

Sir John Talbot's School

CURRICULUM

#togetherwegrow

Marches Academy Trust 

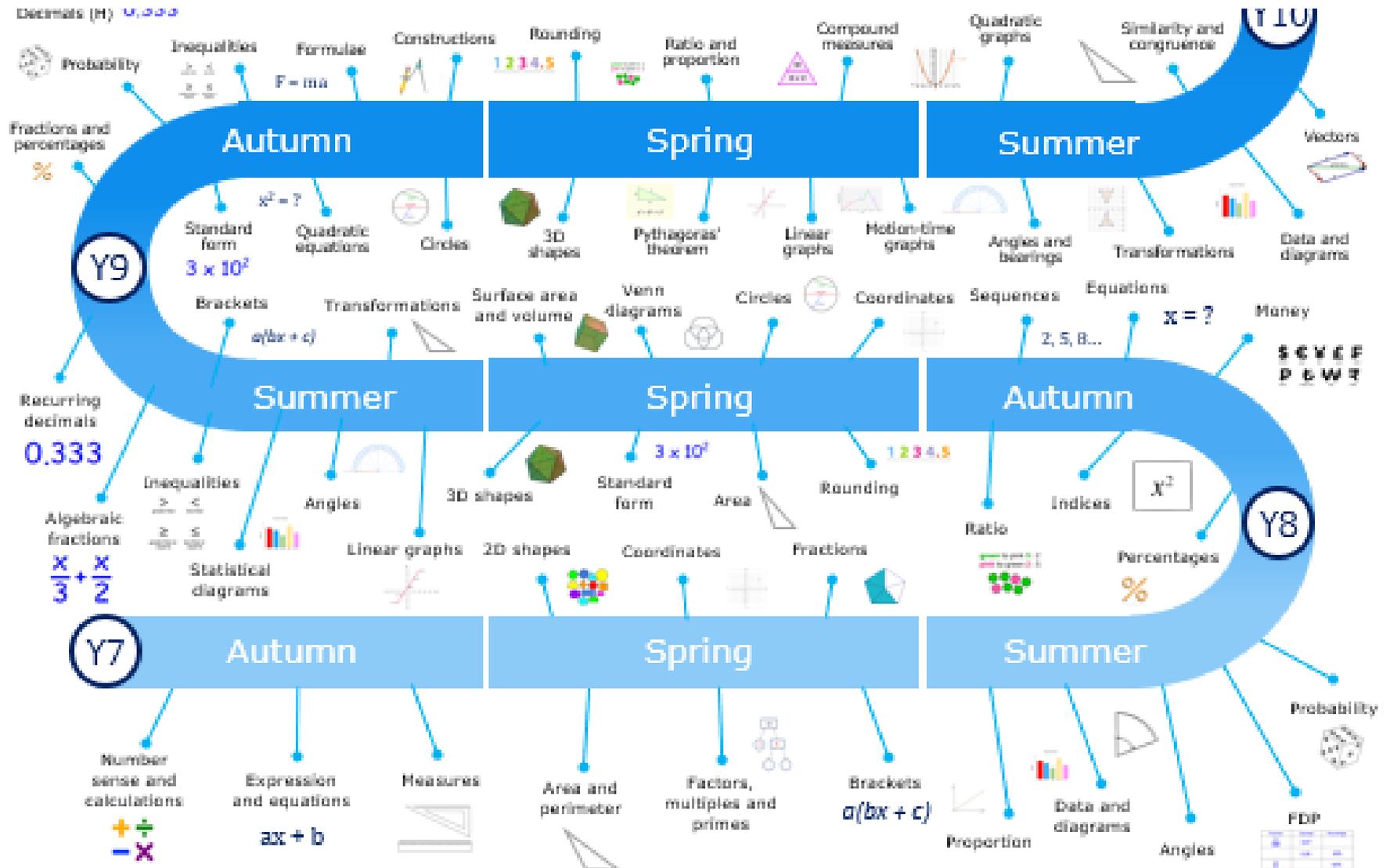
Maths

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.

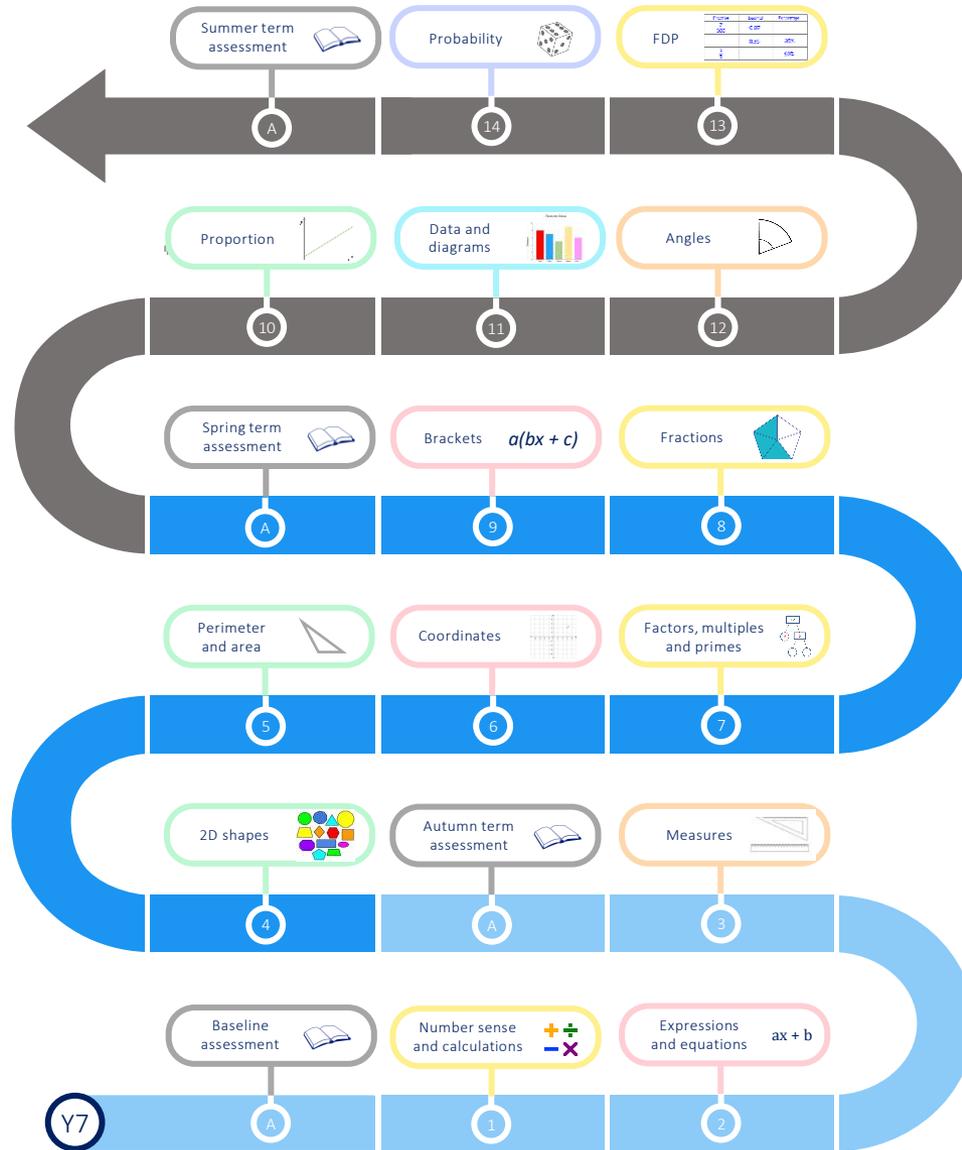
The Mathematics department will promote the development of confidence, willingness to learn and interest in the various aspects of mathematics. The department aspires to remove the "mystery of maths" and providing students of all abilities the opportunities to become numerate and confident with maths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

Key Stage 3



MATHS LEARNING PATHWAY

YEAR 7



Strand key:

- Number
- Algebra
- Geometry
- Probability
- Statistics
- Ratio & Proportion

Year 7 Curriculum Overview - Maths

Autumn Term

	Content	Fluency	Problem solving	Prior Knowledge (KS2)	Future learning (KS3)
	<u>Number Sense and calculations</u> <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			
	<u>Expressions and equations</u> <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			
	<u>Measures</u> <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?		

