

Sir John Talbot's School

CURRICULUM

#togetherwegrow

Marches Academy Trust 

Maths

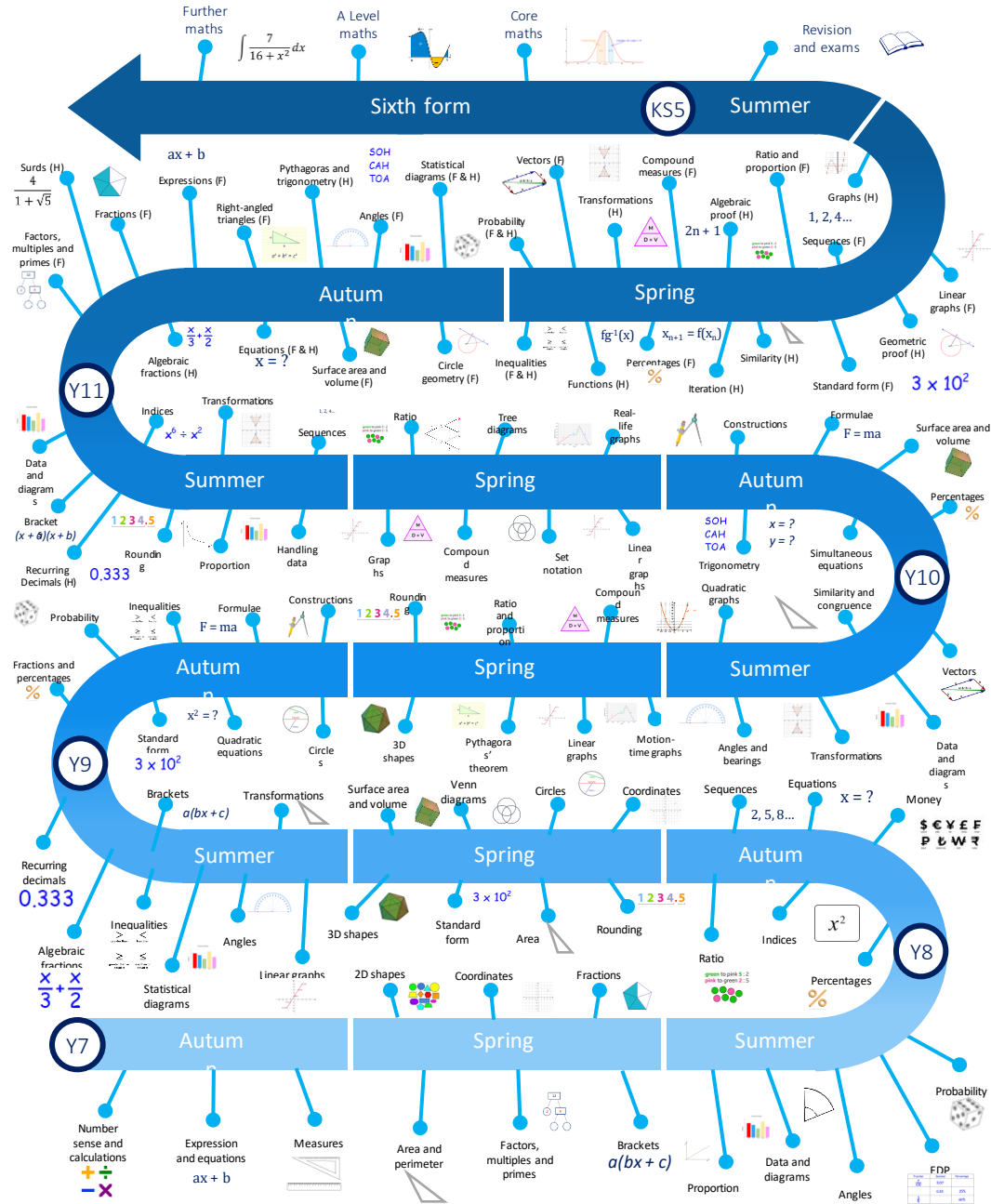
Our vision

The overarching aim of the teaching of Mathematics at Sir John Talbot School is to develop the students' mathematical fluency and enable them to apply to #realworldready examples. Students will leave with the mathematical knowledge to understand the world, to apply mathematical skills to different scenarios and have honed their ability to solve problems through methodical processes.

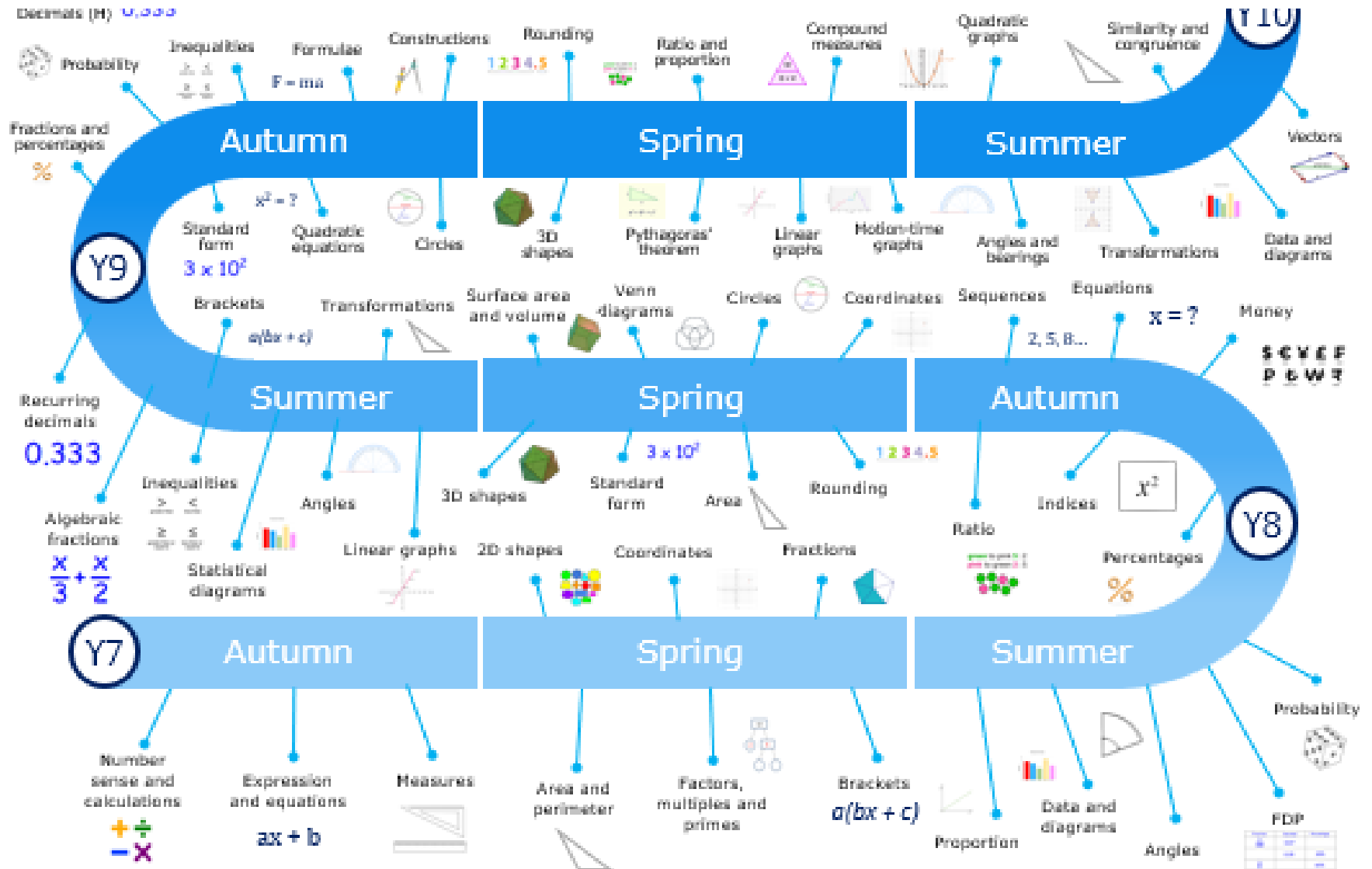
The Mathematics department will promote the development of confidence, willingness to learn and interest in the various aspects of mathematics. The department aspires to remove the “mystery of maths” and providing students of all abilities the opportunities to become numerate and confident with maths beyond the classroom.

The big picture

Developing mathematical fluency and reasoning skills through an enjoyable curriculum, leading to all students achieving their potential.

