

Year 10 Mathematics Curriculum Map 2019-20

	Autumn Term	Spring Term	Summer Term
Unit Length	<p><u>Foundation</u> Unit 9 - Graphs: 3 weeks Unit 10 – Transformations: 3 weeks Unit 11 – Ratio and proportion: 3 weeks</p> <p><u>Higher</u> Unit 9 – Equations and inequalities –2 weeks Unit 10 – Probability: – 2weeks Unit 11 – Multiplicative reasoning – 2 weeks</p>	<p><u>Foundation</u> Unit 12 – right-angled triangles –4 weeks Unit 13 – probability – 2 weeks Unit 14 – Multiplicative reasoning – 2 weeks</p> <p><u>Higher</u> Unit 12 – Similarly and congruence:–2 weeks Unit 13 – More trigonometry – 3-4 weeks Unit 14 – Further statistics – 2 weeks</p>	<p><u>Foundation</u> Unit 15 – constructions, Loci and Bearings –3 weeks Unit 16 – Quadratic Equations and Graphs – 2 weeks Unit 17 – Perimeter, area and volume 3– 4 weeks</p> <p><u>Higher</u> Unit 15 – Equations and graphs –4 weeks Unit 16 – Circle theorems – 4 weeks Unit 17 – More algebra – 2 weeks</p>
Assessment Objectives	<p>AO1 Use and apply standard techniques (Foundation 50%, Higher 40%) AO2 Reason, interpret and communicate mathematically (Foundation 25%, Higher 30%) AO3 Solve problems within mathematics and in other contexts (Foundation 25%, Higher30%)</p>		
Description of the topic and key learning outcomes.	<p><u>Foundation</u> Unit 9 - Graphs: students will study finding the midpoint of a line segment, ● Recognise, name and plot the graphs of $y = x$ and $y = -x$, ●Plot straight-line graphs from tables of values, ●Draw graphs to represent relationships, ●Find the gradient of a line. ●Understand that parallel lines have the same gradient. ● Understand what m and c represent in $y = mx + c$, ● Find the equations of straight-line graphs. Unit 10 – Transformations: students will study to translate a shape on a coordinate grid, ● Use a column vector to describe a translation, ●Draw reflections on a coordinate grid, ● Describe reflections on a coordinate grid, ● Rotate a shape on a coordinate grid, ●Describe a rotation, ●Enlarge a shape by a scale factor, ● Enlarge a shape using a centre of enlargement, ●</p>	<p><u>Foundation</u> Unit 12 – Right-angled triangles: students will study calculating the length in a right-angled triangle, ●solve problems using Pythagoras’ theorem. ● use the sine, cosine and tangent ratios to calculate the length of a side in a right-angled triangle ● use the sine, cosine and tangent ratios to calculate an angle in a right-angled triangle, ● use the trigonometry ratio to solve problems. ● Unit 13 – Probability: students will study calculating simple probabilities from equally likely events. ●Understand mutually exclusive and exhaustive outcomes. ●Use two-way tables to record the outcomes from two events. ●Work out probabilities from sample space diagrams. ●Use Venn diagrams to work out probabilities. ●Understand the language of sets and Venn diagrams. Use frequency trees and tree diagrams. ●Work out probabilities using tree diagrams.</p>	<p><u>Foundation</u> Unit 15 - Constructions, loci and bearings: students will study recognising 3D shapes and their properties. ●Describe 3D shapes using the correct mathematical words. ● Understand and draw plans and elevations of 3D shapes. ● Make accurate drawings of triangles using a ruler, protractor and compasses.● Identify SSS, ASA, SAS and RHS triangles as unique from a given description.● Identify congruent triangles. ●Accurately draw angles and 2D shapes using a ruler, protractor and compasses.● Construct a polygon inside a circle.● Recognise nets and make accurate drawings of nets of common 3D objects.● Bisect angles and lines using rulers and compasses. ● Draw loci for the path of points that follow a given rule.● Identify regions bounded by loci to solve practical problems. ●Find and use three-figure bearings. ● Solve problems involving</p>

