Carnforth High School

Curriculum Map

		Autumn	
		Term 1	**Term 2**
Year 7	**Key Topic:**	U1 Sequence U2 Directed Numbers U3 Understand & Use Algebraic Notation	U4 Equality & Equivalence U5 Place Value & Ordering U6 Fractions, Decimals and Percentages Equivalence
	Students should know:	How to: • generate and describe linear number sequences and to generalise number patterns • use negative numbers in context, and calculate intervals across zero, including solving number and practical problems • use simple formulae & unknowns in mathematical situations that they already understand, such as formulae in mathematics and science and area and perimeter problems	How to: • Use simple formulae • Find pairs of numbers that satisfy an equation with two unknowns • Solve number and practical problems that involve negative numbers all of the above. • Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.
	Students should be able to:	• Generate terms of a sequence from a term to term rule • Recognise arithmetic sequences • Recognise geometric sequences and appreciate other sequences that arise • Use the four operations applied to both positive and negative integers, including substitution into formulae and expressions, including scientific formulae • Use algebra to generalise the structure of arithmetic mathematical relationships • Recognise and use relationships between operations including inverse operations	• Simplify and manipulate algebraic expressions to maintain equivalence by collecting like terms • Use approximation through round to estimate answers • Use algebraic methods to solve linear equations in one variable • Consolidate understanding of the number system and place value to include decimals • Work interchangeably between terminating decimals and their corresponding fractions • Move freely between different numerical representations (equivalent fractions, decimals and percentages) • Compare quantities using percentages and where percentages are greater than 100% • Interpret and compare numbers in standard form
	Assessment:	End of Unit (In-Class) Assessment. Autumn Assessment.	End of Unit (In-Class) Assessment. Autumn Assessment.
	Additional work outside of school:	Weekly Sparks 100% completion	Weekly Sparks 100% completion

Carnforth High School

		Spring	
		Term 3	**Term 4**
Year 7	**Key Topic:**	U7 Solve Problems with Addition & Subtraction U8 Solve Problems with Multiplication & Division	U9 Fractions & Percentages of Amounts U10 Addition & Subtraction of Fractions U11 Construct Measure & Use Geometric Notation
	Students should know:	How to: • Solve comparison, sum and difference problems using information presented in, but not limited to line graphs, pie charts, bar charts, pictograms and other tables and charts • Recognise that shapes with the same areas can have different perimeters and vice versa • Recognise when it is possible to use formulae for area and volume of shapes • Calculate the area of parallelograms, triangles and related composite shapes, including finding unknown lengths	How to: • Distinguish between regular and irregular polygons based on reasoning about equal sides and angles • Draw given angles, and measure them in degrees • Identify: angles at a point on a straight line and one whole turn (total 360), angles at a point on a straight line and half a turn (total 180), other multiples of 90 • Use angle sum facts to make deductions about missing angles and use these for missing number problems. • Use their understanding of the relationship between unit fractions and division to work backwards to find the whole quantity
	Students should be able to:	• Use formal written method, applied to positive integers and decimals • Select and use appropriate calculation strategies to solve increasingly complex problems • Recognise and use relationships between operations including inverse operations • Derive and apply formulae to calculate and solve problems involving perimeter and area of triangles, parallelograms and trapezia • Construct and interpret appropriate tables, charts and diagrams, including frequency tables, bar charts and pictograms for categorical data and vertical (or bar) charts for ungrouped numerical data. • Substitute numerical values into formulae and expressions, including scientific formulae • Use algebraic methods to solve linear equations in one variable • Describe, interpret and compare observed distributions of a single variable through the mean • Distinguish between, and calculate with, factors and multiples to solve problems with common shapes and the mean.	How to: • Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions and mixed numbers, both positive and negative • Interpret fractions and percentages as operators • Express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1 • Select and use appropriate calculation strategies to solve increasingly complex problems • Work interchangeably with terminating decimals and their corresponding fractions • Use standard conventions for labelling sides and angles, points, lines, perpendicular lines, right-angles, regular (and other) polygons • Derive and illustrate properties of triangles, quadrilaterals, circles and other plane figures, including polygons
	Assessment:	End of Unit (In-Class) Assessment. Spring Assessment.	End of Unit (In-Class) Assessment. Spring Assessment.
	Additional work outside of school:	Weekly Sparks 100% completion	Weekly Sparks 100% completion

Carnforth
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		Summer	
		Term 5	**Term 6**
Year 7	**Key Topic:**	U12 Develop Geometric Reasoning	U13 Develop Number Sense U14 Sets & Probability U15 Prime Numbers & Proof
	Students should know:	How to: • Use language precisely to describe 2D shapes • Draw and measure line segments and angles, including scale drawings • Describe, sketch and draw; points, lines, parallel lines, perpendicular lines, right-angles, regular polygons that are reflectively and rotationally symmetric • Use standard conventions for labelling sides and angles	How to: • Use language precisely to analyse 2D shapes • Derive and illustrate properties of angles, quadrilaterals, circles and other plane figures
	Students should be able to:	• Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles. • Understand and use the relationship between parallel lines and alternate and corresponding angles • Derive and the use sum of angles in a triangle and use it to deduce the angle sum in any polygon and to derive properties of regular properties • Construct and interpret pie charts for categorical, ungrouped and grouped numerical data • Identify and construct congruent triangles • Apply angle facts, triangle similarity, parallel line facts and properties of quadrilaterals to derive angles and sides and to solve problems and obtain simple proofs	• Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles. • Apply the properties of angles at a point, angles at a point on a line and vertically opposite angles • Apply angle facts, triangle similarity and properties of quadrilaterals to derive angle and side results to obtain simple proofs • Understand and use the relationship between parallel lines and alternate and corresponding angles • Derive and the use sum of angles in a triangle and use it to deduce the angle sum in any polygon and to derive properties of regular properties
	Assessment:	End of Unit (In-Class) Assessment. Summer Assessment.	End of Unit (In-Class) Assessment. Summer Assessment.
	Additional work outside of school:	Weekly Sparks 100% completion	Weekly Sparks 100% completion

