 	<p><i>Knowledge:</i></p> <ul style="list-style-type: none"> • Straight line graphs • Forming and solving equations and inequalities • Testing conjectures • Three dimensional shapes • Constructions and congruency <p><i>Key Skills:</i></p> <ul style="list-style-type: none"> – Interpret straight line graphs – Find and use the equation of a straight line – Reduce equations to the form $y=mx+c$ – Compare to linear sequences and finding the rule for the nth term – Revisit and forming and solving equations to having unknown on both sides using context e.g. angles, probability, area etc – Change the subject of a formula – Test conjecture in a range of contexts e.g odd and even numbers, position in a sequence; in several shapes; testing parallel lines and exploring predictions – Understand faces, edges and vertices – Know names of prisms and non prisms – Identify 2-d and 3-d shapes – Work out the volume and surface area of cuboids and cylinders – Work out the volume of a prism – Work out missing lengths given area and volume – Construct 3-d shapes from nets and vice versa – Construct and use scale drawings – Construct perpendicular bisectors – Understand congruency – Exploring congruency via construction 	<ul style="list-style-type: none"> ❖ Sequences are used in nature and predicting ❖ Algebra is used for: <ul style="list-style-type: none"> ❖ Writing a rule for time taken to get to a place when travelling a motorway. ❖ Solving problems such as how much carpet would be needed for a bedroom. ❖ How much your savings will earn in interest over a given number of years. ❖ ‘Naismith’s Rule’ for planning a walk. ❖ Baking a cake; take the ingredients (input), mix together and bake in the oven (action), you end up with a cake (output). ❖ The rule for time taken when travelling on a motorway. ❖ Total fee charged by a tradesman. ❖ Calculating area/perimeter. ❖ Carpeting/wallpapering a room. ❖ Interest earned on savings. ❖ Government finance and population data. ❖ Average salary for different professions. ❖ Reading scales such as a thermometer or speedometer. ❖ Estimating costs without a calculator – shopping. ❖ Business/Economics – maximise profits or minimise costs. ❖ Ordering decimals in order to identify a winner of a race – Olympic Games. ❖ Understand an approximate answer more easily – lottery winner reported in a newspaper. ❖ Exchange rates/currency conversion. ❖ Crowds at a sporting fixture/music concert. ❖ Recording extra-large/small numbers – size of a planet or atom. ❖ Government statistics to show changes in social and economic circumstances – GDP, unemployment rates etc. ❖ Bank loans and savings – interest charged on savings and loans. ❖ Salaries and earnings – some business/salespeople earn commission on sales. ❖ Shopping/Black Friday Sales – to get the best deal/discount. ❖ Reading of food labels to see how the nutrients/calories meet the Recommended Daily Intake (RDI). ❖ Ratio is used in: Cooking recipes – round the world
-------------	--	--	---	---

			<ul style="list-style-type: none"> ❖ Greek buildings – ‘Golden ratio’ ❖ Best buys – food shopping ❖ Miles per hour ❖ Multiplicative reasoning is used in Architectural plans ❖ Distance between London and other major cities around the world using the scale ❖ Speed/Distance/Time ❖ Currencies around the world and the rate of exchange to the pound. ❖ Multiplying and dividing fractions is used in architects who use fractions (scales) to design buildings ❖ Interest rates, tax calculations... ❖ Ski slopes, skateboard parks consist of gradients. ❖ Data representation is used in a wide range of situations like business, looking at market research, geography when looking at population dynamics, science, social science and PE. ❖ We use tables in everyday contexts like bus and train timetables. ❖ We use two-way tables to categorise data into a number of different variables. This helps us to predict particular occurrences or characteristics of a population. ❖ Graphs are used in a variety of real-life contexts to illustrate relationships. These include, inflation, savings accounts, rates of pay. ❖ Equations are used in Real life examples of billing e.g., a plumber charges a fixed charge + and hourly rate; a taxi journey will include a fixed charge + a charge per mile. Or in cooking: cook for 20 mins per $\frac{1}{2}$ kg + 20 mins. ❖ Developing problem solving and reasoning skills is a life skill and used and applied in a variety of situations. ❖ Understanding 3-d shapes is used in a range of subjects and disciplines including Design and technology ❖ Architecture ❖ Art, scale drawings ❖ Understanding capacity is linked with 3-d shapes. ❖ Scale drawings and constructions are used for Reading maps