Year 7 Curriculum Overview - Maths

Spring Term

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)
<u>Angles</u> <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
<u>Handling Data and statistical diagrams</u> <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
<u>Proportion</u> <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
<u>Fractions, decimals and percentages</u> <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
<u>Probability</u> <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

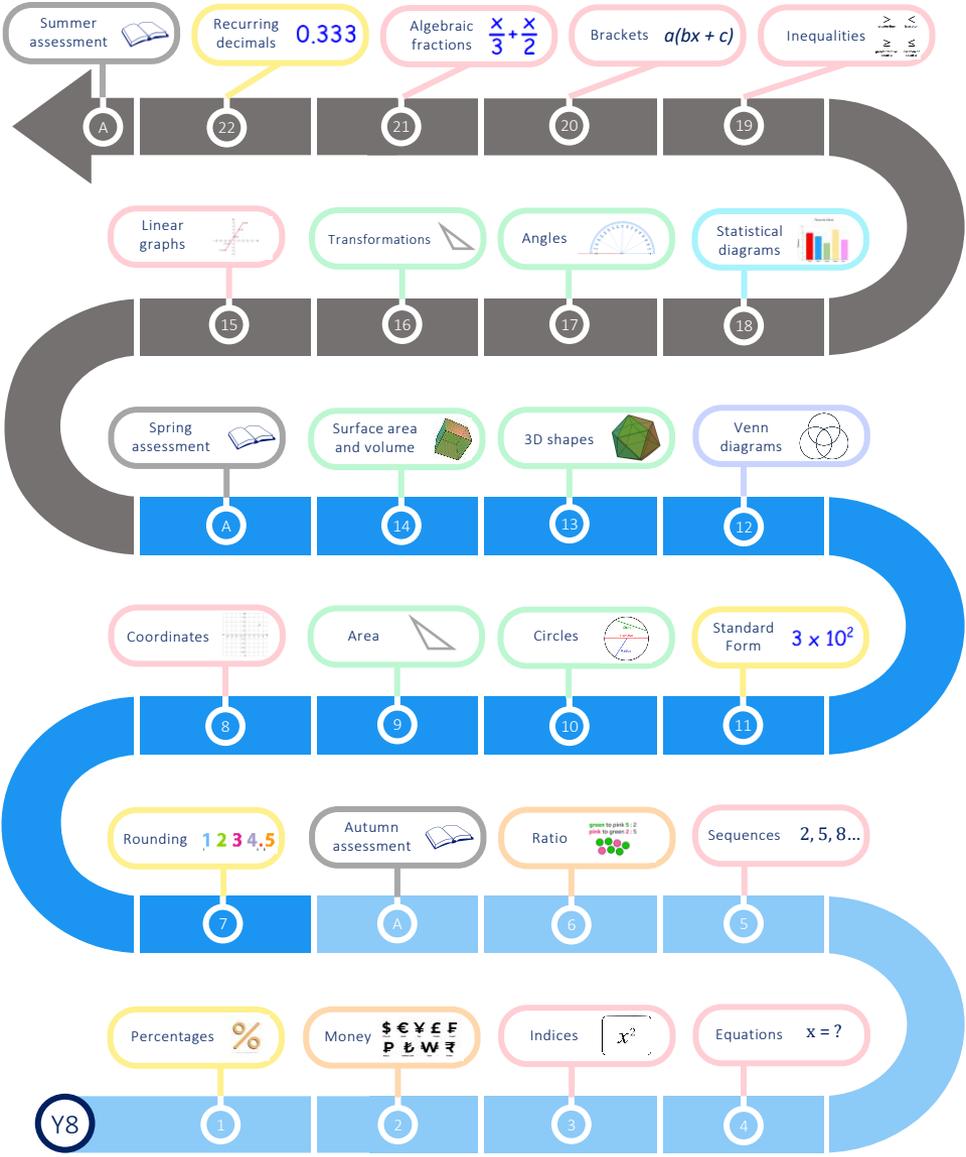


		What key subject specific vocabulary is needed to enable the learning of the expected standard?	Greater depth subject specific vocabulary
Autumn Term	Number sense and calculations	Integer, decimal places, rounding, order of operations, powers	Roots, indices
	Expressions and equations	Expression, solve, substitute, term, variable, formulae, function machines	coefficient
	Measures	Metric, imperial, length, mass, capacity, estimate, convert	

		What key subject specific vocabulary is needed to enable the learning of the expected standard?	Greater depth subject specific vocabulary
Spring Term	2D Shapes	Parallel, Perpendicular, Geometry, Dimension, Reflection, Rotation, Symmetry	
	Perimeter and Area	Perimeter, Area, Formula, Compound Shape, Polygon, Regular, Scalene, Isosceles, Equilateral	Apex
	Co-ordinates	Axis, Axes, Horizontal, Vertical, Vertex, Vertices, Origin, Diagonal, Co-ordinate	
	Factors, Multiples and Primes	Factors, Multiples, Prime Number, Express, Common Factor, LCM, HCF, Product, Divisible	Decomposition
	Fractions	Numerator, Denominator, Improper, Mixed Number, Equivalent, Simplify	
	Brackets	Expand, Factorise, Common Factor, Coefficient, Simplify, Single Brackets	



		What key subject specific vocabulary is needed to enable the learning of the expected standard?	Greater depth subject specific vocabulary
Summer Term	Angles	Acute, Obtuse, Reflex, Protractor, Estimate, Degree, Clockwise, Anti-clockwise, Vertically opposite, Full turn	
	Proportion	Unitary method, Direct proportion, Unit, Conversion graph	
	FDP	Reciprocal, Simplify, Equivalent, Ascending, Descending, Compare	
	Probability	Probability, Event, Outcomes, Mutually exclusive, Sample Space, Probability scale	Theoretical
	Handling Data and Statistical Diagrams	Averages, Mean, Mode, Median, Variable, Range, Consecutive, Discrete, Continuous, Qualitative, Quantitative, Primary, Secondary, Frequency Diagram, Tally, Pictogram	



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	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.
		Finding percentage change with and without a calculator			
	<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	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
		Simplify algebraic fractions by cancelling common factors			
	<u>Equations</u> <ul style="list-style-type: none"> Solving equations 	Solve equations with fractions with the variable in the numerator and denominator	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.
		Solve equations with brackets and unknowns on both sides			
		Construct and solve equations			
	<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	Given the 2 nd and 4 th term, identify the other <u>terms</u> and describe the sequence.	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.
		Substitute into position to term rules to generate arithmetic sequences	Is a number in a sequence – solve to prove		
	<u>Ratio</u> <ul style="list-style-type: none"> Ratio Scale Drawing 	Writing, <u>simplifying</u> and sharing by ratios	Interpreting scales from OS maps.	Finding HCF Constructing fractions Writing numbers as a percentage of another	Accurate drawing with bearings. Calculate real area/ perimeter.
		Draw and interpret scale drawings	Why do we use scales in architecture?		