Carnforth High School

		Autumn	
		Term 1	**Term 2**
Year 8	**Key Topic:**	U1 Ratio & Scale U2 Multiplicative Change U3 Multiplying & Dividing Fractions	U4 Working in the Cartesian Plane U5 Data U6 Tables & Probability
	Students should know:	How to: • Make connections between number relationships and algebraic and graphical representations • Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction	How to: • Substitute numerical values into formulae and expressions • Develop algebraic and graphical fluency for linear (and simple quadratic equations • Construct appropriate tables, charts and diagrams for grouped and ungrouped data • Describe mathematical relationships in scattergraphs and experimental contexts • Record, describe and analyse the frequency of outcomes of simple probability experiments, including using the 0-1 probability scale
	Students should be able to:	• Use scale factors, diagrams and maps • Divide a given quantity into a part:part or part:whole ratio • Solve problems using direct and inverse proportion • Interpret when a problem needs multiplicative, additive or proportional reasoning • Select and use calculation strategies to solve problems • Apply all four operation to decimal, proper, improper or mixed fractions, integers, including positive and negative numbers.	• Use language and properties to analyse probability and statistics • Interpret appropriate tables, charts and diagrams for grouped and ungrouped data • Calculate theoretical probabilities from theoretical sample spaces with equally likely and mutually exclusive outcomes
	Assessment:	End of Unit Assessments and Autumn Assessment	End of Unit Assessments and Autumn Assessment
	Additional work outside of school:	Weekly Sparks 100% completion	Weekly Sparks 100% completion

Carnforth High School

		Spring	
		Term 3	**Term 4**
Year 8	**Key Topic:**	U7 Brackets Equations & Inequalities U8 Sequences	U9 Indices U10 Fractions & Percentages U11 Standard Index Form
	Students should know:	How to: • Substitute numerical values into formulae and expressions • Simplify and manipulate by collecting like terms, multiplying over a single bracket, taking out common factors and expanding two or more binomials	How to: • Substitute values into expressions, rearrange and simplify expressions and solve equations • Use and interpret algebraic notation • Work interchangeably between terminating decimals, fractions and percentages • Use integer powers and associated roots and distinguish between exact representations of roots and their decimal approximations • Round numbers to an appropriate degree of accuracy and use estimation to round numbers and measures
	Students should be able to:	• Understand and use standard mathematical formulae • Use algebraic methods to solve linear equations in one variable • Recognise arithmetic sequences and find the nth term • Recognise geometric sequences and other sequences • Begin to model situations using a range of mathematical representations	• Interpret fractions and percentages as operators • Develop formal mathematical knowledge to solve financial problems • Interpret and compare numbers in standard form where n is positive, negative or zero • Use a calculator to calculate accurate results and interpret them correctly
	Assessment:	End of Unit Assessments and Spring Assessment	End of Unit Assessments and Spring Assessment
	Additional work outside of school:	Weekly Sparks 100% completion	Weekly Sparks 100% completion

Carnforth High School

		Summer	
		Term 5	**Term 6**
Year 8	**Key Topic:**	U12 Number Sense U13 Angles in Parallel Lines &Polygons	U14 Area if Trapezia & Circles U15 Line Symmetry & Refection U16 Data U17 Measure of Location
	Students should know:	How to: • Use standard units of mass, length, time, money, including decimal quantities • Round numbers to an appropriate degree of accuracy • Use approximation through rounding to estimate answers using inequality notation (error intervals) • Use the standard conventions for labelling angles and sides in a triangle	How to: • Choose and use the formula for the area of a trapezium • Identify properties of reflected shapes • Describe, interpret and compare observed through; appropriate graphical representation involving discrete, continuous and grouped data. • Describe and interpret appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers) • Construct appropriate tables, charts, and diagrams for ungrouped and grouped numerical data
	Students should be able to:	• Use a calculator to calculate accurate results and interpret them correctly • Apply the properties of angles at a point, angles at a point on a straight line and vertically opposite angles • Derive and use the sum of angles in a polygon or a triangle • Derive and illustrate properties of triangles, quadrilaterals, circles and other plane figures • Derive and use standard ruler and compass constructions	• Derive and apply formulae to calculate and solve problems including area and perimeter of triangles, parallelograms and trapezia • Calculate and solve problems involving; perimeter of 2D shapes (and circles), areas of circles and composite shapes • Describe the results of reflected shapes • Interpret appropriate tables, charts, and diagrams for ungrouped and grouped numerical data
	Assessment:	End of Unit Assessments and Summer Assessment	End of Unit Assessments and Summer Assessment
	Additional work outside of school:	Weekly Sparks 100% completion	Weekly Sparks 100% completion

