

MATHEMATICS -it's a specific, powerful vocabulary for ideas

Maths takes the concrete and helps students to see more abstractly. It provides students with the necessary skills to be more analytical and creative thinkers. These are the skills which prospective employers are looking for, therefore, Maths is helping shape the minds of students and make them more employable.

- Necessary Mathematics – mathematics for employment and the economy. Functional numeracy; practical and work-related knowledge; and advanced specialist knowledge fall under this reason.
- Social and Personal Mathematics – Mathematics for personal and social relevance. Mathematical problem posing and solving; the development of mathematical confidence, including mathematical persistence; and social empowerment through Mathematics.
- Appreciation of Mathematics as an Element of Culture -- the importance not only of appreciating Mathematics itself, but also its role in history, culture and society in general.

Personal Reasons to Learn Maths:

A person's success in life depends on how well they can solve problems. No matter what their career or life situation, they'll find satisfaction and reward by knowing how to tackle challenges head on. And while students can't possibly practice every problem they'll ever have in life, there is a class in school that can help them learn how to think logically: maths. Doing a maths problem helps practice the problem-solving steps that apply to everyday situations: define the problem, think of ways to solve it, implement a solution, and evaluate the results.

Why do people go to the gym to ride the stationary bike? It's not so that they can compete in the stationary bike Olympics, it's to build up their endurance and strength to make the rest of their lives easier and more enjoyable. Maths is like a gym for your brain. You may never need to use the quadratic equation in your adult life, but the process of learning it boosts your brainpower. By practising how to solve mathematical problems, you optimise your ability to make complex decisions down the road.

Why do we teach Numeracy?

Numeracy is one of the most important skills taught in schools today. A student who has a strong grasp of Numeracy has a massive advantage in today's world. Everyone uses numeracy in their day to day lives financially, professionally and socially. Students with poor numeracy skills are more than twice as likely to face unemployment while students with strong Numeracy skills are more likely to manage their money better and earn higher wages.

Why do we teach Statistics?

Statistics is one of the most applied portions of maths taught today. It is used in every scientific study and used by most successful businesses to help them get an edge on their competitors. Statistics allows us to understand the world more deeply by analysing data. We teach statistics because it teaches every child important analytical skills which are sought after in today's job market. Students need to be aware that statistics can often be misleading and manipulative and coerce an audience into believing a desired outcome.

Why do we teach Shape?

We live in a three dimensional world, and it is important that students develop the ability to think in three dimensions. We teach shape because many occupations, such as carpenters, construct shapes on a daily basis to do their job. Everybody requires a basic understanding of shape to perform simple DIY tasks at home. We also teach shape because it is prevalent in art and design, with concepts like symmetry being an important part of why we may find artwork pleasing to look at.

Why do we teach algebra?

Algebra is a fantastic way to improve student's critical and logical thinking skills, and can also be incredibly beautiful and enriching to learn. Computers are in every aspect of our daily lives and Algebra is integral to how computers are programmed. Teaching algebra allows students to better understand relationships in our world and to better understand mathematics as a whole.

Key Stage 3 - Contents

	Year 7	Year 8	Year 9
Autumn Term	Sequences	Ratio & Scale	Integers and Indices
	Algebraic Notation	Multiplicative Change	Factors and Multiples
	Equality and Equivalence	Multiplying & Dividing Fractions	Expressions and Formulae
	Place Value	Cartesian Plane	Equations and Inequalities
	Fractions, decimals & percentages	Data	Angles
		Tables	Fractions and Decimals
			Theoretical and Experimental Probability
			2D and 3D Shapes
Spring Term	Addition & Subtraction	Brackets, Equations, Inequalities	Functions and Sequences
	Multiplication & Division	Sequences	Estimation and Approximation
	Four Operations	Indices	Graphs
	Fractions	Fractions and Percentages	Gradients
		Standard Form	Ratio and Proportion
		Number Sense	Transformations
			Percentages
			Angles in Polygons
Summer Term	Geometric Notation	Angles in Parallel Lines and Polygons	Perimeter, Area and Volume
	Geometric Reasoning	Area of Trapezia & Circles	Direct and Inverse Proportion
	Number Sense	Symmetry & Reflection	Congruent and Similar Shapes
	Statistics & Probability	Data Handling Cycle	Compound Units
	Prime Numbers & Proof	Measures of Location	Pythagoras and Trigonometry
			Circles and Cylinders
			Charts and Averages
			Bearings and Scale Diagrams