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

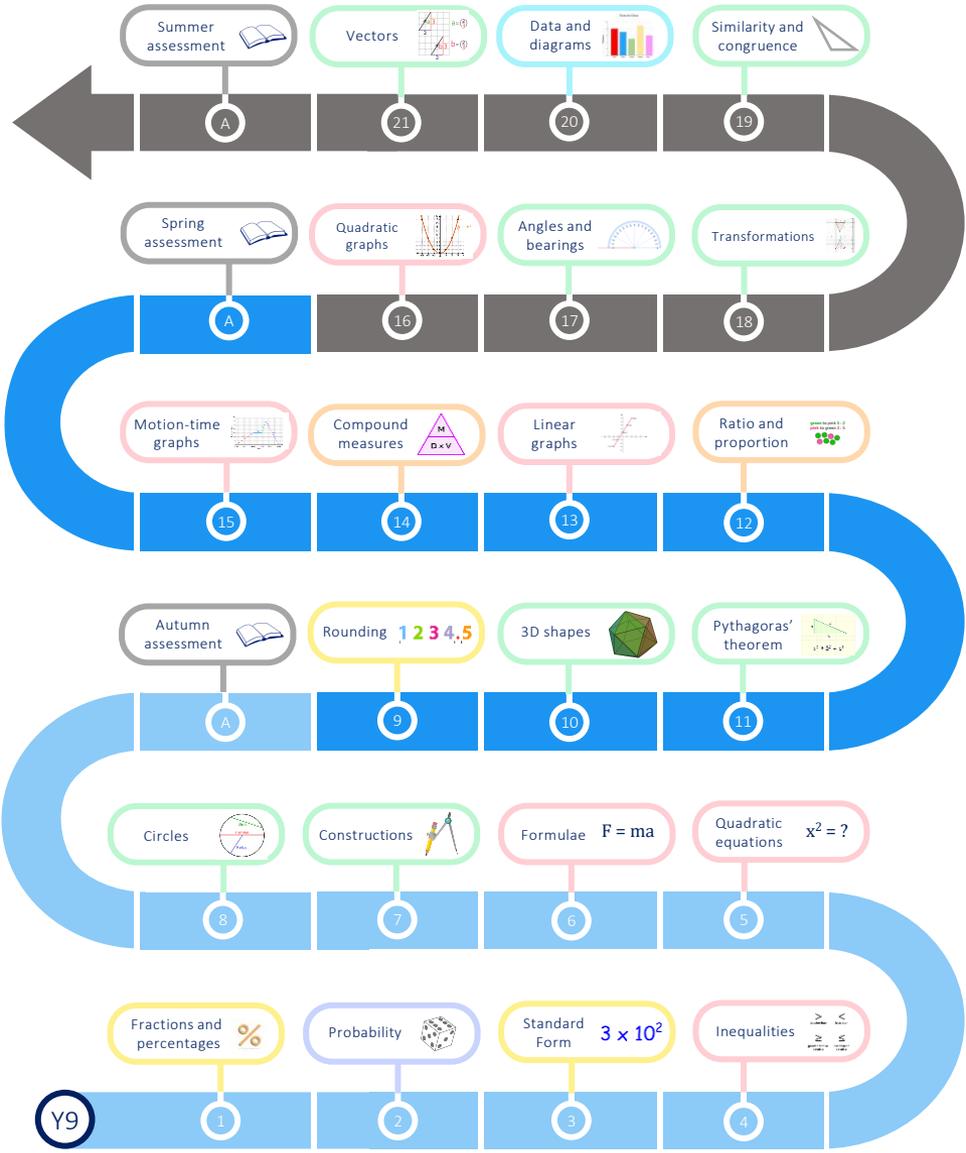
Year 8 Curriculum Overview - Maths

Summer Term

Content	Fluency	Problem solving	Prior Knowledge (KS2)	Future learning (KS3)
<u>Linear Graphs</u> <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
<u>Transformations</u> <ul style="list-style-type: none"> Transforming shapes 	Translation Reflection	Identify the translation and reflection that has happened	Reading and plotting coordinates	Vectors
<u>Angles</u> <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
<u>Statistical diagrams</u> <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
<u>Inequalities</u> <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
<u>Brackets</u> <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
<u>Algebraic Fractions</u> <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
<u>Recurring decimals</u> <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 0.3̇? 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)
<u>Fractions and percentages</u> <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
<u>Probability</u> <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 diagram</u> and <u>two way tables</u> . Tree diagrams
<u>Standard form</u> <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
<u>Inequalities</u> <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
<u>Quadratic equations</u> <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
<u>Formulae</u> <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
<u>Constructions</u> <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
<u>Circles and cylinders</u> <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)
	<u>Rounding</u> <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
	<u>3D shapes</u> <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
	<u>Pythagoras Theorem</u> <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
	<u>Ratio and proportion</u> <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 <u>ratios</u> Graph of conversions Calculating with ratios and algebra
	<u>Linear graphs</u> <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 <u>coordinates</u> Plot straight line graphs	Finding equation of a line from a graph and from coordinates
	<u>Compound measures</u> <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
	<u>Motion-time graphs</u> <ul style="list-style-type: none"> Distance-time graph 	Plot and interpret distance time graphs Calculating speed from distance time graph		Calculate with <u>speed</u> Equation of <u>straight line</u> graphs	Plot velocity time graphs

Year 9 Curriculum Overview - Maths

Summer Term

Content	Fluency	Problem solving	Prior Knowledge	Future learning (KS4)
<u>Quadratic graphs</u> <ul style="list-style-type: none"> Plotting and interpreting quadratic graphs 	Plot and interpret quadratic functions Solve quadratic equations graphically		Substitute into algebraic formulae Plot straight line graphs	Graph of cubic and reciprocal functions
<u>Angles and bearings</u> <ul style="list-style-type: none"> Angles Bearings 	Angles in parallel lines, quadrilaterals and polygons Measure and draw bearings Calculating bearings	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
<u>Transformations</u> <ul style="list-style-type: none"> Transforming shapes 	Rotation Enlargement	Describing transformations	Translations and reflections	Enlargement with negative scale factor
<u>Similarity and congruence</u> <ul style="list-style-type: none"> Similarity Congruence 	Understanding similarity and finding unknown lengths in similar shapes Understand congruence and identify congruent triangles Constructing triangles	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
<u>Handling data and statistical diagrams</u> <ul style="list-style-type: none"> Collecting and presenting data Scatter graphs Grouped data 	Comparing populations using diagrams and averages Plot and interpret scatter graphs Averages from grouped data	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	
<u>Vectors</u> <ul style="list-style-type: none"> Column vectors 	Four operations with column vectors Identify parallel vectors		Using column vectors with translations	Geometric proofs with vectors

Greater Depth in Key Stage 3

Students who are working at greater depth will be able to consistently and accurately complete fluency questions across a number of strands of maths and use these skills to apply in a problem solving context. These questions may require many strands of maths and there may be multiple routes to the same outcome.

Examples of greater depth questions

Lottie has a bag of apples.

She gives half of them to Fred.

Fred eats two and then has four left.

How many apples did Lottie have at the start?

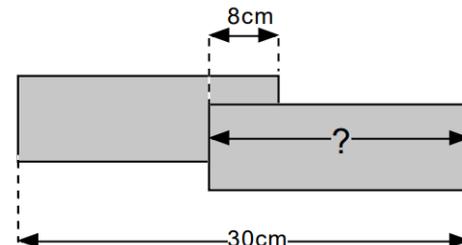
Janice has three coins in her pocket, and they are all different from each other.

Jeremy has three coins in his pocket and they are all the same as each other.

Jeremy has twice as much money as Janice.

What are the coins they each have?

Two identical rectangular tiles are arranged to overlap each other by 8cm.
The length of the whole arrangement is 30cm.