Carnforth High School

		Autumn	
		Term 1	**Term 2**
Year 9	**Key Topic:**	U1 Straight Line Graphs U2 Forming & Solving Equations U3 Testing Conjectures U4 3D Shapes	U5 Constructions & Congruence U6 Numbers
	Students should know:	How to: • Develop algebraic and graphical fluency, including understanding linear and simple quadratic functions • Recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane • move freely between different numerical, algebraic, graphical and diagrammatic representations • make and test conjectures about patterns and relationships; look for proofs or counterexamples • Begin to reason deductively in geometry, number and algebra • Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation • Simplify and manipulate algebraic expressions to maintain equivalence by expanding products of two or more binomials • Identify the properties of faces, edges, surfaces and vertices of prisms, cylinders, pyramids and cones.	How to: • Draw and measure line segments and angles and interpret scale drawings • Use the standard compass and ruler to undertake simple constructions • Identify congruent triangles
	Students should be able to:	• Interpret mathematical relationships both algebraically and graphically • Reduce a given linear equation in two variables to the standard form $y = mx + c$; • Calculate and interpret gradients and intercepts of graphs numerically • Use linear and quadratic graphs to estimate values of y for given values of x and vice versa and to find approximate solutions of simultaneous linear equations • Solve problems involving direct and inverse proportion • Use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement) • Model situations or procedures by translating them into algebraic expressions or formulae, and by using graphs. • Use the properties of faces, edges, surfaces and vertices of prisms, cylinders, pyramids and cones to solve 3D problems	• Identify congruent triangles (SSS, SAS, ASA, RHS) • Locus equidistant from 2 points • Construct an angle bisector • Construct a perpendicular bisector • Explore congruent triangles • Construct a perpendicular from a point • Construct a perpendicular to a point • Locus of distance from 2 lines
	Assessment:	End of Unit Assessments and Autumn Assessment	End of Unit Assessments and Autumn Assessment
	Additional work	Weekly Sparks 100% completion	Weekly Sparks 100% completion

	outside of school:		

		Spring	
		Term 3	**Term 4**
Year 9	**Key Topic:**	U7 Using Percentages U8 Maths & Money U9 Deduction	U10 Rotation & Translation U11 Pythagoras U12 Enlargement & Similarity
	Students should know:	How to: • Define percentages as a number of parts per hundred • Express one number as a percentage of another • Interpret percentages into fractions and decimals • Interpret fractions and percentages as operators • Calculate simple interest (including savings accounts) • Calculate compound interest • Understand bills and bank statements • Calculate wages and tax - real life finance, explore: hourly rates of pay and payslips and income tax	How to: • Identify the order of rotational symmetry of a shape • Rotate a shape about a point on a shape (and when not on a shape) • Translate points and shapes by a given vector (include translated co-ordinates) • Compare and contrast rotational symmetry with line symmetry • Compare rotation and reflection of shapes • Find the result of a series of transformations • Work with squares and square roots • Identify the hypotenuse of a right-angled triangle • Determine whether a triangle is right-angled or not • Calculate the length of the hypotenuse or shorter side using Pythagoras' Theorem • Calculate any missing side of a right-angled triangle • Use Pythagoras' theorem on co-ordinate axes • Understand similarity and congruence • Enlarge a 2D shape by a positive integer scale factor • Describe an enlargement by a positive scale factor • Find the missing side length in a similar shape with any scale factor • Enlarge a 2D shape by a negative or fractional scale factor (and from a point)
	Students should be able to:	• Recognise and solve percentage problems (non-calculator) • Solve reverse percentage problems • Recognise and solve percentage problems (calculator) • Solve problems with repeated percentage change (including growth and decay) • Solve problems with value added tax	• Calculate any missing side of a right-angled triangle (including working with surds) • Use Pythagoras' theorem in 3D shapes • Explore proof of Pythagoras' theorem • Describe a 2D shape by a fractional scale factor (and from a point)

		• Solve problems with bills and bank statements • Solve problems with exchange rates • Compound interest problems in terms of savings accounts and comparisons • Select and use appropriate percentage calculation strategies	• Solve problems with similar shapes • Explore ratios in right-angled triangles
	Assessment:	End of Unit Assessments and Spring Assessment	End of Unit Assessments and Spring Assessment
	Additional work outside of school:	Weekly Sparks 100% completion	Weekly Sparks 100% completion

