

Year 7						
HT topic	HT1 Topic/Unit: Algebraic Thinking and Algebraic Techniques	HT2 Topic/Unit: Algebraic Thinking and Numbers	HT3 Topic/Unit: Geometry and Measures and Statistics	HT4 Topic/Unit: Application of Number and Geometry and Measures	HT5 Topic/Unit: Numbers	HT6 Topic/Unit: Algebraic Thinking And Numbers
Key Content:	<u>Sequence</u> Describe and continue a sequence given diagrammatically, explain the term-to-term rule of numerical sequences and continue both linear and non-linear sequences Represent sequences in tabular and graphical forms Recognise the difference between linear and non-linear sequences and find missing terms within a sequence Find the next term of a sequence using a term-to-term rule Find any missing term of a given sequence Find the nth term of a linear sequence (E) <u>Algebraic Notation and Substitution</u> Find numerical outputs of single and multi-step function machines given the input Find numerical inputs of single and multi-step function machines using inverse operations given the output. Use letters with function machines and substitute values into two-step expressions. Generate sequences using algebraic rules	<u>Expression and equations</u> Understand the meaning of equality and can use fact families, numerically and algebraically. Solve one-step linear equations involving addition and subtraction using inverse operations Solve one-step linear equations involving multiplication and division using inverse operations Understand the meaning of like and unlike terms Understand the meaning of equivalence Simplify algebraic expressions by collecting the like term using the $\equiv$ symbol <u>Place value, ordering and rounding</u> Recognise the place value of any digit in an integer up to one billion Understand and write integers up to one billion in words and figures Work out intervals on a number line Position integers on a number line Round intervals to the nearest power of 10 Compare two numbers using $=$, $\neq$, $<$, $>$, $\leq$ and $\geq$ Order a list of integers Understand place value for decimals Position decimals on a number line Compare and order any number up to one billion Round a number to 1 significant figure Write 10, 100, 1000 etc as powers of 10 H - Write positive integers in the form $A \times 10^n$ H - Investigate negative powers of 10 H - Write decimals in the form $A \times 10^n$	<u>Symmetry and Reflection</u> Recognise line of symmetry for a given shape. Reflect a shape in a horizontal or vertical line Identify rotational symmetry for any shapes Plot vertical and horizontal line in the of $x=a$ or $y=a$ and use these to reflect shapes. Describe and reflect shape given the equation of a line. <u>Averages and Range</u> Find the range of a set of numbers Find the median of a set of numbers Find the mode of a set of numbers Solve problems using the mean Compare data using the range and median	<u>Rounding and estimation</u> Round a number to 1 significant figure. Round to 2 or more significant figures Estimate calculations or solve problems with estimation Understand and use error intervals <u>Graphing Data</u> Draw and interpret pictograms, bar charts including dual and composite bar charts Work with coordinates in all four quadrants Draw and interpret scatter graphs and understand and describe linear correlation Draw and use lines of best fit and identify non-linear relationships Draw and interpret time series graph •	<u>Fractional Thinking</u> 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 H - Convert between fractions and decimals - eighths and thousandths Understand the meaning of percentage using a hundred square Convert fluency 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 Simplify fractions Understand fractions as division Convert fluently between FDP H - Explore fractions above one, decimals and percentages	<u>Operations and equations with directed number</u> 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 •

