



Maths Curriculum Map

Year	What do students learn?	Why?	Tier 3 keywords	Threshold concepts	Literacy	Assessment
KS2	<p>Year 6</p> <p>Number:</p> <ul style="list-style-type: none"> - Number and Place value - Values of digits - Rounding - Negative numbers - Four operations - Fractions <p>Ratio and Proportion</p> <ul style="list-style-type: none"> - Finding percentages of amounts - Similar shapes - Sharing amounts <p>Algebra</p> <ul style="list-style-type: none"> - Simple formulae - Linear sequences - Simple equations <p>Measurement</p> <ul style="list-style-type: none"> - Converting units of measure - Recognise when to use formulae for area and volume - Area of parallelograms and triangles. <p>Geometry:</p> <ul style="list-style-type: none"> - Draw 2D shapes - 2D representations of 3D shapes - Classify quadrilaterals 		Place value Rounding Negative Digit Remainder Factors Multiples Primes Estimation Proportion Sharing Percentage Formula Linear sequence Variables Converting Units Parallelogram Triangles Cube Cuboids Triangles Quadrilaterals Polygons Radius Tangent Diameter Coordinates Translations Mean Pie charts Line graphs	Place value Four operations Equations Area Converting units 2D representations of 3D shapes Coordinates Pie charts Mean	Students sit English grammar, punctuation and spelling tests at the end of Key Stage 2.	<p>Key Stage 2 assessments</p> <ul style="list-style-type: none"> - Mathematics Paper 1 (Arithmetic) - Mathematics Paper 2: Reasoning - Mathematics Paper 3: reasoning. <p>The maths test comprises two components, split over three papers.</p> <p>Paper 1: Arithmetic This paper assesses mathematical calculations: 4 operations, fractions, decimals, percentages. They also cover long division and long multiplication. 30 minutes for 40 marks.</p> <p>Papers 2 & 3 assess mathematical fluency, solving mathematical problems and mathematical reasoning. Pupils have 40 minutes for 35 marks.</p>

	<ul style="list-style-type: none"> - Naming parts of circles - Angles around a point, on a straight line and vertically opposite angles. - Coordinates - Translations <p>Statistics</p> <ul style="list-style-type: none"> - Construct pie charts and line graphs - Use mean as an average 					
Year	What do students learn?	Why?	Tier 3 keywords	Threshold concepts	Literacy	Assessment
7	<p>Probability and Number 1</p> <ul style="list-style-type: none"> • Basic probability • Fractions • Order of operations • Factors, multiples & primes • Powers and roots • Probability – combined events, Venn diagrams <p>Algebra 1</p> <ul style="list-style-type: none"> • Manipulating algebra • Expanding brackets • Substitution • Sequences • Special Sequences • Coordinates • Linear Graphs <p>Ratio and Proportion 1</p>	<p>Term 1:</p> <ul style="list-style-type: none"> - We start with topics that students might not necessarily have covered in as much depth at KS2, to encourage them to build interest in mathematics rather than repeat material they are already comfortable in. For example, students will not have studied Probability in as much depth as many number topics they may cover later in Year 7. - Later in the term, we look at basic fundamentals such as BIDMAS to make sure that the basic concepts and building blocks of maths are secure before moving on. <p>Term 2:</p>	Probability Outcome Impossible Mutually exclusive Exhaustive Experiment Equivalent Operation Division Remainder Factor Multiple Prime Lowest Common Multiple Highest Common Factor Index Notation Power	<ul style="list-style-type: none"> - Powers and Roots - Expanding brackets - Circles (Area and Circumference) - Linear Graphs - Writing ratios using proportion. - Similarity and Congruence. 	<p>Spelling tests</p> <p>We ensure students in Year 7 do a spelling test each half term (Based on Tier 3 vocabulary), with a pre-test at the beginning of the term and a post-test at the end. We record their scores so we can assess the impact of this.</p> <p>Reading</p> <p>Every lesson after lunch starts with 10</p>	<p>Week 7 (End of October) Topic Test/MCQs</p> <p>Week 19 (Beginning of January) Topic test/MCQs</p> <p>Week 29 (End of March) Topic Test/MCQs</p> <p>Week 41 (Beginning of July) End of Topic Test/MCQs</p> <ul style="list-style-type: none"> • At the above assessment points, teachers will assess the

	<ul style="list-style-type: none"> • Ratio • Simplifying Ratio • Sharing in a given ratio • Express one quantity as a ratio of another <p>Geometry and Measures 1</p> <ul style="list-style-type: none"> • Properties of shapes • Symmetry • Perimeter and Area • Circle Area and Circumference • Angles • Constructions • Similarity and Congruence 	<p>- We move away from probability and number skills slightly by introducing and extending algebra that they will have seen at KS2. Students are expected to be able to simplify algebraic expressions, substitute into formulas and recognise differing sequences (including working out the nth term).</p> <p>Term 3:</p> <ul style="list-style-type: none"> - We return to sequences slightly at the start of the term, looking at special sequences: Fibonacci, Geometric, Square, Triangle numbers. - We then move into some graph work which adds variation and helps interleave different topics from before. We use our algebra skills to help us form and draw straight-line (Linear) graphs before we move onto introducing Ratio before January half term. <p>Term 4:</p> <ul style="list-style-type: none"> - Ratio plays an extremely large part to play within mathematics and is also one of the most common constituents of the new GCSE (25% for Foundation tier and 20% for Higher tier students). We build on the introduction of ratio at the end of Term 3 by manipulating ratios further in term 4. - We simplify ratios, write one fraction as another, share in a given ratio and write proportional relationships as fractions and as ratios. <p>Term 5:</p> <ul style="list-style-type: none"> - In term 5, we move away again and look at shapes. This includes looking at symmetry, perimeter and scale diagrams, circle area and circumference and angle constructions. The topics are distinct from each other but help interleaving between topics. <p>Term 6:</p>	<p>Base Exponent Square Root Inverse Cube Approximation Negative number Directed number Venn diagram Sample Space Theoretical probability Bias Fairness Variable Unknown Expression Equation Pattern Sequence Ascending Descending Arithmetic Geometric Horizontal Vertical Coordinate Fraction Proportion Sphere Cone Cylinder Quadrilateral Square Rectangle Parallelogram Isosceles Trapezium Kite Rhombus Delta Diagonal Scalene Equilateral Plane Parallel Perpendicular</p>		<p>minutes of DEAR time.</p> <p>We are great supporters of this in Maths as it is so important that students are able to decipher long problems.</p> <p>Writing Although there is less extended writing in Maths, working out is key.</p> <p>Students are encouraged to work down the page by dividing their pages in two and working in columns. Teachers look for clear, concise and correct working out that is easy for students and others to follow.</p> <p>Furthermore, when the opportunity arises, teachers may ask students to explain certain concepts in their own words. This may be after a teacher has explained a certain concept to the class and wants students to narrate this in their own words.</p> <p>Oracy Teachers should ensure that</p>	<p>learning of students using end of topic tests and multiple choice questions.</p> <ul style="list-style-type: none"> • Teachers will then use this information to review and revise topics that students needed more help on. They form a diagnostic tool to help us with our “deliberate practice” approach.