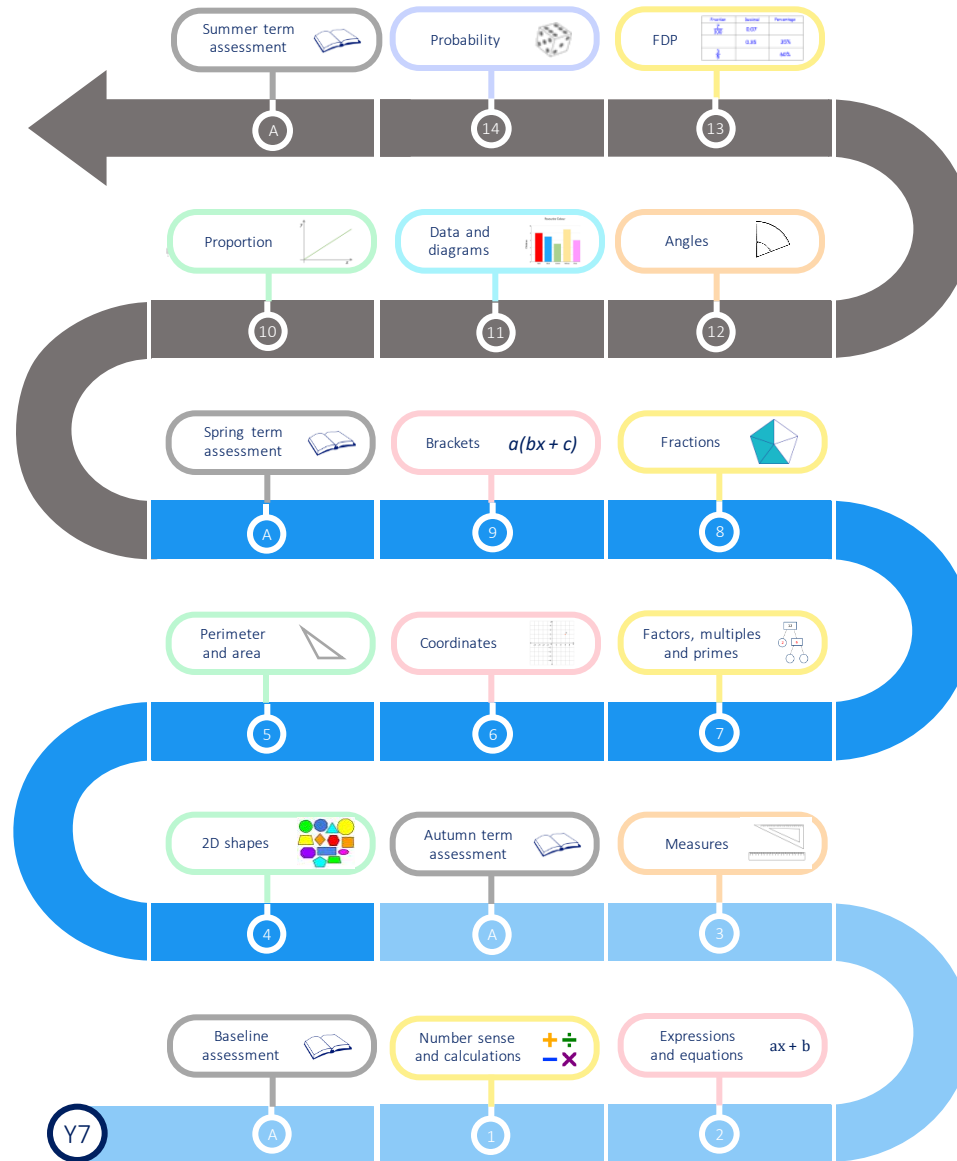


Key Stage 3



MATHS LEARNING PATHWAY

YEAR 7



Year 7 Curriculum Overview - Maths

Autumn Term

		Content	Fluency	Problem solving	Prior Knowledge (KS2)	Future learning (KS3)
		Number Sense and calculations <ul style="list-style-type: none"> Number sense Adding and subtracting Multiplying Dividing Calculating with negative numbers Order of operations 	Understanding of place values for integers and decimals.	What is the number that can be described at 13 tens? How many different ways can you describe the number 145?	Place value, with reference to the place value table for integers and decimals. Written methods are formally taught at primary school. Recall of times tables to support multiplication and division	Learning is crucial for all further topics
			Correctly apply formal written methods for integers and decimals for the four operations	Completing two way tables and frequency tree diagrams. Money problems, including bank statements		
			Use a number line to calculate the four operations with negative numbers			
			Understand the importance of the order of operations			
		Expressions and equations <ul style="list-style-type: none"> Expressions Substitution Solving equations 	Correctly use algebraic notation and vocabulary Simplify expressions by collecting like terms	Given the answer is $4x + 5$, what might the question have been?	Link to integers, decimals and negative numbers from <i>number sense and calculations</i> unit. Function machines	Fundamental skills required for all further algebra topics.
			Substitute any value into expressions	Real life formulae including areas of known shape		
			Solve equations with one and two steps			
		Measures <ul style="list-style-type: none"> Time Measures 	Converting units of time. Calculating with time.	Using timetables and calendars.	Clocks and telling the time taught at KS1/2 however this is a known gap in knowledge	Compound measures Area, perimeter, volume, surface area
			Estimating and measuring lengths, mass and capacity. Converting units of length, mass and capacity	How many 30cm rulers is the length of the classroom? How many average weight humans is the weight of an elephant?		

Content	Fluency	Problem solving	Prior Knowledge (KS2)	Future learning (KS3)
<u>2D shapes</u> <ul style="list-style-type: none"> Line and shape properties 	Properties of lines and shapes. Line and rotational symmetry	Describe a shape using the properties – what is the shape?	Covered in KS1/KS2	Transformations, angle reasoning
<u>Perimeter and Area</u> <ul style="list-style-type: none"> Perimeter Area 	Finding perimeters using grids for counting. Calculate perimeter of simple and compound shapes	Given the perimeter of 20cm, what could the dimension of the shape be?	Covered in KS1/2	Area and perimeter of circles, trapeziums and other compound shapes. Volume of prisms (requiring the cross sectional area)
	Finding areas using grids. Calculate areas of rectangles, triangles and compound shapes.	How many chickens fit in a field? How many tins of paint to paint a wall?		
<u>Coordinates</u> <ul style="list-style-type: none"> Coordinates and shapes 	Reading and plotting coordinates	Coordinates of missing vertices of shapes (using properties of shapes)	Properties of shapes	Plotting linear and non linear graphs Midpoints of lines
<u>Factors, multiples and primes</u> <ul style="list-style-type: none"> Factors and multiples Primes 	Finding factors and multiples using divisibility tests and times tables. Identifying HCF/LCM of pairs of numbers	Two buses leave at the same time, when is the next time they leave at the same time? Sharing lengths in common factors	Strong recall of times tables. Using written methods of dividing integers	Expanding and factorising expressions HCF/LCM with venn diagrams
	Identifying prime numbers and using them to decompose numbers	How do you know if a number is a square number using the factors?		
<u>Fractions</u> <ul style="list-style-type: none"> Writing and comparing fractions Adding and subtracting fractions 	Identify fractions from shapes. Use equivalent fractions to simplify, convert between mixed and improper fractions and order fractions		Using LCM/HCF from <i>factors, multiples, primes</i> unit. Times table recall for equivalent and simplifying. Represent diagrammatically seen at primary.	Multiplication and division of fractions Simplifying algebraic fractions
	Add and subtract proper fractions and mixed numbers	Perimeter of shapes with fractions (both proper and mixed numbers)		
<u>Brackets</u> <ul style="list-style-type: none"> Single brackets 	Expand single brackets and simplify where necessary. Factorise expressions	Giving expressions for area, and given area finding lengths	HCF from <i>factors, multiples, primes</i> unit. Simplifying expressions from <i>expressions and equations</i> unit	Expand and factorise double brackets Applications to geometry problems