Year 8						
HT topic	HT1 Topic/Unit: Algebraic Thinking and Numbers	HT2 Topic/Unit: Geometry and Measures	HT3 Topic/Unit: Numbers	HT4 Topic/Unit: Numbers and Geometry and Measures	HT5 Topic/Unit: Geometry and Measures	HT6 Topic/Unit: Statistics
Key Content:	<u>Operations and equations with directed number</u> Order and complete basic operations using directed numbers Complete basic calculations using directed numbers, including those with algebraic expressions. Use understanding of directed numbers to solve two step equations. Use order of operations (BIDMAS) with directed numbers including roots and powers. Use a calculator for directed number calculations <u>Fractions and Percentages of an amount</u> Find fractions of an amount and use fractions to find whole and other fractions Find the percentage of amount using a calculator and mental methods Find percentage increase and decrease Use percentage to find the whole Solve problems with fractions greater than 1 and percentages greater than 100%	<u>Perimeter and Area</u> Convert metric units of length Calculate the perimeter of any polygon and compound shapes Calculate the area of rectangles, parallelograms, triangles, triangles and trapeziums Solve problems with perimeter and area Form expressions for perimeter and area. Find lengths given perimeter/area. <u>Speed, distance, Time</u> Convert units of time Solve problems with calendars, tables and timetables Calculate speed, distance, time Interpret and draw distance-time graphs. Use graphs to calculate speed.	<u>Properties of Number</u> Find and use factors and multiples of numbers Recognise prime numbers Write a product of prime factors. Identify square, cube and triangular numbers, square roots and cube roots. Find HCF and LCM of a number including in worded form HCF and LCM from a Venn diagram (E) Explore higher powers and roots (E) <u>Addition and Subtraction of Fractions</u> Understand representations of fractions Convert between mixed numbers and improper fractions Add and subtract unit fractions with the same denominator Add and subtract fractions and integers 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 (E) H - Add and subtract simple algebraic fractions (E)	<u>Multiplication and Division of Fractions</u> Multiply a fraction by an integer Find the product of a pair of fractions Divide an integer by a fraction Divide a fraction by a unit fraction Understand and use the reciprocal Divide any pair of fractions Multiply and divide improper and mixed fractions (E) H - Multiply and divide algebraic fractions <u>Angles in Polygons</u> Draw and measure line segments and angles Understand and use geometric notation Classifying angles Measure angles up to 180 degrees. Draw angles up to 180 degrees. Draw and measure angles between 180 and 360 degrees Understand and use the sum of angles at a point Understand and use the sum of angles on a straight line Angles in a triangle Angles in a quadrilateral Recognise and name polygons Solve angle problems including any angle facts	<u>Angles in Parallel line and angle sum in polygons</u> Angles in parallel lines Alternate and corresponding angles Alternate, corresponding and co-interior angles Solve problems with angles in parallel lines Properties of special quadrilaterals and their diagonals Find unknown lengths and angles in special quadrilaterals Exterior angles of a polygon Interior angles of a polygon Interior angles in a regular polygon <u>Constructions</u> 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	Constructions cont'd <u>Tables and Probability</u> Recall and use probability vocabulary Construct samples spaces for 1 or more events and use it to find probabilities Use and apply the fact that probability sums to one (1) Construct two-way table and find probability from data Find probability from frequency trees.