Key Stage 4 - Contents

Foundation GCSE - Curriculum Plan

Higher GCSE - Curriculum Plan

Unit	Topic	Unit	Topic
1	Number inc LCM, HCF, express a number as product of prime factors	1	Number inc indices, standard form, surds
2	Algebraic Expressions inc substitution, expansion & factorisation	2	Expressions inc substitution, expansion, factorising
3	Angles inc parallel lines & polygons	3	Angles & Circle Theorems
4	Averages & Range inc grouped data, stem & leaf diagrams	4	Statistics 1 inc data collection/sampling, averages & range
5	Decimals inc estimation, upper & lower bounds	5	Fractions & Decimals inc upper & lower bound calculations
6	2D Shapes	6	2D Shapes
7	Equations inc balancing and trial & improvement method	7	Linear Equations inc algebraic & graphical solutions of simultaneous equations
8	Fractions	8	Percentages
9	Transformations inc symmetry	9	Transformations
10	Formulae inc substitution, change of subject	10	Formulae & Sequences
11	Percentages	11	Trigonometry 1 inc Pythagoras & 3D shapes
12	Presenting data inc pie chart, scatter diagram, frequency polygon	12	Statistics 2 inc cumulative frequency & box plots, histograms
13	3D Shapes	13	3D Shapes
14	Sequences	14	Algebraic Graphs inc cubic, reciprocal, exponential
15	Ratio & Proportion	15	Ratio & Proportion inc direct & inverse & graphs
16	Algebraic Graphs	16	Loci, Constructions & Congruence
17	Measure	17	Inequalities inc graphical solutions
18	Inequalities	18	Probability
19	Powers & Roots inc rules for indices & standard form	19	Further Factorising Quadratics, completing the square, simplify algebraic fractions
20	Pythagoras Theorem and Trigonometry	20	Trigonometry 2 inc sine/cosine rule, trig graphs, area formula
21	Probability	21	Solve Quadratic Equations inc factorising, completing square, formula
22	Constructions Loci Congruence	22	Similar Shapes inc area and volume
23	Simultaneous Equations	23	Simultaneous Equations -linear/quadratic equations and circles
24	Vector Geometry	24	Vectors

Year 7	
Autumn Term 1a	Term 1b
<p>All lessons in Years 7 & 8 begin with a factual fluency starter in order to aid the retention of key Mathematical facts and skills. Weekly homeworks are used to aid factual fluency and also interleave skills taught in lessons. Low stakes quizzes are carried out in lesson using mini whiteboards or in books. Low stakes, interweaving tests are also taken at the end of each block. Formative assessment takes place each half term where all students sit the same core exam. CPA teaching methods are being developed, with a focus on the concrete.</p>	
<p>Sequences Describe and continue a sequence given diagrammatically Predict and check the next term of a sequence Represent sequences in graphical and tabular form Recognise the difference between linear and non-linear sequences Continue numerical linear sequences Continue numerical non-linear sequences Explain the term to term rule in words Find missing numbers within sequences</p> <p>Algebraic Notation Given the numerical input, find the output of a function machine Use inverse operations to find the input given the output Use diagrams and letters with single function machines Find the function machine given a single letter Substitute values into single operation expressions Find numerical inputs and outputs for two function machines Use diagrams and letters with a series of two function machines Find the function machine given a two step expression Substitute values into two step expressions Generate sequences given an algebraic rule Represent one and two step expressions graphically</p> <p>Equality and Equivalence Understand the meaning of equality Understand and use fact families, both numerically and algebraically Solve one step linear equations using inverse operations Understand the meaning of like and unlike terms Understand the meaning of equivalence</p>	<p>Place Value and Ordering Integers and Decimals Recognise the place value of any number 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 integers to the nearest power of ten Compare two numbers using a variety of symbols Order a list of integers Find the range of a set of numbers Find the median of a set of numbers Understand place value for decimals Position decimals on a number line Compare and order any number up to one billion</p> <p>Fraction, Decimal and Percentage Equivalence 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</p>