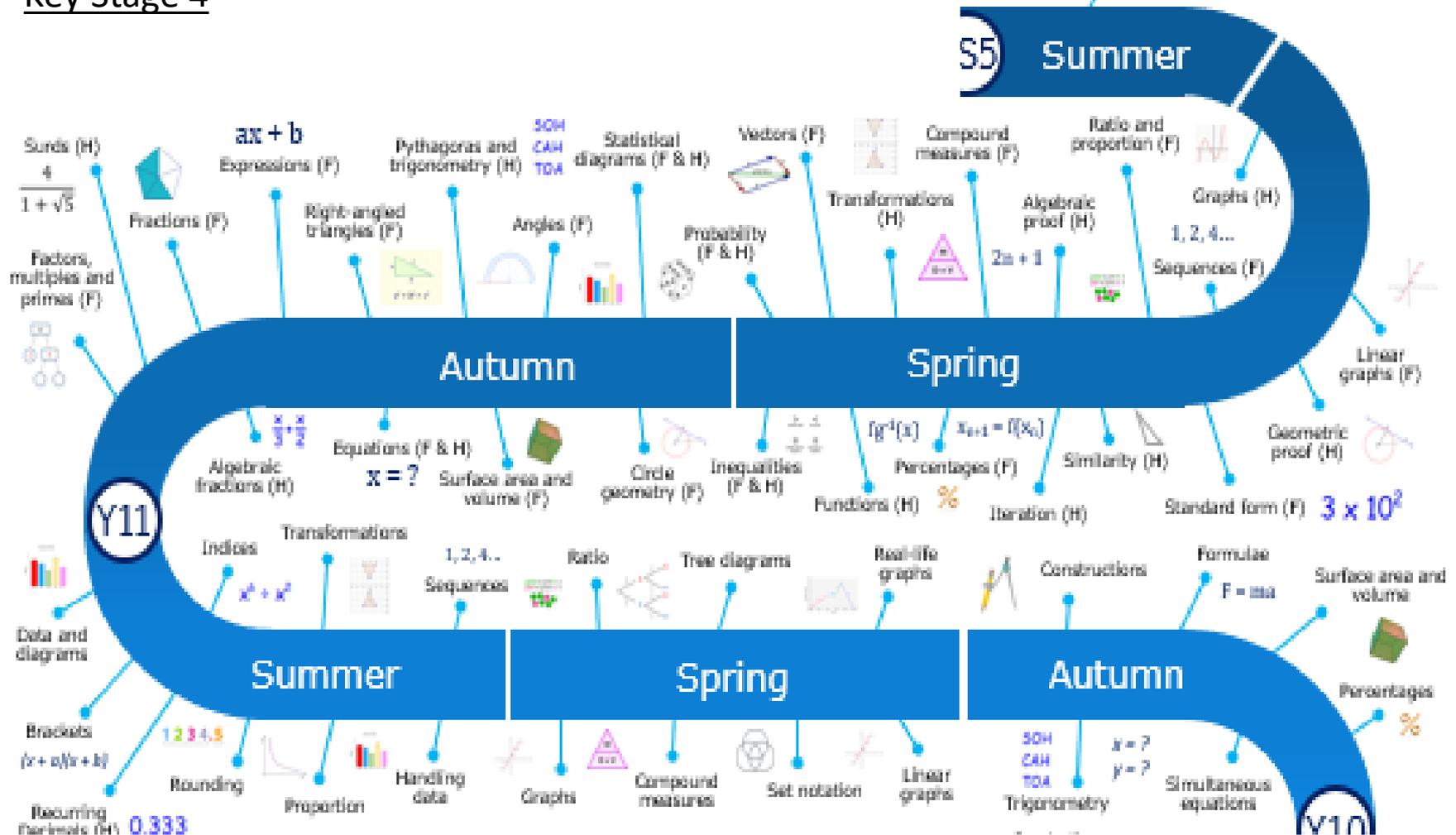


*not drawn
to scale*

Work out the length of a tile.

Students working at greater depth will continue to hone these skills throughout Key Stage 4 which would also support accessing Core Maths at Key Stage 5.

Key Stage 4



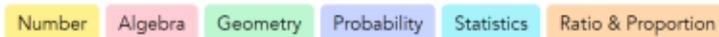
All students learn the same content until Year 10 Summer, when tiers of learning then differ. This allows all students to master core knowledge that enables them to further develop mathematical ideas (Higher tier) or continue to master to the national expected standard (Foundation tier).

MATHS LEARNING PATHWAY

YEAR 10



Strand key:



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
<u>Linear graphs</u> <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 <u>straight line</u> graphs	Equations of tangents (H)
<u>Real-life graphs</u> <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 <u>graphs</u> Equations of <u>straight line</u> graph	Area under a curve (H)
<u>Set notation</u> <ul style="list-style-type: none"> Venn diagrams and set notation 	Venn diagrams with set notation	Identify probabilities given one <u>criteria</u> , how does this impact the denominator?	Venn diagrams with HCF Probabilities as FDP Factors/ multiples	Developed at KS5
<u>Tree diagrams</u> <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
<u>Density and pressure</u> <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 <u>equations</u> Changing the subject	Developed at KS5 (and cross-curricular with science)
<u>Ratio</u> <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)
<u>Graphs</u> <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
<u>Sequences</u> <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)
<u>Handling data</u> <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
<u>Proportion</u> <ul style="list-style-type: none"> Direct and inverse proportion 	Interpret direct and inverse proportion equations	Multi-step transformations	Solve direct and inverse proportion word problems	Forming direct and inverse proportion equations (H)
	Graphs of direct and inverse proportions			
<u>Transformations</u> <ul style="list-style-type: none"> Transforming shapes 	Combining transformations	Multi-step transformations	Translation, reflection, rotation, enlargement	Enlargement of fractional and negative scale factors (H)
	Describing transformations			
<u>Rounding</u> <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)
<u>Indices</u> <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)
<u>Brackets</u> <ul style="list-style-type: none"> Expanding and factorising brackets 	Expand double brackets	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)
	Factorise quadratic equations			
	Solve quadratics by factorising			
<u>Handling data and statistical diagrams</u> <ul style="list-style-type: none"> Grouped <u>data</u> Draw and interpret statistical diagrams 	Finding averages from grouped data	Why is it an estimate of the mean?	Finding averages from frequency tables Draw and interpret bar charts	Histograms from unequal class intervals (H)
	Draw and interpret stem and leaf, line graphs, frequency polygons			

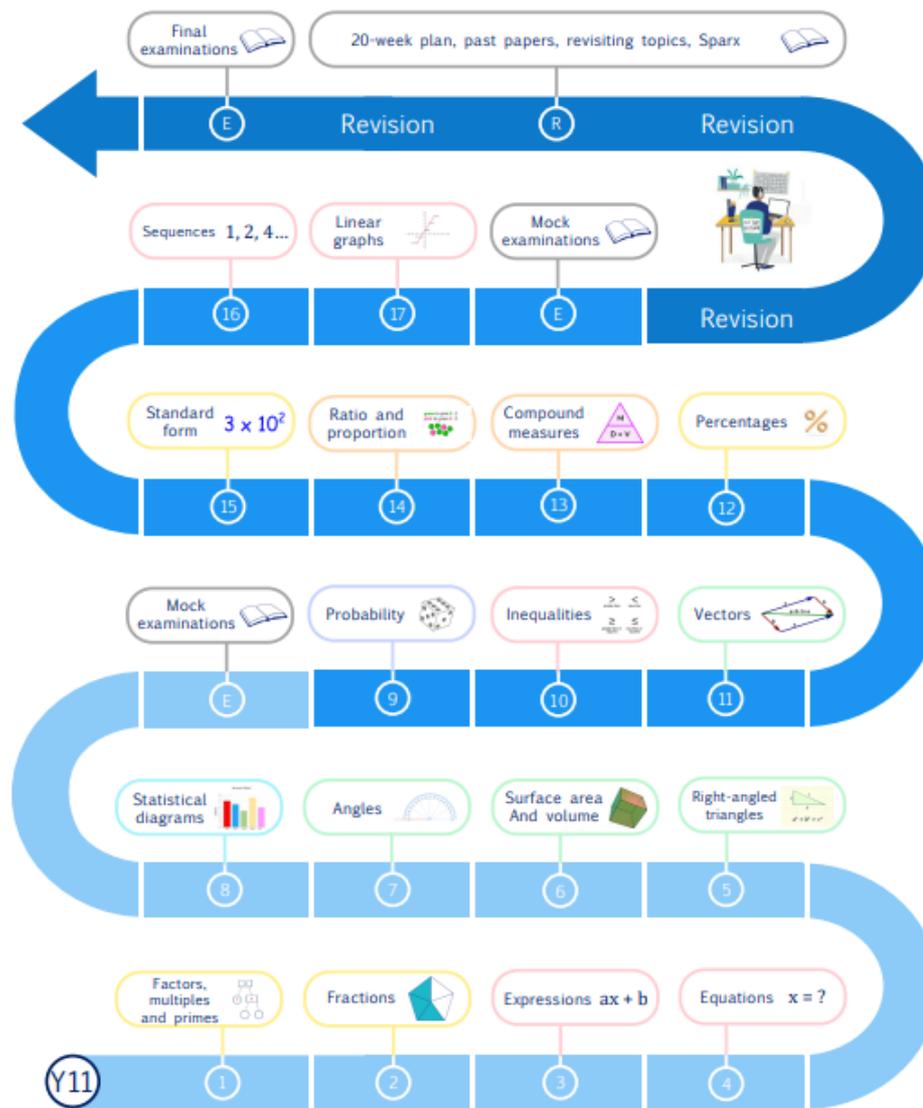
Year 10 Higher Curriculum Overview - Maths