	<ul style="list-style-type: none"> ● Identify the scale factor of an enlargement, ● Find the centre of enlargement, ● Describe an enlargement. <p>Unit 11 – Ratio and proportion: students will study to use ratio notation, ● solve problems using ratios, ● Use ratios to convert between units, write and use ratios for shapes and their enlargements, ● Divide a quantity into a given ratio, ● Use ratios involving decimals, ● Compare ratios, ● Solve ratio and proportion problems, ● Use the unitary method to solve proportion problems, ● solve proportion problems in words, ● work out which product is better value for money. ● Recognise and use direct proportion on a graph, ● understand the link between the unit ratio and the gradient, ● solve word problems involving direct and inverse proportion.</p>	<ul style="list-style-type: none"> ● Understand independent events. ● Solve probability problems involving events that are not independent. <p>Unit 14 – Multiplicative reasoning: students will study calculating a percentage profit or loss. ● Express a given number as a percentage of another in more complex situations. ● Find the original amount given the final amount after a percentage increase or decrease. ● Find an amount after repeated percentage change, ● solve growth and decay problems. ● Solve problems involving compound measures. ● Convert between metric speed measures. ● Calculate average speed, distance and time. ● Use formulae to calculate speed and acceleration.</p>	<p>bearings and scale diagrams.</p> <p>Unit 16 – Quadratic equations and graphs: students will study to multiply double brackets. ● Recognise quadratic expressions. ● Square single brackets. ● Plot graphs of quadratic functions. ● Recognise a quadratic function. ● Use quadratic graphs to solve problems. ● Solve quadratic equations $ax^2 + bx + c = 0$ using a graph. ● Solve quadratic equations $ax^2 + bx + c = k$ ● Using a graph. ● Factorise quadratic expressions. ● Solve quadratic functions algebraically.</p> <p>Unit 17 – Perimeter, area and volume 2: students will study calculating the circumference of a circle. ● Solve problems involving the circumference of a circle. ● Work out the area of a circle. ● Work out the radius or diameter of circle. ● Solve problems involving the area of a circle. ● Give answers in terms of π. ● Work out areas of semicircles and quarter circle and perimeters. ● Work out the volume and surface area of cylinders. ● Work out the volume and surface area of a pyramid, cone and sphere.</p>
	<p>Higher Student</p> <p>Unit 9 - Equations and inequalities: students will study finding the roots of quadratic functions. ● Rearrange and solve simple quadratic equations. ● Solve more complex quadratic equations. ● Use the quadratic formula to solve a quadratic equation. ● Complete the square for a quadratic expression. ● Solve quadratic equations by completing the square. ● Solve simultaneous equations. ● Solve linear and quadratic simultaneous equations where both equations are multiplied. ● Interpret real-life situations involving two unknowns and solve them. ● Solve inequalities and show the</p>	<p>Higher Student</p> <p>Unit 12 – Similarly and congruence: students will study to show that two triangles are congruent. ● Know the conditions of congruence. ● Prove shapes are congruent. ● Solve problems involving congruence ● Use the ratio of corresponding sides to work out scale factors. ● Find missing lengths on similar shapes. ● Use similar triangles to work out lengths in real life. ● Use the link between linear scale factor and area scale factor to solve problems. ● Use the link between scale factors for length, area and volume to solve problems.</p> <p>Unit 13 – More trigonometry: students will study to understand and use upper and lower bounds in</p>	<p>Higher Student</p> <p>Unit 15 – Equations and graphs: students will study solving simultaneous equations graphically. ● Represent inequalities on graphs. ● Interpret graphs of inequalities. ● Recognise and draw quadratic functions. ● Find approximate solutions to quadratic equations graphically. ● Solve quadratic equations using an iterative process. ● Find the roots of cubic equations. ● Sketch graphs of cubic functions. ● Solve cubic equations using an iterative process.</p> <p>Unit 16 – Circle theorems: students will study solving problems involving angles, triangles and circles. ● Understand and use facts about chords and their distance from the centre of a circle. ●</p>

