



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 • Probability Representations- listing outcomes & calculating probabilities as well as Venn Diagrams. • Fractions-simplifying, adding/subtracting and multiplying/dividing • Order of operations • Factors, multiples & primes • Directed Number <p>Algebra 1</p> <ul style="list-style-type: none"> • Manipulating algebra • Expanding brackets • Substitution • Sequences 	<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 factors, multiples & primes, enabling pupils to find HCF & LCM. We also look at simplifying, adding/subtracting fractions. <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 10 (Early November) Topic Test/MCQs</p> <p>Week 22 (Early February) Topic test/MCQs</p> <p>Week 35 (Early May) Topic Test/MCQs</p> <p>Week 45 (End of July) End of Topic Test/MCQs</p> <ul style="list-style-type: none"> • At the above assessment points, teachers will assess the learning of

	<ul style="list-style-type: none"> • Special Sequences • Coordinates • Linear Graphs <p>Ratio and Proportion 1</p> <ul style="list-style-type: none"> • Ratio • Simplifying Ratio. • Sharing in a given ratio. • Express one quantity as a ratio of another. • Proportional reasoning Inc. Best buys. • Scale diagrams. <p>Geometry and Measures 1</p> <ul style="list-style-type: none"> • Properties of shapes. • Line/Rotational Symmetry. • Perimeter and Area. • Circle Area and Circumference. • Parts of a circle. • Re-arrange area and circumference formulae. • Use standard units of measure. 	<ul style="list-style-type: none"> - Term two begins with a look at Directed Number, enabling pupils to become confident with processing negative/positive numbers. - We then move away from number skills slightly by introducing and extending algebra that they will have seen at KS2. Students are expected to be able to know and use basic algebraic notation, recognise expressions, terms, formulae equations and functions. Simplify algebraic expressions & substitute into formulas and expressions. <p>Term 3: Begins with Exploring Sequences:</p> <ul style="list-style-type: none"> - Recognise/continue a variety of sequences. - Generate sequences from a term-to-term rule. - Find the term-to-term rule of a sequence. - We then look at multiplying and dividing fractions. <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). Initially looking at proportional reasoning including best buys. Use notation ratio and reduce to it's simplest form. Split a quantity into 2 or more parts in a given ratio. Apply ratio to scale diagrams. <p>Term 5: An important focus on coordinate grids & straight-line graphs enabling students to:</p> <ul style="list-style-type: none"> • Design and construct an appropriate scale for a set of axes. • Work with coordinates in all four quadrants. • Write equations of lines parallel to the x-axis or the y-axis. • Solve geometrical problems on coordinate axes. 	<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 greater familiarity with higher level vocabulary will enhance problem solving skills at all levels.</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>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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		<p>Term 6: Exclusively looking at Shape:</p> <ul style="list-style-type: none"> • Properties of shapes including correct notation and symmetry. • Perimeter & area of 2D and compound shapes. • Circle area & circumference. <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>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>	
Year	What do students learn?	Why?	Tier 3 keywords	Threshold concepts	Literacy	Assessment
8	<p>Number</p> <ul style="list-style-type: none"> • Using Percentages • Converting between Fractions, decimals and percentages. • Percentage increase/decrease/reverse <p>Statistics</p> <ul style="list-style-type: none"> • Interpreting and comparing data • Averages • Scatter graphs • Data project <p>Algebra</p> <ul style="list-style-type: none"> • Solve linear equations • Sequences, finding the nth term. 	<p>Term 1:</p> <ul style="list-style-type: none"> - The term starts by looking at drawing and measuring angles with some calculations. 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. - The term then looks at interpreting & comparing data, 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. 	<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"> - Scatter graphs - Solving equations - Linear graphs - Direct and inverse proportion - Pythagoras 	<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 10 (Beginning of November) Topic Test/MCQs</p> <p>Week 22(Beginning of February) Topic test/MCQs</p> <p>Week 35 (Beginning of May) Topic Test/MCQs</p> <p>Week 45 (Mid of July) End of Topic Test/MCQs</p> <ul style="list-style-type: none"> • At the above assessment points, teachers will assess the learning of