<p>Simplify algebraic expressions by collecting like terms</p>	
<p>Spring Term 2a</p>	<p>Term 2b</p>
<p>Solving Problems with Addition and Subtraction Properties of addition and subtraction Mental strategies for addition and subtraction Use formal methods for addition of integers Use formal methods for addition of decimals Use formal methods for subtraction of integers Use formal methods for subtraction of decimals Choose the most appropriate method; mental strategies, formal written or calculator Solve problems in the context of perimeter Solve financial maths problems</p> <p>Multiplication and Division Understand and use order of operations Solve problems using the area of rectangles and parallelograms Solves problems using the area of triangles Solves problems using the area of trapezia Solve problems using the mean Explore multiplication and division in algebraic expressions</p> <p>Fractions and Percentages of Amounts Find a fraction of a given amount Use a 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 one and percentages greater than 100%</p>	<p>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 numbers Introduction to two step equations Solve two step equations Use order of operations with directed numbers Understand that positive numbers have more than one square root Explore higher powers and roots</p> <p>Fractional Thinking Understand representation 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 the denominators share a common multiple Add and subtract fractions with any denominator Add and subtract improper fractions and mixed numbers</p>

Summer Term 3a	Term 3b
<p>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 parallel and perpendicular 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</p> <p>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 Solve complex angle problems</p>	<p>Developing Number Sense Know and use mental addition and subtraction strategies for integers Know and use mental multiplication and division strategies for integers Know and use mental arithmetic strategies for decimals Know and use mental arithmetic strategies for 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</p> <p>Sets and Probability Identify and represent sets Interpret and create Venn diagrams Understand and use the intersection of sets Understand and use the union of sets Understand and use the complement of a set Know and use the vocabulary of probability Generate sample space diagrams Calculate the probability of a single event Understand and use the probability scale Know that the sum of probabilities for all possible outcomes is one</p> <p>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 and HCF Find common multiples and LCM Write a number as a product of its prime factors Use a Venn Diagram to calculate HCF and LCM Make and test conjectures Use counterexamples to disprove a conjecture</p>

Year 8	
Autumn Term 1a	Term 1b
<p>All lessons in Years 7 & 8 begin with a factual fluency starter in order to aid the retention of key Mathematical facts and skills. Weekly homeworks are used to aid factual fluency and also interleave skills taught in lessons. Low stakes quizzes are carried out in lesson using mini whiteboards or in books. Low stakes, interweaving tests are also taken at the end of each block. Formative assessment takes place each half term where all students sit the same core exam. CPA teaching methods are being developed, with a focus on the concrete.</p>	
<p>Ratio and Scale Understand the meaning and representation of ratio Understand and use ratio notation Solve problems involving ratio of the form 1:n Solve proportional problems involving the ratio m:n Divide a value into a given ratio Express ratios in their simplest integer form Express ratios in the form 1:n Compare ratios and related fractions Understand Pi as the ratio between diameter and circumference Understand gradient of a line as ratio</p> <p>Multiplicative Change 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 representations Draw and interpret scale diagrams Interpret maps using scale factors and ratios</p> <p>Multiplying and Dividing Fractions Represent multiplication of fractions Multiply a fraction by an integer Find the product of a pair of unit fractions Find the product of a pair of any 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 mixed number and improper fractions Multiply and divide algebraic fractions</p>	<p>Working in the Cartesian Plane Work with coordinates in all four quadrants Identify and draw lines that are parallel to the axes Recognise and use the line $y = x$ Recognise and use lines of the form $y = kx$ Link $y = kx$ to direct proportion problems Explore the gradient of the line $y = kx$ Recognise and draw lines of the form $y = x + a$ Explore graphs with a negative gradient Link graphs to linear sequences Plot graphs of the form $y = mx + c$ Explore non-linear graphs Find the mid-point of a line segment</p> <p>Representing Data Draw and interpret scatter graphs Understand and describe linear correlation Draw and use line of best fit 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</p> <p>Tables and Probability Construct sample space diagrams for one event Find probabilities from a sample space diagram Find probabilities from two way tables Find probabilities from Venn Diagrams Use the product rule for finding the total number of possible outcomes</p>

