



## YEAR 10 Autumn TERM 2

'An ambitious curriculum that meets the needs of all'

### Medium Term Planning

#### Congruence and Similarity (2)    Pythagoras and Trigonometry (3/2)    Angles and bearings (2/3)

##### Curriculum Intent

### UNIT 3: Congruence and Similarity **H & F (8 lessons)**

#### *Previously met: Y8 Scale factors*

To be able to:

- Compare lengths, areas and volumes using ratio notation and/or scale factors; making links to similarity.
- Interpret and use fractional **(and negative)** scale factors for enlargements.
- Apply the concepts of congruence and similarity, including the relationships between lengths, **(areas and volumes)** in similar figures.
- Use mathematical language and properties precisely.
- Make and test conjectures about the generalisations that underlie patterns and relationships; look for proofs or counter-examples.
- Develop mathematical knowledge, through solving problems and evaluating outcomes, including multi-step problems.

#### Links and interleaving

- Change freely between related standard units.
- Similar shapes.
- Scale factors, scale diagrams and maps.
- Understand that the relationship between two quantities can be expressed as a ratio or a fraction.
- Direct proportion.

##### Skills/Assessment Objective Links

### UNIT 4 : Trigonometry **Higher (12) Foundation (8)**

#### *Previously met: Y9 Spring 2 Pythagoras' theorem*

To be able to:

- Apply Pythagoras' Theorem and trigonometric ratios to find angles and lengths in right-angled triangles (and where possible general triangles) in two **(and three)** dimensional figures.
- Know the exact values of  $\sin \theta$ ,  $\cos \theta$ ,  $\tan \theta$  for required angles.
- **Know and apply the sine rule and cosine rule to find unknown lengths and angles.**
- **Know and apply to calculate the area, sides or angles of any triangle.**
- Develop mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems.
- Model situations mathematically and express the results using a range of formal mathematical representations, reflecting on how their solutions may have been affected by any modelling assumptions.

- Select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems; interpret their solution in the context of the given problem.

### **Links and interleaving**

- Pythagoras' Theorem.
- Trigonometric graphs, including transformation of these graphs.

## **UNIT 5: Angles and Bearings **Higher (8) Foundation(12)****

### ***Previously met: Y9 Spring 4: angles rules covered at KS2 and in Y7 & Y8***

To be able to:

- Interpret and use bearings.
- Compare lengths...using scale factors.
- Apply Pythagoras' Theorem and trigonometric ratios to find angles and lengths in right-angled triangles **(and, where possible, general triangles)** in two dimensional figures.
- **Know and apply the sine rule and cosine rule to find unknown lengths and angles.**
- Use mathematical language and properties precisely
- Reason deductively in geometry, number and algebra, including using geometrical constructions.
- Make and use connections between different parts of mathematics to solve problems.

### **Links and interleaving**

- Apply the properties of angles at a point, angles on a straight line, vertically opposite angles.
- Understand and use the relationship between parallel lines and alternate and corresponding angles.
- Derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons.
- Simple angle proofs.
- Interpret and use bearings.
- Pythagoras and trigonometry in the context of bearings.
- Use Sine to calculate the area of any triangle.

**Spiritual, moral, social, and cultural development**

**SMSC:** Making choices, looking for patterns which may reflect the natural world, supporting and collaborating with each other, realisation that mathematics is an international language and making cultural links as we explore the history of mathematics.

**PSHE/British Values:** Working collaboratively, being respectful during discussion and valuing contributions made by others