	<ul style="list-style-type: none"> Graphs of Linear and Quadratic Functions. <p>Ratio, Proportion and Rates of Change</p> <ul style="list-style-type: none"> Direct and Inverse proportion Best Buys Units of measure <p>Geometry and Measures</p> <ul style="list-style-type: none"> Perimeter and Area Volume Pythagoras Geometric reasoning and proof Calculating Angles 3-D shape 	<p>Term 2:</p> <ul style="list-style-type: none"> The term starts by solving linear equations, from the Y6 of study, students should be able to find pairs of numbers that satisfy an equation with 2 unknown, and in Y7, they have worked on algebraic notation, manipulation and substitution. It's an important piece of knowledge they need to grasp before then moving on further in algebra. 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, in term 3. Students will not know how to re-arrange formulae yet, 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"> The term will focus on Linear graphs, students should have seen graphs of the form $x = a$, $y = b$ and $y = \pm x$ in Y7 and they will learn $y = mx + c$ in depth. <p>Term 4:</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>The students will also have a good understanding of ratio and</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>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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		<p>proportion, the link between proportion with linear functions. Students will look into 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> <ul style="list-style-type: none">- Term 4 finishes with Compound measures. This builds on work students will have done in KS2 on comparing units and measurements. <p>Term 5:</p> <ul style="list-style-type: none">- Term 5 starts by identifying properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres and then use these knowledge to solve problems involving 3D shapes.- The term ends with students building on the work they did at KS2 and in Year 7 looking at Perimeter and Area. They also look at volume of shapes, which students won't have seen since Year 6. <p>Term 6:</p> <ul style="list-style-type: none">- Building on work in Term 6 on areas and perimeter, the students will derive and apply formulae to calculate and solve problems involving volume of cuboids (including cubes) and other prisms (including cylinders)- Students then look at angles on a straight line, angles around a point, and vertically opposite angles. The students will derive and use the sum of angles in a triangle to deduce the angle sum in any polygon, and derive the properties of regular polygons.				
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		- The term finish by learning Pythagoras and using it in similar triangles to solve problems involving right-angled triangle including in 3D shapes.				
Year	What do students learn?	Why?	Tier 3 keywords	Threshold concepts	Literacy	Assessment
<p>10</p> <p>Foundation</p> <p>All of year 10 follow the same SOW but take different routes depending upon their success and potential tier entry. Staff have autonomy to work on areas of the curriculum</p>	<p>Number</p> <ul style="list-style-type: none"> Calculating with percentages Indices Number recap and review <p>Algebra</p> <ul style="list-style-type: none"> Introduction to quadratics Rearranging formulae Sketching graphs Linear and quadratic equations and graphs Algebraic Fractions Coordinate Geometry <p>Geometry and Measures</p> <ul style="list-style-type: none"> Measures Congruence and Similarity Pythagoras' theorem and basic trigonometry Volume Transformations and Vectors <p>Probability</p> <ul style="list-style-type: none"> Bar and Pie charts Tree diagrams Venn diagrams <p>Statistics</p> <ul style="list-style-type: none"> Measures of central tendency (Median, mean, mode and modal class) 	<p>Term 1:</p> <p>Students start the year looking at factors, multiples and primes. Whilst this has been taught as early as year 7, these topics underpin the more challenging work later. Key misconceptions should be addressed here to avoid issues with later topics. Work around error intervals and bounds provides the main body of work although students should do some rounding work prior to this.</p> <p>Indices is the next topic and utilises the knowledge acquired from the first weeks of term. The rules of indices are explored and examples and non examples used to generate discussion and key components.</p> <p>Pythagoras concludes term 1 and provides a fantastic opportunity to interleave other areas of the curriculum. Percentages, ratio, area and fractions should appear here and retrieval starters will help reduce the curve of forgetfulness.</p> <p>Term 2:</p> <p>The theme of shape continues after half term with a focus upon trigonometry. This may be bypassed by the weaker end of year 10 as it is not appropriate for them. Triangles is a key theme in the next topic of congruence and similarity as well. For foundation this should just be the basic rules and encourage students to use scale factors to link similar shapes.</p>	<p>Factor</p> <p>Multiple</p> <p>Prime</p> <p>HCF</p> <p>LCM</p> <p>Product</p> <p>upper and lower bounds</p> <p>Powers</p> <p>Roots</p> <p>Reciprocal</p> <p>Indices</p> <p>Right-angled</p> <p>Hypotenuse</p> <p>Congruent</p> <p>Scale Factor</p> <p>Multiplicative</p> <p>Recurring</p> <p>Notation</p> <p>Invariant</p> <p>Radius</p> <p>Diameter</p> <p>Chord</p> <p>Tangent</p> <p>Arc</p> <p>Circumference</p> <p>Sector</p> <p>Segment</p> <p>Coordinate</p> <p>Gradient</p> <p>Y intercept</p> <p>Parallel</p> <p>Perpendicular</p> <p>Turning point</p> <p>Roots</p>	<ul style="list-style-type: none"> Percentage multipliers Upper/Lower bounds Indices Congruent triangles Pythagoras and Trigonometry Rearranging formulae $Y = mx + c$ 	<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. 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>October</p> <p>There is normally an assessment opportunity here. Although there is no official timing for assessment during this time, an assessment on the work from the year to date will help inform staff of progress. DIRT tasks related to this will follow.</p> <p>Term 6 Y10 PPE</p> <p>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>deemed most appropriate to their group.</p>	<ul style="list-style-type: none"> Measures of spread (Range, quartiles and inter-quartile range) Discrete and Continuous data Lines of best fit Product rule for counting Listing of outcomes 	<p>This is another fantastic opportunity to link back to prior learning with indices. ‘Scale factor’ is a key phrase and allows for a natural link into enlargements. Students should expect to see positive and fractional scale factors here.