		Summer	
		Term 5	**Term 6**
Year 9	**Key Topic:**	U13 Solving Ratio & Proportion U14 Rates	U15 Probability U16 Algebraic Representation
	Students should know:	How to: • Understand and use ratio notation • Express ratio in their simplest form • Solve ratio problems 1:n or n:1 where n is an integer • Solve proportional problems including m:n • Solve simple direct proportion problems • Draw and interpret scale diagrams • Represent sequences in tabular and graphical form • Link graphs of $y=mx+c$ to sequences • Metric conversions for weight, length and capacity (Y8) • Solve problems including time and calendar • Note – metric to imperial conversions will be given on the GCSE paper	How to: • Work out fraction calculations • Find probabilities using equally likely outcomes • Work with all probabilities sum to 1 • Interpret and create basic Venn diagrams • Know and use probability language • Use the probability scale • Draw and interpreting two way tables • Plot quadratic graphs from a table of co-ordinates
	Students should be able to:	• Interpret and draw direct proportion and conversion graphs – link to currency conversions • Convert between different units of mass and volume. • Solve best buy problems • Divide a value into a given ratio (include 3-part ratio) • Solve problems with inverse proportion • Solve ratio problems given the whole or a part • Interpret and draw graphs of inverse relationships	• Find probabilities from single event – in tables, Venn Diagrams and frequency trees • Construct and interpret sample spaces for more than one event • Relative frequency – including convergence. • Understand and calculate with expected outcomes • Draw and interpret tree diagrams for independent events to calculate probabilities • Use tree diagrams to solve more complex probabilities

		• Solve problems involving ratio and algebra (H) – (use 'k' for direct and inverse proportion problems (include, squares, roots and cubes) • Convert between units of time (eg, minutes to hours) • Plot and interpret distance-time graphs • Solve simple speed, distance and time (SDT) problems with and without a calculator • Solve more complex speed, distance and time problems (with and without a calculator). • Solve problems with density, mass and volume (DMV) calculations (with and without a calculator) • Solve problems with SDT, DMV and pressure, force and area calculations (with and without a calculator) • Solve problems with SDT, DMV and PFA calculations which require conversion of compound units	• Use tree diagrams to solve non-replacement problems (H) – including those with algebra • Represent inequalities on a number line as a range of values • Draw and interpret quadratic graphs, including solutions and turning points – link to the algebraic equations and tables of co-ordinates • Interpret other graphs, including reciprocals, exponentials and piece-wise • Draw and interpret graphs of simultaneous equations, including regions
	Assessment:	End of Unit Assessments and Summer Assessment	End of Unit Assessments and Summer Assessment
	Additional work outside of school:	Weekly Sparks 100% completion	Weekly Sparks 100% completion

Carnforth High School

		Autumn	
		Term 1	**Term 2**
Year 10	**Key Topic:**	U1 Congruence Similarity & Enlargement U2 Trigonometry	U3 Representing Solutions Equations & Inequalities U4 Simultaneous Equations U5 Angles & Bearings
	Students should know:	How to: • Enlarge and describe 2D shapes by a positive scale factor • Understand similarity and congruence • Perform all transformations • Interpret maps using scale factors and ratios • Understand scale factors as multiplicative relationships • Explore basic relationships between similar shapes • Understand the difference between similar and congruent shapes • Identify the hypotenuse • Label a right-angled triangle	• Solve one-step and two-step equations • Represent inequalities on a number line • Understand and solve one-step inequalities • Factorise a single bracket • Expand a single bracket and collect like terms • Expand and simplify multiple single brackets • Drawing straight line graphs from a table • Changing the subject of a formula/rearranging into the form *y=mx+c* • Plot graphs in the form y=mx+c $y = mx + c$ • Rearranging simpB-rmulae • Factorise quadratics including the difference of two squares • Solve simultaneous equations by elimination • Draw and measure angles up to 360° • Solve angle problems using basic angle facts • Identify and calculate with alternate angles, corresponding angles, co-interior angles. • Use cardinal direction and related angles (measures of turn)
	Students should be able to:	• Understand and describe the difference between congruence and similarity • Enlarge a shape by a positive, fractional and negative scale factor • Identify similar shapes • Work out missing side lengths and angles in a pair of similar shapes with an integer factor • Understand and use conditions for congruent triangles (SSS, SAS, ASA, RHS) • Establish whether a pair of triangles are similar • Use parallel line rules to work out missing angles • Work out missing sides and angles in any pair of given similar shapes (including overlapping and 'twisted' shapes of any fractional scale factor) • Explore areas of similar shapes	How to: • Understand and know the meaning of a solution • Form and solve one-and two-step equations (R) • Form and solve one and two-step inequalities (R) • Show solutions to inequalities on a number line • Interpret representations on number lines as inequalities • Draw straight line graphs from a table and using intercept/gradient method (R) • Form & solve equations (unknowns on both sides) • Find solutions to equations using straight line graphs (R) • Form & solve inequalities (unknowns on both sides) (R) • Form and solve more complex equations and inequalities • Factorise quadratic expressions • Solve quadratic equations through factorisation (H)