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		<ul style="list-style-type: none"> - Students should continue work on shape by continuing with their “angle work,” and in particular looking at extending this with work on similar shapes and congruent shapes. <p>The curriculum at this stage is broken down into distinct parts yet the nature of maths means that topics are interleaved and revised at each stage of the year.</p> <p>The regular assessments points, and more importantly, the periods after the assessment points allow teachers to identify what topics have been taught well, which topics students have learnt as a result but also to identify topics to re-teach and revise before moving on to build on these skills.</p>	<p>Polygon Rotational symmetry Perimeter Distance Dimension Compound shape Height Radius Diameter Circumference Sector Semicircle Irrational Protractor Centimetre Millimetre Acute Obtuse Reflex Interior Exterior Congruent Similar Hypotenuse Prove</p>		<p>students answer in full, eloquent sentences and should ask students to repeat these if they are not said correctly. This is to help build their public speaking skills and also to help the whole school literacy programme.</p>	
Year	What do students learn?	Why?	Tier 3 keywords	Threshold concepts	Literacy	Assessment
8	<p>Number</p> <ul style="list-style-type: none"> • Ordering, Rounding and estimation • Converting between Fractions, decimals and percentages. • Using Percentages • Inverse operations • Percentage change, including Reverse percentages. <p>Statistics</p> <ul style="list-style-type: none"> • Averages • Interpreting and comparing data • Scatter graphs <p>Algebra</p>	<p>Term 1:</p> <ul style="list-style-type: none"> - The term starts looking at averages, comparing data and scatter graphs. All these topics are rarely covered in the Year 7 curriculum and Scatter graphs not at all so they should be topics that are interesting to students. - The term ends revising and developing work on rounding and estimation, fractions, decimals and percentages. This work will have been covered in Year 6 and is also touched upon in the Year 7 curriculum so teachers can develop these skills if students are competent, or ensure competency if students are still not fully grasping certain concepts. 	<p>Mean Median Mode Range Approximate Midpoint Discrete Data Pictogram Frequency Sector Correlation Interpolation Extrapolation Outlier Axis Scale Recurring Terminating Significant figures Solution</p>	<ul style="list-style-type: none"> - Significant Figures - Standard Form - Scatter graphs - Re-arranging formulae - Linear graphs - Direct and inverse proportion 	<p>Reading</p> <p>Every lesson after lunch starts with 10 minutes of DEAR time.</p> <p>We are great supporters of this in Maths as it is so important that students are able to decipher long problems.</p> <p>Writing</p> <p>Although there is less extended writing in Maths, working out is key.</p>	<p>Week 7 (End of October) Topic Test/MCQs</p> <p>Week 19 (Beginning of January) Topic test/MCQs</p> <p>Week 29 (End of March) Topic Test/MCQs</p> <p>Week 41 (Beginning of July) End of Topic Test/MCQs</p> <ul style="list-style-type: none"> • At the above assessment points, teachers will assess the

	<ul style="list-style-type: none"> Solve linear equations Sequences, finding the nth term. Graphs of Linear and Quadratic Functions. Model formulae algebraically and graphically. Use and re-arrange formulae. <p>Ratio, Proportion and Rates of Change</p> <ul style="list-style-type: none"> Units of measure Compound measures, including Speed and Density. Scale drawings Direct and Inverse proportion Best Buys <p>Geometry and Measures</p> <ul style="list-style-type: none"> Perimeter and Area Volume Pythagoras Geometric reasoning and proof Angles in parallel lines 3-D shape Transformations 	<p>Term 2:</p> <ul style="list-style-type: none"> Work on sequences is continued from work on sequences in Year 7, with the introduction of looking at nth term involving negative numbers and fractional increases. Geometric sequences should also be introduced here. Linear graphs are introduced although they will be seen again later in the year, during Topic 4. Students will not know how to re-arrange formulae yet, this comes up in Term 4, but students will be able to look at equations in the form $y = mx + c$. <p>Term 3:</p> <ul style="list-style-type: none"> During this term, students build upon work in Year 7 by using percentages. This includes finding percentage increase/decrease, reverse percentages (where you have to find the original amount). Percentage multipliers are also introduced which is a key skill throughout the GCSE curriculum. <p>Term 4:</p> <ul style="list-style-type: none"> Term 4 looks at Compound measures. This builds on work students will have done in KS2 on comparing units and measurements. Scale drawings builds on work from Year 7 on Similar shapes and then students look at Direct and Inverse proportion which they will not have seen before. Students will also look at direct and inverse proportion (without algebra). This will include topics such as "Best buys" where students are required to find out which products are the best value. <p>Term 5:</p>	<p>Multiplier Percentage Inverse Powers Roots Operation Intersection Substitute Ascending Descending Linear Term Gradient Quadratic Index Plan Elevation Formula Expression Variable Parallelogram Trapezium Perimeter Area Cylinder Prism Radius Diameter Cuboid Cube Cross-section Hypotenuse Pythagoras Geometry Alternate angles Corresponding angles Co-interior angles Reflex Acute Obtuse</p>		<p>Students are encouraged to work down the page by dividing their pages in two and working in columns. Teachers look for clear, concise and correct working out that is easy for students and others to follow.</p> <p>Furthermore, when the opportunity arises, teachers may ask students to explain certain concepts in their own words. This may be after a teacher has explained a certain concept to the class and wants students to narrate this in their own words.</p> <p>Oracy Teachers should ensure that students answer in full, eloquent sentences and should ask students to repeat these if they are not said correctly. This is to help build their public speaking skills and also to help the whole school literacy programme.</p>	<p>learning of students using end of topic tests and multiple choice questions.</p> <ul style="list-style-type: none"> Teachers will then use this information to review and revise topics that students needed more help on. They form a diagnostic tool to help us with our "deliberate practice" approach.