Spring Term 2a	Term 2b
<p>Brackets, Equations and Inequalities Form algebraic expressions Use directed number within Algebra Multiply out a single bracket Factorise into a single bracket Expand multiple single brackets and simplify Expand a pair of binomials Solve equations, including with brackets Form and solve equations with brackets Understand and solve simple inequalities Form simple inequalities Solve equations and inequalities with unknowns on both sides Identify and use formulae, expressions, identities and equations</p> <p>Sequences Generate sequences given a rule in words Generate sequences given a simple algebraic rule Generate sequences given a complex algebraic rule Find the rule for the n^{th} term of any sequence</p> <p>Indices 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 Exploring powers of powers</p>	<p>Fractions and Percentages Convert fluently between key fractions, decimals and percentages Calculate key fractions, decimals and percentages of an amount without a calculator Calculate fractions, decimals and percentages of amounts using calculator methods Convert between decimals and percentages greater than 100% Percentage decrease with a multiplier Calculate percentage increase and decrease using a multiplier Express one number as a fraction or percentage of another without a calculator Express one number as a fraction or percentage of another using calculator methods Work with percentage change Choose appropriate methods to solve percentage problems Find the original amount given the percentage</p> <p>Standard Index Form Investigate positive powers of ten Work with numbers greater than 1 in standard form Investigate negative powers of ten Work with numbers between 0 and 1 in standard form Compare and order numbers in standard form Mentally calculate with numbers 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 Understand and use negative indices Understand and use fractional indices</p> <p>Number Sense Round numbers to powers of 10 and 1 significant figure Round numbers to a given amount of decimal places Estimate the answer to a calculation Understand and use error interval notation Calculate using the order of operations Calculate with money Convert metric measures of length Convert metric units of mass and capacity Convert metric units of area Convert metric units of volume Solve problems involving time and calendar</p>

Summer Term 3a	Term 3b
<p>Angles in Parallel Lines and Polygons Understand and use basic angles rules and notation. Investigate angles between parallel lines and the transversal. Identify and calculate with alternate and corresponding angles. Identify and calculate with co-interior, alternate and corresponding angles. Solve complex problems with parallel line angles. Construct triangles and special quadrilaterals. Investigate the properties of special quadrilaterals. Identify and calculate with sides and angles in special quadrilaterals. Understand and use the properties of diagonals of quadrilaterals. Understand and use the sum of exterior angles of any polygon. Understand and use the sum of interior angles of any polygon. Calculate missing interior angles of regular polygons. Prove simple geometric facts. Construct an angle bisector. Construct a perpendicular bisector of a line segment.</p> <p>Area of Trapezia and Circles Calculate the area of triangles, rectangles and parallelograms Calculate the area of a trapezium Calculate the area and perimeter of compound shapes Investigate the area of a circle Calculate the area of a circle and parts of a circle without a calculator Calculate the area of a circle and parts of a circle with a calculator</p> <p>Line Symmetry and Reflection Recognise line symmetry Reflect a shape in a horizontal or vertical line (1) Reflect a shape in a horizontal or vertical line (2) Reflect a shape in a diagonal line (1) Reflect a shape in a diagonal line (2)</p>	<p>The Data Handling Cycle Measures of Location</p>

Year 9									
Autumn Term 1a	Term 1b								
<p>*Each topic has test and a resit test in the style of the final exam. Results are recorded with a question analysis to inform students of their areas of strength and weakness. These results contribute to the overall datapoint. These low stakes tests are given after a delay so that students are required to revise content (using Hegarty homeworks) and draw from their long term memory reserves rather than short term.</p> <p>*Starters feature interleaving topics in order to keep skills fresh and maintain a sense of perpetual revision. These have been designed to work alongside the curriculum covering the four strands of number, algebra, shape and data.</p>									
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Spring Term 2a	Term 2b								
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Summer Term 3a	Term 3b
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<div data-bbox="108 685 660 902"> <p>Perimeter, Area and Volume</p> <p>Direct and Inverse Proportion</p> <p>Congruent and Similar Shapes</p> <p>Compound Units</p> </div> <p>Units of measurement Area and Perimeter Area of compound shapes Surface Area and Volume</p> <p>Direct and inverse proportion Construct real world graphs Congruence and similar triangles Similarity of 3D shapes Compound units SUVAT Interpret real world graphs</p> <p>Pythagoras Theorem Trigonometry</p>	<div data-bbox="754 685 1307 902"> <p>Pythagoras and Trigonometry</p> <p>Circles and Cylinders</p> <p>Charts and Averages</p> <p>Bearings and Scale Diagrams</p> </div> <p>Area and perimeter of circles Volume and surface area of cylinders</p> <p>Interpret and construct charts/graphs</p> <p>Averages and range for grouped and ungrouped data. Comparing data sets Scatter graphs</p> <p>Scale drawings Ruler and protractor constructions Compass constructions</p>