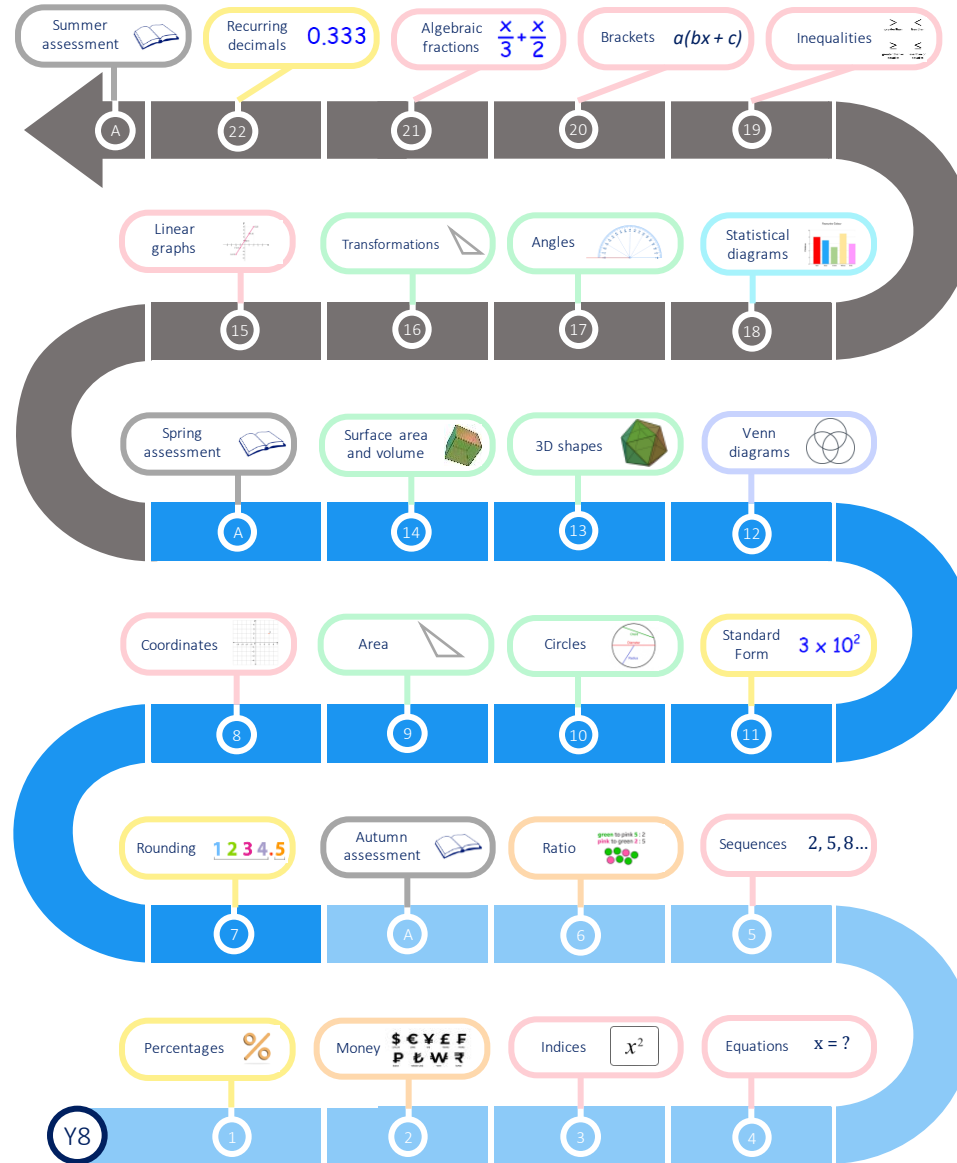
Year 7 Curriculum Overview - Maths

Summer Term

	Content	Fluency	Problem solving	Prior Knowledge (KS2)	Future learning (KS3)
	Angles <ul style="list-style-type: none"> Angles Finding unknown angles 	Naming types of angles, estimating/measuring/ drawing angles Angles on a line, around a point, in a triangle and vertically opposite.	Bunny and Angles - Game involving Constructing Angles (math10.com)		Angles in parallel lines and polygons
	Handling Data and statistical diagrams <ul style="list-style-type: none"> Averages and range Tables and chart Collecting and representing data 	Calculate the range, mean, mode, median and range Draw and interpret frequency tables, two way tables, tally charts, pictograms and bar charts Present data and make conclusions using averages and tables	Show me questions: give me 5 vales that have a mode of 4 etc.	Recall of place value and calculations from <i>number sense and calculations</i> unit	Averages from grouped data Difference between bar graphs and histograms
	Proportion <ul style="list-style-type: none"> Proportion word problems 	Using unitary method, recipes and conversion graphs to solve direct proportion questions	Is a homemade meal better value for money than shop bought?		Calculator skills practice that will be embedded over the years
	Fractions, decimals and percentages <ul style="list-style-type: none"> Multiplying and dividing fractions Fraction of an amount Fractions, decimals and percentages 	Multiply and divide proper fractions and mixed numbers Calculating fractions of an amount with and without a calculator. Convert between fractions, decimals and percentages	Area of shapes with fractional lengths If $\frac{3}{5}$ of a number is 27, what is $\frac{2}{9}$ ^{ths} of the same number?	Recall of equivalent fractions for <i>fractions</i> unit	Multiplication and division of algebraic fractions. Proportional questions
	Probability <ul style="list-style-type: none"> Theoretical probability 	Use probability phrases to real life examples. Identify probabilities of mutually exclusive events and give as fractions, decimals and percentages.	Will repeating experiments get the same results?	Adding and subtracting fractions from <i>fractions</i> unit. Converting between FDP from <i>fractions, decimals and percentages</i> unit.	Probability of multiple events, link to probability trees

MATHS LEARNING PATHWAY

YEAR 8



Strand key:

Number Algebra Geometry Probability Statistics Ratio & Proportion

Year 8 Curriculum Overview - Maths

Autumn Term

	Content	Fluency	Problem solving	Prior Knowledge (KS2)	Future learning (KS3)
	<u>Percentages</u> <ul style="list-style-type: none"> Percentage of amounts Percentage change 	Finding percentage of amounts with and without a calculator Finding percentage change with and without a calculator	Does a 10% increase followed by a 10% decrease return to the original value?	Converting between fractions, <u>decimals</u> and percentages Fractions of an amount with and without a calculator	Calculating simple and compound interest. Finding original amounts given percentage change.
	<u>Money</u> <ul style="list-style-type: none"> Calculating with money 	Unit cost of products (using the unitary method)	Best buy problems. Comparing with different capacity and mass given.	Solving proportional problems Four operations with decimals	Link to compound and simple interest. Best buys/ value for money
	<u>Indices</u> <ul style="list-style-type: none"> Index Laws 	Simplifying expressions using index laws with positive and negative indices Simplify algebraic fractions by cancelling common factors	Evaluated indices, what was the possible question?	Calculating with roots and powers Simplifying fractions Algebraic notation	Simplify index laws with negative and fractions. Evaluate and simplify
	<u>Equations</u> <ul style="list-style-type: none"> Solving equations 	Solve equations with fractions with the variable in the numerator and denominator Solve equations with brackets and unknowns on both sides Construct and solve equations	Construct and solve equations with perimeter and angles. Think of a <u>number</u> questions – write algebraically	Solve one and two step <u>equations</u> Simplify <u>expressions</u> Substitute into expressions	Solve simultaneous <u>equations</u> Solve equations with more than one variable.
	<u>Sequences</u> <ul style="list-style-type: none"> Term to term rules Position to term rules 	Continue and describe term to term sequences with numbers and patterns Substitute into position to term rules to generate arithmetic sequences	Given the 2 nd and 4 th term, identify the other <u>terms</u> and describe the sequence. Is a number in a sequence – solve to prove	Using number lines Four operations with negative numbers Substitute into expressions with multiple operations	Nth term of arithmetic sequences. Position to term of arithmetic, geometric, quadratic sequences.
	<u>Ratio</u> <ul style="list-style-type: none"> Ratio Scale Drawing 	Writing, <u>simplifying</u> and sharing by ratios Draw and interpret scale drawings	Interpreting scales from OS maps. Why do we use scales in architecture?	Finding HCF Constructing fractions Writing numbers as a percentage of another	Accurate drawing with bearings. Calculate real area/ perimeter.

Year 8 Curriculum Overview - Maths

Spring Term

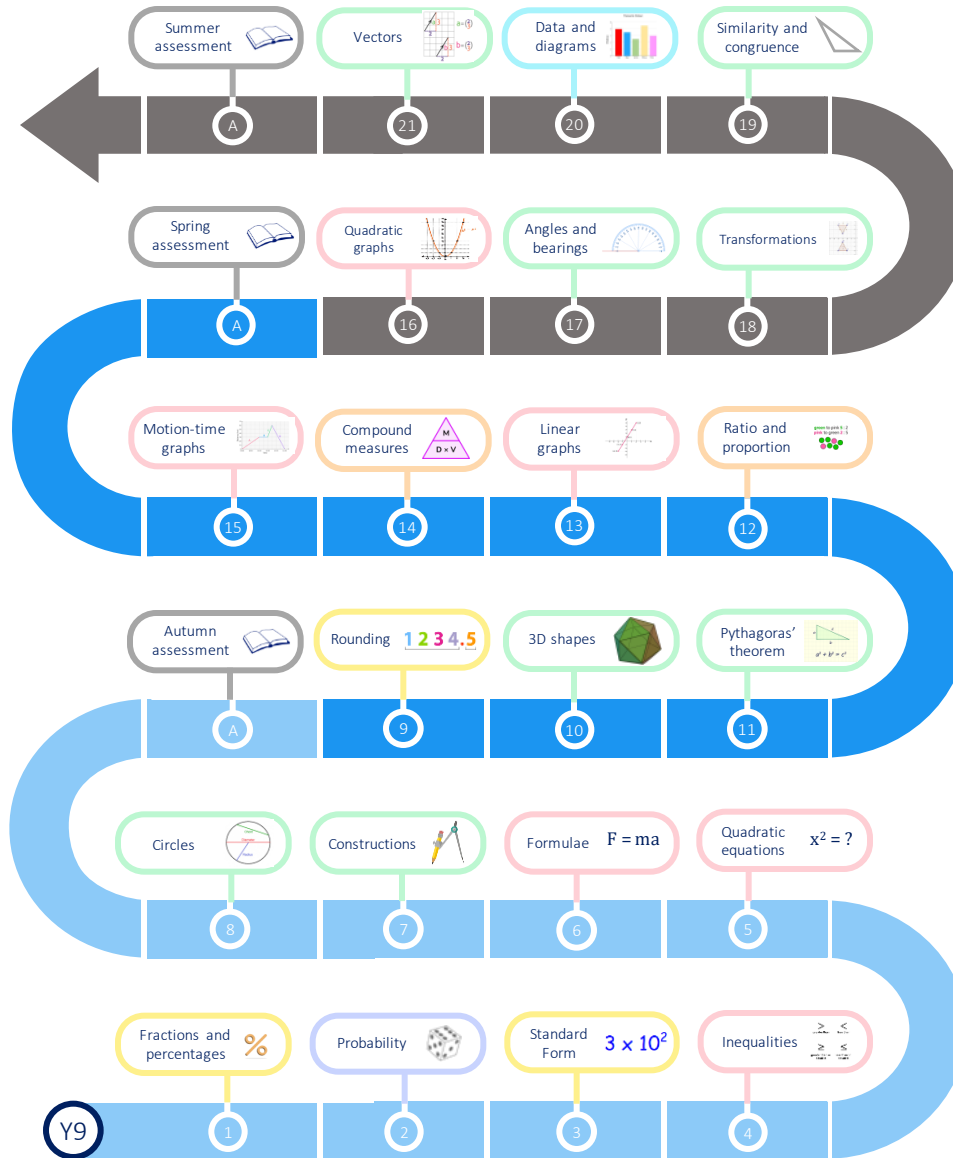
Content	Fluency	Problem solving	Prior Knowledge (KS2)	Future learning (KS3)
<u>Rounding</u> <ul style="list-style-type: none"> Significant figures 	Rounding integers and decimals to given significant figures Estimating calculations	Why do we estimate? What is the impact of over/under estimating?	Rounding to 10, 100, 1000	Estimation Error intervals
<u>Coordinates</u> <ul style="list-style-type: none"> Coordinates and midpoints 	Calculating midpoints	Shape problems with coordinates	Reading and plotting coordinates	Equation of a line from a graph and coordinates
<u>Area</u> <ul style="list-style-type: none"> Area and units 	Area of parallelograms and trapezium Converting units of area	Given different units, find areas. How many mm^2 , make $1m^2$?	Areas of rectangles, triangles, compound shapes Converting lengths	Similarity for area and volume Volume of prisms
<u>Circles</u> <ul style="list-style-type: none"> Area and circumference 	Identify parts of a circle Finding circumference of circles Finding areas of circles	Rearrange formulas to find radius/ diameter? How much fencing around a pond?	Calculating with powers and roots Substituting into algebraic formulae Rounding decimals	Volume and surface area of cylinders Volume and surface area of cones
<u>Standard form</u> <ul style="list-style-type: none"> Standard form and ordinary numbers 	Using standard form with positive and negative indices	Compare the differences between numbers with different powers	Multiplying and dividing by 10, 100, 1000	Four operations with standard form
<u>Venn diagrams</u> <ul style="list-style-type: none"> Venn diagrams Factors, multiples and primes 	Completing <u>venn</u> diagrams and identifying probabilities from them Finding HCF/ LCM using prime factor decomposition	Worded problems, to identify if they are examples of HCF/LCM Use the HCF/LCM to create <u>venn</u> diagram to then find original numbers	Writing probabilities as fractions, decimals, percentages Probabilities of mutually exclusive events LCM/ HCF Prime number decomposition	Venn diagrams with set notation
<u>3D shapes</u> <ul style="list-style-type: none"> Nets 	Properties of 3D shapes Nets of 3D shapes	How many different nets of cubes are there? Why are there many alternatives?	Shape properties	Surface area and volume of prisms
<u>Surface area and volume</u> <ul style="list-style-type: none"> Surface area Volume 	Finding surface area of cubes, <u>cuboids</u> and prisms Finding volume of cubes, <u>cuboids</u> and prisms	How many litres of paint for a cube? Two shapes with equal volumes, what are the dimensions?	Nets of shapes Area of compound shape Converting units of lengths	Volume and surface area of cylinders, pyramids, spheres