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Year	What do students learn?	Why?	Tier 3 keywords	Threshold concepts	Literacy	Assessment
9 Foundation (This is for students	<p>Students should start the 3-year AQA Scheme of Work.</p> <p>Students in 9xMa1 start a 2-year Scheme of Work with the intention of completing AQA Level 2 Further Maths in their final year (Year 11).</p>	<p>Term 1:</p> <ul style="list-style-type: none"> - We start looking at basic number and factors and multiples which students have studied previously in Key Stage 3. Starting the year like this will enable students to begin with 	<p>Factor Multiple Index notation Prime number Highest common factor</p>		<p>Reading Every lesson after lunch starts with 10 minutes of DEAR time.</p>	<p>October In October, there is also an examination that Year 9 students sit based on topics that they have covered to date.</p>

<p>whom we believe will not be able to access the Higher tier scheme of work. These students will follow this scheme of work from the beginning of Year 9.</p> <p>If we are even slightly unsure of which tier students will eventually enter, students will always start following the Higher tier scheme of work, with the option of dropping down to the Foundation</p>	<p>Number</p> <ul style="list-style-type: none"> • Basic number • Factors and multiples • Basic fractions • Basic decimals • Rounding • Basic percentages <p>Algebra</p> <ul style="list-style-type: none"> • Basic algebra • Coordinate and linear graphs • Sequences • Equations <p>Statistics</p> <ul style="list-style-type: none"> • Collecting and representing data • Scatter graphs <p>Geometry and measures</p> <ul style="list-style-type: none"> • Angles • Scale diagrams and bearings • Introduction of perimeter and area • Introduction of circumference and area • Transformations • Pythagoras' Theorem • 2D representation of 3D shapes <p>Ratio, Proportion and Rates of Change</p> <ul style="list-style-type: none"> • Ratio and proportion <p>Probability</p> <ul style="list-style-type: none"> • Basic probability 	<p>confidence and ensure that they have basics before moving on.</p> <ul style="list-style-type: none"> - We then move onto angles and scale diagrams and bearings. Angles is a recap of work previously covered which will give them the skills to study bearings which will be a new topic to them. - At the end of the term, students move onto 'basic algebra' which again is a recap of work covered in years 7 and 8 to ensure that students are secure with this skill set to move onto more challenging algebra in Key Stage 4. - Review and revision time is incorporated into the scheme of work to allow time for teachers to clear up misconceptions students may have on any work they have covered so far. <p>Term 2:</p> <ul style="list-style-type: none"> - The term begins with work on basic fractions, some of this work hasn't been seen since year 7, students need to be given time to go over this. Students also move into harder work involving arithmetic with mixed numbers. - Co-ordinates and linear graphs are then studied, this is to consolidate work covered in years 7 and 8 to ensure that students grasp these ideas to be able to access harder topics later on in the course such as interpreting $y = mx + c$. - This is followed by basic decimals and rounding, which again is a review of work covered in Key Stage 3. Students will need to be able to apply these skills to later topics such as upper and lower bound calculations and rounding answers to a suitable degree of accuracy – e.g. trigonometry and volume of a sphere. - Collecting and representing data is the final topic covered this term. 	<p>Lowest common multiple Complementary Isosceles Scalene Equilateral Reflex Obtuse Acute Triangle Angle Parallel Corresponding Alternate Allied Bearing Clockwise Measure Scale Variable Coefficient Like terms Expand Simplify Fraction Denominator Numerator Mixed number Improper fraction Axes Axis Gradient Intercept Coordinates Significant figure Rounding Decimal place Upper bound Lower bound Accuracy Primary data Secondary data Arithmetic Sum Product Difference Quotient Continuous</p>	<p>We are great supporters of this in Maths as it is so important that students are able to decipher long problems.</p> <p>Writing Although there is less extended writing in Maths, working out is key.</p> <p>Students are encouraged to work down the page by dividing their pages in two and working in columns. Teachers look for clear, concise and correct working out that is easy for students and others to follow.</p> <p>Furthermore, when the opportunity arises, teachers may ask students to explain certain concepts in their own words. This may be after a teacher has explained a certain concept to the class and wants students to narrate this in their own words.</p> <p>Oracy Teachers should ensure that students answer in full, eloquent sentences and</p>	<p>This allows teachers to assess understanding and to address any areas of weakness from students.</p> <p>Term 6 Y9 PPE June at the end of their academic year. 2 x 1.5 hour GCSE papers.</p> <p>Students are given two GCSE papers (1 calculator) and 1 non-calculator) from a past examination series. This allows us to compare our new results with past cohorts, to assess where the current cohort stand in relation to past cohorts.</p> <p>Pre/Post tests At the beginning and end of each topic, students are given a Pre and Post test on the given topic.</p> <p>This is based on developments of cognitive science that "primes" students' brains for what they are about to learn. It also offers teachers to assess any prior</p>
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<p>tier at an appropriate later stage).</p>		<p>Some of this is a recap on prior learning, these skills need to be built up and new content such as to know and understand the terms primary data, secondary data, discrete data and continuous data.</p> <p>Term 3:</p> <ul style="list-style-type: none"> - Work on sequences is continued from work on sequences in Years 7 and 8, with the introduction of looking at quadratic sequences and generating a quadratic sequence from its nth term. Students also need to be able to generate a geometric sequence from its nth term. - Basic percentages are then covered, this is a recap of prior learning but it is important that these skills are embedded so that students can moved onto more challenging work with percentage multipliers. - The final topic this term is perimeter and area. Students need to be reminded of the formulae, in particular for the area of a trapezium. - Review and revision time is incorporated into the scheme of work to allow time for teachers to clear up misconceptions students may have on any work they have covered so far. <p>Term 4:</p> <ul style="list-style-type: none"> - The term begins with introduction of circumference and area of a circle which has already been seen in Key Stage 3. This is to consolidate and ensure that students are aware of the formulae. Students also learn new definitions such as: tangent, arc, sector and segment. Students also begin to apply these skills to composite shapes. - This is followed by ratio and proportion. This gives students a chance to recap prior learning on this topic and build upon their skills. 	<p>Discrete Term Difference Geometric Arithmetic Sequence Linear Rule Quadratic Generate Substitute Percent Calculate Increase Decrease Perimeter Area Composite Trapezium Parallelogram Units Compound Rectilinear Circumference Area Tangent Chord Sector Segment Radius Diameter Arc Ratio Equivalent Proportion Fraction Equivalence Functions Divide Exhaustive Mutually exclusive Probability Outcome Impossible Sample space Experiment Even chance Likely</p>		<p>should ask students to repeat these if they are not said correctly. This is to help build their public speaking skills and also to help the whole school literacy programme.</p>	<p>learning from students and adapt their teaching sequence to the needs of their individual students.</p> <p>The post tests also allow students to build confidence as they can see that they have learnt topics that they may not have been able to do in the past.</p> <p>Although not the most robust form of data to gather, it does help focus students on what they are about to learn and where it fits within the mathematics curriculum and what examination questions on the topics look like.</p>
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		<p>Students will start to see this work in a different context e.g. best buy problems and relating ratios and fractions to linear functions.</p> <ul style="list-style-type: none"> - Basic probability is the final topic this term. Students will not have seen this since year 7, it will be a reminder for them. They will also be able to continue to develop their skills with fractions, decimals and percentages in this unit of work. New content introduced is frequency trees. - Review and revision time is incorporated into the scheme of work to allow time for teachers to clear up misconceptions students may have on any work they have covered so far. <p>Term 5:</p> <ul style="list-style-type: none"> - The term begins with equations. A lot of work was done with equations in year 8. This unit of work will allow students to consolidate these skills. Students need to be introduced to working with unfamiliar formulae (scientific formulae). Equations need to include the unknown on one side, both sides and brackets. - Scatter graphs are then studied, this is a recap of work covered in year 8. It is to remind students of this work and to go into a little more detail. Students need to be able to Recognise correlation and know that it does not indicate causation and know that making predictions using interpolating and extrapolation apparent trends whilst knowing the dangers of doing so. - Review and revision time is incorporated into the scheme of work to allow time for teachers to clear up misconceptions students may have on any work they have covered so far. <p>Term 6:</p>	<p>Unlikely Equation Unknown Variable Solve Formula Solve Inverse Equals Correlation Line of best fit Interpolate Extrapolate Plot Estimate Transformation Translation Vector Enlargement Rotation Reflection Centre of enlargement Scale factor Image Object Congruent Invariant Pythagoras Hypotenuse Right Angle Plan Elevation Front Side Solid Representation</p>			
