

TDMS Curriculum overview Mathematics

Key Stage 2	
Number and Ratio - To have a good understanding of place value and to be able to round whole numbers to appropriate degrees of accuracy. - To have a good understanding of negative numbers. - To use mental and written methods for all four operations. - To solve multi-step problems in contexts, deciding which operations and methods to use and why. - To use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. - To use their knowledge of the order of operations to carry out calculations involving the four operations. - To identify common factors, common multiples and prime numbers and to apply this knowledge to simplify fractions. - To add and subtract fractions with different denominators and mixed numbers. - To multiply simple pairs of proper fractions and to divide proper fractions by whole numbers. - To compare and order fractions, including fractions > 1. - To multiply and divide numbers by a power of 10. - To multiply one-digit numbers with up to two decimal places by whole numbers. - To recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. - To describe positions on the full coordinate grid (all four quadrants). - To draw and translate simple shapes on the coordinate plane, and reflect them in the axes. - To solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts. - To solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison. - To solve problems involving similar shapes where the scale factor is known or can be found. To solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.	Geometry - To solve problems involving the calculation and conversion of units of measure. - To use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places. - To convert between miles and kilometres. - To recognise that shapes with the same areas can have different perimeters and vice versa. - To calculate the area of parallelograms and triangles. - To calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units [for example, mm^3 and km^3]. - To draw 2-D shapes using given dimensions and angles. - To illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius. - To recognise, describe and build simple 3-D shapes, including making nets. - To compare and classify geometric shapes based on their properties and sizes. - To find unknown angles in any triangles, quadrilaterals, and regular polygons. To recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.
Algebra - Simplify expressions by collecting like terms - Substitute into a simple expression - Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3) - Use simple formulae in words, and express missing number problems algebraically. - Generate and describe linear number sequences. - Find possible values in missing number problems and equations involving 1 or 2 unknowns.	Statistics and Probability - To complete, read and interpret information in tables, including timetables - To solve comparison, sum and difference problems using information presented in a line graph - To interpret and construct pie charts and line graphs and use these to solve problems. To calculate and interpret the mean as an average.

Key skills/content requirements at GCSE (Higher Tier Only in { })

Number

In addition to consolidating subject content from key stage 3, pupils should be taught to:

- apply systematic listing strategies, {including use of the product rule for counting}
- {estimate powers and roots of any given positive number}
- calculate with roots, and with integer {and fractional} indices
- calculate exactly with fractions, {surds} and multiples of π {simplify surd expressions involving squares [for example $\sqrt{12} = \sqrt{(4 \times 3)} = \sqrt{4} \times \sqrt{3} = 2\sqrt{3}$] and rationalise denominators}
- calculate with numbers in standard form $A \times 10^n$, where $1 \leq A < 10$ and n is an integer
- {change recurring decimals into their corresponding fractions and vice versa}
- identify and work with fractions in ratio problems
- apply and interpret limits of accuracy when rounding or truncating, {including upper and lower bounds}

Algebra

In addition to consolidating subject content from key stage 3, pupils should be taught to:

- simplify and manipulate algebraic expressions (including those involving surds {and algebraic fractions}) by:
 - factorising quadratic expressions of the form $x^2 + bx + c$, including the difference of 2 squares; {factorising quadratic expressions of the form $ax^2 + bx + c$ }
 - simplifying expressions involving sums, products and powers, including the laws of indices
- know the difference between an equation and an identity; argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments {and proofs}
- where appropriate, interpret simple expressions as functions with inputs and outputs; {interpret the reverse process as the 'inverse function'; interpret the succession of 2 functions as a 'composite function'}
- use the form $y = mx + c$ to identify parallel {and perpendicular} lines; find the equation of the line through 2 given points, or through 1 point with a given gradient
- identify and interpret roots, intercepts and turning points of quadratic functions graphically; deduce roots algebraically {and turning points by completing the square}
- recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions, the reciprocal function $y = \frac{1}{x}$ with $x \neq 0$, {the exponential function $y = k^x$ for positive values of k , and the trigonometric functions (with arguments in degrees) $y = \sin x$, $y = \cos x$ and $y = \tan x$ for angles of any size}
- {sketch translations and reflections of the graph of a given function}
- plot and interpret graphs (including reciprocal graphs {and exponential graphs}) and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration
- {calculate or estimate gradients of graphs and areas under graphs (including quadratic and other non-linear graphs), and interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts}
- {recognise and use the equation of a circle with centre at the origin; find the equation of a tangent to a circle at a given point}
- solve quadratic equations {including those that require rearrangement} algebraically by factorising, {by completing the square and by using the quadratic formula}; find approximate solutions using a graph
- solve 2 simultaneous equations in 2 variables (linear/linear {or linear/quadratic}) algebraically; find approximate solutions using a graph
- {find approximate solutions to equations numerically using iteration}
- translate simple situations or procedures into algebraic expressions or formulae; derive an equation (or 2 simultaneous equations), solve the equation(s) and interpret the solution