Year 9						
HT topic	HT1 Topic/Unit: Statistics and Ratio	HT2 Topic/Unit: Ratio and Proportion and Numbers	HT3 Topic/Unit: Algebraic Thinking and Algebraic Techniques	HT4 Topic/Unit: Algebra and Number	HT5 Topic/Unit: Algebra and Geometry	HT6 Topic/Unit: Geometry
Key Content:	<u>Sets and Probability</u> Identify and represent sets Interpret and create Venn diagrams. Understand and use the intersection of sets. Understand and use the union of sets H - Understand and use the complement of sets 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 Know that the sum of probabilities of all possible outcomes is 1 Find probabilities from two-way tables Find probabilities from Venn diagrams H - Use the product rule for finding the total number of possible outcomes <u>Ratio</u> Understanding the meaning and representation of ratio Understand and use ratio notation Solve problems involving ratios of the form 1:n or n:1 Solve proportional problems involving the ratio m:n Divide a value into a given ratio Express ratios in their simplest integer form H - Express ratios in the form 1:n Compare ratios and related fractions	<u>Proportion and Scale</u> Solve problems involving direct proportion Explore conversion graphs Convert between currencies Explore direct proportion graphs Explore relationships between similar shapes Understand scale factors as multiplicative relationships Draw and interpret scale diagrams Interpret maps using scale factors and ratio <u>Percentages</u> Convert between decimals and percentages more than 100% Express one number as a percentage of another without a calculator. Express one number as a percentage of another using calculator methods. Calculate percentage increase and decrease using a multiplier. Work with percentage change Choose appropriate methods to solve percentage problems Find the original amount given the percentage (E)	<u>Coordinates and Graphs</u> Identify and draw lines parallel to the x-axis and the y-axis Plot graphs of the form $y=mx+c$ Find the equation of a line in the form $y=mx+c$ given the gradient and coordinates. Find the equation of parallel and perpendicular lines. Find the midpoint of a line segment Complete table of values and plot a quadratic graph and use this to solve for roots, intercepts and turning points <u>Interpret and represent data</u> Represent data into two-way tables Draw and interpret scatter graphs Understand and describe linear correlation Draw and use line of best fit (1) Draw and use line of best fit (2) Identify non-linear relationships Identify different types of data Read and interpret ungrouped frequency tables Read and interpret grouped frequency tables Represent grouped discrete data Represent continuous data grouped into equal classes Represent data in two-way tables Draw stem and leaf diagrams	<u>Brackets, equations and inequalities</u> Form algebraic expressions Use directed number with algebra Multiply out a single bracket Factorise into a single bracket Expand multiple single brackets and simplify Expand a pair of binomials Factorise simple quadratic expression Form and solve equations and inequalities including with brackets Identify and use formulae, expressions, identities and equations H - Form and solve equations and inequalities with unknowns on both sides <u>Indices</u> Adding and subtracting expressions with indices Simplifying algebraic expressions by multiplying indices Simplifying algebraic expressions by dividing indices Using the addition law for indices Using the addition and subtraction laws for indices H - Exploring powers of powers <u>Standard form</u> Work with numbers greater than 1 in standard form Work with numbers between 0 and 1 in standard form Add and subtract numbers in standard form Multiply and divide numbers in standard form Use a calculator to work with numbers in standard form	<u>Sequences</u> Generate and describe a sequence given a rule in words Generate a sequence given a simple algebraic rule nth term of a linear sequence Generate a sequence given a complex algebraic rule (E) <u>Area and Volume</u> Calculate the area of a 2-D shapes Calculate the area of triangles, rectangles and parallelograms Calculate the area of a trapezium Calculate the perimeter and area of compound shapes Calculate the circumference and area of a circle Recognise prisms Calculate the volume of cubes and cuboids Convert metric units of mass and capacity Understand the units of density, mass and volume and solve problems	<u>Pythagoras Theorem</u> Identify the hypotenuse and determine whether a triangle is right-angled Find missing sides in a right-angled triangle Use Pythagoras' theorem on coordinate axes <u>Trigonometry</u> Use trigonometric ratio to calculate missing lengths and angles in right-angled triangles Use Pythagoras' theorem and trigonometric ratio in 3D shapes (E)

KS4 Maths – Higher tier – 2-year map

Year 10					
Students learn one module at a time before moving on. This is spread out across the year.					
	Module One	Module Two	Module Three	Module Four	Module Five
Y10	Topics: Number Key Concepts - Estimating answers, limits of accuracy and calculating with bounds - Multiplication and division with decimals - Conversion between terminating and recurring decimals and fractions - Powers, index laws and operations with surds - Prime factor decomposition and using this to find highest common factor and lowest common multiple of two or more numbers. - Calculations with numbers in standard form - Fractions and percentage	Topics: Algebra Key Concepts - Simplifying and manipulating algebraic expressions (including those involving surds and algebraic fractions) - Solving linear equations (including involving algebraic fractions) - Solving inequalities and equations with the unknown in the denominator - Expanding and factorising linear and quadratic expressions, including difference of two squares. - Expanding triple linear brackets - Solving quadratic equations algebraically and using graphs - Recognising graphs of functions - Simplifying algebraic fractions - Four operations with algebraic fractions - Algebraic proof - Understanding equivalence and Identities - Changing the subject (including when expanding or factorising is needed) - Equation of a straight line through two points, parallel and perpendicular line, interpreting y-intercepts and gradients in real life contexts - Solving simultaneous linear and linear/quadratic equations - Plotting quadratic and cubic graphs and finding roots and y-intercepts - Finding the nth term of linear and quadratic sequences	Topics: Ratio, Proportion and Proportional change Key Concepts - Working with percentages and repeated percentage change using multipliers - Solving problems using reverse percentage change - Solving problems involving repeated percentage change compound interest and exponential decay - Understanding the difference between simple and compound interest - Working and problem solving with ratio - Comparing lengths, areas and volumes using ratio notation - Understanding similarity and scale factors - Understanding direct and inverse proportion and their related graphs - Understanding compound measure, including speed, pressure, density and average density or speed	Topics: Geometry and Measure Key Concepts - Understanding and working with congruence and similarity and transformations - Angle geometry review. - Area and perimeter (including compound shapes) - Working with circles and sectors of circles - Calculating volumes and surface areas of 3D shapes - Understanding similarity in 3D shapes - Using Pythagoras' Theorem and trigonometry in right angled triangles - Using exact trigonometric ratios - Problem solving with bearings and scale drawings. - Problem solving with compound measures.	Topics: Probability and statistics Key Concepts - Calculating probabilities using tree diagrams, Venn diagrams and sample space diagrams - Calculating probabilities of independent and mutually exclusive events - Understanding theoretical and experimental probabilities and expected and relative frequencies. - Interpreting Venn diagrams to calculate conditional probabilities and to describe situations in set notation. - Drawing cumulative frequency graphs and using them to find medians and interquartile ranges. - Constructing and interpreting frequency polygons - Constructing and comparing box plots - Calculating and estimating averages - Use and interpret scatter graph and use line of best fit