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		<ul style="list-style-type: none"> - Transformations is the first topic studied. This is a recap of work from Key Stage 3 and involves the following: Identify, describe and construct congruent and similar shapes, on co-ordinate axes, by considering rotation, reflection, translation and enlargement (including fractional scale factors which students may not have seen before). - Pythagoras' Theorem is then covered, students will have seen this in year 8. This gives them a chance to recap the skills learnt. <p>The final topic is 2D representations of 3D shapes. This allows students to consolidate work from year 8 which they are likely to be assessed on in their final GCSE exam.</p>				
<p style="text-align: center;">10 Foundation</p> <p style="text-align: center;">(This is for students whom we believe will not be able to access the Higher tier scheme of work. These students will follow this scheme of work from the beginning of Year 9.</p>	<p>Number</p> <ul style="list-style-type: none"> • Standard form • Calculating with percentages • Indices <p>Algebra</p> <ul style="list-style-type: none"> • Algebra recap and extension • Graphs recap and extension • Simultaneous equations • Real life graphs <p>Statistics</p> <ul style="list-style-type: none"> • Statistical measures <p>Geometry and measures</p> <ul style="list-style-type: none"> • Measures • Constructions and loci • Congruence and similarity • Introduction to trigonometry • Further perimeter and area • Further circumference and area 	<p>Term 1:</p> <ul style="list-style-type: none"> - Review and revision is built into the scheme of work for the first week and a half. This is to ensure that topics taught at the end of last term are embedded and it allows students to begin the year with confidence. - Standard form is then studied. Students will have seen standard form in year 8; this unit of work allows them to recap work taught and it goes into more detail as students learn how to complete standard form calculations with and without a calculator. - We then move onto calculating with percentages. Students will learn to work with percentage multipliers (which was covered in year 8 and students will need to be reminded of). Students will also need to be able to work out original values (reverse percentage problems). - Measures is the final topic. It involves converting between units; working with upper and lower bounds and using them in calculations (which is new). Compound units are also covered – speed, density which have 	<p>Standard Form Power Calculate Ordinary number Ascending Descending Calculation Percentage Multiplier Original value Error Interval Upper bound Lower bound Measure Units Compound units Pressure Density Speed Formula Substitute Primary Data Secondary Data Discrete Continuous Range Median Mode</p>		<p>Reading Every lesson after lunch starts with 10 minutes of DEAR time.</p> <p>We are great supporters of this in Maths as it is so important that students are able to decipher long problems.</p> <p>Writing Although there is less extended writing in Maths, working out is key.</p> <p>Students are encouraged to work down the page by dividing their pages in two and working in columns. Teachers look for clear, concise and correct working out</p>	<p>October In October, there is also an examination that Year 10 students sit based on topics that they have covered during their KS4 curriculum to date (Year 9 and 10).</p> <p>This allows teachers to assess understanding and to address any areas of weakness from students.</p> <p>Term 6 Y10 PPE June at the end of their academic year. 3 x 1.5 hour GCSE papers.</p> <p>Students are given three GCSE papers from a past examination series. This allows us to compare our new results with past</p>

<p>If we are even slightly unsure of which tier students will eventually enter, students will always start following the Higher tier scheme of work, with the option of dropping down to the Foundation tier at an appropriate later stage).</p>	<ul style="list-style-type: none"> • Properties of polygons <p>Probability</p> <ul style="list-style-type: none"> • Review of basic probability • Probability 	<p>been seen in year 8 and pressure which is new.</p> <ul style="list-style-type: none"> - Review and revision time is incorporated into the scheme of work to allow time for teachers to clear up misconceptions students may have on any work they have covered so far. <p>Term 2:</p> <ul style="list-style-type: none"> - The first topic this term is statistical measures. Students should know and understand the terms: primary data, secondary data, discrete data and continuous data. This would be revision for students, they then move onto finding averages and the range, including frequency tables, which is also a recap. A new concept which is introduced is apply statistics to describe a population. Students need to also infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling. - Indices are then covered. Students need to be able to Use positive integer powers and associated real roots (square, cube and higher) and recognise powers of 2, 3, 4, 5. A lot of this is a recap from Key Stage 3 but it is important that students are confident working with powers as they are likely to be assessed on this in a non-calculator exam. - Construction and loci is the final topic covered this term. Students will need to be reminded of the construction skills that they covered in Key Stage 3 (constructing triangles) and then develop these skills further to: constructing perpendicular bisector of a line segment; Constructing a perpendicular to a given line from / at a given point; bisecting a given angle. Then apply these skills to loci problems. <p>Term 3:</p>	<p>Mean Frequency Grouped data Midpoint Spread Consistency Compare Average Population Distribution Sample Sampling Indices Square number Integer Cube number Square root Cube root Construction Loci Perpendicular Bisector Angle Compasses Protractor Line segment Simplify Expand Factorise Expression Coefficient Variable Equation Formula Identity Expression Congruent Similar Hypotenuse Scale factor SSS ASA SAS RHS Side Angle Triangle Trigonometry</p>		<p>that is easy for students and others to follow.</p> <p>Furthermore, when the opportunity arises, teachers may ask students to explain certain concepts in their own words. This may be after a teacher has explained a certain concept to the class and wants students to narrate this in their own words.</p> <p>Oracy Teachers should ensure that students answer in full, eloquent sentences and should ask students to repeat these if they are not said correctly. This is to help build their public speaking skills and also to help the whole school literacy programme.</p>	<p>cohorts, to assess where the current cohort stand in relation to past cohorts.</p> <p>Following their end of year examinations, students receive Question Level analysis sheets which link to maths videos and exercises from HegartyMaths which enable students to look at their areas of weakness. This is particularly key for students to use before their next round of examinations which occur in November of Year 11.</p> <p>Pre/Post tests At the beginning and end of each topic, students are given a Pre and Post test on the given topic.</p> <p>This is based on developments of cognitive science that “primes” students’ brains for what they are about to learn. It also offers teachers to assess any prior learning from students and adapt their teaching sequence to the needs of their individual students.</p> <p>The post tests also allow students to build confidence as they can</p>
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		<ul style="list-style-type: none"> - The term begins with algebra recap and extension. Student will not have seen a lot of these skills since year 9 and it is important that there is time for these skills to be recapped. New content introduced is Simplifying and manipulating algebraic expressions (including those involving surds). - Congruence and similarity is then studied, this is a recap from work covered in Key Stage 3, and students will need to be reminded of these skills as it is something that they are assessed on. The recap on congruent triangles will also help to prepare students for the next unit of work, trigonometry. - Introduction to trigonometry is the next topic. This will be a brand new topic for students. Students will need to be able to label right angled triangles and find missing lengths and angles using trig ratios. - Review and revision time is incorporated into the scheme of work to allow time for teachers to clear up misconceptions students may have on any work they have covered so far. <p>Term 4:</p> <ul style="list-style-type: none"> - Further perimeter and area is the first topic this term. A lot of this unit of work is a recap from year 9 – triangles, trapeziums, parallelograms and composite shapes. Students will need these skills to move onto new content in this topic which is: finding the surface area of pyramids and composite solids. - Graphs recap and extension is the next topic. The first part of this is a recap on $y = mx + c$. It then moves onto students being able to finding the equation of the line through two given points, or through one point with a given gradient. Students also 	Right angle Opposite Adjacent Cosine Sine Tangent Ratio Inverse SOHCAHTOA Perimeter Area Length Parallelogram Trapezium Composite shapes Pyramid Surface area Composite solid Face Edge Vertex Linear Straight line Gradient Co-ordinates Intercept Solve Circumference Radius Diameter Pi Arc Length Sector area Chord Sector Segment Tangent Simultaneous Unknown Eliminate Graphically Algebraically Polygon Regular Irregular Interior Exterior Reciprocal			<p>see that they have learnt topics that they may not have been able to do in the past.</p> <p>Although not the most robust form of data to gather, it does help focus students on what they are about to learn and where it fits within the mathematics curriculum and what examination questions on the topics look like.</p>