- solve linear inequalities in 1 {or 2} variable {s}, {and quadratic inequalities in 1 variable}; represent the solution set on a number line, {using set notation and on a graph}
- recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions, Fibonacci type sequences, quadratic sequences, and simple geometric progressions (r^n where n is an integer, and r is a positive rational number {or a surd}) {and other sequences}
- deduce expressions to calculate the n th term of linear {and quadratic} sequences.

Ratio, proportion and rates of change

In addition to consolidating subject content from key stage 3, pupils should be taught to:

- compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity (including trigonometric ratios)
- convert between related compound units (speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts
- understand that X is inversely proportional to Y is equivalent to X is proportional to $\frac{1}{Y}$; {construct and} interpret equations that describe direct and inverse proportion
- interpret the gradient of a straight line graph as a rate of change; recognise and interpret graphs that illustrate direct and inverse proportion
- {interpret the gradient at a point on a curve as the instantaneous rate of change; apply the concepts of instantaneous and average rate of change (gradients of tangents and chords) in numerical, algebraic and graphical contexts}
- set up, solve and interpret the answers in growth and decay problems, including compound interest {and work with general iterative processes}

Geometry and measures

In addition to consolidating subject content from key stage 3, pupils should be taught to:

- interpret and use fractional {and negative} scale factors for enlargements
- {describe the changes and invariance achieved by combinations of rotations, reflections and translations}
- identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment
- {apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results}
- construct and interpret plans and elevations of 3D shapes
- interpret and use bearings
- calculate arc lengths, angles and areas of sectors of circles
- calculate surface areas and volumes of spheres, pyramids, cones and composite solids
- apply the concepts of congruence and similarity, including the relationships between lengths, {areas and volumes} in similar figures
- apply Pythagoras' Theorem and trigonometric ratios to find angles and lengths in right-angled triangles {and, where possible, general triangles} in 2 {and 3} dimensional figures
- know the exact values of $\sin \theta$ and $\cos \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90° ; know the exact value of $\tan \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$
- {know and apply the sine rule, $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$, and cosine rule, $a^2 = b^2 + c^2 - 2bc \cos A$, to find unknown lengths and angles}
- {know and apply Area = $\frac{1}{2}ab \sin C$ to calculate the area, sides or angles of any triangle}
- describe translations as 2D vectors
- apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors; {use vectors to construct geometric arguments and proofs}

Probability

In addition to consolidating subject content from key stage 3, pupils should be taught to:

- apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to 1
- use a probability model to predict the outcomes of future experiments; understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size
- calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions
- {calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams}

Statistics

In addition to consolidating subject content from key stage 3, pupils should be taught to:

- infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling
- interpret and construct tables and line graphs for time series data
- {construct and interpret diagrams for grouped discrete data and continuous data, ie, histograms with equal and unequal class intervals and cumulative frequency graphs, and know their appropriate use}
- interpret, analyse and compare the distributions of data sets from univariate empirical distributions through:
 - appropriate graphical representation involving discrete, continuous and grouped data, {including box plots}
 - appropriate measures of central tendency (including modal class) and spread {including quartiles and inter-quartile range}
- apply statistics to describe a population
- use and interpret scatter graphs of bivariate data; recognise correlation and know that it does not indicate causation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends whilst knowing the dangers of so doing.