Summer Term

Content	Fluency	Problem solving	Prior Knowledge (KS2)	Future learning (KS3)
Linear Graphs <ul style="list-style-type: none"> Plotting graphs and finding equations 	Plotting horizontal, <u>vertical</u> and straight lines Finding equations of <u>straight line</u> graphs	Total cost vs. time, find the equation of the line to then find any value.	Reading and plotting coordinates Substituting into algebraic formulae	Speed from a distance/time graph
Transformations <ul style="list-style-type: none"> Transforming shapes 	Translation Reflection	Identify the translation and reflection that has happened	Reading and plotting coordinates	Vectors
Angles <ul style="list-style-type: none"> Finding unknown angles 	Angles in quadrilaterals Angles in parallel lines Angles in polygons	Given the type of quadrilateral, what do we know about the angles? Using combination of angle rules to answer multi-step questions	Angles on a line, about a point, in a triangle Vertically opposite angles	Bearings
Statistical diagrams <ul style="list-style-type: none"> Drawing and interpreting statistical diagrams 	Draw and interpret pie charts, line graphs, <u>stem</u> and leaf diagrams Finding averages from diagrams	How can graphs be misleading? Which average should be used depending on the information being portrayed?	Draw <u>angles</u> Angles on a line and a point Fraction of an amount without a calculator Averages and range	Plot and interpret scatter graphs
Inequalities <ul style="list-style-type: none"> Linear inequalities 	Reading and drawing linear inequalities on number lines Solve linear inequalities	What is the maximum and minimum integer values that can be the solution?	Using number lines Solving equations with one or more steps	Double inequalities
Brackets <ul style="list-style-type: none"> Double brackets 	Expand double brackets	Giving expressions for areas of shapes in algebraic terms	Expand and simplify single brackets	Factorise quadratic expressions
Algebraic Fractions <ul style="list-style-type: none"> Fractions review Algebraic fractions 	Four operations with fractions Simplify algebraic fractions by factorising Adding and subtracting algebraic fractions	Express an algebraic fraction with index laws.	Four operations with proper fractions and mixed numbers Factorising into a <u>single brackets</u>	Algebraic fractions with unknowns in the denominator
Recurring decimals <ul style="list-style-type: none"> Fractions and recurring decimals 	Converting between fractions to recurring decimals (<i>do not cover decimal to fraction</i>)	What is the difference between 0.3 and 0. $\dot{3}$? What impact does this have?	Written methods to divide with <u>decimals</u> Convert fractions, decimals, percentages	Converting recurring decimals to fractions

MATHS LEARNING PATHWAY

YEAR 9



Strand key:

Number
Algebra
Geometry
Probability
Statistics
Ratio & Proportion

Year 9 Curriculum Overview - Maths

Autumn Term

Content	Fluency	Problem solving	Prior Knowledge	Future learning (KS4)
Fractions and percentages <ul style="list-style-type: none"> Fractions, <u>decimals</u> and percentages review Percentage change 	Confidently convert between FDP Find percentage of amounts with and without a calculator Simple interest calculations Percentage change with and without calculator Find original amounts following percentage change	How many years has compound interest been applied? What percentage of compound and simple interest? Compare two investment options, which is best?	Finding equivalent fractions Ordering fractions Multiplying fractions	Convert between recurring decimals and fractions
Probability <ul style="list-style-type: none"> Theoretical and experimental probability 	Comparing theoretical and experimental probability Frequency trees	Horse race investigation – what is the benefit of more trials to compare?	Writing probabilities as FDP Finding percentage and fraction of an amount	Probabilities from <u>venn</u> diagram and <u>two way</u> tables. Tree diagrams
Standard form <ul style="list-style-type: none"> Calculations with standard form 	Four operations with standard form Inputting standard form on a calculator	How many times closer to the sun is the Earth compared to Neptune?	Laws of indices Use of a calculator	Complex calculator input
Inequalities <ul style="list-style-type: none"> Linear inequalities 	Solve inequalities with unknowns on both sides Double inequalities Construct and solve inequalities		Inequalities on number lines Solve single inequalities	Graphs of inequalities
Quadratic equations <ul style="list-style-type: none"> Factorise and solve quadratic equations 	Factorise and solve quadratics	Find the lengths of shapes given area?	Expand double <u>brackets</u> Factorise single brackets	Complete the <u>square</u> Factorise quadratics
Formulae <ul style="list-style-type: none"> Rearranging formulae 	Changing the subject by rearranging	Rearrange SUVAT equations and other scientific equations	Solving equations	Applying to higher tier formula
Constructions <ul style="list-style-type: none"> Constructing bisectors and perpendicular lines 	Construct bisectors or lines and angles	Which constructions are needed to construct 30° and 135° without a protractor?	Using rulers and compasses	Construct loci and triangles
Circles and cylinders <ul style="list-style-type: none"> Circles and cylinders 	Finding areas and arc lengths of sectors Surface area and volume of cylinders	What is the angle of the sector? What is the area of a label of a pringles tube?	Area and circumference of circles Surface area and volume of prisms	Finding surface area and volume of cones and spheres,

Year 9 Curriculum Overview - Maths

Spring Term

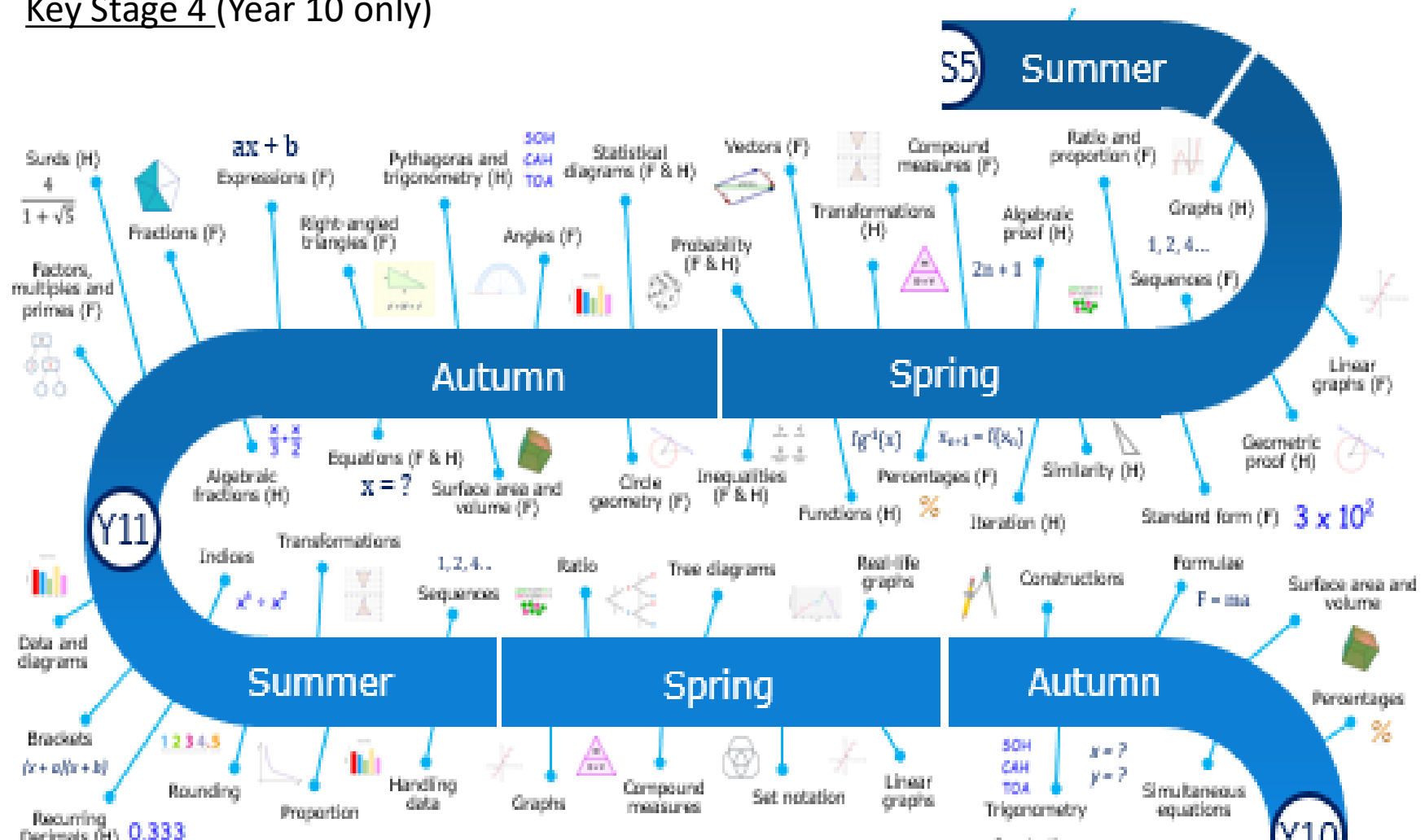
Content	Fluency	Problem solving	Prior Knowledge	Future learning (KS4)
Rounding <ul style="list-style-type: none"> Error intervals 	Error intervals Error intervals with truncated decimals	Given an error interval, identify the largest/ smallest area/ perimeter?	Rounding decimals and integers Rounding to significant figures	Finding bounds for calculations
3D shapes <ul style="list-style-type: none"> Representations of 3D shapes 	Nets, plans and elevations of 3D shapes	Why do you need more than one piece of information? Construct a 3D shape from elevations	Properties of 3D shapes	Scale drawings
Pythagoras Theorem <ul style="list-style-type: none"> Pythagoras in 2D 	Calculating hypotenuse and shortest side using Pythagoras	Combining with area and perimeter both given lengths and finding lengths	Calculating with roots and powers Solving equations	Right angled trigonometry
Ratio and proportion <ul style="list-style-type: none"> Ratio Proportion word problems 	Writing and sharing ratios Direct and inverse proportion Currency conversion	Convert between multiple currencies to identify best value for money.	HCF Using a calculator	Combine ratios Graph of conversions Calculating with ratios and algebra
Linear graphs <ul style="list-style-type: none"> Equations of linear graphs 	Finding and interpreting equations of linear graphs	Compare cost vs. time graphs	Read and plot coordinates Plot straight line graphs	Finding equation of a line from a graph and from coordinates
Compound measures <ul style="list-style-type: none"> Speed and rates 	Calculating with speed and rates	Convert mph to miles per second. Convert kph to m/s	Substituting into formulae Solving equations Rearranging formulae Converting lengths, mass, capacity	Calculate density and pressure
Motion-time graphs <ul style="list-style-type: none"> Distance-time graph 	Plot and interpret distance time graphs Calculating speed from distance time graph		Calculate with speed Equation of straight line graphs	Plot velocity time graphs