Year 10			
Autumn Term 1a		Term 1b	
<p>*Each topic has test and a resit test in the style of the final exam. Results are recorded with a question analysis to inform students of their areas of strength and weakness. These results contribute to the overall datapoint. These low stakes tests are given after a delay so that students are required to revise content (using Hegarty homeworks) and draw from their long term memory reserves rather than short term.</p> <p>*Starters feature interleaving topics in order to keep skills fresh and maintain a sense of perpetual revision. These have been designed to work alongside the curriculum covering the four strands of number, algebra, shape and data.</p>			
FOUNDATION		FOUNDATION	
1	Number inc LCM, HCF, express a number as product of prime factors	3	Angles inc parallel lines & polygons
2	Algebraic Expressions inc substitution, expansion & factorisation	4	Averages & Range inc grouped data, stem & leaf diagrams
		5	Decimals inc estimation, upper & lower bounds
<p>Number BIDMAS Powers, roots and brackets Product of prime factors LCM and HCF</p> <p>Expressions Simplify algebraic expressions Use the index laws Expand single brackets and simplify Expand double brackets Factorise quadratic expressions</p>		<p>Angles Apply angle rules associated with polygons Apply angle rules associated with parallel lines Draw and measure bearings</p> <p>Averages and Range Work out averages and range from a list Compare data Find averages for grouped and ungrouped data</p> <p>Decimals Rounding Estimation Four rules with decimals Solve problems Find upper and lower bounds</p>	

HIGHER

1	Number inc indices, standard form, surds
2	Expressions inc substitution, expansion, factorising

Number

Find HCF and LCM of larger numbers
 Write a number as a product of its prime factors
 Apply the laws of indices
 Write numbers in standard form
 Calculate with numbers in standard form
 Simplify surds

Expressions

State relationships between different quantities
 Simplify algebraic expressions – four rules
 Index rules to simplify
 Expand and factorise algebraic expressions

HIGHER

3	Angles & Circle Theorems
4	Statistics I inc data collection/sampling, averages & range
5	Fractions & Decimals inc upper & lower bound calculations

Angles and Circle Theorems

Calculate using the sum of interior angles of polygons
 Calculate using the sum of exterior angles of polygons
 Prove and use the angle properties of a circle
 Prove and use the tangent/chord properties of a circle
 Prove and use the alternate segment theorem

Handling Data

Use appropriate sampling techniques
 Calculate the mean in a frequency distribution
 Find the mean of grouped data
 Use the sigma notation
 Represent data as a time series

Fractions and decimals

Add and subtract mixed numbers
 Convert a fraction to a decimal and vv
 Find reciprocals
 Multiply and divide fractions
 Convert a fraction to a recurring decimal and vv
 Solve problems involving fractions
 Work out upper and lower bounds of measures and calculate the effect.

Spring Term 2a	Term 2b										
<p>*Each topic has test and a resit test in the style of the final exam. Results are recorded with a question analysis to inform students of their areas of strength and weakness. These results contribute to the overall datapoint. These low stakes tests are given after a delay so that students are required to revise content (using Hegarty homeworks) and draw from their long term memory reserves rather than short term.</p> <p>*Starters feature interleaving topics in order to keep skills fresh and maintain a sense of perpetual revision. These have been designed to work alongside the curriculum covering the four strands of number, algebra, shape and data.</p>											
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6	2D Shapes										
7	Equations inc balancing and trial & improvement method										
8	Fractions										
9	Transformations inc symmetry										
10	Formulae inc substitution, change of subject										

HIGHER

6	2D Shapes
7	Linear Equations inc algebraic & graphical solutions of simultaneous equations
8	Percentages

2D shapes

Use formulae to calculate areas and perimeters of circles and parts of circles
 Convert units of area

Linear Equations and Graphs

Solve linear equations (incl fractional coefficients)
 Algebraically solve two simultaneous equations
 Draw graphs of linear equations
 Implement $y=mx+c$
 Find the gradient of perpendicular lines
 Find solutions to simultaneous equations from the point of intersection.