Curriculum Overview

	Term 1	Term 2	Term 3	Portable knowledge	Key terms

Year 7	Half term 1: Algebraic thinking Sequences - Describe and continue a sequence given diagrammatically - Predict and check the next term(s) of a sequence - Represent sequences in tabular and graphical forms - Recognise the difference between linear and non-linear sequences - Continue numerical linear sequences - Continue numerical non-linear sequences - Explain the term-to-term rule of numerical sequences in words Find missing numbers within sequences Understand and use notation - Given a numerical input, find the output of a single function machine - Use inverse operations to find the input given the output - Use diagrams and letters to generalise number operations - Use diagrams and letters with single function machines - Find the function machine given a simple expression - Substitute values into single operation expressions - Find numerical inputs and outputs for a series of two function machines - Use diagrams and letters with a series of two function machines - Find the function machines given a two-step expression - Substitute values into two-step expressions - Generate sequences given an algebraic rule - Represent one-and two-step functions graphically	Half term 1: Applications of number Solving problems with addition and subtraction - Properties of addition and subtraction - Mental strategies for addition and subtraction - Use formal methods for addition and subtraction of integers and decimals - Choose the most appropriate method: mental strategies, formal written or calculator - Solve problems in the context of perimeter - Solve financial maths problems - Solve problems involving tables and timetables - Solve problems with frequency trees, bar charts and line charts Add and subtract numbers given in standard form Solving problems with multiplication and division - Properties of multiplication and division - Understand and use factors and multiples - Multiply and divide integers and decimals by powers of 10 Multiply by 0.1 and 0.01 - Convert metric units - Use formal methods to multiply and divide integers and decimals - Understand and use order of operations - Solve problems using the area of rectangles, parallelograms and triangles Solve problems using the area of trapezia - Solve problems using the mean	Half term 1: Lines and angles Constructing, measuring and using geometric notation - Understand and use letter and labelling conventions including those for geometric figures - Draw and measure line segments including geometric figures - Understand angles as a measure of turn - Classify angles - Measure angles up to 180° - Draw angles up to 180° - Draw and measure angles between 180° and 360° - Identify perpendicular and parallel lines - Recognise types of triangle - Recognise types of quadrilateral - Identify polygons up to a decagon - Construct triangles using SSS - Construct triangles using SSS, SAS and ASA - Construct more complex polygons - Interpret simple pie charts using proportion - Interpret pie charts using a protractor - Draw pie charts Developing geometric reasoning - Understand and use the sum of angles at a point - Understand and use the sum of angles on a straight line - Understand and use the equality of vertically opposite angles - Know and apply the sum of angles in a triangle - Know and apply the sum of angles in a quadrilateral - Solve angle problems using properties of triangles and quadrilaterals	Times tables Written calculations Order of operations Negative numbers Rounding Estimation Types of number HCF LCM Angle facts Time Area Fraction manipulation Fraction operations Metric units Using algebraic notation Substitution into algebraic expressions/formulae Solving equations Converting between FDP	Acute angle Algebra Angle Area Average Axis Brackets Calculate Centilitre (cl) Centimetre (cm) Cube number Cuboid Decagon Decimal Decrease Denominator Difference Distance Equal Equation Equilateral triangle Estimate Even number Expand Expression Factor Factorise Figures Frequency Gram (g) HCF Heptagon Hexagon Increase Integer Kilogram (Kg) Kilometre (Km) LCM Litre (l) Mean Median Metre (m) Millilitre (ml) Millimetre (mm) Mode	Multiple Negative Nonagon Numerator Obtuse angle Octagon Odd number Operation Order Parallel Parallelogram Pentagon Perimeter Perpendicular Polygon Positive number Power Prime Prism Probability Product Quadrilateral Range Ratio Reflex angle Regular Remainder Right angle Rotation Round Scale factor Sequence Share Significant figure Simplify Solve Square number Sum Tally Term Trapezium Triangle Units Value
