

CURRICULUM PLAN



SUBJECT:	Maths (KS3)	YEAR GROUP:	7
SUBJECT INTENT:	In Year 7 we give students the opportunity to become more fluent and confident in the concepts and calculator strategies studied at Key Stage 2, whilst also developing their depth of understanding and their reasoning skills. Students apply fundamental concepts to new and challenging contexts such as algebraic manipulation, prime factorisation and probability. Scientific calculator use is embedded throughout all topics, practicing these skills in topics such as averages, area and angles and normalising calculator use to self-assess their work. Students are introduced to Statistics, collecting, presenting and analysing data.		

TERM	TOPIC	CORE LEARNING (Sparx codes)	SEQUENCING
Autumn 1	Number Sense and Calculations	- Integer and decimal place value, including using a number line (M763, M704, M522) - Ordering negative numbers (M527) - Rounding integers and decimals (M111, M431) - Adding and subtracting integers and decimals (M928, M429, M347, M152) - Multiplying and dividing by powers of 10 (M113, M911) - Multiply integers and decimals (M187, M803) - Dividing integers and decimals (M462, M354, M262, M491) - Four operations with negative numbers (M106, M288) - Calculating with roots and powers (M135) - Using the correct order of operations (M521) - Using the commutative and associative laws (M409, M952) - Select appropriate calculation strategies to solve problems	<i>Building on...</i> The number line and the laws of arithmetic introduced at KS1&2. Students will revisit and deepen their understanding of written methods of arithmetic, including with decimals, and the order of operations. <i>Building towards...</i> This unit covers fundamental number skills which are needed for many other units covered throughout KS3&4. We use Autumn Term 1 to ensure students are confident and fluent calculators. Being able to work fluently with both positive and negative numbers, and decimals is vital throughout secondary mathematics. Multiplying and dividing by powers of 10 leads into conversion of metric units in Y7 Autumn 2 and into standard form notation in Y8.
Autumn 2	Expressions and Equations	- Algebraic notation and terminology (M813, M830) - Simplifying expressions containing a single and multiple variables and non-linear terms (M795, M531, M949) - Substituting into expressions (M417, M327) - Substituting into algebraic and real life formulae (M208, M979) - Solving one step equations (M707) - Solving two step equations (M634, M647)	<i>Building on...</i> From KS2, the use of simple formulae, expressing missing number problems algebraically, finding pairs of numbers that satisfy an equation with two unknowns. Understanding that algebra can be used to generalise the laws of arithmetic. Substitution consolidates Autumn term 1 use of negative numbers. <i>Building towards...</i> Writing algebraically and manipulating expressions are fundamental skills that underpin KS3&4 mathematics. The ability to express an unknown algebraically is the gateway of problem solving in a variety of contexts, including with angles in Y7 Summer term.

Spring 1	Measures	• Converting units of time (M515) • Using clocks (M892) • Calculating with time (M627) • Using timetables and calendars (M963, M747) • Estimating and measuring length, mass and capacity (M828) • Converting units of length, mass and capacity (M774) • Using appropriate units (M487)	<i>Building on...</i> Knowledge of time from KS1&2, including the language of time, telling the time on digital and analogue clocks, roman numerals. Converting simple units of time and linking this to fractions of an hour. Also real-life applications of time e.g bus timetables and calendars. Metric and imperial units were introduced at KS2. <i>Building towards...</i> Speed/distance/time calculations, using timetables, solving LCM problems involving time. Spring term Y7 works with units to calculate perimeter and area. Knowledge of units is also necessary for future topics such as solving compound measure problems seen in Y9 and also in science.
	2D Shapes	• Line properties (M814) • Shape properties (M276) • Symmetry (M523)	<i>Building on...</i> KS1&2 knowledge of recognising, describing and drawing 2D shapes, identifying and drawing lines of symmetry on 2-D shapes. <i>Building towards...</i> Use of letter and labelling conventions. Angles in parallel lines rules, interior and exterior angles in polygons, transformations of shapes all taught in Y8. Equations of parallel and perpendicular lines taught in Y9 (higher tier) and triangle properties useful for Pythagoras taught in Y9
	Perimeter and Area	• Finding the perimeter of rectangles and simple shapes (M920, M635) • Finding the perimeter of compound shapes (M690) • Finding the area of rectangles (M900, M390) • Finding the area of compound shapes (M269) • Finding the area of triangles and compound shapes containing triangles (M610, M996) • Expressing areas and perimeters algebraically.	<i>Building on...</i> KS2 curriculum of measurement and properties of shapes; finding the area of rectilinear shapes by counting squares, calculating the area of parallelograms and triangles. Measures topic; units of length and also expressions and equations in Y7 Autumn 2. <i>Building towards...</i> Area of further 2D shapes, volume and surface area of prisms in Y8. It will also build towards multi-step KS4 contextual problems eg. cost of carpet/tiling.
	Coordinates	• Reading and plotting coordinates (M618) • Solving shape problems involving coordinates (M230)	<i>Building on...</i> Working with coordinates in KS2, properties of shapes from earlier in Y7 <i>Building towards...</i> Midpoints, gradients, linear graphs, equations of parallel and perpendicular lines. Plotting linear and non-linear graphs through KS3/4 in both maths and science.