</p> <p>The final few weeks of term revert back to number work with percentages. This will involve percentage of amounts, multipliers, reverse percentages and percentage change. Growth and decay (compound interest) may be appropriate for the top end of the foundation students. (Much of this body of work should build upon the percentages work from year 9).</p> <p>Term 3: ‘New style’ GCSE topics such as the product rule for counting commence term 3. Foundation students should also be able to list outcomes in an ordered and structured fashion. Students will need to link situations to sample space diagrams and be able to represent ideas in a Venn diagram. This challenging topic offers a great opportunity to interleave ratio and fractions of amounts. Whilst not on the SOW, a link to frequency trees may be appropriate here.</p> <p>Term 3 concludes with work on Volume. This was covered in year 8 but should involve work around working backwards and rearranging equations. Volumes of cones, spheres and pyramids should be tackled here as with higher although the work may just focus upon substitution of values.</p> <p>Term 4: Straight line graphs start off term 4. This topic was covered in years previously, however the focus is now towards basic coordinate geometry. The scheme of work is flexible at this point depending upon how students respond to this part of the curriculum. Links to real life graphs (distance time) will provide an opportunity to link work with that of Science. Some quadratic graph work may happen here</p>	<p>Numerator Denominator Translation Column Vector Reflection Rotation Clockwise / anti Centre of rotation</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>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 see that they have learnt topics that they may not have been able to do in the past.</p>
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		<p>although this depends upon whether it is appropriate for the group.</p> <p>Term 5: Both higher and foundation start term 5 with fractions. Foundation students work should focus upon the 4 operations and apply this to mixed numbers as well. Rearranging equations follows and this may allow for links back to the volume and area work with rearranging from a given area or volume.</p> <p>A key crossover topic of transformations follows. We have covered enlargements already and so the focus should be on combining transformations. Reflection will link to the straight line graph topic and translations will precede the vectors topic that follows. Adding and subtracting column vectors will really stretch the top end of foundation. Students should be able to combine transformations, describe them and evaluate a scenario when something has gone wrong.</p> <p>Term 6: In the final term students will predominantly work on statistical concepts. Representations of data such as bar and pie charts form the basis of this. There may be an opportunity to interleave percentages and ratio here. Links to other subjects where charts are used (Geography for example) may well be seen here.</p> <p>Following the end of year mock exams it is highly likely students will be undertaking DIRT tasks based upon weaknesses. If there is time however Circle Theorems will be introduced.</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>
<p>11 Foundation</p>	<p>Number</p> <ul style="list-style-type: none"> • Standard form • Calculating with percentages 	<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 	<p>Volume Scale factor Ratio</p>		<p>Reading Students are often given textbook work or worksheets that involve worded</p>	<p>Term 2 Y11 PPE Beginning of November 3 x 1.5 Hour GCSE Papers.</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>If we are unsure of which tier students will eventually enter, students will always start following the Higher tier scheme of work, with the option of</p>	<ul style="list-style-type: none"> 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>topics taught at the end of last term are embedded and it allows students to begin the year with confidence.</p> <ul style="list-style-type: none"> 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. 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 $y = \frac{1}{x} \text{ with } x \neq 0$ <p>function</p> <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 	<p>Prism Pyramid Cuboid Cube Cylinder Pi Radius Diameter Height Length Triangular prisms Inequality Solve Illustrate Integer Geometric Form Graph Linear Sketch Function Quadratic Cubic Reciprocal Equation Plot Co-ordinates 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</p>		<p>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 Teachers should ensure that students answer in full, eloquent sentences and</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 complete the 12 papers before the February examination series in order to improve their marks.</p> <p>Pre/Post tests</p>
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<p>dropping down to the Foundation tier at an appropriate later stage).</p>		<p>concept of inverse proportion and representing proportion graphically.</p> <ul style="list-style-type: none"> - 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 interpret roots, intercepts and turning points of quadratic functions graphically. - 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 	<p>Factorise Turning point Maximum Minimum Intercept Growth Decay Compound interest Interest Annual Depreciate Vector Scalar Parallel Column Diagrammatic Addition Subtraction</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>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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		involves: applying addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic representation of vectors.				