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	Equality and equivalence - Understand the meaning of equality - Understand and use fact families, numerically and algebraically - Solve one-step linear equations involving $\pm$-using inverse operations - Solve one-step linear equations involving $\times/\div$-using inverse operations - Understand the meaning of like and unlike terms - Understand the meaning of equivalence - Simplify algebraic expressions by collecting like terms, using the $\equiv$ symbol Half term 2: Place value and proportion Place Value - Recognise the place value of any number in an integer up to one billion - Understand, order and write any number up to one billion in words and figures - Use number lines to work out intervals, and position integers and decimals. - Round integers to the nearest power of ten - Compare two numbers using $=$, $\neq$, $<$, $>$, $\leq$, $\geq$ - Find the range and median of a set of numbers - Round a number to 1 significant figure Write 10, 100, 1000 etc. as powers of ten Write positive integers in the form $A \times 10^n$ Investigate negative powers of ten Write decimals in the form $A \times 10^n$ Fraction, decimal and	Explore multiplication and division in algebraic expressions Fractions and percentages of amounts - Find a fraction of a given amount - Use a given fraction to find the whole and/or other fractions - Find a percentage of a given amount using mental methods - Find a percentage of a given amount using a calculator Solve problems with fractions greater than 1 and percentages greater than 100% Half term 2: Directed number and fractional thinking Operations and equations with directed number - Understand and use representations of directed numbers - Order directed numbers using lines and appropriate symbols - Perform calculations that cross zero - Add directed numbers - Subtract directed numbers - Multiplication of directed numbers - Multiplication and division of directed numbers - Use a calculator for directed number calculations - Evaluate algebraic expressions with directed number - Introduction to two-step equations - Solve two-step equations	- Solve complex angle problems Find and use the angle sum of any polygon Investigate angles in parallel lines Understand and use parallel line angle rules Use known facts to obtain simple proofs Half term 2: Reasoning with number Developing number sense - Know and use mental addition, subtraction, multiplication and division strategies for integers - Know and use mental arithmetic strategies for decimals and fractions - Use factors to simplify calculations - Use estimation as a method for checking mental calculations - Use known number facts to derive other facts - Use known algebraic facts to derive other facts - Know when to use a mental strategy, formal written method or a calculator Sets and probability - Identify and represent sets - Interpret and create Venn diagrams - Understand and use the intersection and union of sets Understand and use the complement of a set - Know and use the vocabulary of probability - Generate sample spaces for single events - Calculate the probability of a single event - Understand and use the probability scale			
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	percentage equivalence - Represent tenths and hundredths as diagrams - Represent tenths and hundredths on number lines - Interchange between fractional and decimal number lines - Convert between fractions and decimals –tenths and hundredths - Convert between fractions and decimals –fifths and quarters - Convert between fractions and decimals –eighths and thousandths - Understand the meaning of percentage using a hundred square - Convert fluently between simple fractions, decimals and percentages - Use and interpret pie charts - Represent any fraction as a diagram - Represent fractions on number lines - Identify and use simple equivalent fractions - Understand fractions as division - Convert fluently between fractions, decimals and percentages Explore fractions above one, decimals and percentages Note: Bold content may only be taught to some classes and will be repeated in other year groups. <i>(R) denotes a review step.</i>	- Use order of operations with directed numbers Roots of positive numbers Explore higher powers and roots Addition and subtraction of fractions - Understand representations of fractions - Convert between mixed numbers and fractions - Add and subtract unit fractions with the same denominator - Add and subtract fractions with the same denominator - Add and subtract fractions from integers expressing the answer as a single fraction - Understand and use equivalent fractions - Add and subtract fractions where denominators share a simple common multiple - Add and subtract fractions with any denominator - Add and subtract improper fractions and mixed numbers - Use fractions in algebraic contexts - Use equivalence to add and subtract decimals and fractions Add and subtract simple algebraic fractions Note: Bold content may only be taught to some classes and will be repeated in other year groups. <i>(R) denotes a review step.</i>	- Know that the sum of probabilities of all possible outcomes is 1 Prime numbers and proof - Find and use multiples - Identify factors of numbers and expressions - Recognise and identify prime numbers - Recognise square and triangular numbers - Find common factors of a set of numbers including the HCF - Find common multiples of a set of numbers including the LCM - Write a number as a product of its prime factors Use a Venn diagram to calculate the HCF and LCM - Make and test conjectures - Use counterexamples to disprove a conjecture Note: Bold content may only be taught to some classes and will be repeated in other year groups. <i>(R) denotes a review step.</i>			
Assessment focus		- -	-			
Year 8	Ratio and proportion Writing and simplifying ratio	Brackets, equations and inequalities	Angles in parallel lines and polygons	Substitution Simplifying expressions	Adjacent Circumference	