Year 9 Curriculum Overview - Maths

Summer Term

		Content	Fluency	Problem solving	Prior Knowledge	Future learning (KS4)
		Quadratic graphs <ul style="list-style-type: none">Plotting and interpreting quadratic graphs	Plot and interpret quadratic functions		Substitute into algebraic formulae Plot straight line graphs	Graph of cubic and reciprocal functions
			Solve quadratic equations graphically			
		Angles and bearings <ul style="list-style-type: none">AnglesBearings	Angles in parallel lines, quadrilaterals and polygons	What is the reverse bearing? What rules are needed for bearings?	Angles on lines, about a point, vertically opposite, triangles and quadrilaterals	Applying right angled trigonometry to bearings
			Measure and draw bearings			
			Calculating bearings			
		Transformations <ul style="list-style-type: none">Transforming shapes	Rotation	Describing transformations	Translations and reflections	Enlargement with negative scale factor
			Enlargement			
		Similarity and congruence <ul style="list-style-type: none">SimilarityCongruence	Understanding similarity and finding unknown lengths in similar shapes	Compare 2 triangles, with different angles given, are they congruent? Is a square and a rhombus congruent, or similar or neither?	Scale factor for enlargement Identify triangles that have different orientations	Finding perimeter and area of similar shapes Geometry proofs with congruence and similarity
			Understand congruence and identify congruent triangles			
			Constructing triangles			
		Handling data and statistical diagrams <ul style="list-style-type: none">Collecting and presenting dataScatter graphsGrouped data	Comparing populations using diagrams and averages	Independent investigation to analyse the data	Averages and range Interpreting graphs and charts Reading and plotting coordinates Finding equations of lines Averages from frequency tables	
			Plot and interpret scatter graphs			
			Averages from grouped data			
		Vectors <ul style="list-style-type: none">Column vectors	Four operations with column vectors		Using column vectors with translations	Geometric proofs with vectors
			Identify parallel vectors			

Key Stage 4 (Year 10 only)



All students learn the same content until Year 10 Summer, when tiers of learning then differ. This allows all students to master core knowledge that enables them to further develop mathematical ideas (Higher tier) or continue to master to the national expected standard (Foundation tier).

Year 10 Curriculum Overview - Maths

Autumn Term

	Content	Fluency	Problem solving	Prior Knowledge (KS2/3)	Future learning
	<u>Percentages</u> <ul style="list-style-type: none"> Percentage change 	Calculate with compound interest Growth and decay	A ball bounces at a height of 60% <u>it's</u> original height, how many bounces until it stops?	Percentage change with a calculator Finding original values in percentage calculations	
	<u>Surface area and volume</u> <ul style="list-style-type: none"> Surface area Volume 	Finding surface area of pyramids, cones, sphere, frustums Finding volume of pyramids, cones, spheres, frustums	If a cube has the same volume of a sphere, what is the surface area of a cube if the sphere has a volume of 48π ?	Finding surface area and volume of cubes, cuboids, prisms, cylinders Use of a calculator Rearranging formulae	Use of trigonometry and Pythagoras to find missing lengths
	<u>Simultaneous equations</u> <ul style="list-style-type: none"> Linear simultaneous equations 	Solving simultaneous equations algebraically Solving simultaneous equations graphically	Form equations from worded scenario to then solve	Solve equations including with unknowns on both <u>sides</u> Construct and solve equations	Simultaneous with a quadratic and linear
	<u>Formulae</u> <ul style="list-style-type: none"> Rearranging formulae 	Change the subject of the formulae	Combine more than one <u>formulae</u>	Solve <u>equations</u> Expand and factorise brackets	Apply to non- <u>right angled</u> trigonometry to find missing values, and volume, surface area formulae.
	<u>Trigonometry</u> <ul style="list-style-type: none"> Right angled trigonometry 	Finding lengths using SOHCAHTOA Finding angles using SOHCAHTOA	Angles of elevations and depression Calculating with bearings	Calculate with roots and <u>powers</u> Solving equations Angles in triangles Rearranging formulae Bearings	Non <u>right angled</u> trigonometry
	<u>Constructions</u> <ul style="list-style-type: none"> Constructions and loci 	Constructing loci	Multi-step constructions to create regions	Construct bisector of angles and lines	

Year 10 Curriculum Overview - Maths

Spring Term

Content	Fluency	Problem solving	Prior Knowledge (KS2/3)	Future learning
Linear graphs <ul style="list-style-type: none"> Equations of linear graphs 	Equations of straight lines from gradients and points Equations of parallel lines Equations of perpendicular lines (H)	Prove that two lines are perpendicular to each other? Prove that points are on a line.	Finding equations of straight line graphs	Equations of tangents (H)
Real-life graphs <ul style="list-style-type: none"> Plotting and interpreting real-life graphs 	Plot and interpret real-life graphs Sketch graphs of water flows	Given a graph, what would the shape of the container be? Is there more than one answer?	Plot straight line graphs Equations of straight line graph	Area under a curve (H)
Set notation <ul style="list-style-type: none"> Venn diagrams and set notation 	Venn diagrams with set notation	Identify probabilities given one criteria , how does this impact the denominator?	Venn diagrams with HCF Probabilities as FDP Factors/ multiples	Developed at KS5
Tree diagrams <ul style="list-style-type: none"> Independent and dependent events 	Tree diagrams for independent and dependent events	How/ why do probabilities change with one option is removed on the second occasion?	Multiplying fractions Probabilities as FDP	Applying probabilities with algebra where the total is not given
Density and pressure <ul style="list-style-type: none"> Calculating with density Calculating with pressure 	Calculating with density and pressure	A prism has a stated cross-sectional area, and a density. What is the height of the prism?	Substituting Converting units Solve equations Changing the subject	Developed at KS5 (and cross-curricular with science)
Ratio <ul style="list-style-type: none"> Working with ratio and algebra 	Combining ratio Calculate ratios and algebra	There are an unknown number of counters in the box. Half the counters are red, two fifths are blue, the rest are green. Write this as a ratio of r:b:g.	Writing and simplifying ratio Equivalent ratios Convert between ratio, fraction, percentages	Vector proofs with ratio (H)
Graphs <ul style="list-style-type: none"> Velocity-time graph Cubic, reciprocal, exponential graphs 	Plot velocity-time graphs. Calculate acceleration from graphs Plotting graphs of cubic and reciprocals Graphs of exponential functions (H)	Identify which type of graph using knowledge of key features.	Plotting distance-time graphs Plotting graphs of quadratic functions	Trigonometric graphs (H)

