Maths Department - Year 11 Higher

Shirley High Curriculum Map	*The year 11 curriculum builds on the knowledge and skills students have acquired in year 10. Students are regularly examined at GCSE level, with a focus on improving exam technique, knowledge application and time keeping. Students are regularly assessed according to their ability to: use and apply standard techniques; interpret and communicate Mathematically and solve problems within Mathematics and other contexts.*					
	Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:
	(16) Circle theorems (17) More algebra	(18) Vectors and geometric proof (19) Proportion and graphs	Revision and Exam Practice	Revision and Exam Practice	Revision and Exam Practice	Public examination.
Why Now?	(16) Pupils build on their geometrical knowledge from year 10. Pupils will also be required to retrieve algebraic knowledge from year 10 in order to prove a given circle theorem. (17) Pupils learn the most complex algebraic content on the higher tier. The algebraic proof covered in this unit continues a theme of proof.	(18) The theme of proof is continued into vector geometry. (19) The course content is completed with a unit that involves a combination of prior knowledge of algebra and ratio, proportion and rates of change skills.	Having covered all content each class will begin bespoke revision based on their first set of Pre-Public Examinations (PPEs). Teachers will use the data from PPE1 to inform them of what topics their class needs to practise further.	Pupils will attempt their second set of PPEs. This will inform teachers on what topics their class needs to practise further and thus teaching will be bespoke for all classes.	Pupils will then focus on exam practice and exam technique before attempting their third and final set of PPEs. Teachers will again be teaching bespoke exam practice on select topics that their class requires.	
Fundamental Concepts	Geometry and measures Algebra	Geometry and measures Algebra Ratio, proportion and rates of change	Number Algebra Ratio, proportion and rates of change Geometry and measures Probability Statistics	Number Algebra Ratio, proportion and rates of change Geometry and measures Probability Statistics	Number Algebra Ratio, proportion and rates of change Geometry and measures Probability Statistics	
Students will…	(16) **Solving** problems involving angles, triangles and circles. **Understanding** and using facts about chords and their distance from the centre of a circle. **Solving** problems involving chords and radii. **Understanding** and using facts about tangents at a point and from a point. **Solving** angle and length problems involving circles and tangents. **Understanding**, proving and using facts about angles subtended at the centre and the circumference of a circle. **Understanding**, proving and using facts about the angle in a semicircle. **Understanding**, proving and using facts about cyclic quadrilaterals. **Proving** the alternate segment theorem. **Solving** angle problems using circle theorems. **Finding** the equation of the tangent to a circle at a given point. (17) **Changing** the subject of a formula where the power or root of the subject appears. **Changing** the subject of a formula where the subject appears twice. **Adding** and subtracting algebraic fractions. **Multiplying** and dividing algebraic fractions. **Changing** the subject of a formula involving fractions where all the variables are in the denominators. **Simplifying** algebraic fractions. **Adding** and subtracting more complex algebraic fractions. **Multiplying** and dividing more complex algebraic fractions. **Proving** a result using algebra. **Simplifying** expressions involving surds. **Expanding** expressions involving surds. **Rationalising** the denominator of a fraction. **Solving** equations that involve algebraic fractions. **Using** function notation. **Finding** composite functions. **Finding** inverse functions.	(18) **Understanding** and using vector notation. **Working** out the magnitude of a vector. **Adding** and subtracting vectors. **Calculating** using vectors and representing the solutions graphically. **Identifying** when vectors are parallel. **Calculating** the resultant of two vectors. **Solving** problems using vectors. **Using** the resultant of two vectors to solve vector problems. **Expressing** points as position vectors. **Proving** that lines are parallel. **Proving** that points are collinear. **Solving** geometric problems in two dimensions using vector methods, including where vectors are divided in a given ratio. **Applying** vector methods for simple geometric proofs. (19) **Writing** and using equations to solve problems involving direct proportion. **Solving** problems involving square and cubic proportionality. **Writing** and using equations to solve problems involving inverse proportion. **Using** and recognising graphs showing inverse proportion. **Recognising** graphs of exponential functions. **Sketching** graphs of exponential functions. **Matching** equations to graphs. **Calculating** the gradient of a tangent at a point. **Estimating** the area under a non-linear graph. **Understanding** the relationship between translating a graph and the change in its function notation. **Understanding** the effect reflecting a curve in one of the axes has on its function form.	A bespoke selection of GCSE content according to data from PPEs for the class.	A bespoke selection of GCSE content according to data from PPEs for the class.	A bespoke selection of GCSE content according to data from PPEs for the class.	
Language for Life (Key terms/Vocabulary)	(16) Radius, radii, centre, tangent, circumference, diameter, gradient, perpendicular, reciprocal, coordinate, equation, substitution, chord, triangle, isosceles, angles, degrees, cyclic quadrilateral,	(18) Vector, direction, magnitude, scalar, multiple, parallel, collinear, proof, ratio, column vector. (19) Reciprocal, linear, gradient, quadratic, exponential,	A bespoke combination of the key terminology mentioned across the 19 units.	A bespoke combination of the key terminology mentioned across the 19 units.	A bespoke combination of the key terminology mentioned across the 19 units.	

	alternate, segment, semicircle, arc, theorem. (17) Rationalise, denominator, surd, rational, irrational, fraction, equation, rearrange, subject, proof, function notation, inverse, evaluate.	functions, direct, indirect, proportion, estimate, area, rate of change, distance, time, velocity, transformations, cubic, transformation, constant of proportionality.				
Extended writing Opportunities						
Maths Across the Curriculum	(17) **Rearranging formulae** is used in subjects such as food technology, physics, business studies and geography.	(18) **Vectors** are used in the creation of accurate images in computer science. (19) **Calculating the gradient of a tangent at a point** is used in physics but can also be used in geography.	Bespoke Curriculum applied			
Links to careers/ aspirations	(16) **Pupils** can use their understanding of circle theorems to become a teacher of mathematics. (17) **Composite functions** are used in manufacturing and design. One example being a factory that bottles and brands a liquid, whilst another being how a petrol machine calculates the cost of petrol consumed by a customer.	(18) **Vectors** are used in careers involving flight and boat navigation. (19) **Exponential functions** are used by engineers to measure tensile strength.				
Cultural Capital	(16) **Problem solving with circle theorems** gives pupils a model for how to problem solve in day-to-day life or in the workplace. A task may seem overwhelming when looked at in its entirety but breaking down the task into more manageable steps using prior knowledge makes the task achievable. (17) **Pupils** learn another way to categorise numbers by distinguishing a rational number from an irrational number.	(18) **Pupils** can use their understanding of bounds to purchase enough product for an area when provided with approximate dimensions, without being wasteful. (19) **Rates of change** are crucial in forecasting. Being able to calculate the rate of change from real life graphs allows pupils to better understand the references to the rate of infection (r) in the global pandemic and the subsequent decisions that were made because of its value at that time.				
Practical Application of Skills	(17) **Pupils** can use their ability to rearrange formulae to calculate the maximum amount of money they could borrow for a set time and set APR.	(18) **Pupils** can abstract their understanding of vectors to help plan train and tube journeys at times where the commonly known route is compromised due to engineering works. (19) **Pupils** can use their understanding of composite functions to calculate the discount in pounds of an item on sale in a country with a different currency.				