	<p>solution on a number line and using set notation.</p> <p>Unit 10 – Probability: students will study using the product rule for finding the number of outcomes for two or more events. ● List all the possible outcomes of two events in a sample space diagram ● Find the probabilities of mutually exclusive outcomes and events. ● Find the probability of an event not happening. ● Draw and use frequency trees. ● Calculate probabilities of repeated events. ● Draw and use probability tree diagrams. ● Decide if two events are independent. ● Draw and use tree diagrams to calculate conditional probability. ● Draw and use tree diagrams without replacement. ● Use two-way tables to calculate conditional probability. ● Use Venn diagrams to calculate conditional probability. ● Use set notation.</p> <p>Unit 11 – Multiplicative reasoning: students will study finding an amount after repeated percentage changes. ● Solve growth and decay problems. ● Calculate rates. ● Convert between metric speed measures. ● Use a formula to calculate speed and acceleration. ● Solve problems involving compound measures. ● Use relationships involving ratio. ● Use direct and indirect proportion.</p>	<p>calculations involving trigonometry. ● Understand how to find the sine, cosine and tangent of any angle. ● Know the graph of the sine, cosine and tangent function and use it to solve equations. ● Find the area of a triangle and a segment of a circle. ● Use the sine rule to solve 2D problems. ● Use the cosine rule to solve 2D problems. ● Solve bearings problems using trigonometry. ● Use Pythagoras’ theorem in 3D. ● Use trigonometry in 3D. ● Recognise how changes in a function affect trigonometric graphs.</p> <p>Unit 14 – Further statistics: students will study to understand how to take a simple random sample. ● Understand how to take a stratified sample. ● Draw and interpret cumulative frequency tables and diagrams. ● Work out the median, quartiles and interquartile range from a cumulative frequency diagram. ● Draw and interpret box plots. ● Understand frequency density. ● Draw histograms. ● Interpret histograms. ● Compare two sets of data.</p>	<p>Solve problems involving chords and radii. ● Understand and use facts about tangents at a point and from a point ● Understand, prove and use facts about angles subtended at the centre and the circumference of circles. ● Understand, prove and use facts about the angle in a semicircle being a right angle. ● Find missing angles using these theorems and give reasons for answers. ● Solve angle problems using circle theorems. ● Find the equation of the tangent to a circle at a given point.</p> <p>Unit 17 – More algebra: students will study changing the subject of a formula. ● Add and subtract algebraic fractions. ● Multiply and divide algebraic fractions. ● Simplify algebraic fractions. ● Simplify expressions involving surds. ● Expand expressions involving surds. ● Rationalise the denominator of a fraction. ● Solve equations that involve algebraic fractions. ● Use function notation. ● Find composite functions. ● Find inverse functions. ● Prove a result using algebra</p>
Assessment objectives and skills being taught	AO1, AO2 & AO3	AO1, AO2 & AO3	AO1, AO2 & AO3
Milestone assessments	w/c 2 nd October Milestone assessment on all work covered since September (Units 9 – 11)	w/c 4 th December Milestone assessment on all work covered since December (Units 12 – 14)	w/c 22 nd January Milestone assessment on all work covered over the course of the year (Unit 15 – 17)
Wider reading	<u>Foundation Students</u> Research about Global Positioning System	<u>Foundation Students</u> who is Pythagoras and why is his work still	<u>Foundation Students</u> Investigate how architects can use mathematical

	<p>(GPS). Research on how robots and machines use translation to move components from place to place. How can we use ratio in a real life.</p> <p>Higher students Can a linear equation and a linear inequality be solved in the same way and what makes them different? What ways can simultaneous equations be used in everyday life? What is experimental and theoretical probability? How do you find the monthly interest rate?</p>	<p>relevant in geometry? Who came up with the theory of probability? Who is Sir Ronald Aylmer Fisher?</p> <p>Higher students Is congruent the same as similar? How do you prove triangles are similar? What is the caesium fountain atomic clock? How accurate is it? How is trigonometry useful to astronomers? Research Greek Mathematician Pythagoras of Samos. Investigate some careers where Pythagoras and trigonometry skills could be required. Why do we use stratified sampling?</p>	<p>shapes and symmetry to make buildings more interesting? How can food manufacturers use nets of 3-D shapes to work out the most efficient way to cut food cardboard? Why is bearing useful? Why is quadratic function important to learn? How is the value of pi derived?</p> <p>Higher students Research the history of algebra. Where did the word algebra derive from? Which civilizations introduced algebra? Who were the early pioneers? How do you draw a graph from an equation? Describe a career or real life situation in which circle theorems are used. Why irrational numbers are called Surds? Why PI is not a SURD?</p>
Literacy programme	<p>All Students: Definition and spelling tests., glossary/keyword bank, breaking down problem solving questions and explaining answers in full sentences.</p>		
Independent Learning Tasks	<p>Knowledge organiser. PiXL Maths App. Weekly homeworks</p>		
RRSA	<p>Article 2 – Non discrimination Article 12 – Respect for the views of the child Article 13 – Freedom of expression Article 14 – Freedom of thought, belief and religion Article 15 – Freedom of association Article 16 – Right to privacy Article 23 – Right to a full life if child with disability Article 28 – Right to education Article 29 – Goals of education Article 42 – Knowledge of rights</p>		
CEI	<ul style="list-style-type: none"> • The specific value of maths as a required or preferred subject for particular careers, e.g.: • Nano medicine • Food Engineering • Medicine and Nursing • Graphical design • Agriculture • Engineers and engineering technicians • Surveyors and surveying technicians 		

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| | <ul style="list-style-type: none">• Systems analysts• Actuaries• Accountants• Operational researchers• Chemists• Software engineers• Statisticians |
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