(GCSE Mathematics - FT) Year 11 Long Term Plan

Rationale (with end points): Year 11 is for students to practise their retrieval of the past 2 years of content. Students look at the 4 main areas of maths and use these skills to help solve problems solving questions and develop their mathematical reasoning				
Term	**Topic**	**Knowledge**	**Skills**	***Reading /wider reading***
Autumn term 1	Unit 16: Quadratic equations and graphs	● Quadratics equations, expanding and factorising ● Quadratics equations: graphs	• Generate points and plot graphs of simple quadratic functions, then more general quadratic functions; • Identify the line of symmetry of a quadratic graph; • Find approximate solutions to quadratic equations using a graph; • Interpret graphs of quadratic functions from real-life problems; • Identify and interpret roots, intercepts and turning points of quadratic graphs.	The Life-Changing Magic of Numbers by Bobby Seagull
	Unit 17: Perimeter, area and volume 2	● Circles, cylinders, cones and spheres	• Recall the definition of a circle and identify, name and draw parts of a circle including tangent, chord and segment; • Recall and use formulae for the circumference of a circle and the area enclosed by a circle circumference of a circle = $2\pi r = \pi d$, area of a circle = πr^2; • Use $\pi \approx 3.142$ or use the π button on a calculator; • Give an answer to a question involving the circumference or area of a circle in terms of π; • Find radius or diameter, given area or perimeter of circles; • Find the perimeters and areas of semicircles and quarter-circles; • Calculate perimeters and areas of composite shapes made from circles and parts of circles; • Calculate arc lengths, angles and areas of sectors of circles; • Find the surface area and volume of a cylinder; • Find the surface area and volume of spheres, pyramids, cones and composite solids; • Round answers to a given degree of accuracy.	
	Unit 18: Fractions and reciprocals	● Fractions & reciprocals ● Indices & Standard form	• Add and subtract mixed number fractions; • Multiply mixed number fractions; • Divide mixed numbers by whole numbers and vice versa; • Find the reciprocal of an integer, decimal or fraction;	

			• Understand 'reciprocal' as multiplicative inverse, knowing that any non-zero number multiplied by its reciprocal is 1 (and that zero has no reciprocal because division by zero is not defined).	
			• Use index laws to simplify and calculate the value of numerical expressions involving multiplication and division of integer powers, fractions and powers of a power; • Use numbers raised to the power zero, including the zero power of 10; • Convert large and small numbers into standard form and vice versa; • Add, subtract, multiply and divide numbers in standard form; • Interpret a calculator display using standard form and know how to enter numbers in standard form.	
Autumn term 2	Unit 19: Congruence, similarity and vectors	• Similarity and congruence in 2D • Vectors	• Use the basic congruence criteria for triangles (SSS, SAS, ASA and RHS); • Solve angle problems involving congruence; • Identify shapes which are similar; including all circles or all regular polygons with equal number of sides; • Understand similarity of triangles and of other plane shapes, use this to make geometric inferences, and solve angle problems using similarity; • Identify the scale factor of an enlargement of a shape as the ratio of the lengths of two corresponding sides; • Understand the effect of enlargement on perimeter of shapes; • Solve problems to find missing lengths in similar shapes; • Know that scale diagrams, including bearings and maps are 'similar' to the real-life examples. • Understand and use column notation in relation to vectors; • Be able to represent information graphically given column vectors; • Identify two column vectors which are parallel; • Calculate using column vectors, and represent graphically, the sum of two vectors, the difference of two vectors and a scalar multiple of a vector	Dr. Math Explains Algebra: Learning Algebra Is Easy! Just Ask Dr. Math! by The Math Forum
	Unit 20: More algebra	• Rearranging equations • Graphs of cubic and reciprocal functions	• Know the difference between an equation and an identity and use and understand the ≠ symbol; • Change the subject of a formula involving the use of square roots and squares;	

		● Graphs of simultaneous equations	• Answer 'show that' questions using consecutive integers $(n, n + 1)$, squares a^2, b^2, even numbers $2n$, and odd numbers $2n + 1$; • Solve problems involving inverse proportion using graphs, and read values from graphs; • Find the equation of the line through two given points; • Recognise, sketch and interpret graphs of simple cubic functions; • Recognise, sketch and interpret graphs of the reciprocal function $y = \frac{1}{x}$ with $x \neq 0$; • Use graphical representations of inverse proportion to solve problems in context; • identify and interpret the gradient from an equation $ax + by = c$; • Write simultaneous equations to represent a situation; • Solve simultaneous equations (linear/linear) algebraically and graphically; • Solve simultaneous equations representing a real-life situation, graphically and algebraically, and interpret the solution in the context of the problem;
Spring term 1	Exam preparation		
Spring term 2	Exam preparation		
Summer term 1	Exam preparation & Exams		
Summer term 2	Students not present after exams		