--	--	--	--

				<p>❖ Using scale drawings to make estimates, working out the length of journeys on a map or the distance of places.</p>
--	--	--	--	---

Spring Term	<p><i>Knowledge:</i></p> <ul style="list-style-type: none"> ● <i>Addition and Subtraction</i> ● <i>Multiplication and division</i> ● <i>Fractions and percentages of amounts</i> ● <i>Directed number</i> ● <i>Adding and subtracting fractions</i> <p><i>Key Skills:</i></p> <ul style="list-style-type: none"> – <i>Use mental and formal written methods of addition with integers and decimals, including choosing the most appropriate method</i> – <i>Solve problems in the context of perimeter, money, frequency trees and tables</i> – <i>Solve problems in the context of bar charts and line charts</i> – <i>Multiply by 10,100 and 1,000, 0.1 and 0.01</i> – <i>Convert metric units</i> – <i>Use mental and formal written methods of multiplication and division</i> – <i>Find the HCF and LCM of small numbers</i> – <i>Evaluate areas of triangles, rectangles and parallelograms</i> – <i>Find the mean of a set of numbers</i> – <i>Begin to use the order of operations</i> – <i>Work out simple fractions and percentages of amounts with and without a calculator</i> – <i>Order directed numbers both in context and abstract situations</i> – <i>Revisit four operations with directed number</i> – <i>Use a calculator with directed number</i> – <i>Solve two step equations with and without a calculator</i> – <i>Use the order of operations</i> – <i>Represent tenths and hundredths on diagrams and number lines</i> – <i>Convert mixed numbers and improper fractions</i> – <i>Add and subtract fractions with the same and different denominators</i> – <i>Add and subtract fractions and decimals. E.g. $\frac{1}{2} + 0.2$</i> 	<p><i>Knowledge:</i></p> <ul style="list-style-type: none"> ● <i>Brackets, equations and inequalities</i> ● <i>Sequences</i> ● <i>Indices</i> ● <i>Fractions and percentages</i> ● <i>Standard index form</i> ● <i>Number sense</i> <p><i>Key Skills:</i></p> <ul style="list-style-type: none"> – <i>Expand and factorise into single brackets</i> – <i>Form and use expressions, formulae and identities</i> – <i>Form and solve equations and inequalities with and without brackets</i> – <i>Distinguish between equations, expressions, formulae and identities</i> – <i>Generate sequences using more complex rules e.g. with brackets and squared terms both in words and algebraically</i> – <i>Form expressions using indices</i> – <i>Understand and use the addition and subtraction rules</i> – <i>Develop understanding of fractions, decimals and percentages</i> – <i>Evaluate percentage increase and decrease</i> – <i>Use multipliers to solve percentage problems</i> – <i>Express one number as a percentage of another</i> – <i>Convert between numbers in ordinary and standard form</i> – <i>Compare numbers given in standard form</i> – <i>Calculate with numbers given in standard form with and without a calculator</i> – <i>Develop mental strategies</i> – <i>Convert between metric measures and units</i> – <i>Estimation including rounding a number to a given number of decimal places</i> – <i>Use the order of operations</i> 	<p><i>Knowledge:</i></p> <ul style="list-style-type: none"> ● <i>Numbers</i> ● <i>Using percentages</i> ● <i>Mathematics and money</i> ● <i>Deduction</i> ● <i>Rotation and translation</i> ● <i>Pythagoras theorem</i> <p><i>Key Skills:</i></p> <ul style="list-style-type: none"> – <i>Revisit types of number include rational and real numbers</i> – <i>Revisit fraction arithmetic</i> – <i>Extend knowledge of HCF and LCM</i> – <i>Revisit standard form</i> – <i>Revisit percentage increase and decrease</i> – <i>Use percentages over 100%</i> – <i>Find percentage change</i> – <i>Use multipliers in a variety of contexts</i> – <i>Solve reverse percentage