Percentages

Find a percentage increase and decrease of an amount
 Find a reverse percentage
 Use a multiplier
 Calculate simple and compound interest

HIGHER

9	Transformations
10	Formulae & Sequences

Transformations

Translate using vector notation
 Rotate a shape about a CoR
 Reflect shapes in horizontal, vertical, $y=x$ and $y=-x$ lines
 Enlarge shapes (=ve, -ve, fractional sf)
 Recognise congruent shapes
 Combine transformations

Formulae and Sequences

Use formula triangles for speed, density etc
 Substitute =ve and -ve numbers into simple formulae and those involving powers
 Generate a formula from given information
 Change the subject of a formula
 Determine if an expression represents L, A or V

Summer Term 3a	Term 3b										
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<p><u>FOUNDATION</u></p> <table border="1"> <tr> <td>11</td> <td>Percentages</td> </tr> <tr> <td>12</td> <td>Presenting data inc pie chart, scatter diagram, frequency polygon</td> </tr> <tr> <td>13</td> <td>3D Shapes</td> </tr> </table> <p>Percentages Find percentages of quantities One amount as a percentage of another Increase and decrease using multipliers Solve real life problems</p> <p>Presenting Data Design questionnaires and surveys Primary and Secondary data Discrete and continuous data Sampling methods and bias Draw and interpret graphs</p> <p>3D shapes Calculate the volume of 3D shapes Calculate the surface area of 3D shapes Convert between units of volume</p>	11	Percentages	12	Presenting data inc pie chart, scatter diagram, frequency polygon	13	3D Shapes	<p><u>FOUNDATION</u></p> <table border="1"> <tr> <td>14</td> <td>Sequences</td> </tr> <tr> <td>15</td> <td>Ratio & Proportion</td> </tr> </table> <p>Sequences Generate terms using term-to-term and position-to-term Generate terms derived from diagrams Find the nth term of an arithmetic sequence Generate a sequence using an nth term formula</p> <p>Ratio and Proportion Reduce a ratio to its simplest form Solve problems involving ratio Proportion set in a variety of contexts</p>	14	Sequences	15	Ratio & Proportion
11	Percentages										
12	Presenting data inc pie chart, scatter diagram, frequency polygon										
13	3D Shapes										
14	Sequences										
15	Ratio & Proportion										

HIGHER

11	Trigonometry 1 inc Pythagoras & 3D shapes
12	Statistics 2 inc cumulative frequency & box plots, histograms
13	3D Shapes

Pythagoras and Trigonometry

Use Pythagoras in 3D situations
 Use Trig ratios to calculate unknown lengths and angles
 Use Trig in 3D situations

Handling Data 2

represent data in frequency polygons
 recognise the differences between a bar chart and a histogram
 compare distributions show in charts and graphs
 find the median and quartiles of large sets of ungrouped data
 draw a cumulative frequency table for grouped data
 find medians and quartiles from cumulative frequency curves
 use cumulative frequency curve to solve problems
 draw box plot from cumulative frequency curve
 compare cumulative frequency curves and box plots
 complete a histogram from a frequency table
 complete a frequency table from a histogram
 use a histogram to work out the frequency in part of a class interval

3D Shapes

use formulae to calculate volumes and surface areas
 solve problems involving volume and surface area
 convert between units of volume
 find the number of vertices, edges and faces of 3D shapes
 draw nets and recognise solids from their net
 draw and interpret plans and elevations
 draw planes of symmetry in 3D shapes
 recognise and name solids in the real world, including prisms

HIGHER

14	Algebraic Graphs inc cubic, reciprocal, exponential
15	Ratio & Proportion inc direct & inverse & graphs

Algebraic Graphs

plot the graphs of quadratic functions for +ve & -ve values of x
 find graphically the solution to quadratic equations
 plot the graphs of cubic functions for +ve & -ve values of x
 find graphically the solution to cubic equations
 find graphically the solution to quadratic and linear simultaneous equations
 draw graphs of reciprocal and exponential functions

Ratio and Proportion

work out map distance given ratio and real distance
 interpret direct and indirect proportions as algebraic functions
 find the constant of proportionality
 use algebraic functions to find unknown values
 recognise and sketch graphs for $y \propto x$, $y \propto x^2$, $y \propto x^3$, $y \propto 1/x$, $y \propto 1/x^2$

Year 11

Autumn Term 1a

Term 1b

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FOUNDATION

16	Algebraic Graphs
17	Measure
18	Inequalities
19	Powers & Roots inc rules for indices & standard form

Algebraic Graphs

Straight line graphs of the form $y=mx+c$
Plot graphs of functions in which y is given in terms of x.