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 <u>problems</u> 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

MATHS LEARNING PATHWAY

YEAR 11 – Foundation tier



Strand key:

Number
Algebra
Geometry
Probability
Statistics
Ratio & Proportion

Year 11 Foundation Overview - Maths

Autumn Term

	Content	Fluency	Problem solving	Prior Knowledge (KS2/3)	Future learning
	<u>Factors, multiples and primes</u> <ul style="list-style-type: none"> HCF and LCM 	Finding HCF and LCM by listing Finding HCF and LCM using prime number decomposition	Applying HCF/LCM to worded problems where it is necessary to identify which is required.	Factors, <u>multiples</u> and primes. Use of <u>venn</u> diagrams	Factorising quadratics
	<u>Fractions</u> <ul style="list-style-type: none"> Fractions and mixed number 	Four operations with proper fractions and mixed numbers	Application of fractions to wider areas of maths including area and perimeter	Simplify and order fractions	Applying to different contexts including for rearranging formulae
	<u>Expressions</u> <ul style="list-style-type: none"> Simplifying expressions 	Simplify using index laws Simplify algebraic fractions using common factors		Index laws for positive and negative indices and simplifying expressions by collecting like terms	Core skills required in most areas of maths
	<u>Equations</u> <ul style="list-style-type: none"> Solving equations Simultaneous equations 	Solve equations including with unknowns on both <u>sides</u> , <u>fractions</u> and quadratics Solve algebraic and graphically	Form and solve equations including with angles and perimeter. Form and solve simultaneous equations	Solve equations with one step. Factorising quadratics	
	<u>Angles</u> <ul style="list-style-type: none"> Finding unknown angles 	Finding, and giving reasons for, angles in parallel lines and polygons		Angles on a line, around a point, in a triangle, in a quadrilateral	Bearings and problem solving
	<u>Pythagoras and Trigonometry</u> <ul style="list-style-type: none"> Pythagoras Right angled trigonometry 	Missing lengths in right angled triangles using Pythagoras Missing lengths and angles using trigonometry	Using bearings for context, and <u>back to back</u> triangles	Solving equations, angles in triangles and parallel lines, measure and draw bearings	Non <u>right angled</u> triangles
	<u>Surface area and volume</u> <ul style="list-style-type: none"> Surface area Volume 	Find surface area and volume of prisms and use given formulas for cones, <u>spheres</u> and frustums	Given one measure, work out the other.	Rearranging formula, solve equations, use of a calculator	Rearranging in different forms, giving in terms of pi
	<u>Statistical diagrams</u> <ul style="list-style-type: none"> Draw and interpret statistical diagrams 	Draw and interpret pie charts and scatter graphs	Compare pie charts to understand it represents proportion	Use of a protractor, frequency tables, bar charts and line graphs	

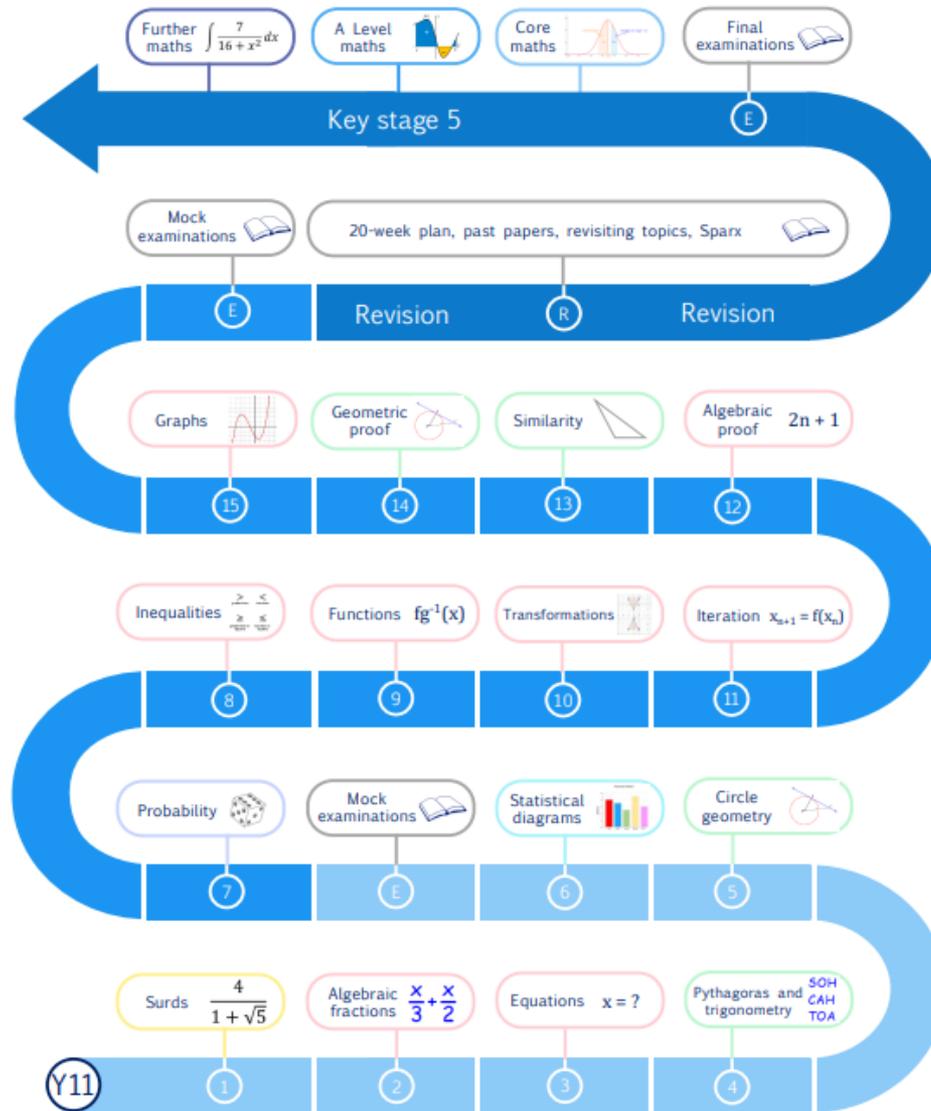
Year 11 Foundation Curriculum Overview - Maths