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		<p>need to be able to identify and interpret gradients and intercepts of linear functions graphically and algebraically.</p> <ul style="list-style-type: none"> - Further circumference and area is the final topic this term. This topic will not have been seen since year 8 so students will need to be given time to consolidate these skills to enable them to move on to find arc length and sector area and giving answers in terms of pi. - Review and revision time is incorporated into the scheme of work to allow time for teachers to clear up misconceptions students may have on any work they have covered so far. <p>Term 5:</p> <ul style="list-style-type: none"> - We start the term with simultaneous equations which is a new topic. The algebra recap in term 3 and graph recap in term 4 should help students to learn this topic. Students need to be able to solve simultaneous equations graphically and algebraically. - Properties of polygons is the final topic this term. Students will have a reminder about angles in triangles and quadrilaterals which will then help them to understand the interior and exterior angle sum of any polygon. - Review and revision time is incorporated into the scheme of work to allow time for teachers to clear up misconceptions students may have on any work they have covered so far. <p>Term 6:</p> <ul style="list-style-type: none"> - Real life graphs is the first topic this term which sees a lot of new content. Students need to be able to plot and interpret graphs (<u>including reciprocal graphs</u>) and graphs of non-standard 	<p>Kinematic Velocity Time Distance Acceleration Rate Frequency tree Experiment Exhaustive Dependent Independent Relative frequency Sample space Outcomes Mutually exclusive Probability tree Probability</p>			
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		<p>functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration. Students also use previous work on $y = mx + c$ to help them to interpret gradients.</p> <ul style="list-style-type: none"> - Review of basic probability (work from year 9) is then covered – in particular frequency of outcomes from experiments in a table and frequency trees. This then leads into the next topic. <p>Probability is the final topic and the main focus of this is tree diagrams of independent and dependent events.</p>				
<p>11 Foundation</p> <p>(This is for students whom we believe will not be able to access the Higher tier scheme of work. These students will follow this scheme of work from the beginning of Year 9.</p>	<p>Number</p> <ul style="list-style-type: none"> • Standard form • Calculating with percentages • Indices <p>Algebra</p> <ul style="list-style-type: none"> • Algebra: quadratics, rearranging formulae and identities • Inequalities • Algebra and graphs • Sketching graphs • Solving quadratic equations • Quadratic graphs <p>Geometry and measures</p> <ul style="list-style-type: none"> • Volume • Trigonometry • Vectors <p>Ratio, Proportion and Rates of Change</p> <ul style="list-style-type: none"> • Direct and inverse proportion • Growth and decay 	<p>Term 1:</p> <ul style="list-style-type: none"> - Review and revision is built into the scheme of work for the first week and a half. This is to ensure that topics taught at the end of last term are embedded and it allows students to begin the year with confidence. - Volume is the first topic this term. A lot of new content is covered including: ratio in length, area and volume; volume of a sphere, cone and pyramid. Also giving answers, for volume, in terms of pi will be a new concept. New ideas include: quadratics, rearranging formulae and manipulating expressions which have powers in them. - Review and revision time is incorporated into the scheme of work to allow time for teachers to clear up misconceptions students may have on any work they have covered so far. <p>Term 2:</p> <ul style="list-style-type: none"> - Inequalities is the first topic this term. This work has not been seen since year 8. Students will need to be shown how illustrate an inequality on a number line and then develop skills further by solving inequalities. 	<p>Volume</p> <p>Scale factor</p> <p>Ratio</p> <p>Prism</p> <p>Pyramid</p> <p>Cuboid</p> <p>Cube</p> <p>Cylinder</p> <p>Pi</p> <p>Radius</p> <p>Diameter</p> <p>Height</p> <p>Length</p> <p>Triangular prisms</p> <p>Inequality</p> <p>Solve</p> <p>Illustrate</p> <p>Integer</p> <p>Geometric Form</p> <p>Graph</p> <p>Linear</p> <p>Sketch</p> <p>Function</p> <p>Quadratic</p> <p>Cubic</p> <p>Reciprocal</p> <p>Equation</p> <p>Plot</p> <p>Co-ordinates</p>		<p>Reading</p> <p>Students are often given textbook work or worksheets that involve worded problems. This will help them develop their reading and inference skills and also expose them to a greater variety of vocabulary.</p> <p>Writing</p> <p>Although there is less extended writing in Maths, working out is key.</p> <p>Students are encouraged to work down the page by dividing their pages in two and working in columns.</p> <p>Teachers look for clear, concise and correct working out that is easy for students and others to follow.</p>	<p>Term 2 Y11 PPE</p> <p>Beginning of November</p> <p>3 x 1.5 Hour GCSE Papers.</p> <p>Term 3 Y11 PPE</p> <p>End of February</p> <p>3 x 1.5 Hour GCSE Papers</p> <p>Students have two sets of “Pre Public Examinations (PPEs)” in November and February.</p> <p>The examinations offer teachers a chance to assess the learning of students and identify areas of strength and areas that need improvements.</p> <p>After each examination, students will be given Question Level Analysis sheets which link to maths videos and exercises on “HegartyMaths”</p>

<p>If we are even slightly unsure of which tier students will eventually enter, students will always start following the Higher tier scheme of work, with the option of dropping down to the Foundation tier at an appropriate later stage).</p>		<ul style="list-style-type: none"> - Algebra and further graphs is the next topic. Students recap their equation solving skills and look at how we can solve equations using graphs. Including the solution of geometrical problems and problems set in context. - Sketching graphs is the last topic this term where students learn how to recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions and the reciprocal $y = \frac{1}{x} \text{ with } x \neq 0$ function <p>Term 3:</p> <ul style="list-style-type: none"> - Direct and inverse proportion is the first topic this term. Work in this topic builds upon previous work from years 7, 8 and 9 and moves into the concept of inverse proportion and representing proportion graphically. - Trigonometry is the next topic covered. Students were only introduced to this in year 10, they will need time to consolidate this and then they will be introduced to knowing exact trig values. - Review and revision time is incorporated into the scheme of work to allow time for teachers to clear up misconceptions students may have on any work they have covered so far. <p>Term 4:</p> <ul style="list-style-type: none"> - Solving quadratic equations is the first topic. This builds upon previous work on quadratics. Students also learn how to solve quadratic equations graphically. - This is followed by quadratic graphs. Students will have previously learnt how to plot a quadratic graph, they will need to recap this then move onto being able to identify and 	<p>Axes Grid Direct proportion Inverse proportion Graphically Trigonometry Ratio Hypotenuse Opposite Adjacent Right angle Cosine Sine Tangent Exact value Significant figure Decimal place Evaluate Pythagoras Quadratic Root Factorise Turning point Maximum Minimum Intercept Growth Decay Compound interest Interest Annual Depreciate Vector Scalar Parallel Column Diagrammatic Addition Subtraction</p>		<p>Furthermore, when the opportunity arises, teachers may ask students to explain certain concepts in their own words. This may be after a teacher has explained a certain concept to the class and wants students to narrate this in their own words.</p> <p>Oracy Teachers should ensure that students answer in full, eloquent sentences and should ask students to repeat these if they are not said correctly. This is to help build their public speaking skills and also to help the whole school literacy programme.</p>	<p>which students can then use to address their weakest areas.</p> <p>After the November examination series, students are given a booklet of 12 past papers in a plastic wallet which also contain the papers' answers. Students are advised and encouraged to complete the 12 papers before the February examination series in order to improve their marks.</p> <p>Pre/Post tests At the beginning and end of each topic, students are given a Pre and Post test on the given topic.</p> <p>This is based on developments of cognitive science that "primes" students' brains for what they are about to learn. It also offers teachers to assess any prior learning from students and adapt their teaching sequence to the needs of their individual students.</p> <p>The post tests also allow students to build confidence as they can see that they have learnt topics that they may not have been able to do in the past.</p>