problems</i> – <i>Explore financial mathematics including bills and bank statements</i> – <i>Interest</i> – <i>Unit pricing (best buys)</i> – <i>Revisit angle rules including within special quadrilaterals</i> – <i>Find angles using algebraic methods</i> – <i>Use chains of reasoning to evaluate angles</i> – <i>Identify the order of rotation symmetry of a shapes</i> – <i>Find the result of rotation shapes</i> – <i>Translate point and shapes given by a vector</i> – <i>Understand variance and invariance in the context of transformations</i> – <i>Identify the hypotenuse of a right angles triangle</i> – <i>Determine whether a triangle is right angled</i> – <i>Calculate missing sides in a right angled triangle</i> 	<ul style="list-style-type: none"> ❖ <i>Government finance and population data.</i> ❖ <i>Music – polyrhythm when drumming.</i> ❖ <i>Fiscal Consumerism – shopping, savings, credit, debit, and loans.</i> ❖ <i>Estimating costs without a calculator – shopping.</i> ❖ <i>Business/Economics – maximise profits or minimise costs.</i> ❖ <i>Interpreting Data</i> ❖ <i>Perimeter and length.</i> ❖ <i>Crowds at a sporting fixture/music concert.</i> ❖ <i>Recording extra-large/small numbers – size of a planet or atom.</i> ❖ <i>Estimating costs without a calculator – shopping.</i> ❖ <i>Crowds at a sporting fixture/music concert.</i> ❖ <i>Recording extra-large/small numbers – size of a planet or atom.</i> ❖ <i>Government statistics to show changes in social and economic circumstances – GDP, unemployment rates etc.</i> ❖ <i>Bank loans and savings – interest charged on savings and loans.</i> ❖ <i>Salaries and earnings – some business/sales</i> ❖ <i>Shopping/Black Friday Sales – to get the best deal/discount.</i> ❖ <i>Hospitality – chef using a recipe for large number of guests.</i> ❖ <i>Shopping – sales/discounts, best buys.</i> ❖ <i>Working out exam marks as a percentage.</i> ❖ <i>Finance – use percentages for interest rates and savings; pay rises; profit and loss.</i> ❖ <i>Distances on road signs e.g. 7 ½ miles.</i> ❖ <i>Hospitality – using fractions of amounts to adjust recipes in larger quantities.</i> ❖ <i>Food labelling – caloric intake, nutrients and RDI (Recommended Daily Intake).</i> ❖ <i>Temperature reading.</i> ❖ <i>Cost and amount needed for carpeting a room.</i> ❖ <i>Comparing numbers when choosing a mobile phone plan.</i> ❖ <i>Climate – when deciding where to go on holidays.</i> ❖ <i>Bank loans and savings – interest charged on savings and loans.</i> ❖ <i>Salaries and earnings – some business/sales</i> ❖ <i>Scientists, financial analysts and economists make use of powers and roots.</i>
--------------------	--	--	--	---

				<ul style="list-style-type: none"> ❖ Engineers, accountants, architects, and computer programmers work out complex calculations using a calculator. ❖ Hospitality – chef using a recipe for large number of guests. ❖ Algebra is used in a variety of contexts including: Cooking, Trajectories, Space exploration, Military, Child development, Coding, Sports , Loans/investments ❖ Sequences are used in Modelling of disease, Population growth, Cell growth, Sequences in computing, Fibonacci in nature, Fractals ❖ Computing uses base 2 and base 16 in formulae ❖ Richter measuring index scales are used to denote the power of earthquakes. ❖ Indices are used with Growth and decay of organisms or finances. ❖ Percentages are used in a range of Curriculum subjects like PE, geography, History, Food. ❖ Test scores are given in percentages. ❖ Percentages are used for Assessing the best deal on sale items/offers ❖ Pay rises ❖ Standard index form is used in expressing very large numbers such as distances in space, or between countries, and very small numbers like magnification on a microscope. ❖ We use estimation in everyday life to give us a guide about how much something would cost, or how much change we should get in a shop. ❖ It is also useful to understand that often, when reporting numbers, a certain degree of accuracy is used and how this can affect the way we judge figures. ❖ Converting between metric units is used in science, food, PE and in everyday life such as recipes. ❖ The relationship between maths and money is made explicit by studying Sale prices, Inflation, Taxes, Interest rates, Exchange rates.