	- Dividing in a given ratio - Direct proportion (including best buys and recipes) - Direct and inverse proportion - Currency conversion - Compound measures (S, D, T) Fractions - Calculations with fractions using all four operations - Converting between mixed and improper fractions - Calculations with mixed numbers using all four operations Working in the Cartesian Plane - Plotting graphs of form ($y = a$, $x = a$, $y = x$ and $y = -x$) - To identify gradient and y-intercept from an equation - Plotting linear graphs using a table of values Representing Data - Two-way tables - Pie charts - Types of data - Tally charts and frequency tables Tables and Probability - Probability including expected results and relative frequency - Frequency trees - Probability trees - Venn diagrams - Set notation	- Forming and solving equations - Inequalities - Expanding single and double brackets - Factorising linear expressions with numerical and algebraic coefficients Sequences - Linear sequences Indices - Index laws - Product of primes and finding HCF and LCM from venn diagrams Fractions and percentages - Expressing an amount as a percentage of another - Percentage change - Reverse percentages - Recurring decimals Standard index form - Standard form Number sense - Using a calculator effectively - Finding the upper and lower bound of integers - To know what the term 'surd' means	- Angle rules - Angles along parallel lines - Angles in polygons Area of trapezia and circles - Circle terminology - Area and circumference of circles Line symmetry and reflection - Enlargement - Describing transformations - Nets and 3D drawings - Plans and elevations The data handling cycle Measures of location - Averages - Averages from frequency tables	Solving equations FDP conversions Percentages Sequences Frequency tables	Coefficient Congruent Cross section Diameter Formula Gradient Hypotenuse Indices Pi (Π) Radius Recurring Segment Solid Speed Symmetrical Transformation Translation Tree diagram Variable Volume X-Axis Y-Axis Y-Intercept	
Assessment focus						
Year 9	Numbers - Calculations with integers and decimals - Powers and roots - Rounding and estimation - Index laws - HCF & LCM	Straight line graphs - Plotting linear graphs using a table of values - Simultaneous equations Forming and solving equations - Solving linear equations	Ratio and proportion - Writing and simplifying ratio - Dividing in a given ratio - Working with ratio (one part and differences) - Combining ratio - Three-part ratios	Indices Pythagoras' theorem Graphs Factorising expressions Speed, distance, time	Approximate Bisect Constant Credit Debit Loci Modal Natural number	