Year 10 Foundation Curriculum Overview - Maths

Summer Term

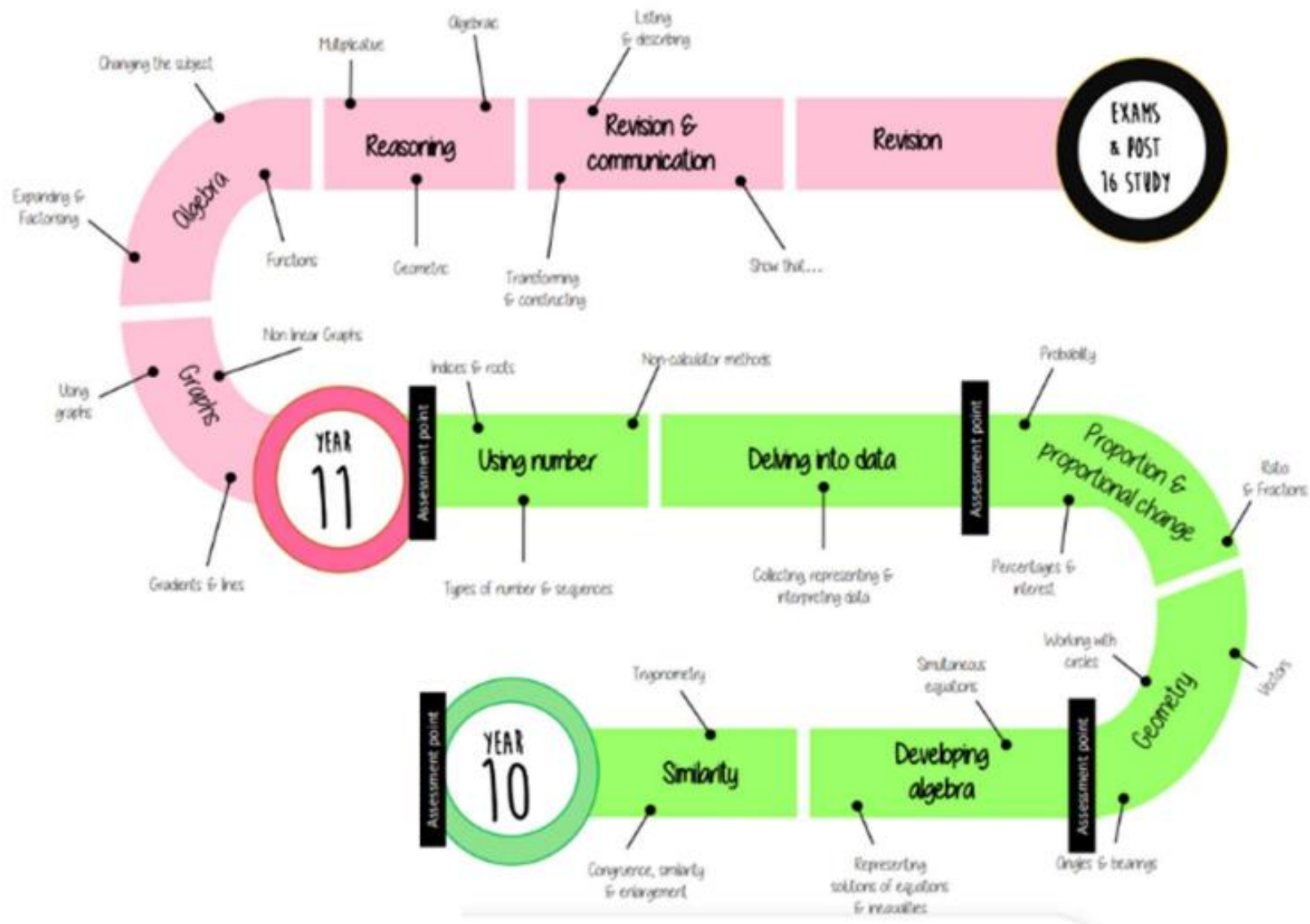
Content	Fluency	Problem solving	Prior Knowledge (KS2/3)	Future learning
Sequences <ul style="list-style-type: none"> Arithmetic and geometric sequences 	Position to term for arithmetic and geometric sequences	Position to term and nth term of patterns	Term to term rules Substitution	Nth term of quadratic sequences (H)
Handling data <ul style="list-style-type: none"> Sampling 	Sampling and bias	Which is the best type of sampling, why? Does it depend on the scenario?	Solving direct proportion word problems	Developed at KS5
Proportion <ul style="list-style-type: none"> Direct and inverse proportion 	Interpret direct and inverse proportion equations Graphs of direct and inverse proportions		Solve direct and inverse proportion word problems	Forming direct and inverse proportion equations (H)
Transformations <ul style="list-style-type: none"> Transforming shapes 	Combining transformations Describing transformations	Multi-step transformations	Translation, reflection, rotation, enlargement	Enlargement of fractional and negative scale factors (H)
Rounding <ul style="list-style-type: none"> Error intervals 	Finding error intervals of integers, <u>decimals</u> and truncated numbers	A decimal has an error interval of $2.3 \leq n < 2.4$ when truncated but an error interval of $2.395 \leq n < 2.405$ when rounded to 3 significant figures, what could the decimal be?	Rounding integers and decimals to significant figures	Calculating with bounds (H)
Indices <ul style="list-style-type: none"> Index Laws 	Index laws with positive and negative indices		Calculating with roots and powers Simplifying fractions	Evaluate indices with negative and fractions (H)
Brackets <ul style="list-style-type: none"> Expanding and factorising brackets 	Expand double brackets Factorise quadratic equations Solve quadratics by factorising	Expressions of area and perimeter of compound shapes	Find HCF Expand and factorise single <u>brackets</u> Simplify expressions by collecting like terms	Expand triple <u>brackets</u> Solve quadratics by completing the square and using the formula (H)
Handling data and statistical diagrams <ul style="list-style-type: none"> Grouped <u>data</u> Draw and interpret statistical diagrams 	Finding averages from grouped data Draw and interpret stem and leaf, line graphs, frequency polygons	Why is it an estimate of the mean?	Finding averages from frequency tables Draw and interpret bar charts	Histograms from unequal class intervals (H)

Year 10 Higher Curriculum Overview - Maths

Summer Term

Content	Fluency	Problem solving	Prior Knowledge (KS2)	Future learning
<u>Sequences</u> <ul style="list-style-type: none"> Quadratic and geometric sequences 	Position to term of quadratic sequences Position to term of geometric sequences	Position to term and nth term of patterns	Substitution Position to term of arithmetic sequences	
<u>Handling data</u> <ul style="list-style-type: none"> Sampling 	Sampling and bias Capture-recapture	Which is the best type of sampling, why?	Solve direct proportion word problems	
<u>Proportion</u> <ul style="list-style-type: none"> Direct and inverse proportion 	Construct direct and inverse proportion equations Graphs of direct and inverse proportion	Give 5 examples of direct, and 5 inverse proportion scenarios	Solve direct and inverse proportion word problems Currency conversion	
<u>Transformations</u> <ul style="list-style-type: none"> Transforming shapes 	Enlargement by a positive and negative scale factor Combining transformations	Multi-step transformations	Translation, reflection, rotations. Describe transformations	
<u>Rounding</u> <ul style="list-style-type: none"> Bounds 	Finding bounds for calculations	Give an example of a decimal with different error bounds that is the same original number.	Finding error intervals Error intervals for truncated numbers	
<u>Indices</u> <ul style="list-style-type: none"> Index Laws 	Estimating roots and powers Indices in the form $\frac{1}{a}$ and $\frac{a}{b}$	The answer is $\frac{1}{32}$. How many questions with indices can you write?	Calculating with roots and powers Index rules with positive and negative indices	
<u>Recurring decimals</u> <ul style="list-style-type: none"> Fractions and recurring decimals 	Convert between fractions and recurring decimals	Calculate $0.\dot{5} + \frac{2}{5}$	Written methods to divide with <u>decimals</u> Solving equations	
<u>Brackets</u> <ul style="list-style-type: none"> Expanding and factorising brackets 	Expand triple brackets Complete the square Factorise and then solve quadratics in the form $ax^2 + bx + c = 0$	Expressions of area and perimeter of compound shapes	Expanding double brackets Factorise and solve equations in the form $x^2 + bx + c = 0$	Developed at KS5
<u>Handling data and statistical diagrams</u> <ul style="list-style-type: none"> Cumulative frequency graphs Box plots 	Plot and interpret cumulative frequency graphs from grouped data Use box plots to represent quartiles and compare results	Which data set did better? Which is the best measure of spread – range or IQR?	Interpret frequency tables with grouped <u>data</u> Calculating median and mode	Developed at KS5

Key Stage 4 (Year 11 following a legacy scheme of learning)



The Big Picture

Year Group 11

Y11 Mathematics is the final year of the GCSE where students will continue to develop and build mathematical skills and knowledge required for their final examinations in the summer. There is an emphasis placed on reasoning skills at this stage in preparation for the final examinations.

Intent 'Learning Programme' blocks to be covered: Graphs, Algebra, Reasoning

Up till February half term, terms are split into units to ensure content is covered and students spend enough time to get a deep understanding of the topic covered. From February student will follow a bespoke revision timetable based on previous PLC's and exam feed back. Units have an element of interleaving as a key element enabling students to revisit previous work, develop knowledge and understanding and further extend their skills. Number work is emphasized throughout the blocks alongside estimation. Calculator skills have been incorporated throughout the curriculum, thus enabling all students to access the materials presented. Any student will be able to access the work the challenging strands present however in extreme cases where student(s) are having considerable issues alternatives will be put in place alongside the main strand.

Implementation

There will be 4/5 LP units of approx. 3/4 weeks each. Each lesson will involve a WRM flashback task. Independence and study skills will be fostered through challenging questions and problems, group and pair work, modelling, homework and PLC after each unit and mock assessment.

Each unit starts with a student self reflective log which is revisited after each objective has been taught (may be across a few lessons)

Lessons will be based around multiple representations; Concrete, Pictorial, Abstract to give a deeper understanding of concepts. Reasoning will be developed through the exploration of mathematical patterns and images with a variety of problem-solving methods for just one question. Formal structure to answering GCSE questions will be embedded. Past papers will be part of everyday lessons. Learning to move forward and uncover mathematical ideas from mistakes and misconceptions via true/false, spot the mistake and other reasoning tasks where students are required to make a judgement and justify their answers.

Knowledge organiser will be provided for each block to enable students to recall keywords, facts, formulas and/or formal methods. Revision maps and other resources will be utilized to aid recall. WOW moments will occur when students solve complex problems, when the barrier wall disappears, and they have a moment of satisfying clarity (no matter how brief) or spotting a relationship that was previously unseen. Completion and accessing more exam questions will boost motivation to succeed. Numeracy and calculator skills will be embedded.