		• Explore volumes of similar shapes • Solve mixed problems involving similar shapes (H) • Calculate (short and hypotenuse) sides in right-angled triangles using Pythagoras' Theorem (R) • Work fluently with hypotenuse, adjacent and opposite sides • Determine whether a triangle is right angled or not (using Pythagoras) • Use the Sine/Cosine/Tangent ratios to find missing side lengths and angles • Select the appropriate method to solve right-angled triangles • Work with key angles in right-angles triangles (exact values) • Use Pythagoras & trigonometry in 3D shapes (H) • Use the formula 1/2abSinC to find the area of a triangle (H) • Understand and use the sine rule to find missing sides and angles (H) • Understand and use the cosine rule to find missing sides and angles (H) • Select the appropriate method to solve problems using Pythagoras, trigonometry rules (H)	• Represent solutions to inequalities using set notation (H) • Represent solutions to single inequalities on a graph (H) • Represent solutions to multiple inequalities on a graph (H) • Solve quadratic inequalities in one variable (H) • Use a given equation to derive certain facts (R) • Understand that equations can have more than one solution • Determine if a given (x,y) is a solution to a pair of linear simultaneous equations • Solve a pair of linear simultaneous equations by substituting a known variable • Solve a pair of linear simultaneous equations using graphs • Solve simultaneous equations by elimination (no scaling), adjusting one equation, substitution, elimination (adjusting both equations) • Form and solve a pair of linear simultaneous solutions from given information • Determine whether a given (x,y) is a solution to both a linear and quadratic equation (H) • Solve a pair of simultaneous equations (one linear and one quadratic) using graphs (H) and algebra (H) • Understand and use the sine rule to find missing sides and angles (H) • Understand and use the cosine rule to find missing sides and angles (H) • Select the appropriate method to solve problems using Pythagoras, trigonometry rules (H) • Draw and interpret scale diagrams (R) • Use cardinal directions and related angles (R) • Understand, represent, measure, read and make scale drawings of bearings • Calculate angles using bearing rules • Solve bearing problems using Pythagoras and Trigonometry • Solve bearing problems using the Sine and Cosine rules (H)
	Assessment:	End of Unit Assessments and Autumn Assessment	End of Unit Assessments and Autumn Assessment
	Additional work outside of school:	Weekly Sparks 100% completion	Weekly Sparks 100% completion

Carnforth High School

		Spring	
		Term 3	**Term 4**
Year 10	**Key Topic:**	U6 Working with Circles U7 Vectors U8 Ratios & Fractions	U9 Percentages & Interest U10 Probability
	Students should know:	How to: • Recognise and label parts of a circle • Calculate the area of circles including in terms of pi and with a calculator • Calculate the circumference of circles including in terms of pi and with a calculator • Performing vector translations • Describing translations using vectors • Understand and use ratio notation • Express ratio in their simplest form • Solve ratio problems 1:n or n:1 where n is an integer • Understand the gradient of a line as a ratio • Area and volume scale factors to find missing values	• Work out percentages of amounts (with and without a calculator) • Increase/decrease by a given percentages • Covert and compare Fractions, Decimals and Percentages • Express one number as a percentage of another • Fraction calculations • Finding probabilities using equally likely outcomes • Probabilities sum to 1 • Interpret and create basic Venn diagrams • Know and use probability language and the probability scale • Draw and interpret two-way tables
	Students should be able to:	• Recognise and label parts of a circle (R) • Calculate the area of semi-circles and quarter-circles (including in terms of p)i • Calculate the arc length and perimeter of semi-circles and quarter-circles (including in terms of pi) • Calculate the area of any size of circle sector (including in terms of pi) • Calculate the perimeter of any sector (including in terms of pi) • Understand and use the surface area of cylinders and other prisms. • Understand and use the volume of a cone and cylinder (and pyramid) • Understand and use the volume of a sphere • Understand and use the surface area of a sphere • Work out missing lengths given the area/perimeter and/or volume • Circle theorems: ○ Angles at the centre and circumference (H) • Angles in a semi-circle (H) • Angles in the same segment (H) • Angles in a cyclic quadrilateral (H) • Calculate the volume and surface area and apply to composite 3D shapes including cones, cylinders and spheres • Solve area and volume problems involving similar shapes	• Work out percentage of an amount (with and without a calculator) • Increase and decrease by a given percentage (with and without a calculator • Express one number as a percentage of another • Find the original value after a percentage change • Calculate simple interest • Solve simple problems involving percentages, ratios and fractions • Calculate compound interest and decay • Repeated percentage change • Solve problems in growth and decay • Solve more complex problems involving percentages, ratios and fractions • Find the original amount after repeated percentage change • Understand and perform iterative processes to solve equations *(Use trial and error to introduce the topic) – link to quadratic solutions (H)* • Know how to add, subtract & multiply fractions (R) • Construct and interpret sample spaces for more than one event (R)

		• Understand and represent vectors both diagrammatically and with column representations • Use and read vector notation • Draw and understand vectors multiplied by a scalar • Draw and understand addition and subtraction of vectors • Explore vector journeys in shapes • Explore quadrilaterals using vectors (H) • Understand parallel vectors (H) • Explore co-linear points using vectors (H) • Use vectors to construct geometric arguments and proofs (Points on a straight line) (H) • Compare quantities using a ratio (R) • Link ratios and fractions (R) • Use ratios and fractions to make comparisons • Share in a ratio (given a whole or part) (R) • Link ratio and scales (R) • Use and interpret ratios of the form 1:n and n:1 • Combine and work with a set of ratios • Solve simple best buy problems • Solve more complex best buy problems • Solve problems with currency conversion ratio • Link ratios and direct proportion graphs • Link ratios and algebra (interpret equations) • Mixed complex ratio problems • Ratio in area problems (H) • Ratio in volume problems (H) • More complex mixed ratio Problems (H)	• Use the property that probabilities sum to 1 (R) • Find probabilities from tables, Venn Diagrams and frequency trees • Using experimental data to estimate probabilities (link to sampling) • Calculate probability with independent events • Use tree diagrams for independent events • Use tree diagrams for dependent events • Construct and interpret conditional probabilities: tree diagrams; Venn diagrams; and Two-Way tables (H) • Understand and use the product rule for counting (H)
	Assessment:	End of Unit Assessments and Spring Assessment	End of Unit Assessments and Spring Assessment
	Additional work outside of school:	Weekly Sparks 100% completion	Weekly Sparks 100% completion

