Curriculum Map – Year 10 - Mathematics (2023-24)

Topic name	Term	Skills developed	Prior Learning	Next link in curriculum
Similarity and Congruence	Spring	- Develop their understanding of similarity studied in KS3 - How to prove congruence? - What makes two shapes similar? - Understand the relationship between scale factors for length, area and volume	- Y9 Autumn – Constructions and Congruency - Y9 Summer – Enlargement and Similarity	Use of scale factors applied to 2D and 3D shapes to solve increasingly challenging problems
Trigonometry	Autumn	- Use sine, cosine and tangent ratios to calculate missing aides and angles in right-angled triangles. - Calculate sides in right-angled triangles using Pythagoras' Theorem. - Use Trigonometry and Pythagoras in 3D	Y9 Similar shapes and enlargement	Using trigonometry and Pythagoras/ Theorem to calculate missing sides and angles in any triangle.
Further Trigonometry	Autumn	- Accuracy and bounds - Graphs of trigonometric functions - Further trigonometry - Area of a triangle using 0.5 ab sin C - Sine rule - Cosine rule	Y9 legacy SOW - Trigonometry	- Using upper and lower bounds to complete calculations. - Transformations of functions. - Use sin cos and tan to calculate angles of any size.

		o Trigonometry without a calculator o 3D trigonometry		

Quadratics, expanding more than two brackets, sketching graphs, graphs of circles, cubes and quadratics	Autumn	● Understanding of expanding brackets will be developed so that students will be able to multiply together two or three brackets with more than one term in them.
		
		● Pupils will develop their understanding of solving quadratics using the following methods
		
		    o Factorising (seen before)
		
		    o Quadratic Formula (seen before)
		
		    o Completing the square
		
		● An introduction to sketching functions
		
		    o Sketching quadratics and cubics
		
		    o Finding the turning point of a quadratic by completing the square
		
		● Solve linear and quadratic simultaneous equations graphically. This builds on their understanding of how to achieve the same outcome algebraically.
		
		● Solve more complex equations by using recursive iteration.
			● Y9 legacy SOW – Expanding Brackets and Solving Equations
			
			● Y10 Autumn – Quadratic, Cubic and other Graphs
				● Further work on graphs of various functions will be seen throughout the GCSE course.
				
				● The study of polynomials and other functions is seen at A-level and finding maximum and minimum points on these graphs are found using differentiation at this stage.

Angles	Spring	- Measure and read bearings - Make scale drawings using bearings - Calculate bearings using angle rules - Solve bearings problems using trigonometry and Pythagoras.	Y10 Autumn term	Using Pythagoras' Theorem and Trigonometry is developed further at A level.
Circles	Spring	- Learn all necessary circle theorems for the GCSE syllabus. - Apply the circle theorems to increasingly challenging problems. - Be able to prove circle theorems.	- Y9 Spring – Area of Trapezia and Circles - Y8 Summer – Angles in Parallel Lines and Polygons	Apply the circle theorems to unfamiliar questions that involve other techniques learned earlier in the course such as Pythagoras' Theorem and trigonometry.
Vectors and Proof	Spring	- Understand and use vector notation, including column notation, and understand and interpret vectors as displacement in the plane with an associated direction. - Understand that 2a is parallel to a and twice its length, and that a is parallel to –a in the opposite direction. - Represent vectors, combinations of vectors and scalar multiples in the plane pictorially. - Calculate the sum of two vectors, the difference of two vectors and a scalar multiple of a vector using column vectors (including algebraic terms).	- Y9 Autumn – Testing Conjectures - Y9 Spring – Pythagoras' Theorem	- Developing understanding of Vectors at A Level. - Problem Solving with Vectors at A Level.

		- Find the length of a vector using Pythagoras' Theorem. - Calculate the resultant of two vectors. - Solve geometric problems in 2D where vectors are divided in a given ratio. - Produce geometrical proofs to prove points are collinear and vectors/lines are parallel.		
Ratio	Spring	- Solve problems involving ratios, fractions and algebra. - Solve best buy problems - Calculate with ratio with area and volume	Y9 Summer 1 – Solving ratio and proportion problems	Y11 Spring – Multiplicative reasoning
Multiplicative Reasoning	Spring	- Compound interest and depreciation - Multiplication and division to calculate problems with compound measures - Direct and inverse proportion	- Y9 Spring – Using Percentages - Y9 Summer – Solving Ratio and Proportion Problems	- Link iterative methods to compound growth and decay. - Pupils use their understanding to explain their answers in context.
Probability	Spring	- Calculating probabilities - Combined events - Independent and mutually exclusive events - Relative frequency	Y9 Summer - Probability	Solve complex questions related to probability out of context that include algebra or surds.

		• Conditional probabilities including tree diagrams • Venn diagram notation and finding probabilities using Venn diagrams		

Collecting data	Summer	• Understand what is being asked in a variety of problems
		
		  o What and how to collect data
		
		  o Understand primary and secondary data
		
		  o Consider fairness
		
		• Pupils will learn what a population and sample is
		
		  o Sample size will be discussed and how it may affect the reliability of some data
		
		• Plan how best to minimise bias in data collection and the reason for wanting to do so
		
		• Understand how to perform Capture-Recapture and see examples of when it is used
			• Y8 Autumn – Representing Data
			
			• Y8 Summer – The Data Handling Cycle
				• Use these techniques to carry out a survey and collect data.
				
				• Be able to explain, in context, how sample size, type of data, bias, etc may have affected a particular set of data that has been collected.

Cumulative frequency, box plots and histograms	Summer	• Pupils will learn how to draw and interpret a number of data presentation techniques o Cumulative Frequency Diagrams	• Y8 Autumn – Representing Data • Y8 Summer – The Data Handling Cycle	• Pupils should be able to apply their new learning to questions posed to them out of context; it is particularly important for them to be able to distinguish the

		o Box plots o Histograms ● Pupils will develop their understanding of averages and measures of spread by calculating these from statistical diagrams and will also be introduced to interquartile range ● By the end of this topic pupils will be able to estimate the mean from a histogram. This process is developed from calculating averages from frequency tables.		difference between each statistical diagram. ● A number of these statistical diagrams are studied at A-level as well as required in GCSE examinations. ● Further work on measures of spread is seen in year 12 including standard deviation.
Non-Calculator methods	Summer	● Pupils will understand how to use and calculate with surds and upper and lower bounds ● Understand limits of accuracy ● Solve financial maths problems	● Y9 Spring – Maths and Money	● Many GCSE questions require pupils to be able to identify a range of possible solutions or to work out the error bounds of solutions.
Sequences	Summer	● Describe and continue arithmetic and geometric sequences ● Describe sequences involving surds ● Find the nth term for linear and quadratic sequences	● Y10 Summer – Non-calculator methods ● KS3 work on sequences	● This topic is further developed at A level
Indices and roots	Summer	● Work with fractional indices ● Calculate with numbers in standard form	● KS3 work on positive and negative indices and standard form	● Working with Indices is a fundamental area of mathematics. Indices appear throughout many types of questions and problems at Ks4 and KS5.

Manipulating Expressions	Summer	- Learn how to add, subtract, multiply and divide algebraic fractions - Solve equations involving algebraic fractions - Be able to form and solve equations and inequalities with fractions - Use algebraic proof	- KS3 work on solving equations - Y10 Autumn – work on solving equations and inequalities	This topic is widening the array of equations and inequalities which pupils can solve. This is developed further at A level.

Key

Number	Geometry	Ratio & proportion	Algebra	Statistics