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		<p>interpret roots, intercepts and turning points of quadratic functions graphically.</p> <ul style="list-style-type: none"> - Growth and decay is the next topic where students learn to set up, solve and interpret the answers in growth and decay problems, including compound interest. This builds upon their previous work on percentage multipliers. - Review and revision time is incorporated into the scheme of work to allow time for teachers to clear up misconceptions students may have on any work they have covered so far. <p>Term 5:</p> <ul style="list-style-type: none"> - Vectors is the final topic to be covered before revision starts. Students will have seen vectors in transformations. New content involves: applying addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic representation of vectors. 				<p>Although not the most robust form of data to gather, it does help focus students on what they are about to learn and where it fits within the mathematics curriculum and what examination questions on the topics look like.</p>
<p>9</p> <p>(The vast majority of students in Year 9 will follow the Higher tier scheme of work.</p>	<p>Higher</p> <p>Students should start the 3-year AQA Scheme of Work.</p> <p>Students in 9xMa1 start a 2-year Scheme of Work with the intention of completing AQA Level 2 Further Maths in their final year (Year 11).</p> <p>Number</p> <ul style="list-style-type: none"> • Basic Number • Factors and Multiples • Basic fractions • Basic decimals • Rounding • Basic Percentages • Standard form 	<p>Term 1: The Year 9 course starts with an extension of the number skills that they will have seen to date. New topics as part of this that will be focused on are Credit and Balance sheets, product of prime factors, knowledge of finance, estimating answers using rounding to significant figures and further use of the inequality notation.</p> <p>The term continues looking at some geometry work, including ensuring all students are secure with the correct geometrical notation and knowing the key angle facts. Students will look at scale diagrams and bearings before looking back through some algebraic work they have done previously. Algebraic work includes looking at the differences between equations, expressions, formulae, identities and inequalities.</p>	<p>Product of Prime factors Points Vertices Edges Parallel Bearings Perpendicular Rotational symmetry Alternate angles Corresponding angles Primary data Discrete Continuous Secondary data Trapezium Parallelogram Centre</p>	<ul style="list-style-type: none"> - Product of prime factors - Angle facts from geometry - Fractions - $Y = mx + c$ - Rounding to decimal places and significant figures. - Representing data - Percentage multipliers - Real life graphs - Frequency trees - Transformations - Constructions and Loci 	<p>Reading Every lesson after lunch starts with 10 minutes of DEAR time.</p> <p>We are great supporters of this in Maths as it is so important that students are able to decipher long problems.</p> <p>Writing Although there is less extended writing in Maths, working out is key.</p>	<p>October In October, there is also an examination that Year 9 students sit based on topics that they have covered to date.</p> <p>This allows teachers to assess understanding and to address any areas of weakness from students.</p> <p>Term 6 Y9 PPE June at the end of their academic year. 2 x 1.5 hour GCSE papers.</p>

<p>For students that may struggle, and whose final tier decision may be more unknown, students will start on the Higher tier scheme of work.</p> <p>If appropriate, at a later stage, students will drop down to do the Foundation tier exam).</p>	<p>Algebra</p> <ul style="list-style-type: none"> Basic algebra review Coordinates and linear graphs Sequences Real life graphs Equations <p>Ratio, Proportion and Rates of Change</p> <ul style="list-style-type: none"> Ratio and Proportion <p>Geometry and Measures</p> <ul style="list-style-type: none"> Angles Scale diagrams and bearings Perimeter and area Circumference and area Transformations Constructions and loci 2D representations of 3D shapes. <p>Probability</p> <ul style="list-style-type: none"> Theoretical and experimental probability <p>Statistics</p> <ul style="list-style-type: none"> Collecting and representing data Scatter graphs 	<p>Finally, the term finishes with revision of fractions. Students will need to be secure at the four operations, simplify fractions and convert between mixed and improper fractions.</p> <p>Term 2: Term 2 starts looking at basic decimals, ordering, four operations, and also looks at changing recurring decimals into fractions, and vice versa.</p> <p>Students then look at coordinates and linear graphs using $y = mx + c$ to identify parallel and perpendicular lines. Students will also need to give equations through two given points, given a gradient.</p> <p>Rounding is taught next, with students needing to be comfortable rounding to given decimal places and/or significant figures whilst also being introduced to upper and lower bounds.</p> <p>Later in the term, students will look at collecting and representing data including frequency tables, bar charts, pie charts, pictograms and line graphs. Students will need to know the differences between primary, secondary, discrete and continuous data and also be taught how to draw and interpret boxplots. Students will need to be able to draw and construct cumulative frequency graphs and also histograms.</p> <p>The term finishes with sequences, building on work they have done in Years 7 and 8. One of the additional pieces of work introduced here which students won't have seen before is to work out the nth term of quadratic sequences.</p> <p>The term finishes with topic assessments.</p> <p>Term 3: Percentages is how the term starts with students building on prior knowledge but also looking at using percentages greater than 100% for the first time. Problems involving</p>	<p>Radius Chord Diameter Circumference Tangent Arc Sector Segment Bisector Recurring decimals Decimal places Significant figures Estimation Exponential Gradient Extrapolation Scale factor Transformations Translation Enlargement Reflection Rotation Invariance Construction Loci Plan Front elevation Side elevation</p>	<p>- 2D representations of 3D shapes.</p>	<p>Students are encouraged to work down the page by dividing their pages in two and working in columns. Teachers look for clear, concise and correct working out that is easy for students and others to follow.</p> <p>Furthermore, when the opportunity arises, teachers may ask students to explain certain concepts in their own words. This may be after a teacher has explained a certain concept to the class and wants students to narrate this in their own words.</p> <p>Oracy Teachers should ensure that students answer in full, eloquent sentences and should ask students to repeat these if they are not said correctly. This is to help build their public speaking skills and also to help the whole school literacy programme.</p>	<p>Students are given two GCSE papers (1 calculator and 1 non-calculator) from a past examination series. This allows us to compare our new results with past cohorts, to assess where the current cohort stand in relation to past cohorts.</p> <p>Pre/Post tests At the beginning and end of each topic, students are given a Pre and Post test on the given topic.</p> <p>This is based on developments of cognitive science that "primes" students' brains for what they are about to learn. It also offers teachers to assess any prior learning from students and adapt their teaching sequence to the needs of their individual students.</p> <p>The post tests also allow students to build confidence as they can see that they have learnt topics that they may not have been able to do in the past.</p>
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		<p>percentage multipliers will also be introduced which won't have been seen before yet form a crucial part of later study within the course.</p> <p>The course then looks into more geometry, in particular identifying properties of shape, finding the perimeter of compound shapes, finding the surface areas of pyramids and composite shapes. Students will also need to learn the formulas for triangles, parallelograms and trapezia.</p> <p>The term concludes by looking at real-life graphs, including reciprocal and exponential graphs. Students will also look at interpreting the gradient of a straight line as the rate of change.</p> <p>Term 4: This half term starts by looking at circumference and area of circles. Students must be familiar with circle notation and learn the formulas for area and circumference by heart.</p> <p>Students will also look at calculating surface areas of spheres, cones and composite solids whilst also calculating arc lengths, angles and areas of sectors of circles. Importantly, students should be encouraged to leave their answers "in terms of pi" unless specified as this provides the most 'exact' answer.</p> <p>Half way through the term, students look at ratio and proportion in more depth. Students use ratio notation, share amounts in ratio, apply them to contexts and relate ratios to fractions. Ratio forms a significant part of the GCSE course and students are introduced this at this point. Students will have seen it in Year 7 but it is seen here to revise it and take it further.</p> <p>Finally, equations are developed further solving equations with variables on both sides of the equation.</p> <p>Term 5:</p>				<p>Although not the most robust form of data to gather, it does help focus students on what they are about to learn and where it fits within the mathematics curriculum and what examination questions on the topics look like.</p>