--	--	--	--	--

Summer Term	<p>Knowledge:</p> <ul style="list-style-type: none"> • <i>Construction and Measuring</i> • <i>Geometric reasoning</i> • <i>Developing number sense</i> • <i>Sets and probability</i> • <i>Prime numbers and proof</i> <p>Key Skills:</p> <ul style="list-style-type: none"> – <i>Understand lettering and labelling notation for lines and angles</i> – <i>Draw and measure lines and angles accurately</i> – <i>Classify angles</i> – <i>Identify and draw parallel and perpendicular lines</i> – <i>Recognise types of triangle, quadrilateral and other polygons</i> – <i>Construct triangles given SSS, SAS, ASA</i> – <i>Draw and interpret pie charts</i> – <i>Calculate and use angles at a point, angles on a straight line and vertically opposite angles</i> – <i>Calculate missing angles in triangles and quadrilaterals</i> – <i>Develop mental arithmetic strategies</i> – <i>Use known facts to derive other facts</i> – <i>Evaluate an algebraic expression given a related fact</i> – <i>Use estimation</i> – <i>Understand set notation</i> – <i>Draw and interpret Venn diagrams</i> – <i>Understand and use the language of probability</i> – <i>Calculate the probability of a single event</i> – <i>Use the sum of probabilities of an event is 1</i> – <i>Recognise prime, square and triangle numbers</i> – <i>Express a number as a product of its prime factors</i> – <i>Powers and roots</i> – <i>Make and test conjectures</i> – <i>Understand and use counterexamples</i> 	<p>Knowledge:</p> <ul style="list-style-type: none"> • <i>Angles in parallel line and polygons</i> • <i>Area of trapezia and circles</i> • <i>Line symmetry and reflection</i> • <i>Data handling cycle</i> • <i>Measures of location and dispersion</i> <p>Key Skills:</p> <ul style="list-style-type: none"> – <i>Review angle rules</i> – <i>Understand and use parallel lines and angles</i> – <i>Revisit geometric notation</i> – <i>Work out angles in special quadrilaterals</i> – <i>Find and use the sum of interior and exterior angles of a polygon</i> – <i>Prove simple geometric facts</i> – <i>Review area of shapes</i> – <i>Calculate area of a trapezium</i> – <i>Calculate the area of a circle and the area of parts of a circle</i> – <i>Use significant figures</i> – <i>Calculate the area of compound shapes</i> – <i>Recognise line symmetry in polygons and other shapes</i> – <i>Reflect shapes in horizontal, vertical and diagonal lines</i> – <i>Understand and use primary and secondary sources of data</i> – <i>Collect data including using questionnaires</i> – <i>Interpret and construct statistical diagrams including multiple bar charts</i> – <i>Construct and interpret pie charts</i> – <i>Compare distributions using charts</i> – <i>Identify misleading graphs</i> – <i>Revisit the mean and the median including finding the total given the mean</i> – <i>Find the mean of grouped data</i> – <i>Work out mode and modal class</i> – <i>Choose the appropriate average</i> – <i>Comparing distributions using measures</i> 	<p>Knowledge:</p> <ul style="list-style-type: none"> • <i>Enlargement and similarity</i> • <i>Solving ratio and proportion problems</i> • <i>Rates</i> • <i>Solving problems using graphs tables and algebra</i> <p>Key Skills:</p> <ul style="list-style-type: none"> – <i>Enlarge shapes by a positive scale factor including from a given point</i> – <i>Calculate lengths of missing sides in similar shapes</i> – <i>Direct proportion problems and graphs</i> – <i>Conversion graphs</i> – <i>Solve ratio problems given the whole or part</i> – <i>Simple inverse proportion</i> – <i>Unit pricing (best buys)</i> – <i>Work with speed, distance and time</i> – <i>Solve problems using density</i> – <i>Work with compound units</i> – <i>Revisit data measures, charts and graphs including bivariate data; criticise misleading graphs</i> – <i>Revisit alternative representations of sequences including algebraic rules</i> – <i>Revisit frequency trees and other representations e.g. tables</i> – <i>Revisit conversions between standard form and ordinary form and representing numbers as products of primes</i> – <i>Expand a pair of binomials</i> – <i>Create and interpret tables, timetable; solve problems involving speed, distance and time</i> – <i>Solve inequalities on number lines, including error intervals</i> – <i>Represent word problems in a variety of forms (graphs, tables, expressions...)