Spring 2	Factors, Multiples and Primes	- Finding the lowest common multiple (M227) - Finding factors and using divisibility tests (M823) - Finding the highest common factor (M698) - Finding prime numbers (M322) - Prime factor decomposition (M108)	<i>Building on...</i> Identifying and listing factors, multiples, factors and prime numbers from KS2. <i>Building towards...</i> Use of index notation in Y8. Factorising linear expressions in Spring Term 2 and factorising quadratic expressions in Y9, as well as simplifying surds at KS4.
	Fractions	- Finding fractions of shapes (M158) - Constructing fractions - write one quantity as a fraction of another (M939) - Finding equivalent fractions (M410) - Simplifying fractions (M671) - Ordering fractions (M335) - Compare fractions using inequality symbols - Converting between mixed numbers and improper fractions (M601) - Adding and subtracting fractions including mixed numbers (M835, M931)	<i>Building on...</i> Fraction work from KS2 which includes equal parts of a shapes, writing and recognising simple fractions, simplifying simple fractions, recognise equivalent fractions with diagrams, adding and subtracting fractions with the same denominator or with a common multiple, compare and order unit fractions and fractions with the same denominators, simple worded problems <i>Building towards...</i> F.D.P in summer term; multiplying and dividing fractions, equivalence of fractions, decimals and percentages. Fractions feature regularly in topics on area, perimeter, and volume and solving equations. At KS4 students need a good understanding of fraction arithmetic to apply this to algebraic fractions.
	Brackets	- Using the distributive law (M637) - Expanding single brackets (M237) - Expanding single brackets and simplifying expressions (M792) - Factorising into one bracket (M100)	<i>Building on...</i> Students have a basic knowledge of distributive law at KS2 e.g. that to calculate an expression such as 3×48 they can think of it as $3 \times (40 + 8)$, which equals $3 \times 40 + 3 \times 8$. <i>Building towards...</i> Manipulating expressions are a fundamental skill that underpins KS3/4. This leads to expanding double brackets (Y8), factorising double brackets (Y9), solving equations that contain brackets (Y8).
Summer 1	Angles	- Classify types of angles (M502) - Estimating angles (M541) - Measuring angles (M780) - Drawing angles (M331) - Angles on a line and about a point (M818) - Vertically opposite angles (M163) - Angles in triangles, using the properties of equilateral and isosceles triangles (M351) - Using equations to solve angle problems - Solve multi-step angle problems	<i>Building on...</i> From KS2, students should understand basic angle facts as well as recognising different types of angles and measuring with a protractor. They should be able to accurately estimate approximate sizes of angles. Also draws on solving equations from earlier in Y7. <i>Building towards...</i> Angles in parallel lines (Y8), constructions (Y9), rotation (Y9), accuracy in presenting data in a Pie Chart (Y8). Fluency with angle use required in many KS4 topics such as bearings, circle theorems and trigonometry.

	Handling data and statistical diagrams	- Calculating the range, median, mode and mean (M328,M934,M841,M940) - Interpreting frequency tables and two-way tables (M899) - Drawing and interpreting tally charts (M597) - Drawing and interpreting pictograms (M644) - Drawing and interpreting bar charts, including dual and compound (M460,M738) - Collecting and recording data using tables (M945) - Finding averages from frequency tables (M127) - Choosing suitable averages and solving problems (M440)	<i>Building on...</i> KS2 curriculum of calculating the mean and range, interpreting and presenting data in bar charts and pictograms for discrete data. <i>Building towards...</i> Mean from grouped frequency tables (Y9) and further statistical diagrams such as box plots, stem and leaf diagrams, frequency polygons, scatter graphs, histograms and cumulative frequency graphs. Interpreting, analysing and comparing the distributions of data sets is required throughout KS3/4 maths and science.
	Proportion	Solving proportion problems (M478)	<i>Building on...</i> Core multiplication and division skills and practical applications like scaling up recipes. <i>Building towards...</i> Similar shapes and scale factors. More complex proportional reasoning in KS4, ie. graphical representation of direct proportion, conversion graphs and currency conversions.
Summer 2	Fractions, Decimals and percentages	- Multiplying fractions including mixed numbers (M157,M197) - Reciprocals (M216) - Dividing fractions including mixed numbers (M110,M265) - Fractions of amounts with and without a calculator (M695,M684) - Converting between fractions, decimals and percentages (M958,M264) - Ordering fractions, decimals and percentages (M553) - Writing numbers as percentages of other numbers (M235)	<i>Building on...</i> From KS2 building on the basic properties of F.D.P and how they can be applied to number problems. Building on fraction arithmetic from the previous Y7 unit and consolidating understanding of place value. <i>Building towards...</i> Fractions and money units in Y8; being able to solve money problems by finding amounts in terms of percentages or fractions. Students will be able to apply equivalent F.D.P to ratio and proportion problems. Fraction arithmetic used in the next Y7 unit on probability.
	Probability	- Using probability phrases (M655) - Writing probabilities as fractions (M941) - Writing probabilities as fractions, decimals and percentages (M938) - Probabilities of mutually exclusive events (M755) - Sample space diagrams (M718) - Systematic listing (M817) - Investigate the idea of fairness and bias	<i>Building on...</i> The fraction and decimal units, apply to probability written in these forms; fraction arithmetic and converting between F.D.P. *This topic is not in KS2 but some students may have some prior knowledge from primary school. <i>Building towards...</i> Frequency trees in Y9, then KS4 probability skills of probability trees, Venn diagrams, conditional and unconditional probability, expectation.