Spring Term

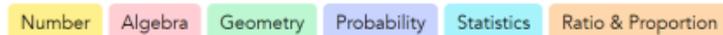
Content	Fluency	Problem solving	Prior Knowledge (KS2/3)	Future learning
<u>Probability</u> <ul style="list-style-type: none"> Theoretical and experimental probability 	Probabilities from single events, frequency trees, sample space diagrams and <u>venn</u> diagrams Tree diagrams for dependent and independent events	Giving an estimate of outcomes. Comparing number of trials and the accuracy of the results	Writing probabilities as FDP, use of <u>venn</u> diagrams and frequency trees	Conditional probability
<u>Inequalities</u> <ul style="list-style-type: none"> Linear inequalities 	Solve single and double inequalities Construct and solve inequalities	When so	Inequalities from a number line, solving equations	Graphing inequalities to identify regions
<u>Vectors</u> <ul style="list-style-type: none"> Vector problems 	Add, subtract, multiply column vectors	Solve geometric problems using vectors	Understanding column vectors	Proving two vectors are parallel
<u>Percentages</u> <ul style="list-style-type: none"> Percentage change 	Finding percentage change Reverse percentages (finding the original) Compound interest, <u>growth</u> and decay		Finding percentages with and without a calculator	Rearrange to find percentages
<u>Compound measures</u> <ul style="list-style-type: none"> Calculating with compound measures 	Calculate with speed, rates, <u>density</u> and pressure	Combining densities, interpreting volume of a prism to find area	Substituting, solving equations, converting units	Developed at KS5
<u>Ratio and proportion</u> <ul style="list-style-type: none"> Working with ratio and algebra Proportion word problems 	Combining ratio Solve direct and inverse proportion questions	Ratio and proportion linked to recipes, conversion graphs, best buys	Simplifying ratio, sharing by a ratio, using a calculator	Formal direct and inverse proportion by finding the k value
<u>Standard form</u> <ul style="list-style-type: none"> Calculating with standard form 	Four operations with standard form	Apply to worded problems that require understanding of multiplication and division	Writing numbers in standard form, index rules for positive and negatives	
<u>Sequences</u> <ul style="list-style-type: none"> Arithmetic and geometric sequences 	Position to term rules for arithmetic, geometric and special sequences	Apply to algebraic expressions	Finding term to term sequence, substitution	Quadratic sequences
<u>Linear graphs</u> <ul style="list-style-type: none"> Equations of linear graphs 	Plot equations of a line from a coordinate table Use $y = mx + c$ to identify gradient and intercepts Find equations of lines with a gradient, from two points and those that are parallel	Are two lines parallel when written in different forms?	Coordinates, substitution, rearranging	Graphical simultaneous equations

MATHS LEARNING PATHWAY

YEAR 11 – Higher tier



Strand key:



Year 11 Higher Overview - Maths

Autumn Term

	Content	Fluency	Problem solving	Prior Knowledge (KS2/3)	Future learning
	<u>Surds</u> <ul style="list-style-type: none"> Calculating with surds Rationalising denominator 	Simplifying surds Four operations with surds Expanding brackets	Application of <u>right angled trigonometry</u> through non calculator methods	Calculating with roots and powers Expand single and double brackets	Use in other areas of maths particularly in circles and trigonometry
	<u>Algebraic fractions</u> <ul style="list-style-type: none"> Calculating with algebraic fractions 	Simplify by factorising Four operations with algebraic fractions	Form and solve through worded contexts	Simplify algebraic <u>fractions</u> Factorising quadratics	Developed in KS5
	<u>Equations</u> <ul style="list-style-type: none"> Solving quadratic equations Simultaneous equations 	Solve by the formula, complete the square and graphically Solve with quadratics algebraically and graphically	What can be inferred from the completed square regarding turning point, y intercept and solutions?	Factorising quadratics Solve simultaneous equations	Factorising binomials at KS5
	<u>Pythagoras and Trigonometry</u> <ul style="list-style-type: none"> Trigonometric ratios and graphs Non <u>right angled</u> trigonometry 3D Pythagoras and trigonometry 	Understand trig ratios and graphs of trig functions Use of sine rule, cosine rule and area rule Pythagoras and trigonometry in 3D	How to you determine which rule to use? What are the key indicators?	Right angled trigonometry Changing the subject Solving equations Pythagoras in 2D	Developed in KS5
	<u>Circle geometry</u> <ul style="list-style-type: none"> Circle theorems 	Single and combined angle rules in circles including stating the reason	Application of all previous angle rules	Combined angle facts	Developed in KS5
	<u>Statistical diagrams</u> <ul style="list-style-type: none"> Histograms 	Draw and interpret histograms with unequal class intervals Averages from histograms	Calculating the median and mean value from a drawn histogram	Interpret frequency tables with grouped <u>data</u> Averages from grouped data	Used accurately in the wider <u>curriculum</u>

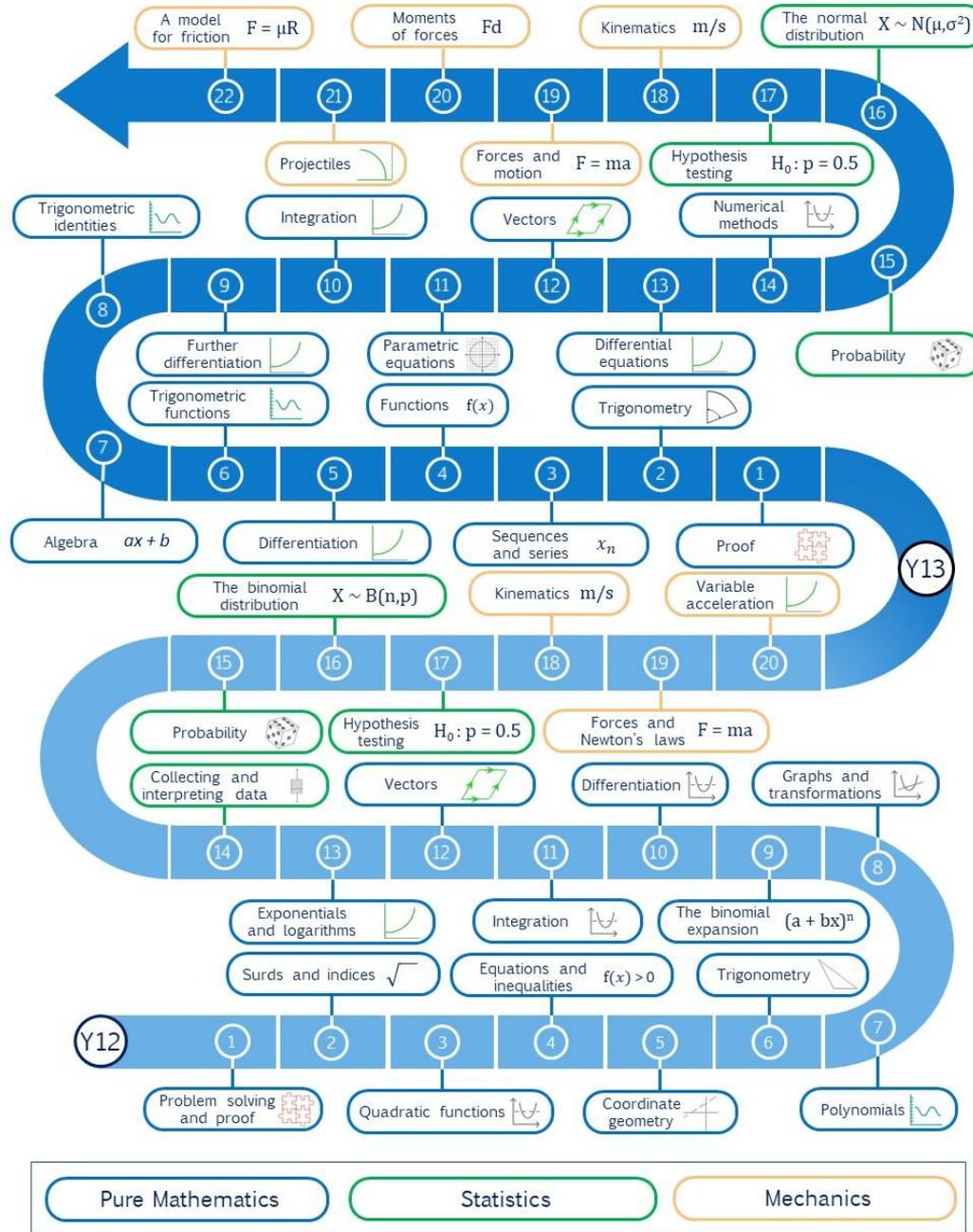
Year 11 Higher Curriculum Overview - Maths