	Summer	
	Term 5	**Term 6**

Year 10	**Key Topic:**	U11 Data	U12 Non-Calculator Methods U13 Number & Sequences U14 Indices & Roots U15 Manipulating Expressions
	Students should know:	How to: • Read and interpret grouped and ungrouped frequency tables • Represent continuous data grouped into equal classes in a frequency table (include tally charts) • Represent data in a Two-Way table • Draw and interpret scatter graphs • Understand and describe linear correlation • Draw and use a line of best fit • Know about different types of data, continuous, discrete, qualitative and quantitative • Represent grouped data in a frequency table using tally charts) • Draw and interpret pictograms, bar charts and vertical line graphs • Comparative and composite bar charts • Mean/median/mode and range from a grouped table	How to: • Solve problems using direct proportion • Use squares, cubes and their associated roots • Calculating in terms of pi • Rounding to the nearest 10, 100, 100 etc • Rounding to decimal places • Rounding to significant figures • **G-** simplify surds and four operations with surds • Describe and continue linear sequences both numerically and diagrammatically • Explain the term-to-term rule of linear sequences • Continue the next terms of triangular numbers, square numbers, cube numbers, arithmetic progressions, and simple geometric progressions • Know the difference between linear and non-linear sequences • Find the missing terms in a sequence • Link graphs of y=mx+c to sequences • Finding the nth term of an arithmetic sequence and a geometric sequence • Understanding place value and powers of 10 • Working with roots and powers greater than 2 • Evaluate squares, cubes and their roots • Write ordinary numbers in standard form • Convert standard form into ordinary numbers • Order numbers given in standard form • Substituted into 2 step expressions • Use of simple function machines • Worked with formulae for area and volume including working backwards • Fluency in expanding and factorising single and multiple brackets.
	Students should be able to:	• Understand populations and samples • Understand primary and secondary data • Construct and interpret frequency tables and frequency polygons • Construct and interpret two-way tables (R) • Construct and interpret line and bar charts (incl. composite bar charts)	• Mental & written methods for addition /subtraction of integers & decimals (R) • Mental & written methods for multiplication/division of integers & decimals (R) • Four rules of fraction arithmetic (R)

		• Construct and interpret pie charts (R) • Find and interpret averages & range from a list (R) • Find and interpret averages & range from a table (R) • Construct and interpret scatter graphs, including outliers, line of best fit & extrapolation (R) • Construct and interpret stem and leaf diagrams • Construct and interpret time series graphs • Criticise charts and graphs • Compare distributions using charts and measures • Chose the most appropriate diagram for a given set of data • **Construct a stratified sample (H)** • **Construct and interpret histograms (H)** • **Construct and interpret box plots (H)** • **Construct and interpret cumulative frequency diagrams to find measures (H)** • **Identify and work with quartiles and inter-quartile range (H)** • **Interpret, analyse and compare different distributions using complex charts and measures of average and range (H)**	• Break down and solve simple multi-step problems • Rounding to decimal places and Sig. Figs. (R) • Estimating answers to calculations (R) • Exact answers (pi /fractions) • Understand and use limits of accuracy (error intervals) • Use number sense • **Understand and use rational and irrational numbers (H)** • **Understand and use surds (H), including all four operations** • **Calculate with surds (H), including single and double brackets** • **Upper and Lower bounds (H)** • **Rationalising the denominator of surds** • Understand the differences between factors and multiples (R) • Understand primes and express a number as a product of its prime factors (R) • Find the HCF and LCM of a set of numbers (R) – with or without a Venn diagram • Find and use the nth term rule to generate a sequence (R) • Describe and continue arithmetic and geometric sequences • Explore other sequences, triangular, Fibonacci, quadratic, algebraic. • Using the nth term to find whether a term lies in a given sequence • **Describe and continue sequences** • **involving surds (H)** • **Find the nth term rule for quadratic sequences (H)** • Add and subtract numbers in standard form • Multiply and divide numbers in standard form • Use a calculator to work in standard form and to check answers • Understand and use basic laws of indices including; multiplying; dividing; and raising to a power • Understand and use (calculate with) basic laws of indices including power of zero and negative indices • Understand and use **fractional** indices • Understand and use base numbers to help simplify e.g. calculate 64 x 4^3 = 2^x • Simplify algebraic expressions (R)

			• Use simple identities, including expanding single and multiple brackets • Represent numbers algebraically • Use identities, including 'show that' questions and more complex algebra manipulation • Form and solve equations and inequalities with fractions • **Add and subtract simple algebraic fractions (H)** • **Multiply and divide simple algebraic fractions (H)** • **Add and subtract complex algebraic fractions (H)** • **Multiply and divide complex algebraic fractions (H)** • **Solve equations with algebraic fractions (H)** • **Algebraic arguments and proof**
	Assessment:	End of Unit Assessments and Summer Mock Assessment	End of Unit Assessments and Summer Mock Assessment
	Additional work outside of school:	Weekly Sparks 100% completion	Weekly Sparks 100% completion