Year 11					
	Module One	Module Two	Module Three	Module Four	Module Five
Y11	Topics: Number Key Concepts - Estimating answers, limits of accuracy and calculating with bounds - Calculation of error intervals - Multiplication and division with decimals - Powers, roots, negative and fractional indices and manipulating surds. - Performing calculations with numbers in standard form	Topics: Algebra Key Concepts - Solving linear and quadratic equations (including involving algebraic fractions) and inequalities - Expanding and factorising linear and quadratic expressions, including difference of two squares. - Expanding triple linear brackets - Solving quadratic equations algebraically and using graphs - Identifying roots and turning points on quadratic graphs - Finding turning points by completing the square - Plotting and recognising linear, quadratic, cubic, reciprocal and exponential functions - Understanding functions, inverse functions and composite functions - Estimating roots of functions using iteration - Transform graphs of functions, and in particular graphs of trigonometric functions - Algebraic proof - Understanding equivalence and Identities - Changing the subject (including when expanding and factorising is needed) - Equation of a straight line through two points, parallel and perpendicular line, interpreting y-intercepts and gradients in real life contexts - Solving simultaneous linear and linear/quadratic equations - Finding the nth term of linear and quadratic sequences - Recognise and use the equation of a circle centred at the origin. - Calculate or estimate gradients of graphs and areas under graphs and interpret results	Topics: Ratio, Proportion and proportional change Key Concepts - Working with percentages, reverse percentages and repeated percentage change - Problem solving with ratio. - Comparing lengths, areas and volumes using ratio notation; make links to similarity (including trigonometric ratios) and scale factors. - Understanding gradients as rates of change, and areas under speed time graphs as representing distance - Calculating instantaneous rates of change using tangents - Solving problems involving direct and inverse proportion - Recognising and interpreting graphs that illustrate direct and inverse proportion, conversion between units in compound measure, and solving problems involving compound measure.	Topics: Geometry and Measure Key Concepts - Congruence and similarity and transformations review - Angle geometry review. - Vectors and Vector geometry - Working with and problem solving with circle theorems - Area and volume review - Volumes of pyramids and frustrum - Working with circles and sectors of circles - Using Pythagoras' Theorem and trigonometry in non- right-angled triangles - Using exact trigonometric ratios - Problem solving with compound measures. - Using straight edge and compass to construct loci	Topics: Probability and statistics Key Concepts - Calculating probabilities using tree diagrams, Venn diagrams and sample space diagrams - Understanding theoretical and experimental probabilities and expected and relative frequencies. - Using cumulative frequency graphs and box plots - Using histograms to display continuous data. - Calculating and estimating averages Assessment: Two one-hour papers

