

## Maths KS4 Higher Curriculum Map

Year	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p style="text-align: center;"><b>Year 10</b></p> <p>The year 10 curriculum gives students the opportunity to revisit key topics allowing them to recap and extend their learning on these key topics. Each half-term has a key focus covering: number; algebra; probability; geometry; similarity and finally data handling. The focus will be on initially ensuring fluency on all topics. Students will then be able to attempt problem-solving questions which require knowledge from several domains.</p>	<p style="text-align: center;"><b>Number</b></p> <p><b>Knowledge Content</b> Powers and roots; surds and irrational numbers; indices; standard form; sequences</p> <p><b>Threshold Concepts</b></p> <ul style="list-style-type: none"> <li>• Surds can be calculated with but won't always result in 'nice-looking' answers.</li> <li>• Find the nth term of linear, geometric and quadratic sequences.</li> </ul> <p><b>Link to Prior Learning</b> Builds on knowledge of prime factorisation and index laws</p> <p><b>Enquiry Question</b> The first term of a sequence is 10. The fifth term is 40. Find the second, third and fourth terms if the sequence is</p> <ol style="list-style-type: none"> <li>Linear</li> <li>Geometric</li> <li>Fibonacci</li> </ol>	<p style="text-align: center;"><b>Applications of algebra</b></p> <p><b>Knowledge Content</b> Quadratics; quadratic graphs algebraic fractions; simultaneous equations</p> <p><b>Threshold Concepts</b></p> <ul style="list-style-type: none"> <li>• Simultaneous equations with a quadratic involved can result in two solutions.</li> <li>• Algebraic fractions can be simplified by dividing the numerator and denominator by a common factor.</li> </ul> <p><b>Link to Prior Learning</b> Builds on knowledge of quadratics and equation solving</p> <p><b>Enquiry Question</b> Sketch a quadratic and linear equation which give</p> <ol style="list-style-type: none"> <li>1 solution</li> <li>2 solutions</li> <li>No solutions</li> </ol>	<p style="text-align: center;"><b>Percentages and probability</b></p> <p><b>Knowledge Content</b> KS3 FDP review; percentages; probability sets, venn and sample space diagrams (including conditional probability)</p> <p><b>Threshold Concepts</b></p> <ul style="list-style-type: none"> <li>• Probability can be represented a fraction, decimal or percentage.</li> <li>• Know the difference between simple and compound interest.</li> <li>• Problems with conditional probability require more careful consideration.</li> </ul> <p><b>Link to Prior Learning</b> Builds on knowledge of FDP and probability</p> <p><b>Enquiry Question</b> If you have a bank account which offers interest, explain why compound interest is better than simple interest?</p>	<p style="text-align: center;"><b>Geometry</b></p> <p><b>Knowledge Content</b> Transformations; upper and lower bounds; 2D shapes and circle geometry; 3D shapes; volume and surface area</p> <p><b>Threshold Concepts</b></p> <ul style="list-style-type: none"> <li>• There are 4 main types of transformation.</li> <li>• Upper and lower bounds show the margin of error as a result of rounding.</li> <li>• A sector is a fraction of a circle.</li> </ul> <p><b>Link to Prior Learning</b> Builds on knowledge of 2D/3D shape properties (area, volume etc.)</p> <p><b>Enquiry Question</b> A cube has side lengths of 8cm correct to 1 significant figure. Write the error interval for the:</p> <ol style="list-style-type: none"> <li>side length</li> <li>volume</li> <li>length of the diagonal of the cube</li> </ol>	<p style="text-align: center;"><b>Similarity</b></p> <p><b>Knowledge Content</b> Ratio review; compound measures and proportion; Pythagoras review; similarity and trigonometry; 3D triangles</p> <p><b>Threshold Concepts</b></p> <ul style="list-style-type: none"> <li>• Speed, density and pressure are all examples of compound measures.</li> <li>• Problems involving right-angled triangles can be solved using Pythagoras or the sin/cos/tan ratios.</li> <li>• For non-right angled triangles the following can be used: sine rule; cosine rule; area of a triangle using sine rule</li> </ul> <p><b>Link to Prior Learning</b> Builds on knowledge of ratio and trigonometry</p> <p><b>Enquiry Question</b> How can we derive the formula for the length of the diagonal of a cube?</p>	<p style="text-align: center;"><b>Data Handling</b></p> <p><b>Knowledge Content</b> Averages and range review; data collection and sampling; presenting data including scatter diagrams; further statistical diagrams</p> <p><b>Threshold Concepts</b></p> <ul style="list-style-type: none"> <li>• Averages can be calculated from a frequency table and estimated from a grouped-data table</li> <li>• Boxplots can be used to compare the distribution of two data sets.</li> </ul> <p><b>Link to Prior Learning</b> Builds on knowledge of averages and data presentation</p> <p><b>Enquiry Question</b> From a grouped-data table, can we find the error interval for our estimation of the mean?</p>

## Year 11

After year 10, students will spend the Autumn term completing the curriculum covering proof and graph work. The remainder of the year will then be spent revisiting topics that students can improve on. Students will have time to get exam-practice and improve their confidence in preparation for their GCSE exams.

### Reasoning and proof

#### Knowledge Content

Vectors; geometric reasoning review; circle theorems; bearings; congruence; construction and loci

#### Threshold Concepts

- Parallel vectors are scalar multiples of each other.
- Angles made in circles using the points on the centre and/or circumference can be found using the circle theorems.

#### Link to Prior Learning

Builds on knowledge of angles and constructions

#### Enquiry Question:

Prove the circle theorem that states that the angle at the centre is double the angle at the circumference.

### Inequalities and graphs

#### Knowledge Content

Inequalities; linear graphs, non-linear graphs; trig graphs

#### Threshold Concepts

- The graphs of  $\sin(x)$  and  $\cos(x)$  are identical but out of phase by  $90^\circ$ .

#### Link to Prior Learning

Builds on knowledge of inequalities and graphs

#### Enquiry Question:

What are the key similarities and differences between the graphs of  $\sin(x)$ ,  $\cos(x)$  and  $\tan(x)$ .

### Algebra and graphs

#### Knowledge Content

Algebraic proof and reasoning; recurrence relations; functions; transformation of graphs; further graphs

#### Threshold Concepts

- Algebra can be used to construct proofs
- The area under a curve can be estimated using basic triangles and quadrilateral.

#### Link to Prior Learning

Builds on knowledge of non-linear graphs

#### Enquiry Question:

When estimating the area under a curve, is it always beneficial to use a constant width for each shape?

### Revision

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