Key assessments:

Weekly SPARX Maths tasks set as homework to consolidate learning with Fix-It Five weekly check ins.

**Low-stakes testing.
Live marking during lessons**

**Autumn – Mock 1
3 examination papers.**

**Spring – Mock 2
3 examination papers.**

Autumn Term

**Benchmarks – Graphs
Benchmarks – Algebra
Mock examinations 1**

Spring Term

**Benchmarks – Reasoning
Mock examinations 2**

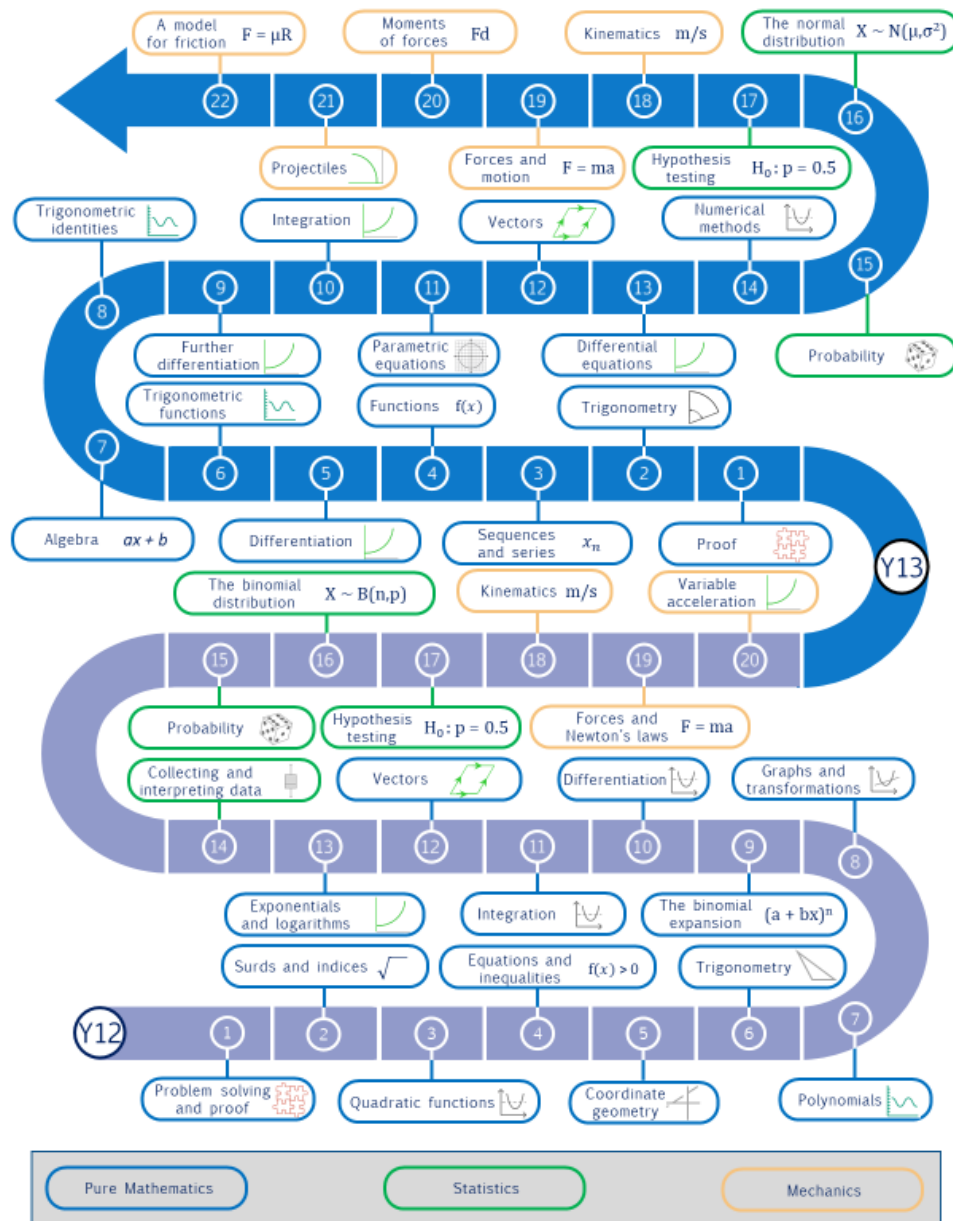
Summer Term

GCSE examinations

Impact

Students will have the desired understanding and confidence in Maths and be able to apply skills to a variety of challenging mathematical problems. Students will know more and remember more. Students will have developed their AO1/2/3 skills enabling them to manipulate familiar and unfamiliar vocabulary and deduce mathematical content. They will be familiar with a variety of exam questions and be suitably prepared to answer all examination style questions. Students will achieve their maximum attainment level to progress to their next level of study.

A LEVEL MATHS LEARNING JOURNEY YEAR 12 AND 13



The Big Picture

Year Group 12

Y12 Mathematics is designed to maximise progression in preparation for Y13 or AS Level outcomes. Many topics presents opportunities to recap on GCSE covered content linking this to brand new A-Level content. All topics give students the chance to extended themselves on the journey to achieving their potential.

Content covered

Pure mathematics: Problem solving, surds and indices, quadratic functions, equations and inequalities, coordinate geometry, trigonometry, polynomials, graphs and transformations, the binomial expansion, differentiation, integration, vectors, exponentials and logarithms.
Statistics: Collecting and interpreting data, probability, the binomial distribution, statistical hypothesis testing.
Mechanics: Kinematics, Newton's laws of motion, variable acceleration.

Implementation

Lessons are split between two members of staff. The Teacher 1 delivers 3 sessions per week and teacher 2 delivers 2 sessions per week. Both teachers deliver Pure Maths modules with a focus on Mechanics from Teacher 1 and Statistics from Teacher 2.

Independence and study skills will be fostered through challenging questions and problems, group and pair work, modelling, homework and PLC after each unit and past paper assessment.

Each unit starts with a student self-reflective log which is revisited after each objective has been taught (may be across a few lessons)

Lessons will be based around developing a deeper understanding of concepts. Reasoning will be developed through the exploration of mathematical patterns and images with a variety of problem-solving methods for just one question. Formal structure to answering A Level questions will be embedded.

Learning to move forward and uncover mathematical ideas from mistakes and misconceptions via true/false, spot the mistake and other reasoning tasks where students are required to make a judgement and justify their answers.

Knowledge organiser will be provided for each block to enable students to recall keywords, facts, formulas and/or formal methods. WOW moments will occur when students solve complex problems, when the barrier wall disappears, and they have a moment of satisfying clarity (no matter how brief) or spotting a relationship that was previously unseen.

Numeracy and calculator skills specific to A-Level content will be embedded.

Key assessments:

Topic assessments throughout the academic year.

Low-stakes testing.

Live marking during lessons.

January mock examinations.

June mock examinations.

Impact

Students will have increased understanding and confidence in A-Level Maths and be able to apply new skills to a variety of new and challenging mathematical problems. Students will know more and remember more. Students will have developed skills enabling them to manipulate familiar and unfamiliar vocabulary and deduce mathematical content. They will be familiar with a variety of exam questions and be suitably prepared to answer examination style questions. There will be an increase in attainment, evidenced in regular, formal and interleaved assessments.

The Big Picture

Year Group 13

Y13 Mathematics is designed to maximise progression in preparation for Y13 Examination and Maths at Degree Level. Many topics presents opportunities to recap on Year 12 covered content linking this to brand new Year 2 A-Level content. All topics give students the chance to extended themselves on the journey to achieving their potential.

Content covered

Pure mathematics: Proof, trigonometry, sequences and series, functions, differentiation, trigonometric functions, algebra, trigonometric identities, further differentiation, integration, parametric equations, vectors, differential equations, numerical methods.
 Statistics: Probability, statistical distributions, statistical hypothesis testing.
 Mechanics: Kinematics, forces and motion, moments of forces, projectiles, a model for friction.

Implementation

Lessons are split between two members of staff. The Teacher 1 delivers 3 sessions per week and teacher 2 delivers 2 sessions per week. Both teachers deliver Pure Maths modules with a focus on Mechanics from Teacher 1 and Statistics from Teacher 2.

Independence and study skills will be fostered through challenging questions and problems, group and pair work, modelling, homework and PLC after each unit and past paper assessment.

Each unit starts with a student self-reflective log which is revisited after each objective has been taught (may be across a few lessons)

Lessons will be based around developing a deeper understanding of concepts. Reasoning will be developed through the exploration of mathematical patterns and images with a variety of problem-solving methods for just one question. Formal structure to answering A Level questions will be embedded.

Learning to move forward and uncover mathematical ideas from mistakes and misconceptions via true/false, spot the mistake and other reasoning tasks where students are required to make a judgement and justify their answers.

Knowledge organiser will be provided for each block to enable students to recall keywords, facts, formulas and/or formal methods. WOW moments will occur when students solve complex problems, when the barrier wall disappears, and they have a moment of satisfying clarity (no matter how brief) or spotting a relationship that was previously unseen.

Numeracy and calculator skills specific to A-Level content will be embedded.

Key assessments:

Topic assessments throughout the academic year.

Low-stakes testing.

Live marking during lessons.