	- Product of primes and finding HCF and LCM from venn diagrams - Order of operations Using percentages - Finding percentages, percentage increases and decreases with and without a calculator - Reverse percentages - Percentage increase and decrease (and repeated) Maths and money - Proportion, best buys Three dimensional shapes - Area, Perimeter, volume - Angles in polygons - Constructions and congruency - Rules of congruency - Ruler and compass constructions	- Forming and solving equations Algebraic representation - Simplifying expressions - Substitution - Expanding and factorising linear & quadratic expressions - Changing the subject Testing conjectures - Simple proof - Algebraic proof Enlargement and similarity - Identify properties of similar shapes - Enlarge shapes by positive scale factors	Fractions and Rates - Fractions of an amount and finding original amount - Fractions, Decimal, Percentage conversions - Recurring decimals - Calculations with fractions and mixed numbers Deduction - Angles - Angles along parallel lines Rotation and translation - Vectors - Rotate and translate shapes - Identify which rotation and translation has happened. Pythagoras' theorem - Pythagoras' theorem Probability and Averages - Averages - Reverse mean - Averages from frequency tables		Rational Reciprocal Surface area
Assessment focus					
Year 10 Foundation and Higher Tiers <i>(Higher Tier Only in Italic)</i>	Non-calculator methods - Four operations with integers & decimals - Four operations with fractions & mixed numbers - Rounding & estimation - Financial maths problems <i>Convert fractions to recurring decimals</i> <i>Understand and calculate with surds, including rationalising denominators</i> <i>Error intervals</i> Types of number & sequences - Factors, multiples & primes. - HCF, LCM and product of prime factors. - Nth term of linear sequences	Simultaneous equations - Solve simultaneous equations via elimination - Substitution <i>Solve simultaneous equations graphically</i> <i>Solve simultaneous equations via substitution</i> Angles & bearings - Scale drawings - Measure and read bearings - Bearings and parallel lines <i>Bearings with Pythagoras' Theorem & trigonometry</i> Working with circles - Area and circumference, inc fractional circles (factors of 360)	Percentages & interest - Compare and convert between fractions, decimals and percentages - Percentage of an amount, increase and decrease - Simple and compound interest - Write a number as a percentage of another - Reverse percentages <i>Iteration</i> Probability - Properties (sum to 1, equally likely) - Estimation - Sample spaces - Independent events & frequency trees - Venn diagrams	Averages Interquartile range Expanding brackets Pythagoras' theorem Speed, distance, time Surds Volume	Arc Bearing Bound Cumulative frequency Distribution Error interval Frequency density Histogram Inter-quartile range (IQR) Irrational Justify Quadratic equation Sampling

	- Continue arithmetic, geometric and Fibonacci sequences <i>Nth term of quadratic sequences</i> Congruence, similarity & enlargement - Enlarge by positive, fractional and <i>negative</i> scale factors. - Similar shapes and scale factors <i>Similar areas and volumes</i> - Congruence Trigonometry - Finding missing angles and sides in right-angled triangles - Pythagoras' Theorem <i>Trigonometry in 3D shapes</i> <i>Sine rule, cosine rule and area of triangle.</i> Representing solutions of equations & inequalities - Forming and solving equations and inequalities with unknowns on one side. - Represent solutions to inequalities on number lines and <i>using set notation.</i> <i>Find solutions to equations and inequalities graphically.</i> - Form and solve equations and inequalities with unknowns on both sides <i>Solve quadratic equations by factorisation</i>	<i>Arc length and area of a sector</i> <i>Circle theorems</i> - Volume and surface area of spheres, cylinders and cones <i>Area and volume scale factors</i> Vectors - Vector notation - Operations with vectors <i>Vector journeys</i> <i>Co-linear points</i> Ratio & fractions - Converting between fractions and ratio - Share in a ratio when given total, one part or difference - Currency conversion - Simplification and writing in form 1:n - Best buys - a:b and b:c <i>Ratio with algebra</i> <i>Ratio in area and volume problems</i>	- Two-way tables <i>Dependent events</i> <i>Conditional probability</i> Collecting, representing and interpreting data - Sampling - Frequency polygons - Line and bar charts - Pie charts - Analysis of charts - Averages from raw and grouped data - Stem-and-leaf diagrams - Time series - Scatter graphs <i>Histograms</i> <i>Cumulative frequency</i> <i>Box plots & inter-quartile range</i> Indices & roots - Squares, cubes, roots and higher powers - Standard form - Calculate in standard form - Rules of indices - Power 0 and negative indices <i>Fractional indices</i> Manipulating expressions - Simplify expressions using all four operations - Identities <i>Algebraic fractions</i> <i>Solve equations involving algebraic fractions</i> - Algebraic representation & proof		
Year 11	<u>Foundation</u> Number - Four operations with integers and decimals - Money problems – multi-step reasoning. - Reasoning problems with four operations Percentages - Percentage of an amount	Subject to change following mock analysis. <u>Foundation</u> Similarity and congruence - Scale drawings - Find missing sides in similar shapes - Understand the difference between similarity and congruence.	Bespoke revision plan of content based on each individual class		Ascending Calculate Complete Convert Descending Estimate Expand Explain Factorise Prove Show that Simplify