<p>Year 9</p> <p>Students in Year 9 follow the same scheme of work.</p> <p>Where there is a high likelihood of students studying Higher, there are extension topics which will be covered.</p>	<p>Number</p> <ul style="list-style-type: none"> • Rounding • Error intervals • Estimation • Standard form • Indices • Maths & Money <p>Algebra</p> <ul style="list-style-type: none"> • Expanding and factorising • Basic rearranging • Identities • Substitution and using formulae • Solving equations • Solving simultaneous equations • Linear inequalities • Linear nth term • Sequences • Straight line graphs • Rearranging formulae <p>Ratio, Proportion and Rates of Change</p> <ul style="list-style-type: none"> • Using percentages and % change • Reverse percentages • Compound measures • Direct and Inverse proportion • Units • Similarity <p>Geometry and Measures</p> <ul style="list-style-type: none"> • Angles in parallel lines • Bearings • Constructions and loci • Transformations • Plan and elevation 	<p>Term 1: Year 9 starts with revision and extension of number skills. It starts with rounding and estimation, using these skills to look at error intervals. Standard form and indices are also covered.</p> <p>The term finishes looking at consolidating algebra skills, including expanding and factorising brackets (single and double where appropriate), along with exploring algebraic equivalence and identities</p> <p>Term 2: The term starts looking at percentages, percentage change and reverse percentages. Number work follows with a look at maths and money, exploring how balance sheets are created and what they mean. The term finishes exploring probability, probability trees and averages.</p> <p>Term 3: Term 3 continues work on averages looking at averages from frequency tables. There is then a period of re-teach and revision before a written assessment. The term concludes looking at boxplots, before looking at aspects of geometry including angles in parallel lines and bearings.</p> <p>Term 4: The term starts with some more geometry, looking at constructions and loci. Students then return to algebra work, looking at using formulae, including substitution, solving equations, simultaneous equations, linear inequalities and linear nth term.</p> <p>Term 5: This shorter term concentrates on algebra and builds on the work of nth term in the previous</p>	<p>Significant figures</p> <p>Decimal places</p> <p>Error intervals</p> <p>Error bounds</p> <p>Bounds of accuracy</p> <p>Standard form</p> <p>Coefficient</p> <p>Powers</p> <p>Roots</p> <p>Square root</p> <p>Cube root</p> <p>Reciprocal</p> <p>Expand</p> <p>Factorise</p> <p>Quadratic</p> <p>Identity</p> <p>Reverse percentages</p> <p>Credit</p> <p>Debit</p> <p>Balance</p> <p>Frequency tree</p> <p>Probability</p> <p>Mean</p> <p>Median</p> <p>Mode</p> <p>Range</p> <p>Boxplots</p> <p>Interquartile range</p> <p>Lower quartile</p> <p>Upper quartile</p> <p>Parallel</p> <p>Corresponding angle</p> <p>Co-interior angle</p> <p>Vertically opposite</p> <p>Bearings</p> <p>Loci</p> <p>Substitution</p>	<ul style="list-style-type: none"> - Rounding - Standard form - Expanding and factorising - Averages - Solving equations - Straight line graphs - Plans and elevations - Maths and money 	<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>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</p>	<p>January</p> <p>In January, there is also a written assessment 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</p> <p>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>These topics will also be covered for students in later years if it is decided they have a chance of entering the higher tier exam.</p>	<ul style="list-style-type: none"> Surface area <p>Probability</p> <ul style="list-style-type: none"> Probability and frequency trees Probability tree diagrams <p>Statistics</p> <ul style="list-style-type: none"> Statistical measures Averages from frequency tables Boxplots 	<p>half term. Sequences are explored, recognising famous ones and also learning about geometric, quadratic and quadratic nth term. Rearranging formulae follows and then there is some work on compound measures to conclude the half term's work.</p> <p>Term 6: Work on ratio and proportion starts the final term, looking at direct and inverse proportion. Units and ideas of similarity are explored before another period of revision and reteach in anticipation of a written assessment. The year concludes with some geometry topics: transformations, plans & elevations, and surface area.</p>	<p>Simultaneous equation Linear inequality Inequality Great than Less than Nth term Linear Geometric Fibonacci Direct proportion Inverse proportion Units Similarity Scale factor Transformations Translation Enlargement Reflection Rotation Front elevation Side elevation Plan Surface area</p>		<p>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>	
Year	What do students learn?	Why?	Tier 3 keywords	Threshold concepts	Literacy	Assessment
<p>10</p> <p>All of year 10 follow the same SOW but take different routes depending upon their success and</p>	<p>Higher</p> <p>Number</p> <ul style="list-style-type: none"> Calculating with percentages Surds Indices Number recap and review <p>Algebra</p> <ul style="list-style-type: none"> Introduction to quadratics Rearranging formulae Sketching graphs Linear and quadratic equations and graphs Algebraic Fractions Coordinate Geometry Equations of Circles <p>Geometry and Measures</p>	<p>Term 1: Students start the year looking at factors, multiples and primes. Whilst this has been taught as early as year 7, these topics underpin the higher tier content that follows. This should be a quick recap for higher students with work around error intervals and bounds providing the main body of work.</p> <p>Indices and surds utilises the knowledge acquired from the first week of term and is a great opportunity to extend students towards the highest grade topics. Indices will in part recap elements of year 9 (rules) but the primary focus is fractional and negative powers.</p> <p>Pythagoras concludes term 1 and provides a fantastic opportunity to interleave the surds knowledge just acquired. We look at Pythagoras in both 2d and 3d and students should expect to see a variety of mathematical</p>	<p>Factor Multiple Prime Product upper and lower bounds Powers Roots Reciprocal Indices Surd Rationalise Irrational Right-angled Hypotenuse Congruent Scale Factor Multiplicative Recurring Notation Invariant Radius Diameter</p>	<ul style="list-style-type: none"> Percentage multipliers Upper/Lower bounds Surds Measures of central tendency Indices Properties of polygons Congruent triangles Pythagoras and Trigonometry Conditional Probability Rearranging formulae $Y = mx + c$ 	<p>Reading</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</p>	<p>October There is normally an assessment opportunity here. Although there is no official timing for assessment during this time, an assessment on the work from the year to date will help inform staff of progress. DIRT tasks related to this will follow.</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</p>