KS4 Maths – Foundation tier – 2-year map

Year 10					
Students learn one module at a time before moving on.					
	Module One	Module Two	Module Three	Module Four	Module Five
Y10	Topics: Number Key Concepts - Rounding and estimating answers, - Calculation of error intervals - Multiplication and division with decimals - Conversion between terminating decimals and corresponding fractions - Powers, index laws and operations - Prime factor decomposition and using this to find highest common factor and lowest common multiple of two or more numbers. - Calculations with numbers in standard form - Fractions and percentage	Topics: Algebra Key Concepts - Simplifying and manipulating algebraic expressions - Solving linear equations (including involving surds and unknown on both sides) - Solving inequalities and equations and represent solution set on a number line - Expanding and factorising linear and quadratic expressions, including difference of two squares. - Expanding double linear brackets - Solving quadratic equations algebraically and using graphs - Recognising graphs of functions - Simplifying algebraic fractions - Understanding equivalence and Identities - Changing the subject - Equation of a straight line through two points, parallel and perpendicular line, interpreting y-intercepts and gradients in real life contexts - Solving simultaneous linear equations - Plotting quadratic and cubic graphs and finding roots and y-intercepts - Finding the nth term of linear and quadratic sequences	Topics: Ratio, Proportion and proportional change Key Concepts - Working with percentages and repeated percentage change using multipliers - Solving problems using reverse percentage change - Solving problems involving repeated percentage change compound interest and exponential decay - Understanding the difference between simple and compound interest - Working and problem solving with ratio - Comparing lengths, areas and volumes using ratio notation - Understanding similarity and scale factors - Understanding direct and inverse proportion and their related graphs - Understanding compound measure, including speed, pressure, density and average density or speed	Topics: Geometry and Measure Key Concepts - Angle geometry review. - Area and perimeter (including compound shapes) - Transformation of shapes - Working with circles and sectors of circles - Calculating volumes and surface areas of 3D shapes. - Using Pythagoras' Theorem and trigonometry in right angled triangles - Using exact trigonometric ratios - Problem solving with bearings and scale drawings. - Problem solving with compound measures. - Using straight edge and compass to construct triangles	Topics: Probability and statistics Key Concepts - Calculating probabilities using tree diagrams, Venn diagrams and sample space diagrams - Calculating probabilities of independent and mutually exclusive events - Understanding theoretical and experimental probabilities and expected and relative frequencies. - Interpreting Venn diagrams to calculate conditional probabilities and to describe situations in set notation. - Interpret and construct tables, charts and diagram - Constructing and interpreting frequency polygons - Calculating and estimating averages - Use and interpret scatter graph and use line of best fit

Year 11					
	Module One	Module Two	Module Three	Module Four	Module Five
Y11	Topics: Number Key Concepts - Round numbers to suitable degree of accuracy - Estimating answers. - Calculation of error intervals - Multiplication and division with decimals - Powers, roots, negative and fractional indices - Performing calculations with numbers in standard form	Topics: Algebra Key Concepts - Solving linear and quadratic equations - Solving inequalities - Expanding and factorising linear and quadratic expressions, including difference of two squares. - Expanding double linear brackets - Solving quadratic equations algebraically and using graphs - Identifying roots and turning points on quadratic graphs - Plotting and recognising linear, quadratic, cubic, reciprocal and exponential functions - Understanding equivalence and Identities - Changing the subject - Equation of a straight line through two points, parallel and perpendicular line, interpreting y-intercepts and gradients in real life contexts - Solving simultaneous linear equations - Finding the nth term of linear and linear sequences	Topics: Ratio, Proportion and proportional change Key Concepts - Working with percentages, reverse percentages and repeated percentage change - Problem solving with ratio. - Comparing lengths, areas and volumes using ratio notation; make links to similarity (including trigonometric ratios) and scale factors. - Understanding gradients as rates of change, - Solving problems involving direct and inverse proportion - Recognising and interpreting graphs that illustrate direct and inverse proportion - Conversion between units in compound measure, and solving problems involving compound measure.	Topics: Geometry and Measure Key Concepts - Congruence and similarity and transformations review - Angle geometry review. - Vectors - Area and volume review - Volumes and surface area of 3D shapes. - Working with circles and sectors of circles - Using exact trigonometric ratios - Problem solving with compound measures.	Topics: Probability and statistics Key Concepts - Calculating probabilities using tree diagrams, Venn diagrams and sample space diagrams - Understanding theoretical and experimental probabilities and expected and relative frequencies. - Calculating and estimating averages Assessment: Two one-hour papers