	- Percentage increase/decrease - Compound interest Speed, distance, time - Calculate missing values - Calculate values with fractional number of hours Solving equations and inequalities - Solving equations with unknowns on one sides - Solving inequalities with unknowns on one side - Representing solutions to inequalities on a number line - Solving equations and inequalities with unknowns on both sides - Form equations from a variety of contexts Angles reasoning - Forming geometric arguments using angle facts - Apply angles facts to multi-step problems. - Interior and exterior angles. - Angles in parallel lines Substitution - Substitution into expressions, including BIDMAS - Substitution into formulae, including rearranging/solving Fractions, decimals, percentages - Finding fractions of amounts. - Reverse fraction of amounts problems - Converting between fractions, decimals and percentages	- Conditions for congruent triangles Rounding and estimation - Round to decimal places and significant figures - Estimate calculations - Error intervals Conversions - Convert between metric units of weight, capacity, and distance. - Conversion graphs and extrapolation - Currency conversion Representing data - Bar charts including dual and composite - Frequency polygons - Frequency trees - Stem-and-leaf diagrams - Pictograms - Two-way tables - Venn diagrams - Averages from raw data and tables Proportion - Best buys. - Recipe calculations - Scatter graphs - Sampling Area and volume - Area of simple and compound shapes - Inverse area problems - Area of sectors and circles - Volume of prisms & inverse Scatter graphs - Plotting points and line of best fit. - Interpretation and understanding of outliers. - Approximating using scatter graphs Number - Converting to standard form			Solve
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- Comparing and ordering fractions, decimals and percentages Ratio - Solve multi-step problems involving finding fractions and percentages of amounts alongside sharing in a ratio. - Share in a ratio when given the total, part or difference - Simplify ratio including 1:n - Convert between ratios and fractions. - Express values in a ratio Probability - Probability of events - Properties such as sum to 1, complements. - Probability tables - Probability trees Crossover Speed, distance, time - Calculating missing values, inc with fractions of hours - Drawing and interpreting graphs Multiplying and dividing decimals - Estimation - Similar calculations - Multiplication and division of integers and decimals Quadratic graphs - Shape and properties including turning points and roots. - Calculating, plotting and sketching Scatter graphs - Plotting points and line of best fit. - Interpretation and understanding of outliers. - Approximating using scatter graphs	- Calculations with standard form - Laws of indices - Factors, multiples, primes - HCF, LCM, prime factorisation - Operations with fractions and mixed numbers Algebraic manipulation - Simplify expressions using all four operations - Expand and factorise - Change the subject Linear and quadratic graphs $y=mx+c$ - Plot linear and quadratic equations - Properties of quadratics – turning points, roots, y-intercept. Crossover Ratio & proportion - Direct proportion & graphs - Inverse proportion & graphs - Best buys - Sharing in a ratio - total given, part given and difference given - Conversion between fractions & ratio and equations & ratio. - Forming & simplifying ratios Averages and charts - Calculate averages from tables – grouped and non-grouped - Pie charts - Frequency polygons - Stem-and-leaf diagrams Area and volume - Area of trapezia & compound shapes - Area of circles & sectors. - Pressure/force/area - Volume of prisms			
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	Venn diagrams - Completing for totals and raw data - Set notation, intersect, union and complement. Angles reasoning - Corresponding, cointerior and alternate. - Interior and exterior - Multi-step reasoning and justification Percentages - Increase and decrease - Simple and compound interest - Reverse percentages - Representing as a percentage Forming and solving equations and inequalities - Solving equations and inequalities with unknowns on both sides - Forming equations and inequalities from a range of contexts - Representing solutions graphically and on number lines. Number - Four operations with mixed numbers and fractions. - Product of primes, HCF and LCM - Standard form – converting and calculating - Laws of indices - Error intervals Higher Equations of parallel and perpendicular lines - Properties of straight lines - Equations of circles - Finding equations of parallel and perpendicular lines	- Inverse area and volume problems - Mass/density/volume Pythagoras' Theorem and trigonometry - Pythagoras' Theorem in 2D and 3D - Right-angled trigonometry finding sides and angles Probability - Independent and dependent events - Calculating probabilities from multiple events - Probability trees - Two-way tables - Conditional probability Higher Algebra - Graphs of simultaneous equations - Simultaneous equations - Inequalities - Algebraic fractions - Iteration Geometry - Circle theorems - Angle problems - Coordinate geometry - Types of graphs & transformations Statistics and probability - Sampling - Capture/Recapture - Cumulative frequency - Box Plots - Histograms - Frequency polygons Number - Indices - Surds - Standard form Ratio and proportion			
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	▪ Tangents Distance-time and speed-time graphs ▪ Calculating speed, distance, time from linear graphs. ▪ Gradient of tangents ▪ Area under graph ▪ Describe and draw graphs Vector geometry ▪ Properties of vectors and vector arithmetic ▪ Vector journeys ▪ Forming geometric arguments using vectors Trigonometry ▪ Right-angled trigonometry ▪ 3D trigonometry and Pythagoras' Theorem ▪ Sine rule, cosine rule, area of a triangle. ▪ Trig graphs ▪ Specific trig values Functions ▪ Function notation ▪ Composite functions ▪ Inverse functions ▪ Changing subject of formula Bounds ▪ Error intervals ▪ Upper and lower bounds ▪ Calculations using upper and lower bounds Solving quadratics ▪ Factorisation of quadratics ▪ Quadratic formula ▪ Completing the square and turning points Proof ▪ Forming geometric arguments ▪ Forming algebraic proof	▪ Direct and inverse proportion equations ▪ Ratio sharing and representing Algebra ▪ Plotting quadratics, cubics and reciprocals ▪ Equation of a line Geometry ▪ Circles and sectors ▪ Volume and surface area of cylinders, cones, spheres and pyramids ▪ Similarity and congruence Statistics and probability ▪ Set notation			
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	Transformations - Combinations of transformations - Negative and fractional enlargements				
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GCSE External assessment:

All content is assessed at the end of Year 11. The written examinations are made up of 3 examination papers, two calculator and one non-calculator. Each paper is equally weighted. Each lasts 1 hour 30 minutes and is marked out of 80. Students are awarded grades based on the 9-1 grading system (with 9 being the best grade).

Each examination is available at two tiers. Teachers will use internal class assessments to decide which tier is most appropriate for each student.

Tier	Available Grades
Higher	9-4
Foundation	1-5

SMSC in the mathematics

Through various projects, mini investigations and activities built into lessons, SMSC (Spiritual, Moral, Social and Cultural) is being delivered in high quality lessons.

What we offer:

- A classroom environment which encourages problem solving, collaborative work and enjoyment of exploring real-life problems.
- Participation in extra-curricular activities such as the UK Schools Mathematics Challenges, Maths Enrichment Days, Mathematics Revision Sessions, and Maths Club for students who want to extend themselves and have fun in mathematics

Spiritual development in mathematics

We encourage pupils to see the awe and wonder that can be found within mathematics – from the symmetry of a snowflake or the number of seeds in a sunflower head to the design of galaxies and the coordinates of a newly discovered planet. Pupils are introduced to famous mathematicians, some of whom are also well-known as philosophers. There is a sense of wonder in the exactness of mathematics and students are able to gain a sense of personal achievement in solving problems.

Moral development in mathematics

We look at the use and interpretation of data, particularly the use of statistics and how people manipulate them to promote their own (biased) opinions. Pupils are encouraged to discuss the use and misuse of data in all issues, including those supporting moral arguments, and consider the use of questionnaires to conduct opinion surveys.

Social development in mathematics

Pupils are regularly asked to work in pairs or small groups during experimental or investigative work where they are able to develop both their problem solving and teamwork skills. They are given many opportunities to discuss their ideas and are encouraged to develop their mathematical reasoning through communication with others. Through the use of peer- assessment pupils are able to improve their use of language and better understand how to give constructive criticism.

Cultural development in mathematics

Students are able to explore the mathematics found and used in other cultures. They are introduced to symmetrical patterns, number systems and mathematical methods such as patterns found in Islamic art and Roman numerals. Students are introduced to the culturally and historically significant art of code-breaking and theorems devised by famous mathematicians.