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		<p>Probability is looked at again here using frequency trees, theoretical probability and knowing mutually exclusive events sum to 1.</p> <p>Scatter graphs are then taught with bivariate data. Students are expected to recognise correlation and know it doesn't necessarily mean causation. Students will need to be able to draw lines of best fit and know the dangers of extrapolating.</p> <p>Students are then taught to calculate using standard form, including questions given in context. This is an extension of work they covered in Year 8.</p> <p>Term 6: To conclude the year, students are introduced to the four transformations again, yet enlargement now includes fractional and negative scale factors which won't have been seen before. Students will be expected to recognise, too, the combinations of reflections, rotations and translations. It will also be expected that students are familiar with column notation.</p> <p>After the summer examinations, students are introduced to constructions and loci, including bisecting angles, perpendicular bisectors and using these to solve loci problems. Students will also be expected to know how to construct a 60 degree angle.</p> <p>Finally, students look at 2D representations of 3D shapes, looking at constructing and interpreting plans and elevations of 3D shapes.</p>				
Year	What do students learn?	Why?	Tier 3 keywords	Threshold concepts	Literacy	Assessment
<p>10 (The vast majority of students in Year 9 will</p>	<p>Higher</p> <p>Number</p> <ul style="list-style-type: none"> Calculating with percentages Surds Indices Number recap and review 	<p>Term 1: Students start the year looking at calculating with percentages. Although this topic was covered in depth in Year 9, this is repeated here to "interleave" material and to act against the curve of forgetting. Students look at using percentage multipliers again to help them with percentage problems.</p>	<p>Isosceles Equilateral Scalene Right-angled Reflex Obtuse-angled Invariant Transformations Frustums</p>	<ul style="list-style-type: none"> Percentage multipliers Upper/Lower bounds Surds Measures of central tendency Indices 	<p>Reading Every lesson after lunch starts with 10 minutes of DEAR time.</p> <p>We are great supporters of this in Maths as it is so important that</p>	<p>October In October, there is also an examination that Year 10 students sit based on topics that they have covered during their KS4 curriculum to date (Year 9 and 10).</p>

<p>follow the Higher tier scheme of work.</p> <p>For students that may struggle, and whose final tier decision may be more unknown, students will start on the Higher tier scheme of work.</p> <p>If appropriate, at a later stage, students will drop</p>	<p>Algebra</p> <ul style="list-style-type: none"> • Simultaneous equations • Introduction to quadratics • Rearranging formulae • Sketching graphs • Linear and quadratic equations and graphs <p>Geometry and Measures</p> <ul style="list-style-type: none"> • Measures • Properties of polygons • Congruence and Similarity • Pythagoras' theorem and basic trigonometry • Volume <p>Probability</p> <ul style="list-style-type: none"> • Tree diagrams • Venn diagrams • Theoretical probability • Conditional probability • Independent and Dependent combined events <p>Statistics</p> <ul style="list-style-type: none"> • Measures of central tendency (Median, mean, mode and modal class) • Measures of spread (Range, quartiles and inter-quartile range) • Sampling • Discrete and Continuous data • Histograms • Cumulative Frequency • Box plots • Lines of best fit 	<p>Students then also use knowledge from Year 9 about upper and lower bounds and apply them to problems. Compound measures are also introduced including speed, density and pressure.</p> <p>Surds concludes the rest of Term 1 in Year 10 and forms a major part of the GCSE course. It leads in to many later topics such as trigonometry and exact trig values so it is worth spending time on this. Students need to be able to calculate exactly with surds, rationalise denominators and also apply this to recognising geometric sequences where the common ratio is a surd.</p> <p>Term 2: Students start Year 10 with revision of measures of central tendency, quartiles and inter-quartile ranges. They will have seen this in Year 9 too, along with the application to boxplots, but it appears here as interleaving and to act as active retrieval practice. Students build on limitations and knowledge of sampling.</p> <p>Indices is taught next, where students need to recognise powers of 2,3,4,5 and to estimate powers and roots of any given number. Students need to be able to calculate with roots, and with integer and fractional indices.</p> <p>The final topic of Term 2 involves the properties of polygons. Students need to be able to derive the interior angle sum of any polygons, eventually learning the formula $(n-2) * 180$. Students should also be familiar with the names and properties of shapes.</p> <p>Term 3: In order for students <i>not</i> to forget previous topics, term 3 involves a number of topics that have been taught before but need to be recapped in order for the knowledge to be "learnt." This includes converting recurring decimals to fractions, problems with bounds, nth terms of quadratics and linear sequences,</p>	<p>Upper/Lower bounds Surd Rationalise Geometric progression Sampling Powers Roots Indices Recurring decimal Quadratic sequences Congruent Simultaneous Histograms Cumulative Frequency Parallel Perpendicular Exponential Reciprocal Scale factor Invariant Arc length</p>	<ul style="list-style-type: none"> - Properties of polygons - Congruent triangles - Simultaneous equations - Conditional Probability - Rearranging formulae - $Y = mx + c$ 	<p>students are able to decipher long problems.</p> <p>Writing Although there is less extended writing in Maths, working out is key.</p> <p>Students are encouraged to work down the page by dividing their pages in two and working in columns. Teachers look for clear, concise and correct working out that is easy for students and others to follow.</p> <p>Furthermore, when the opportunity arises, teachers may ask students to explain certain concepts in their own words. This may be after a teacher has explained a certain concept to the class and wants students to narrate this in their own words.</p> <p>Oracy Teachers should ensure that students answer in full, eloquent sentences and should ask students to repeat these if they are not said correctly. This is to</p>	<p>This allows teachers to assess understanding and to address any areas of weakness from students.</p> <p>Term 6 Y10 PPE June at the end of their academic year. 3 x 1.5 hour GCSE papers.</p> <p>Students are given three GCSE papers from a past examination series. This allows us to compare our new results with past cohorts, to assess where the current cohort stand in relation to past cohorts.</p> <p>Following their end of year examinations, students receive Question Level analysis sheets which link to maths videos and exercises from HegartyMaths which enable students to look at their areas of weakness. This is particularly key for students to use before their next round of examinations which occur in November of Year 11.</p> <p>Pre/Post tests At the beginning and end of each topic, students are given a</p>
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<p>down to do the Foundation tier exam).</p>		<p>geometric progressions, using surds and fractional and negative indices.</p> <p>Students are then taught congruent triangles and similarity which they were first introduced to at the end of Year 7. Students are extended by learning the basic criteria for congruence but also need to know how to use similar lengths to work out similar areas and volumes.</p> <p>The term concludes applying pythagoras' theorem and basic trigonometry. Students also learn the exact trigonometric values at this stage.</p> <p>Term 4: This term starts with simultaneous equations which won't have been seen before. It uses extensive algebra skills that have been built up within KS3 and Year 9 and now students use this extensively. Students need to be able to derive and solve two simultaneous equations in two variables and to find approximate solutions using a graph.</p> <p>Probability is also revised here whilst also introducing independent and dependent events using tree diagrams. Conditional probabilities are also looked at using expected frequencies with two-way tables, tree diagrams and Venn diagrams.</p> <p>Again, revision of statistics helps students remember previously covered topics. Here, students revise histograms, cumulative frequency graphs, boxplots and the dangers of extrapolation.</p> <p>Term 5: Quadratics and re-arranging formulae are a significant part of Term 5 with students expanding brackets, factorising and simplifying and changing the subject.</p> <p>Term 5 finishes looking at Volume, linking to similarity from earlier in the year, and also to</p>			<p>help build their public speaking skills and also to help the whole school literacy programme.</p>	<p>Pre and Post test on the given topic.</p> <p>This is based on developments of cognitive science that "primes" students' brains for what they are about to learn. It also offers teachers to assess any prior learning from students and adapt their teaching sequence to the needs of their individual students.</p> <p>The post tests also allow students to build confidence as they can see that they have learnt topics that they may not have been able to do in the past.</p> <p>Although not the most robust form of data to gather, it does help focus students on what they are about to learn and where it fits within the mathematics curriculum and what examination questions on the topics look like.</p>
