

Subject	Maths	Year Group	10						
	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9
Scheme title	Properties of number	Expressions & Sequences	Interpreting & Representing Data	Fractions, Percentages & Ratio	2D Geometry: Angles & Triangles	Linear & Non-Linear Graphs	2D & 3D Geometry	Accuracy & Bounds	Geometrical Transformations & Constructions
Purpose of scheme	To revisit and deepen understanding of working with number from topics originally seen in KS3 including calculating with positive and negative integers and decimals, identifying properties of numbers; simplifying expressions involving indices and finding the HCF and LCM of sets of numbers. Work on indices will be deepened from Year 9; and pupils will experience calculating with surd values.	To be able to fluently manipulate and simplify algebraic expressions and connect this to being able to find an expression for the nth term of linear and quadratic sequences and use this to solve problems.	To be able to develop fluency with interpretation and construction of statistical graphs and diagrams, and to be able to use and interpret appropriate measures of central tendency and spread.	To be able to calculate and solve problems with fractions, percentages and ratio and to be able to draw connections between them.	To be able to solve problems relating to angles and side lengths in 2D Geometry using appropriate strategies and formulae, including Pythagoras' Theorem and the Trigonometric ratios.	To be able to plot linear and non-linear graphs, and be able to identify and interpret their key features in real life contexts.	To develop pupils dimensional thinking and ability to solve problems involving 2D and 3D figures. Pupils will derive and understand formulae to calculate the area of 2D shapes and volume of 3D shapes.	To be able to consider the limits of accuracy when rounding and solve problems by identifying upper and lower bounds, including with formulae.	To be able to translate, reflect, rotate and enlarge a 2D shape and also to be able to identify how a shape has been transformed. Pupils should also be able to extend their knowledge of constructions, bearings and map scales to solve problems with real life context.
Knowledge in sequence	- Calculating and rounding - Hierarchy of operations - Factors, multiples, primes - Indices - Standard form - Surds	- Algebraic conventions - Simplifying and manipulating expressions - Forming and solving linear equations - Linear and non-linear sequences	- Averages and the range - Representing data	- Fractions and percentages - Ratio and proportion	- Polygons, angles and parallel lines - Pythagoras' Theorem - Trigonometry	- Graphs: the basics - Real-life graphs - Coordinate geometry - Linear graphs - Quadratics, cubic and other graphs	- Perimeter - Area - Circles - 3D Forms and volume - Cylinders, cones and spheres	- Rounding - Error intervals - Calculating with bounds	- Transformations - Constructions - Loci - Bearings
Skills	- Order positive and negative integers and use the appropriate notation - Apply the four operations, including formal written methods to integers and decimals - Understand and use place value - Recognise and use relationships between operations, including inverse operations - Use conventional notation for priority of operations, including brackets, powers, roots and reciprocals - Use the concepts and vocabulary of prime numbers, factors, multiples, HCF, LCM - Write a number as a product of its prime factors - Use positive integer powers and associated real roots - Estimate powers and roots of any given real number - Calculate with roots and with integer and fractional indices - Simplify and manipulate algebraic expressions involving the laws of indices - Calculate with and interpret standard form - Calculate exactly with surds - Simplify surd expressions - Rationalise denominators	- Use and interpret algebraic notation - Find approximate solutions to equations numerically using iteration - Understand and use the concepts and vocabulary of expressions, equations, formulae, inequalities, terms and factors - Substitute numerical values into formulae and expressions, including scientific formulae - Simplify and manipulate algebraic expressions by collecting like terms - Multiply a single term over a bracket - Take out common factors - Understand and use mathematical formulae - Rearrange formulae to change subject - Argue mathematically to show two expressions are equivalent - Interpret expressions as functions, with inputs and outputs - Translate situations or procedures into algebraic expressions - Solve linear equations in one unknown algebraically, including those with the unknown on both sides of the equation - Generate terms of a sequence from either a term-to-term or a position-to-term rule - Recognise and use sequences of triangular, square and cube numbers and simple arithmetic progressions - Recognise and use Fibonacci sequences - Recognise and use quadratic sequences - Recognise and use geometric progressions - Recognise and use sequences that involve surds - Deduce expressions to find the nth term of linear and quadratic sequences	- Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mean, mode and modal class) and spread (range, including consideration of outliers) - Apply statistics to describe a population - Infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling - Interpret and construct: * Frequency tables * Bar charts * Pie charts * Pictograms * Vertical Line charts * Line graphs for time series data * Scatter graphs for bivariate data - Recognise correlation - Draw estimated lines of best fit - Make predictions - Interpolate and extrapolate apparent trends whilst knowing the dangers of doing so	- Apply the four operations on fractions (proper, improper and mixed numbers) and decimals - Calculate exactly with fractions - Work interchangeably with terminating decimals and their corresponding fractions - Express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1 - Define percentage as number of parts per hundred - Interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively - Interpret fractions and percentages as operators - Express one quantity as a percentage of another - Compare two quantities using percentages - Work with percentages greater than 100% - Solve problems involving percentage change, including percentage increase/decrease and original value problems - Solve problems involving simple interest - Use ratio notation, including reduction to simplest form - Divide a given quantity into two or more parts - Express the division of a quantity into two parts as a ratio - Apply ratio to real context and problems - Express a multiplicative relationship between two quantities as a ratio or fraction - Understand and use proportion as equality of ratios - Relate ratios to fractions and linear functions	- Use conventional terms and notations - Use the standard conventions for labelling and referring to the sides and angles of triangles - Draw diagrams from written descriptions - Apply the properties of basic angle theorems - Understand and use alternate and corresponding angles on parallel lines - Derive and apply the properties and definitions of special types of quadrilaterals and triangles and other plane figures using appropriate language - Derive and use the sum of angles in a triangle to deduce and use the angle sum in any polygon, and to derive properties of regular polygons - Derive and apply the properties and definitions special types of quadrilaterals and triangles - Know the formulae for Pythagoras' Theorem and the trigonometric ratios - Apply these formulae to find angles and lengths in right angled triangles in two dimensional figures and three dimensional figures	- Work with coordinates in all four quadrants - Identify and interpret gradients and intercepts of linear functions both graphically and algebraically - Plot and interpret graphs, and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems - Plot graphs of equations that correspond to straight line graphs in the coordinate plane - Use the form $y=mx+c$ to identify parallel and perpendicular lines - Find the equation of a line given two points, or through one point with a given gradient - Identify and interpret roots, intercepts and turning points of quadratic functions - Deduce roots algebraically - Deduce turning point by completing the square - Plot and interpret reciprocal graphs and exponential graphs	- Know and apply formulae to calculate: area of triangles, parallelograms and trapezia - Know the formulae for circumference and area of a circle - Calculate perimeters of 2D shapes, including circles - Calculate areas of composite shapes - Calculate arc lengths and areas of sectors of circles - Identify properties of the faces, surfaces, edges and vertices of 3D shapes - Construct and interpret plans and elevations of 3D shapes - Know and apply formulae to calculate volume of cuboids and other right prisms (including cylinders) - Calculate the volume and surface area of spheres, pyramids, cones and composite solids, including frustums	- Use inequality notation to specify simple error intervals due to truncation or rounding - Apply and interpret limits of accuracy including upper and lower bounds - Use these to construct given figures and solve loci problems - Know that the perpendicular distance from a point to a line is the shortest distance to the line - Measure line segments and angles in geometric figures, including interpreting maps and scale drawings and the use of bearings	- Identify, describe and construct congruent and similar shapes, including on coordinate axes, by considering rotation, reflection, translation and enlargement - Enlarge a shape using fractional and negative scale factors - Describe the changes and invariance achieved by combinations of rotations, reflections and translations - Use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle) - Use these to construct given figures and solve loci problems - Know that the perpendicular distance from a point to a line is the shortest distance to the line - Measure line segments and angles in geometric figures, including interpreting maps and scale drawings and the use of bearings