**Skills Builder: Key skills in numeracy used in all topic areas.**

**Numeracy**

**Focus on key skills.**

Literacy	<p><b>Vocabulary Tier 2:</b> Command words displayed in the classroom and italicized/bold font used in shared resources/presentations. These are a constant focus in discussion and questioning,</p> <p><b>Vocabulary Tier 3:</b> Title slide in all shared resource presentations show the key vocabulary for each topic.</p> <p><b>Reading:</b> Underlining command words,</p> <p><b>Writing:</b> Modelling solutions</p> <p><b>Oracy:</b> Think, pair, share, discussion, verbal feedback (peer to peer), questioning, student modelling</p>
Becoming future ready	<p><b>Personal Skills:</b> As a Mathematics student you will learn many skills: you will gain opportunities to listen to others supportively and to use questioning to develop your own understanding, you will learn how to cope with challenging questions and how to build up your resilience, you will get the chance to work on your own and with others. You will develop problem solving skills and you will learn how to break a problem down into smaller more manageable steps. You will learn how to collaborate with others when solving problems and you will learn how to articulate your solution to a problem.</p> <p><b>Employability:</b> Mathematical skills are invaluable in the workplace. There are many transferable skills which are much valued by employers. Specific career paths for each topic are discussed at the beginning of each unit of work.</p>
Adaptation	<ul style="list-style-type: none"> <li>• By progressive questioning: exploring pupils' understanding through interactive dialogue.</li> <li>• By outcome: different learners will produce different outcomes.</li> <li>• By resource: worksheets are clearly presented and accessible.</li> <li>• By intervention: by providing different levels of supervision and support.</li> <li>• By grouping/setting: according to prior attainment, gender, social preference, preferred learning style.</li> <li>• By offering optional activities: In class or as homework, to extend learning.</li> </ul>
QFT/SEND Provision	
Implementation Curriculum Delivery	<p><b><u>Unit 3: Congruence, Similarity and Enlargement</u></b></p> <p>Pre-requisites</p> <ul style="list-style-type: none"> <li>• Coordinates</li> <li>• Area, volume</li> <li>• 2 D shapes</li> <li>• Multiplying by a fraction</li> <li>• Angles in parallel lines</li> <li>• Ratio and proportion</li> </ul> <p>Foundation Tier: Up to Grade 5</p> <ul style="list-style-type: none"> <li>• Enlarge a shape by a positive integer scale factor.</li> <li>• Enlarge a shape by a fractional scale factor.</li> <li>• Enlarge a shape from a centre of enlargement (positive integer and fractional)</li> <li>• Identify a centre of enlargement.</li> <li>• Identify similar and congruent shapes.</li> <li>• Work out missing sides in similar shapes.</li> </ul> <p>Additional content for Higher Tier (Up to Grade 9)</p> <ul style="list-style-type: none"> <li>• Enlarge a shape by a negative scale factor.</li> <li>• Understand area and volume of similar shapes.</li> <li>• Prove triangles are similar or congruent.</li> </ul> <p><b><u>Unit 4: Trigonometry</u></b></p> <p>Pre-requisites</p> <ul style="list-style-type: none"> <li>• Types of number (factors, multiples, primes, squares)</li> <li>• Area of squares</li> <li>• Solving equations with fractions</li> <li>• Substitution into formulae</li> <li>• Using a calculator</li> </ul>
Learning Outcomes (Key Knowledge)	

	<ul style="list-style-type: none"> <li>Ratio</li> </ul> <p>Foundation Tier: Up to Grade 5</p> <ul style="list-style-type: none"> <li>Pythagoras (revisit from Y9)</li> <li>Calculating sides and angles in right angled triangles.</li> </ul> <p>Additional content for Higher Tier (Up to Grade 9)</p> <ul style="list-style-type: none"> <li>Trigonometry and Pythagoras in 3D</li> <li>Further trigonometry: area of a triangle, sine rule, cosine rule</li> </ul> <p><b><u>Unit 5 Angles and Bearings</u></b></p> <p>Pre-requisites</p> <ul style="list-style-type: none"> <li>Angle rules</li> <li>Drawing angles</li> <li>Compass directions</li> <li>Solving equations</li> </ul> <p>Foundation Tier: Up to Grade 5</p> <ul style="list-style-type: none"> <li>Bearings</li> <li>Calculate bearings using angle rules.</li> <li>Problems with Pythagoras and trigonometry using bearings.</li> </ul> <p>Additional content for Higher Tier: Up to Grade 9</p> <ul style="list-style-type: none"> <li>Bearings problems using sine and cosine rules</li> </ul>
<b>Current learning to be developed in the future within:</b>	<p>Students will extend their skills in Year 11 during:</p> <p>Spring Block 4 Loci and plans and elevations/ Trigonometric graphs and transformations.</p> <p>Autumn Block 6 extend trigonometry to look at the Sine and Cosine rule.</p>
<b>Assessment</b>	Refer to assessment maps for formative and summative assessment opportunities.
<b>Impact</b>	Attainment and Progress – Refer to assessment results / data review documentation.