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		<p>find the volume of spheres, pyramids, cones and composite solids. Students, again, should be encouraged to leave answers in terms of "pi."</p> <p>Term 6: To combat the curve of forgetting, students are re-introduced to $y=mx + c$ for parallel and perpendicular lines. Students also look at reciprocal and exponential graphs and solve equations with a variable on both sides of the equation. This was introduced in Year 9 but is a common topic at GCSE and also helps later topics in Year 11 such as tangents to circles so it is important students have a strong grasp of this.</p> <p>Students are also taught to recognise, sketch and interpret graphs of linear functions, quadratic functions, cubic and reciprocal functions.</p> <p>After the summer examination series, students practice solving equations with variables on both sides, solving quadratics by factorising and using graphs.</p> <p>Finally, the year concludes with revision of geometry and measures. This includes the transformations studied earlier in Year 9. Column vector notation is repeated but also students need to be introduced here to the notion of invariance. Volume and Surface area of complex shapes, including frustums, is also revised here along with finding arc lengths, angles and areas of sectors.</p>				
Year	What do students learn?	Why?	Tier 3 keywords	Threshold concepts	Literacy	Assessment

<p style="text-align: center;">11 (The vast majority of students in Year 9 will follow the Higher tier scheme of work.</p> <p style="text-align: center;">For students that may struggle, and whose final tier decision may be more unknown, students will start on the Higher tier scheme of work.</p>	<h2 style="text-align: center;">Higher</h2> <p>Algebra</p> <ul style="list-style-type: none"> Expanding brackets Factorising quadratics Re-arranging formulae Algebraic proof Functions Equations of circles Tangents to circles Solving equations (including quadratics) Sketch graphs (quadratics, linear, cubic, reciprocal, trigonometric) Completing the square Inequalities Transforming functions Iteration Pre-calculus and area under a curve Algebraic fractions <p>Ratio, Proportion and Rates of Change</p> <ul style="list-style-type: none"> Growth and Decay Compound Interest Direct and Inverse proportion Gradients and Rates of change <p>Geometry and Measures</p> <ul style="list-style-type: none"> Trigonometry Exact values Vectors Geometric arguments and proofs Sine and Cosine rules Circle Theorems <p>Revision</p>	<p>Term 1: Term 1 starts by exploring algebra in more depth, building on work in Year 9 and 10. Students should have already learnt how to expand double brackets but are introduced here to triple brackets. Students will factorise harder quadratics, including the difference of two squares. Building on work from Year 9, students will need to be able to recognise the difference between expressions, equations, identities and be able to use algebra in proofs.</p> <p>Inverse, Composite Functions are introduced here for the first time. This is taught here after students have practised rearranging formulae in year 10 and Year 9.</p> <p>Students will also build on their knowledge of trigonometry and Pythagoras by looking at 3D problems. Exact trigonometric values will be seen here and students will need to learn these off by heart or know how to derive them.</p> <p>The term finishes by looking at compound interest and depreciation. This builds on the knowledge of percentage multipliers covered earlier in their school career.</p> <p>Term 2: Term 2 starts by looking at the equations of circles with the centre at the origin. Students will use their knowledge of $y = mx + c$ to be able to work out the equations of tangents to circles at a given point.</p> <p>Students then continue working through algebra, including solving equations where re-arranging is required. Completing the square and the Quadratic Formula are introduced here as ways to solve quadratics. Students will be needed to identify and interpret roots, intercepts, deduce roots and finding turning points of quadratics.</p> <p>Students build on the work in Year 8 with direct and inverse proportion by using algebra to solve problems. Students are required to</p>	<p>Binomials Factorising Quadratics Surds Equations Expressions Identities Inverse function Composite function Iteration Tangent Completing the square Quadratic formula Roots Turning point Direct/Inverse Proportion Inequalities Vectors Proof Scalar Reciprocal Cubic Sine rule Cosine rule Segment Chord Tangent Radii Cyclic quadrilateral Gradient</p>	<ul style="list-style-type: none"> Solving quadratics in different ways. 3D Pythagoras and Trigonometry problems Equations of circles Transforming functions Finding gradients of curves Algebraic fractions 	<p>Reading Students are often given textbook work or worksheets that involve worded problems. This will help them develop their reading and inference skills and also expose them to a greater variety of vocabulary.</p> <p>Writing Although there is less extended writing in Maths, working out is key.</p> <p>Students are encouraged to work down the page by dividing their pages in two and working in columns. Teachers look for clear, concise and correct working out that is easy for students and others to follow.</p> <p>Furthermore, when the opportunity arises, teachers may ask students to explain certain concepts in their own words. This may be after a teacher has explained a certain concept to the class and wants students to narrate this in their own words.</p> <p>Oracy</p>	<p>Term 2 Y11 PPE Beginning of November 3 x 1.5 Hour GCSE Papers</p> <p>Term 3 Y11 PPE End of February 3 x 1.5 Hour GCSE Papers</p> <p>Students have two sets of "Pre Public Examinations (PPEs)" in November and February.</p> <p>The examinations offer teachers a chance to assess the learning of students and identify areas of strength and areas that need improvements.</p> <p>After each examination, students will be given Question Level Analysis sheets which link to maths videos and exercises on "HegartyMaths" which students can then use to address their weakest areas.</p> <p>After the November examination series, students are given a booklet of 12 past papers in a plastic wallet which also contain the papers' answers. Students are advised and encouraged to</p>
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<p>If appropriate, at a later stage, students will drop down to do the Foundation tier exam).</p>		<p>form and solve equations themselves and also recognise graphs that illustrate proportion.</p> <p>Term 3: Inequalities starts Term 3 where students are needed to solve linear inequalities in one or two variable and quadratic variables in one variable. Students are also needed to represent the solution set on a number line, using set notation on a graph.</p> <p>Students then look at vectors, including the addition and subtraction of vectors, and using vectors to construct geometric arguments and proofs.</p> <p>Students then need to recognise, sketch and interpret graphs of linear functions, quadratic functions, cubics and reciprocal functions. Students will also need to recognise trigonometric graphs and exponential functions.</p> <p>Term 4: Term 4 starts the term developing the sine rule and cosine rule. Students will be introduced to know and apply the sine rule to work out the area of a triangle, find missing sides or angles of a triangle.</p> <p>At this point in the term, students will also be introduced to transforming functions and reflections of a given function. Students should be comfortable sketching graphs of quadratics and trigonometry by know which is why transformations of graphs is introduced here.</p> <p>The students then move on to looking at numerical methods including 'iteration' where students will need to know how to use iterative formulas.</p> <p>The term concludes introducing students to circle theorems, including applying and proving the standard circle theorems.</p> <p>Term 5:</p>			<p>Teachers should ensure that students answer in full, eloquent sentences and should ask students to repeat these if they are not said correctly. This is to help build their public speaking skills and also to help the whole school literacy programme.</p>	<p>complete the 12 papers before the February examination series in order to improve their marks.</p> <p>Pre/Post tests At the beginning and end of each topic, students are given a Pre and Post test on the given topic.</p> <p>This is based on developments of cognitive science that "primes" students' brains for what they are about to learn. It also offers teachers to assess any prior learning from students and adapt their teaching sequence to the needs of their individual students.</p> <p>The post tests also allow students to build confidence as they can see that they have learnt topics that they may not have been able to do in the past.</p> <p>Although not the most robust form of data to gather, it does help focus students on what they are about to learn and where it fits within the mathematics curriculum and what examination questions on the topics look like.</p>
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