<p>potential tier entry. Further Maths is undertaken with 10x1 after school each week to encourage students aspiration towards grade 8 and 9.</p>	<ul style="list-style-type: none"> Measures Properties of polygons Congruence and Similarity Pythagoras' theorem and basic trigonometry Volume Transformations and Vectors Circle Theorems <p>Probability</p> <ul style="list-style-type: none"> Bar and Pie charts Tree diagrams Venn diagrams Theoretical probability Conditional probability <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 Product rule for counting 	<p>topics coming together here. (Percentages, ratios, surds, algebra etc).</p> <p>Term 2:</p> <p>The theme of shape continues after half term with a focus upon trigonometry. Sine rule and Cosine rule is to be left until year 11 however students should have a sound understanding of exact values as well as finding missing angles and lengths. This should be done in 2d as well as 3d. Triangles is a key theme in the next topic of congruence and similarity as well. Links to proving congruence should be seen and similar shape work will involve line, area and volume scale factors. This is another fantastic opportunity to link back to prior learning with indices. 'Scale factor' is a key phrase and allows for a natural link into enlargements. Students should expect to see positive, fractional and negative scale factors here.</p> <p>The final few weeks of term revert back to number work with percentages. This will involve percentage of amounts, multipliers, reverse percentages and percentage change. Growth and decay (compound interest) along with recurring decimals are key topics on the higher tier papers. (Much of this body of work should build upon the percentages work from year 9).</p> <p>Term 3:</p> <p>'New style' GCSE topics such as the product rule for counting commence term 3. Students will need to link situations to sample space diagrams and be able to represent ideas in a venn diagram. This challenging topic offers a great opportunity to interleave ratio, fractions of amounts and even forming and solving quadratic equations. A thorough understanding of 'notation' is important here.</p> <p>Term 3 concludes with work on Volume. This was covered in year 8 but should involve work around working backwards and rearranging</p>	<p>Chord Tangent Arc Circumference Sector Segment Gradient Y intercept Parallel Perpendicular Turning point Roots Numerator Denominator Translation Column Vector Reflection Rotation Clockwise / anti Centre of rotation Histograms Frequency Density</p>		<p>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>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 Hegarty Maths 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>
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equations. Volumes of cones, spheres and pyramids should be tackled here.