Carnforth High School

		Autumn	
		Term 1	**Term 2**
Year 11	**Key Topic:**	U1 Gradient & Lines U2 Non-Linea Graphs U3 Using Graphs	U4 Expanding & Factorising U5 Changing the Subject U6 Functions
	Students should know:	How to (bold type for Higher Students only): • Work with coordinates to plot a linear graph in the form y=mx+c (mainly from a table) • Identify parallel and **perpendicular lines** • Solve linear equations • Fill in a table of co-ordinates and plot the graph. • Plot a quadratic graph from a table of values (H) • Factorise and solve a quadratic equation (H) • Work with coordinates to plot a linear graph in the form y=mx+c (mainly from a table)	How to (bold type for Higher Students only): • Work with coordinates to plot a linear graph in the form y=mx+c (mainly from a table) • Identify parallel and **perpendicular lines** • Plot a quadratic graph from a table of vales • Factorise and solve a quadratic equation • Sketched quadratic through factorising • Substitute into 2 step expressions • Use of simple function machines • Worked with formulae for area and volume including working backwards • Work with coordinates to plot a linear graph in the form y=mx+c (mainly from a table) • Identify parallel and **perpendicular lines** • Factorise and solve a quadratic equation • Sketch a quadratic through factorising (H)
	Students should be able to:	• Interpret straight line graphs (R) • Find the equation of a straight line from a graph - working with gradients and y-intercepts separately first (R) • Determine whether a point is on a line • Solve linear simultaneous equations graphically (R) • Find equations of straights line from a graph fluently, including those with fractional gradients • Identify parallel lines using y=mx+c • Find equations of straight lines graphs given one point and a gradient • Find equations of straight line graphs given two points • **Identify perpendicular lines using y=mx+c (H)** • **Explore perpendicular lines (H)** • **Find the equation of a perpendicular line from a graph or algebraically from a point and an equation (H)** • **Solve complex problems including perpendicular lines (H)** • Factorise and solve simple quadratic equations • Plot and read from quadratic, cubic and reciprocal graphs • Identify and interpret roots and intercepts of quadratic graphs	• Expand and factorise with a single bracket (R) • Factorise simple quadratic expressions • Solve linear equations, including those requiring rearrangement • Expand products of two binomials (R) • Deduce roots of quadratics algebraically by factorisation, including simple DOTS • Solve linear equations, including those with the unknown on both sides • Solve quadratic equations algebraically by factorising • Solve problems involving factorising and solving quadratics • **Factorise quadratics where a>1 (H)** • **Factorise quadratics where a>1 including rearrangement** • **Factorise Quadratics using more complex DOTS (H)** • **Expand products of more than two binomials (H)** • **Solve quadratic equations using the quadratic formula (H)** • **Complete the square, including where a>1 (H)** • **Identify and interpret turning points by completing the square (H)**

		• Identify and interpret roots, intercepts and turning points of quadratic graphs graphically • Deduce roots of quadratic graphs algebraically • Recognise graph shapes • **Understand and use exponential graphs (H)** • **Find and use the equation of a circle centre (0,0) (H)** • **Find the equation of a tangent to any curve at any point (H)** • **Find the instantaneous rate of change (tangent) from any graph (H)** • **Find the average rate of change (chord) from any graph (H)** • **Work with tangent and circle problems (H)** • Reflect shapes in given lines (R) • Construct and interpret conversion graphs (R) • Construct and interpret other straight-line graphs • Interpret distance-time graphs • Construct distance-time graphs • Construct and interpret speed-time graphs • Construct and interpret piece-wise graphs • Recognise and interpret graphs that illustrate direct and inverse proportion • Find approximate solutions to equations using graphs • **Estimate the area under a curve, including quadratic and other non-linear graphs (H)** • **Interpret gradients and area results in distance-time graph, velocity-time graphs and in financial context problems (H).**	• **Solve complex problems involving factorising and solving quadratics where a>1 (H)** • Solve linear equations (R) • Change the subject of a simple formulae • Solve linear inequalities (R) in one **and two** variables • Form and solve equations and inequalities in geometric problem questions • Change the subject of formulae, including those with perimeter, area and volume formula • Use and solve problems with the formula for 3D shapes, including spheres, cylinders, cones and pyramids • **Change the subject of more complex formulae (including those where the subject appears more than once)** • **Solve equations with iteration (H)** • **Solve equations with iteration, including 'show that' problems** • Substitute into simple expressions and formula (R) • Use function notation and function machines, including the reverse • Work with functions and function notation (any letters) • Substitute into more complex expressions and formulae • Interpret results from real-life expressions and formulae in context • **Know and use formal function notation (H)** • **Work with inverse functions (H)** • **Work with composite functions (H)** • **Solve complex function problems, including a mixture of inverse and composite functions (H)**
	Assessment:	End of Unit Assessments and Autumn Mock Assessment	End of Unit Assessments and Autumn Mock Assessment
	Additional work outside of school:	GCSE Revision Planner of weekly revision tasks and past paper practise	GCSE Revision Planner of weekly revision tasks and past paper practise

		Spring	
		Term 3	**Term 4**
Year 11	**Key Topic:**	U7 Multiplicative Reasoning U8 Geometric Reasoning Yr 11 Mocks 2	U9 Algebraic Reasoning U10 Transforming & Constructing U11 Listing & Describing U12 Show That