Spring Term

Content	Fluency	Problem solving	Prior Knowledge (KS2/3)	Future learning
<u>Probability</u> <ul style="list-style-type: none"> Conditional probability 	Conditional probabilities from tables, <u>venn</u> diagrams and tree diagrams Product rule for counting	Probability with algebra where there is an expression for the overall probability	Use of <u>venn</u> diagrams Tree diagrams for independent/dependent	Developed in KS5
<u>Inequalities</u> <ul style="list-style-type: none"> Linear and quadratic inequalities 	Graphs of linear inequalities Solving quadratic inequalities	What inequalities are necessary to create the shaded region?	Solve linear <u>inequalities</u> Plotting linear and quadratic graphs	Linked to form and solve from worded problems
<u>Functions</u> <ul style="list-style-type: none"> Substituting into functions Finding composite and inverse functions 	Substituting into functions and composite functions Finding composite and inverse functions		Substituting into algebraic formulae Changing the subject Expanding single and double brackets	Developed at KS5
<u>Transformations</u> <ul style="list-style-type: none"> Transforming graphs 	Translating, <u>reflecting</u> and transforming graphs	With graph and transformed graph, state the change	Substitute into <u>formulae</u> Translation and <u>Reflect</u>	Linked to quadratic graphs
<u>Iteration</u> <ul style="list-style-type: none"> Using iterative formulae 	Substitute and find approximate solutions using iterations		Substitute into <u>formulae</u> Changing the subject	Linked to the wider curriculum
<u>Algebraic proofs</u> <ul style="list-style-type: none"> Writing algebraic proofs 	Writing algebraic proofs		Expand double <u>brackets</u> Changing the subject	Developed at KS5
<u>Similarity</u> <ul style="list-style-type: none"> Area and volume of similar shape 	Perimeter and area of similar shapes Surface area and volume of similar shapes	Use of VSF and ASF in combination with compound measures	Unknown sides in similar shapes Converting units for area and volume	Linked to transformations and enlargements
<u>Geometric proof</u> <ul style="list-style-type: none"> Vector <u>proofs</u> Geometric proofs 	Geometric proofs with vectors Geometric proofs with angles, <u>congruence</u> and similarity	How can you prove a line is parallel?	Column vectors Similarity and congruence	Developed in KS5
<u>Graphs</u> <ul style="list-style-type: none"> Non-linear graphs 	Estimating areas and gradients of <u>non linear</u> graphs Equations of circles and tangents	What is the equation of a tangent of a line?	Equations of parallel and perpendicular lines Graphs of cubic, reciprocal, exponential functions	Developed at KS5

A LEVEL MATHS LEARNING JOURNEY

YEAR 12 AND 13



A Level Mathematics – Year 12

Year 12 mathematics is designed to maximise progression and depth of understanding in preparation for Year 13. Many topics present opportunities to recap on higher tier GCSE content linking this to brand new A Level content. All topics give students the chance to extend 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. Both teachers deliver an equal amount of pure mathematics, whilst one is responsible for teaching statistics and the other is responsible for the teaching of mechanics.

The importance of developing independent study skills is a priority. Challenging questions and problems will be commonplace, often approached in groups and pairs.

Each unit starts with a student self-reflective log which is revisited after online section tests have been completed.

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 is a key part of the learning process. Support is offered and intervention sessions are put in place for students who require it.

Knowledge organisers will be provided for each block to enable students to recall keywords, facts, formulae and/or formal methods. Students will build the resilience to solve complex problems, breaking down barriers.

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

Key assessments

Autumn 1 – Baseline assessment

Autumn 2 – Pure mathematics

Spring 1 – Mock exam – Pure mathematics

Spring 2 – Applied mathematics

Summer 1 – Pure mathematics

Summer 2 – Mock exams – Pure and applied mathematics

Impact

Students will have increased understanding and confidence in A Level Maths and will be able to apply new skills to a variety of 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 informal assessments.

A Level Mathematics – Year 13

Year 13 mathematics is designed to maximise progression in preparation for final examinations and maths at degree level. Many topics present opportunities to recap on Year 12 content linking this to brand new Year 13 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. Both teachers deliver an equal amount of pure mathematics, whilst one is responsible for teaching statistics and the other is responsible for the teaching of mechanics.

The importance of developing independent study skills is a priority. Challenging questions and problems will be commonplace, often approached in groups and pairs.

Each unit starts with a student self-reflective log which is revisited after online section tests have been completed.

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 is a key part of the learning process. Support is offered and intervention sessions are put in place for students who require it.

Knowledge organisers will be provided for each block to enable students to recall keywords, facts, formulae and/or formal methods. Students will build the resilience to solve complex problems, breaking down barriers.

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

Key assessments

Autumn 1 – Pure mathematics

Autumn 2 – Applied mathematics

Spring 1 – Mock exams – Pure mathematics and statistics

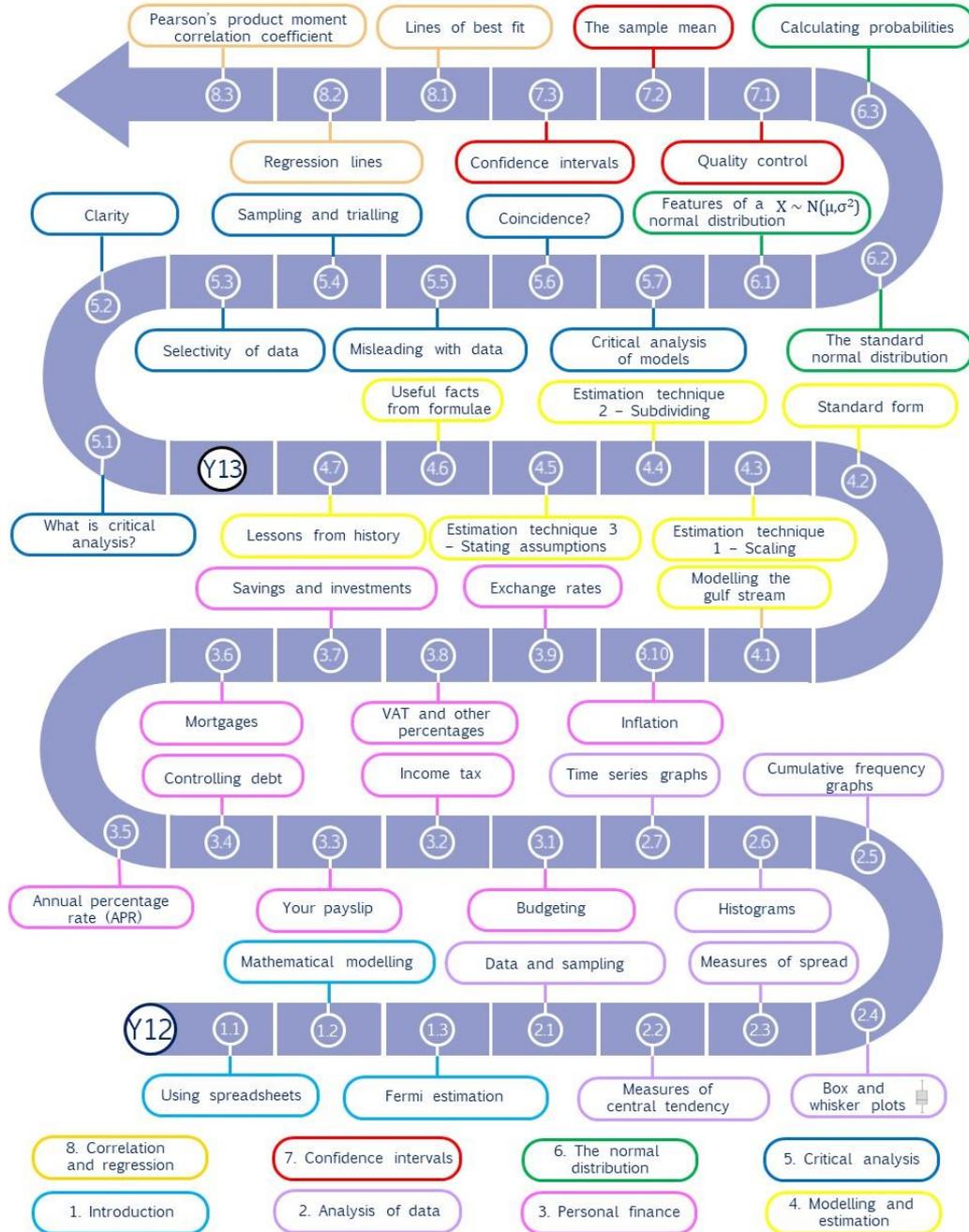
Spring 2 – Mock exams – Pure mathematics and mechanics