Term 4:

Straight line graphs starts off term 4. This topic was covered in years previously, however the focus is now towards perpendicular lines and coordinate geometry. (This ties in really nicely with the Further Maths curriculum that some of year 10 are undertaking after school). The scheme of work is flexible at this point depending upon how students respond to this part of the curriculum. Function notation may be explored as well as the solving of quadratic equations. These graphs can then be plotted and opportunities to find turning points and minimum points may arise. 10x1 and possibly x2 may then explore the equations of circles. There could be a great link back to simultaneous equations from year 9 here.

Term 5:

Both higher and foundation start term 5 with fractions. Higher students need to focus upon mixed numbers and then onto algebraic fractions. This is an opportunity to link back to the previous term where students needed to factorise quadratic equations to then be able to solve them. Complex rearranging follows with the work predominantly focusing upon rearranging where a term appears on both sides. Fractions will be used as part of this to supplement their prior learning.

A key crossover topic of transformations follows. We have covered enlargements already and so the focus should be on combining transformations. Reflection will link to the straight line graph topic and translations will precede the vectors topic that follows. Adding and subtracting column vectors can then inform the more challenging higher tier vectors work. X1 and x2 may then focus on the vector proofs.

		<p>Term 6: To combat the curve of forgetting, students are re introduced to cumulative frequency which they looked at in year 9. Links to box plots will be made and the challenging topic of histograms will follow. Links to other subjects where charts are used (Geography for example) will be exploited here.</p> <p>Following the end of year mock exams it is highly likely students will be undertaking DIRT tasks based upon weaknesses. If there is time however Circle Theorems will be introduced.</p>				
Year	What do students learn?	Why?	Tier 3 keywords	Threshold concepts	Literacy	Assessment
<p>11 (The vast majority of students in Year 9 will follow the Higher tier scheme of work.</p> <p>For students that may struggle, and whose final tier decision may be</p>	<p>Higher</p> <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 	<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</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</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>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</p>

<p>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>	<ul style="list-style-type: none"> 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>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 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</p>	<p>Gradient</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>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 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</p>
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		<p>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: Term 5 starts looking at gradients and rates of change. Students look at interpreting the gradient at a point on a curve and apply the concepts of average and instantaneous rates of change (gradients of chords and tangents) in numerical, algebraic and graphical contexts.</p> <p>The penultimate topic of the course is "pre-calculus and area under a curve." Students must calculate or estimate gradients of graphs and areas under graphs (including quadratic and non-linear graphs). Students must then interpret the results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts.</p> <p>The final topic is algebraic fractions where students will use all of their algebra skills to date to solve problems. This is introduced here as it incorporates a lot of previous topics that students must be secure about, including factorising quadratics and the four operations with fractions.</p> <p>The term concludes with revision.</p> <p>Term 6: Term 6 involves revision of topics identified from the Question Level Analysis (QLAs) from the February examination series. Teachers will tailor lessons to address any gaps in students' knowledge.</p>				<p>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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		Students will also complete past paper booklets that they will be given to prepare students for their examinations.				
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