</i> – <i>Interpret graphs of any form (exponential, piece-wise, reading from quadratics, speed/time)</i> – <i>Compare theoretical and experimental probabilities; probability of two or more events</i> 	<ul style="list-style-type: none"> ❖ Measurement is used in a range of subjects like PE, Food, Geography, Science and DT. ❖ There are a range of professions that use measurement like carpentry and construction. ❖ Angles are used by the armed forces and search and rescue organisations as well as various tradesmen. ❖ The technique of problem solving is a life skill that needs to be taught and developed. ❖ Mental strategies for numerical calculations are used in lots of everyday situations like shopping, working out best mobile phone tariff's special offers and times and distances for journeys. ❖ The idea of classification helps us to work out facts and properties of items belonging to particular sets as well as solve problems. ❖ Probability is used in everyday disciplines such as meteorology and science to help us predict outcomes. ❖ Gambling and betting also uses probability. ❖ Properties of number help us to understand problems using factors and multiples to multiply and divide as well as working out when concurrent events will occur. ❖ Area of shapes are used in various jobs like carpet fitting or floor specialists, gardening, tiling, and painting and decorating. ❖ Finding the area under graphs can also give us various other measures and these measures are used later in GCSE science and maths as well as at a 'level. ❖ Pictorial representation of data in various graphs is used in a range of subjects like science, PE, Geography, History, Business. ❖ It is a life skill to be able to identify misleading features of data. ❖ We use various measures of average and dispersion in everyday life from looking at football team performance to figuring out how to decide which products to stock in a shop. ❖ Enlargements are used in architecture and construction when using blueprints or scale drawings. ❖ Ratio and proportion is used in cooking and scaling recipes up or down as well as sharing quantities fairly for investment purposes.
--------------------	--	---	--	--

				<ul style="list-style-type: none"> ❖ Ratio can also be used in any situations where the quantities have to be in the same proportions e.g. construction cement, pasty, baking no etc. ❖ Rates of change can be linked to inflation, population change or even the spread of infectious diseases.
Key Independent Learning Resources			GREAT READS	
<p>Corbett Maths Mymaths Mathswatch Tassomai</p>			<p><u>A Hundred Billion Trillion Stars</u> Written by Seth Fishman <u>Secret Coders #1: Get with the Program</u> Written by Gene Luen Yang, illustrated by Mike Holmes <u>Giant Pumpkin Suite</u> By Melanie Heuser Hill <u>Really Big Numbers</u> By Richard Evan Schwartz <u>Alex's Adventures in Numberland</u> by Alex Bellos <u>The Monty Hall Problem: Beyond Closed Doors</u> by Rob Deaves <u>The Music of the Primes</u> by Marcus Du Sautoy <u>Fermat's Last Theorem</u> by Simon Singh <u>The Number Devil</u> by Hans Magnus Enzensberger <u>The Indisputable Existence of Santa Claus</u> by Hannah Fry and Thomas Oléron Evans <u>The Thrilling Adventures of Lovelace and Babbage</u> by Sydney Padua <u>The 'Uncle Albert' Series</u> by Russell Stannard</p> <p><u>A Girl Named Digit</u> by Annabel Monaghan</p>	