Measure

Select and suitable strategies and techniques to solve problems and word problems involving a range of measures including compound measures.

Inequalities

Write numbers given an inequality
Represent inequalities on a number line
Solve inequalities

Powers and Roots

Square/Square root/Cube/Cube root
Index notation
Index laws including negative powers
Standard Form notation

FOUNDATION

20	Pythagoras Theorem and Trigonometry
21	Probability
22	Constructions Loci Congruence
23	Simultaneous Equations

Pythagoras and Trig

How to apply Pythagoras' Theorem
How to apply Trigonometry to right-angled triangles.

Probability

How to use the language of probability to describe the likelihood of an event
How to represent and compare probabilities on a number scale
How to list outcomes for mutually exclusive events
How to use probability tree diagrams and Venn diagrams to find probability.

Construct/Loci/Congruence

Construct triangles and other 2D shapes using ruler and protractor/compasses
Use the rules for congruence SSS, SAS, ASA, RHS
Use Loci

Simultaneous Equations

Algebraically solve two simultaneous equations
Find solutions to sim eqns from the point of intersection.

HIGHER

16	Loci, Constructions & Congruence
17	Inequalities inc graphical solutions
18	Probability
19	Further Factorising Quadratics, completing the square, simplify algebraic fractions

Loci Constructions and Congruence

- How to construct equilateral triangles
- How to construct the midpoint and perpendicular bisectors of a line
- How to construct the perpendicular from a point on a line
- How to construct the bisector of an angle
- How to construct 60, 30 and 45 degrees
- How to construct a regular hexagon inside a circle
- How to construct a region bounded by a circle and line
- How to find a path equidistant from two points or two line segments

Inequalities

- How to solve linear inequalities and show results on line or write integer solutions
- How to draw the graphs of inequalities and identify regions or point solns

Probability

- How to use $p(a \text{ or } b) = p(a) + p(b)$
- How to use $p(a \text{ and } b) = p(a) \times p(b)$
- How to draw and use tree diagrams to solve probability questions
- How to find estimates of probability by considering relative frequencies
- To recognise that the more an experiment is repeated the better the accuracy

Further factorising

- How to factorise more complex quadratic expressions
- How to simplify rational quadratic expressions
- How to add & subtract rational quadratic expressions
- How to complete the square

HIGHER

20	Trigonometry 2 inc sine/cosine rule, trig graphs, area formula
21	Solve Quadratic Equations inc factorising, completing square, formula
22	Similar Shapes inc area and volume
23	Simultaneous Equations - linear/quadratic equations and circles

Trigonometry 2

- How to sketch and use graphs: $y = \sin x$, $\cos x$, $\tan x$
- How to use sine and Cosine rules in non-right angled triangles
- How to identify and use the Sine and Cosine rules
- How to find the area of triangles given 2 lengths & an angle

Quadratic Equations

- How to use the quadratic formula to solve quadratic equations
- How to use quadratic formula to solve eqns leaving answer in surd form
- How to complete the square of a quadratic to find max/min point

Similar Shapes

- How to use integer and non-integer scale factors to find missing lengths
- How to find the relationship of linear, area and volume scale factors
- How to prove formally geometric properties of triangles

Simultaneous Equations

- How to solve quadratic and linear functions graphically
- How to find the exact solution of linear and quadratic equations
- How to draw a circle of radius r centred on the origin
- How to find approximate solns for linear and circular simultaneous equations
- How to find the exact solution of linear and circular simultaneous equations

Spring Term 2a	Term 2b		
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<p>FOUNDATION</p> <table border="1"> <tr> <td>24</td> <td>Vector Geometry</td> </tr> </table> <p>Vector Geometry Recognise magnitude and direction of a vector Recognise the 3 forms of vector notation Identify equal vectors Calculate the magnitude of a vector Identify parallel vectors Multiply a vector</p> <p>Revision Plan – 10 week rota Interleaving starters and Banker topics in order to secure content.</p>	24	Vector Geometry	<p>Finish the rota to secure the content</p> <p>Past Paper questions to secure exam technique.</p>
24	Vector Geometry		