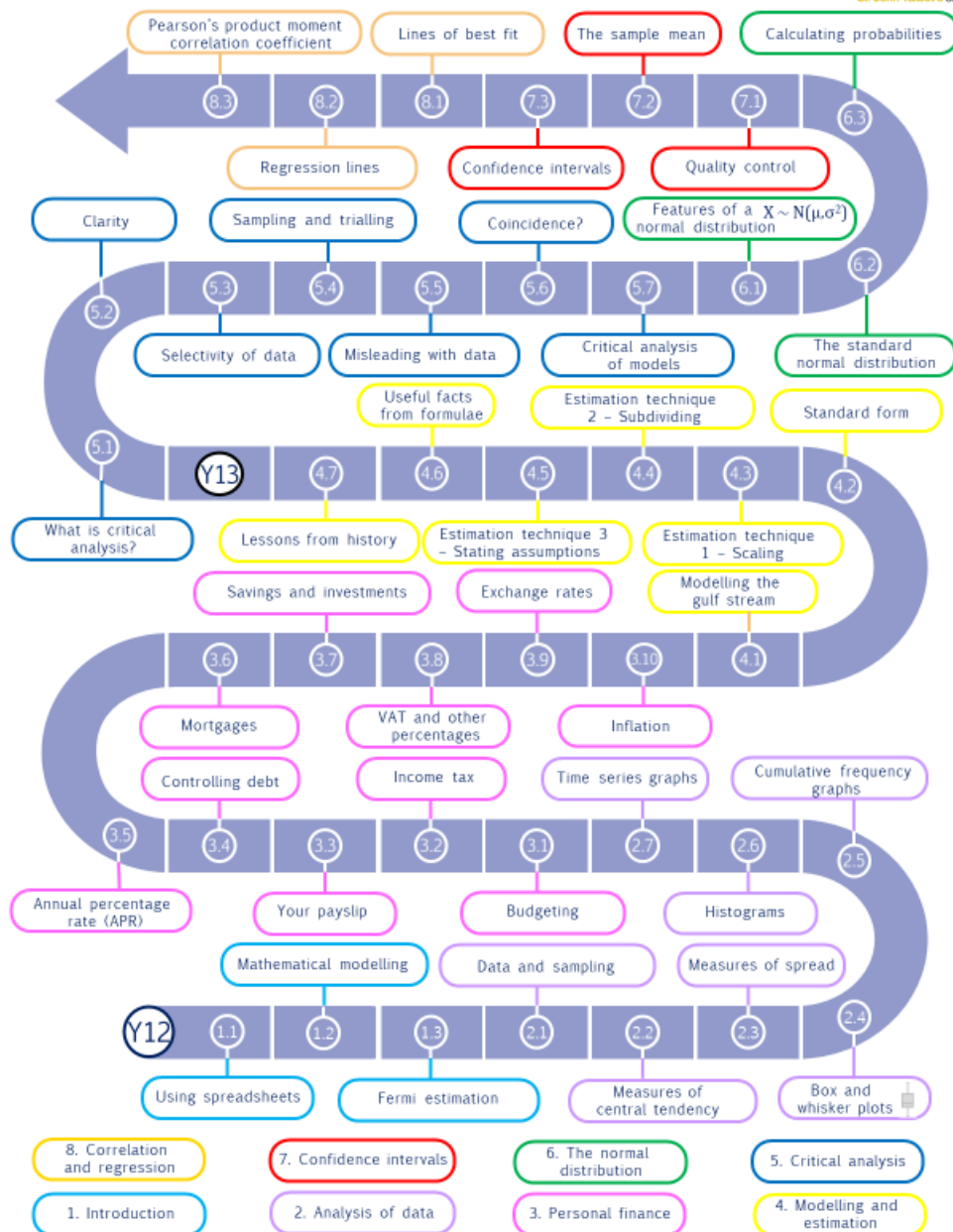
January mock examinations.

Impact

Students will have increased understanding and confidence in A-Level Maths and be able to apply new skills to a variety of new and challenging mathematical problems. Students will know more and remember more. Students will have developed skills enabling them to manipulate familiar and unfamiliar vocabulary and deduce mathematical content. They will be familiar with a variety of exam questions and be suitably prepared to answer examination style questions. There will be an increase in attainment, evidenced in regular, formal and interleaved assessments.

CORE MATHS LEARNING JOURNEY

YEAR 12 AND 13



The Big Picture

Year Group 12& 13

Core Maths is designed to present students with opportunities to explore mathematics in the real world. All topics give students the chance to extend themselves on the journey to achieving their potential.

Content covered – Core Maths

Paper 1: Analysis of data, personal finance, modelling & estimation

Paper 2a: Critical Analysis, The Normal Distribution, Confidence intervals, Correlations & Regression

Implementation

Lessons are split over the two years with two lessons per week.

Independence is encouraged relating work in class with other subjects and real life.

Each unit starts by recapping what students already know from GCSE. For students entering from Foundation tier, scaffolding steps can be implemented to help with the step up.

Lessons will be based around the nuts and bolts of how to answer questions but there is a heavy reliance on reasoning and understanding so as to be able to apply techniques to more unfamiliar contexts.

Learning often uncovers mathematical ideas from mistakes and misconceptions. Spot the mistake and other reasoning tasks where students are required to make a judgement and justify their answers are frequently incorporated.

Unit overviews will be provided for each topic to enable students to track their learning journeys.

WOW moments will occur when students solve complex problems, when the barrier wall disappears, and they have a moment of satisfying clarity (no matter how brief) or spot a relationship that was previously unseen.

Numeracy and calculator skills specific to CORE Maths content will be embedded.

Key assessments:

Topic assessments throughout the academic year.

Low-stakes testing.

Live marking during lessons.

End of year Y12 exams & Y13 mock examinations.

Impact

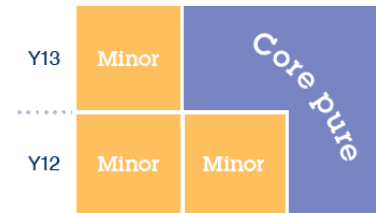
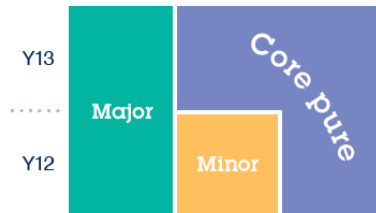
Students will have increased understanding and confidence in CORE Maths. They will be able to apply new skills to a variety of new and challenging mathematical problems. They will be able to relate the work done in class to other subjects and life outside the classroom. Students will know more and remember more. Students will have developed skills enabling them to manipulate familiar and unfamiliar vocabulary and deduce mathematical content. They will be familiar with a variety of exam questions and be suitably prepared to answer examination style questions. There will be an increase in attainment, evidenced in regular, formal and interleaved assessments.

A LEVEL FURTHER MATHS LEARNING JOURNEY YEAR 12 AND 13

One major option + one minor option

OR

Three minor options



Major options

Major

Mechanics major
Statistics major

The first half of each of these is the same content as a minor option and can be taught in Year 12.

You cannot choose:
Mechanics major + Mechanics minor
Statistics major + Statistics minor

Minor options

Minor

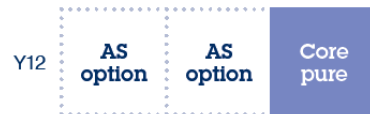
Mechanics minor
Statistics minor
Modelling with algorithms
Numerical methods

These can be taught in either Year 12 or Year 13.

Extra pure
Further pure with technology

AS LEVEL FURTHER MATHS LEARNING JOURNEY YEAR 12

Core pure is mandatory, choose two AS options



These AS options are available as standalone Level 3 Certificates:

AS Core pure
Statistics a
Numerical methods

Mechanics a
Modelling with algorithms

AS options

AS option

Mechanics a
Statistics a
Modelling with algorithms
Numerical methods

These are suitable for Year 12 and have the same content as the respective A level minor option.

Mechanics b
Statistics b

These are suitable for Year 13 and have the same content as the second half of the respective A level major option.

The Big Picture

Year Group 12 (& 13)

Further Mathematics is designed to maximise progression in preparation for Y13 Examination and related degree Level studies. Many topics presents opportunities to recap and build on content covered in A Level Mathematics. All topics give students the chance to extended themselves on the journey to achieving their potential.

Content covered – Further Maths

Core Pure: Matrices, complex numbers, roots of polynomials, sequences and series, Vectors and 3D space.

Statistics: Discrete random variables, discrete probability distributions, bivariate data, Chi-squared tests.

Mechanics: Forces, work, energy and power, impulse and momentum, centre of mass, dimensional analysis.

Modelling with Algorithms: Algorithms, graphs and networks, linear programming, simplex method.

Implementation

Four weekly lessons are split between two members of staff. Both teachers deliver Core Pure content, whilst the applied units are delivered in a way that utilises expertise of staff and maximises the potential of students.

Independence and study skills will be fostered through challenging questions and problems, group and pair work, modelling, homework and PLC after each unit and past paper assessment.

Each unit starts with a student self reflective log which is revisited after each objective has been taught (may be a cross a few lessons).

Lessons will be based around developing a deeper understanding of concepts. Reasoning will be developed through the exploration of mathematical patterns and images with a variety of problem-solving methods for just one question. Formal structure to answering A Level questions will be embedded.

Learning to move forward and uncover mathematical ideas from mistakes and misconceptions via true/false, spot the mistake and other reasoning tasks where students are required to make a judgement and justify their answers.

Knowledge organisers will be provided for each block to enable students to recall keywords, facts, formulas and/or formal methods.

WOW moments will occur when students solve complex problems, when the barrier wall disappears, and they have a moment of satisfying clarity (no matter how brief) or spotting a relationship that was previously unseen.

Numeracy and calculator skills specific to A Level content will be embedded.

Key assessments:

Topic assessments throughout the academic year.

Low-stakes testing.

Live marking during lessons.

End of year Y12 exams & Y13 mock examinations

Impact

Students will have increased understanding and confidence in A Level Maths and be able to apply new skills to a variety of new and challenging mathematical problems. Students will know more and remember more. Students will have developed skills enabling them to manipulate familiar and unfamiliar vocabulary and deduce mathematical content. They will be familiar with a variety of exam questions and be suitably prepared to answer examination style questions. There will be an increase in attainment, evidenced in regular, formal and interleaved assessments.