Key words	Rational, Irrational, Factor, Multiple, Prime, Square, Cube, Total, Product, Quotient, Distributive, Associative, Commutative, Rationalise, Surd, Expand, Simplify, Evaluate, Convert, Priority, Index, Base, Exponent,	Variable, Term, Position, Generate, Linear, Quadratic, Geometric, Fibonacci, Simplify, Evaluate, Solve, Equation, Expression, Identity, Equivalent, Expand, Factorise, Coefficient, Constant, Substitute,	Average, Range, Mean, Median, Mode, Frequency, Interval, Estimate, Central Tendency, Consistent, Compare, Data, Distribution, Spread, Graph, Proportion, Univariate, Bivariate, Extrapolation, Axis, Key, Correlation, Causation	Fraction, Percent, Numerator, Denominator, Equivalent, Simplify, Vinculum, Reciprocal, Product, Factor, Multiple, Convert, Reverse, Multiplier, Growth, Decay, Interest, Compound, Depreciate, Product, Ratio, Proportion, Scale Factor, Constant of Proportionality	Polygon, Angle, Interior, Exterior, Parallel, Transversal, Region, Allied, Alternate, Corresponding, Supplementary, Vertex, Vertically Opposite, Prove, Hypotenuse, Adjacent, Opposite, Sine, Cosine, Tangent, Trigonometry, Theorem, Formula, Similar, Congruent, Constant of Proportionality, Ratio	Axis, Rate, Gradient, Intercept, Constant, Linear, Parallel, Perpendicular, Formula, Rearrange, Arc, Sector, Segment, Chord, Line Segment, Parallel, Perpendicular, Horizontal, Vertical, Estimate, Solution, Substitute, Quadrant, Formula, Function, Reciprocal, Quadratic, Roots, Turning Point, Cubic, Exponential,	Perimeter, Area, Volume, Parallel, Perpendicular, Formula, Rearrange, Arc, Sector, Segment, Chord, Tangent, Radius, Enlargement, Circumference, Unit, Prism, Dimension, Cross Section, Pyramid, Surface Area, Plan, Elevation, Net, Face, Edge, Vertices	Round, Error Interval, Bound, Significant, Estimate, Accuracy	Transformation, Translation, Vector, Reflection, Symmetry, Rotation, Enlarge, Centre of Enlargement, Similar, Congruent, Invariant, Scale Factor
End point	Pupils should be able to draw connections between indices, standard form and surds and be able to connect this with prior understanding of mathematical axioms. Pupils should also be able to identify properties of numbers and use this to solve problems.	Pupils should be able to perform key algebraic skills with expressions and equations, and solve a variety of problems with algebraic context. They should be able to recognise important sequences and deduce position-to-term rules for linear and quadratic sequences.	Pupils should be able to consider the difference in purpose between collecting univariate and bivariate data and be able to consider this when plotting and interpreting graphs. They should be able to calculate mean, median, mode and range and use these measures to compare data sets.	Pupils should have developed greater fluency in working with fractions, decimals, percentages and ratio and be able to solve problems involving combinations of these. They should be able to consider both calculator and non-calculator techniques for calculating percentages and relate this to real life contexts such as interest and connect this to graphical representations.	Pupils should be able to solve problems using a variety of techniques and deduction. They should be able to recall appropriate formulae and use appropriate strategies when finding missing angles and side lengths in 2D and 3D figures. Pupils should be able to fluently convey their reasoning using appropriate mathematical notation.	Pupils should be able to relate key features of linear and non-linear graphs to real life contexts including rates of pay and speed, distance and time. They should be able to plot and interpret quadratic, cubic, reciprocal and exponential graphs and be able to use algebraic techniques to deduce key features of these.	Pupils should be able to recall and apply key formulae in order to solve problems involving 2D and 3D figures with length, area and volume.	Pupils should be aware that when rounding we lose accuracy in a calculation. They should be able to identify how to find the upper and lower bound of a value has been rounded, by appropriately choosing the upper and lower bounds.	Pupils should be able to perform the four transformations on 2D shapes and identify when these have taken place. They should be able to use their understanding of scale, bearings and loci to solve problems with real life contexts.
Assessment Methods	Indices, roots and reciprocals AQA Topic Test	Algebraic Expressions AQA Topic Test	Averages and the range AQA Topic Test	Fractions & Percentages AQA Topic Test	Polygons, Angles & Parallel Lines AQA Topic Test	Linear Graphs AQA Topic Test	Perimeter, Area and Circles AQA Topic Test		
All content to be assessed in summative termly assessments and in Mock Exam in Summer 2									