HIGHER

24	Vectors
25	Transformation of Functions

Vectors

How to recognise magnitude and direction of a vector

How to recognise the three forms of vector notation

How to identify equal vectors

How to calculate the magnitude of a vector

How to identify parallel vectors

How to multiply a vector

How to simplify vector expressions

How to recognise that $-AB = BA$

How to solve simple geometrical problems in 2D

How to show two lines are parallel

How to recognise when 3 points lie on the same line

Transformation of functions

How to use function notation

How to identify, describe and carry out vertical translations

How to identify, describe and carry out horizontal translations

How to identify, describe and carry out reflections in the x and y axes

How to identify, describe and carry out a stretch parallel to the axes

How to apply all the above to the graphs of $\sin x$ and $\cos x$

Revision Plan – 10 week rota

Interleaving starters and Banker topics in order to secure content.

Summer Term 3a	Term 3b
Past paper questions	

Year 12	
Autumn Term 1a	Term 1b
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<p>Algebra 1 Argument and proof Index Laws Surds Quadratic functions Lines and circles Simultaneous Equations Inequalities</p> <p>Polynomials and the Binomial Theorem Expanding and factorising The binomial Theorem Algebraic division Curve sketching</p> <p>Collecting, representing and interpreting data Sampling Central tendency and spread Single-variable data Bivariate data</p> <p>Probability and DRVs Probability Binomial distribution</p>	<p>Trigonometry Sine, cosine and tangent The sine and cosine rules</p> <p>Differentiation and Integration Differentiation from first principles Differentiating axn and Leibniz notation Rates of change Tangents and Normals Turning points Integration Area under a curve</p> <p>Units and Kinematics Standard units and basic dimensions Motion in a straight line Equations of motion for constant acceleration Motion with variable acceleration</p>
Spring Term 2a	Term 2b
<p>Exponentials and Logarithms The law of logarithms Exponential functions Exponential processes Curve fitting</p> <p>Forces and Newton's Laws Forces 1 Dynamics 1 Motion under gravity Systems of forces</p>	<p>Vectors Definitions and properties Components of a vector</p> <p>Hypothesis testing 1 Formulating a test The critical region</p>
Summer Term 3a	Term 3b
<p>Revision</p>	<p>Motion in two dimensions 2D motion with constant acceleration 2D motion with variable acceleration Motion under gravity 2 Motion under forces</p>

Year 13	
Autumn Term 1a	Term 1b
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<p>Algebra 2 Mathematical Proof Functions Parametric Equations Algebraic fractions Partial fractions Vectors in 3D</p> <p>Sequences The Binomial Series Arithmetic Sequences Geometric Sequences</p> <p>Probability and CRVs Conditional probability The Normal distribution Using the Normal as an approximation of the Binomial</p> <p>Hypothesis Testing 2 Testing correlation Testing a Normal distribution</p>	<p>Trigonometric Identities Radians Reciprocal and inverse trigonometric functions Compound angles Equivalent forms for $a\cos\theta + b\sin\theta$</p> <p>Differentiation 2 The shapes of functions Trigonometric functions Exponential and logarithmic functions The product and quotient rules The chain rule Inverse functions Implicit differentiation Parametric functions</p> <p>Forces 2 Statics Dynamics 2 Moments</p>
Spring Term 2a	Term 2b
<p>Integration and differential equations Standard integrals Integration by substitution Integration by parts Integrating rational functions Integrating parametric functions Differential equations</p> <p>*Each topic has test and a resit test in the style of the final exam. Results are recorded with a question analysis to inform students of their areas of strength and weakness. These results contribute to the overall datapoint.</p> <p>*Starters feature interleaving topics in order to keep skills fresh and maintain a sense of perpetual revision.</p>	<p>Numerical Methods Simple root finding Iterative root finding Newton-Raphson root finding Numerical integration</p> <p>*Each topic has test and a resit test in the style of the final exam. Results are recorded with a question analysis to inform students of their areas of strength and weakness. These results contribute to the overall datapoint.</p> <p>*Starters feature interleaving topics in order to keep skills fresh and maintain a sense of perpetual revision.</p>
Summer Term 3a	Term 3b
Revision	

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