Impact

Students will have increased understanding and confidence in A Level Maths and will be able to apply new skills to a variety of 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 informal assessments.

CORE MATHS LEARNING JOURNEY

YEAR 12 AND 13



Core Maths

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

Content covered

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

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

Implementation

The course is delivered over 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 fundamentals of how to answer questions but there is a heavy emphasis on reasoning and understanding. As the course progresses, students will become confident in applying techniques to more unfamiliar contexts.

Learning often uncovers mathematical ideas from mistakes and misconceptions. Spot the mistake and other reasoning tasks are often used, requiring students to make a judgement and justify their answers.

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

Ultimately, we aim for students to become confident when solving complex problems and to feel satisfaction when they realise that they are applying mathematics in real world contexts.

Key assessments

Topic assessments throughout the course.

Year 12 mock examinations.

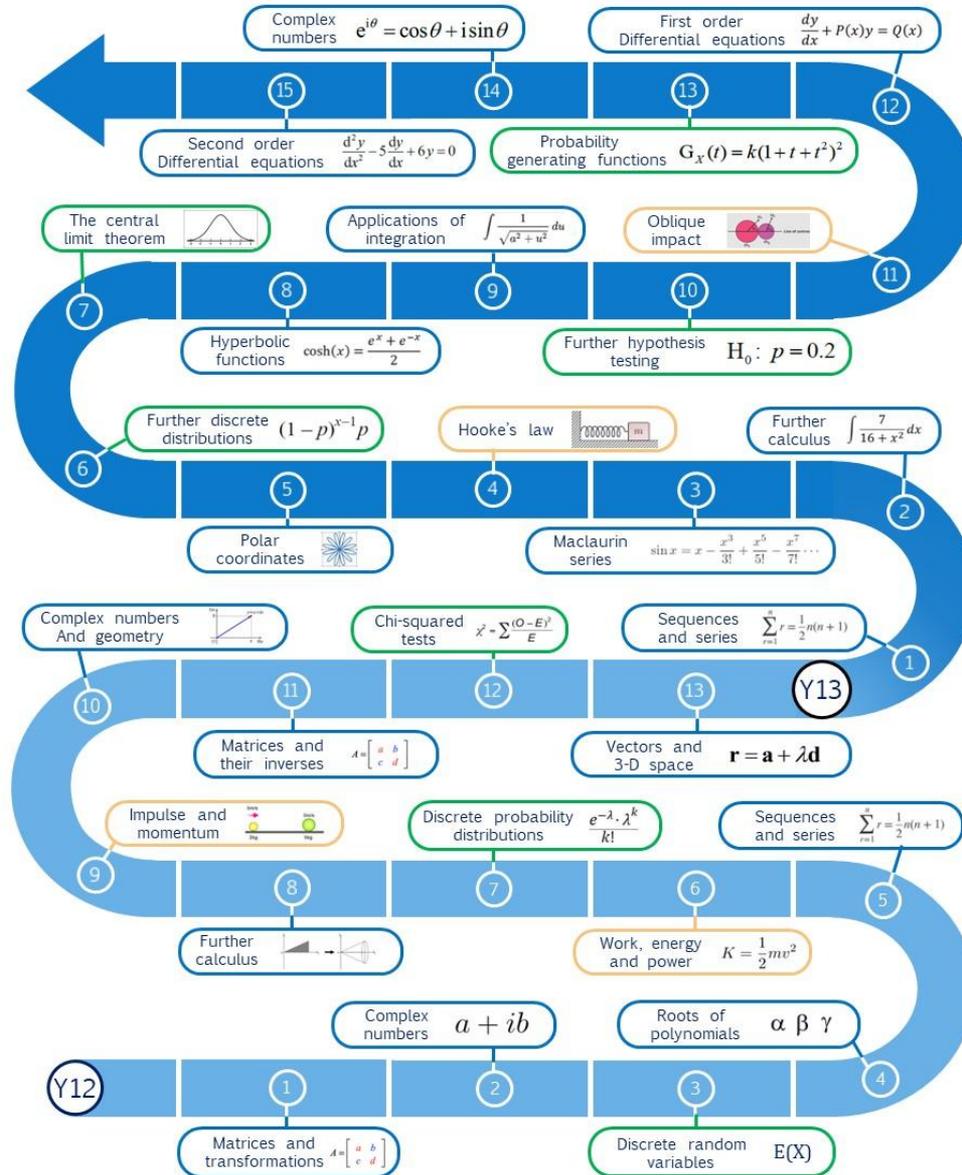
Year 13 mock examinations.

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 by regular, formal and informal assessments.

A LEVEL FURTHER MATHS LEARNING JOURNEY

YEAR 12 AND 13



Further Maths

Further Mathematics is designed to maximise progression in preparation for final examinations 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

Core pure Y12: Matrices, complex numbers, roots of polynomials, sequences and series, further calculus, vectors and 3-D space.

Core pure Y13: Sequences and series, further calculus, Maclaurin series, polar coordinates, applications of integration, differential equations, complex numbers.

Statistics: Discrete random variables, discrete probability distributions, chi-squared tests, the central limit theorem, probability generating functions.

Mechanics: Work, energy and power, impulse and momentum, Hooke's law, oblique impact.

Implementation

Lessons are split between two members of staff. Both teachers deliver an equal amount of pure mathematics, whilst one is responsible for teaching statistics and the other is responsible for the teaching of mechanics.

The importance of developing independent study skills is a priority. Challenging questions and problems will be commonplace, often approached in groups and pairs.

Each unit starts with a student self-reflective log which is revisited after online section tests have been completed.

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 examination questions will be embedded.

Learning to move forward and uncover mathematical ideas from mistakes and misconceptions is a key part of the learning process. Support is offered and intervention sessions are put in place for students who require it.

Knowledge organisers will be provided for each topic to enable students to recall keywords, facts, formulae and/or formal methods. Students will build the resilience to solve complex problems, breaking down barriers.

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

Key assessments

Topic assessments throughout the course.

Year 12 mock examinations.

Year 13 mock examinations.

Impact

Students will have increased understanding and confidence in Further Maths and will be able to apply new skills to a variety of 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 informal assessments.