	Students should know:	• Construct SDT graphs • Comparing ratio • Expressing ratio in their simplest form • Sharing in a ratio • Similar shapes • Conversion problems using ratio • Linking ratio to algebra • Link the gradient of a line to proportion • Ratio in area and volume • Use of basic angle facts • Use of angles in parallel lines facts and working with these in the contest of similar shapes	• Work with basic laws of indices; including multiplying dividing and raising to a power • Understand and use negative indices and power of zero • Fractional indices • Understand and use base numbers • Identify lines of symmetry and rotational symmetry • Perform and describe basic transformations including rotation, reflection, translation and enlargement • working with scale factors in similar shapes • Construct ASA, SSS and SAS triangles • Find probabilities from tables, Venn Diagrams and frequency trees • Construct and interpret sample spaces for more than one event • Using experimental data to estimate probabilities (link to sampling) All linked topics: Number Ratio and Proportion Algebra Geometry Statistics
	Students should be able to:	• Work with scale factors (R) • Understand direct proportion (R) • Understand inverse proportion (R) • Solve simple ratio problems (R) • Solve problems involving scale factors (R) • Solve problems involving simple direct proportion (R) • Solve problems involving inverse proportion (R) • Solve more complex ratio problems (R) • Calculate with SDT, DMV and PFA (R) • Solve complex ratio problems, including combinations with proportion, geometry, fractions etc… (H) • Construct and work complex direct proportion equations, and those including ‘k’ (H) • Construct and work with complex inverse proportion equations, and those with ‘k’ (H) • Work with angles at a point (R) • Work with angles in parallel lines and shapes (R) • Work with interior and exterior angles of polygons (R) • Derive and use angle sum in a triangle and angle sum in polygon	• Simplify expressions, including those that include brackets • Use rules for sequences; triangular, square, cube and simple arithmetic progressions • Find the rule for the nth term of a linear sequence (R) • Use rules for sequences; including Fibonacci-style, quadratic and simple geometric progressions **(including surds)** • Solve linear simultaneous equations (R) • **Find the nth term rule of a quadratic or other sequences (H) (R)** • **Solve simultaneous equations with one quadratic (H) (R)** • **Solve problems with inequalities in two variables (H)** • **Form and work with algebraic proof (H)** • Perform and describe line symmetry & reflection (R) • Perform and describe rotations & rotational symmetry (R) • Perform and describe translations of shapes (R) • Identify single transformations of shapes (R) • Identify more than one transformation of shapes • Identify invariant points and lines (H) • Solve loci problems • Calculate bearings with angle rules

		• Solve simple vector problems (R), including + - x in diagrams and column representations • Solve more complex vector problems with shapes • Review Pythagoras and Trigonometry Knowledge (R) • **Prove geometric facts** • **Review all circle theorems (H):** • **Angles at the centre and circumference (H)** • **Angles in a semi-circle (H)** • **Angles in the same segment (H)** • **Angles in a cyclic quadrilateral (H)** • **New circle theorems (H)** • **Angle between a radius and a chord** • **Angle between a radius and a tangent** • **Two tangents from a point** • **Alternate segment theorem** • **Construct formal geometric proofs for circle theorems (H)** • **Use the formula 1/2abSinC to find the area of a triangle in 2D & 3D shapes (H)** • **Understand and use the sine rule to find missing sides and angles in 2D and 3D shapes (H)** • **Understand and use the cosine rule to find missing sides and angles in 2D & 3D shapes (H)**	• Performa and describe negative enlargements of shapes (H) • Perform and describe a series of transformations of shapes • **Recognise, sketch and interpret trigonometric graphs for angles of any size** • **Sketch and identify translations of any given function (H)** • **Sketch and identify reflections of any given function (H)** • Work with organised lists • Calculate probabilities of independent combined events • Work with sample spaces and probability (R) • Work with Venn diagrams, including probability (R) • Construct and interpret plans and elevations (R) • Work with scattergraphs (R) • Use tree diagrams for independent events • **Use the product rule for counting (H)** • **Work with histograms (H)** • **Construct and interpret cumulative frequency diagrams (H)** • **Solve problems containing a mixture of histograms, cumulative frequency and box plots (H)** • **Compare distributions using a range of different charts and measures** • 'Show that' with number (tier appropriate) • 'Show that' with algebra (tier appropriate) • 'Show that' with shape (tier appropriate) • 'Show that' with angles (tier appropriate) • 'Show that' with data (tier appropriate) • 'Show that' with congruent triangles • **'Show that' with vectors, including parallel, multiple of, co-linear (H)** • **'Show that' proof forming with congruent triangles (H)**
	Assessment:	End of Unit Assessments and Spring Mock Assessment	End of Unit Assessments and Spring Mock Assessment
	Additional work outside of school:	GCSE Revision Planner of weekly revision tasks and past paper practise	GCSE Revision Planner of weekly revision tasks and past paper practise

Carnforth
High School

		Summer
		Term 5
Year 11	**Key Topic:**	Revision for all GCSE exams
	Students should know:	Through content of GCSE topics
	Students should be able to:	Apply knowledge and understand in GCSE question context
	Assessment:	GCSE Exams May to June
	Additional work outside of school:	GCSE Revision Planner of weekly revision tasks and past paper practise