



# YEAR 9 2023-2024 SPRING TERM 2

'An ambitious curriculum that meets the needs of all'

## Medium Term Planning

### 10. Rotation and Translation    11. Pythagoras' Theorem 12. Enlargement and Similarity

#### Curriculum Intent

#### UNIT 10: ROTATION AND TRANSLATION, (7 lessons)

##### *Previously met:*

- Area (Year 8, Sum 1)
- Line Symmetry and reflection (Year 8, Sum 1)

To be able to:

- Identify the order of rotational symmetry of a shape
- Compare and contrast rotational symmetry with lines of symmetry
- Rotate a shape about a point on a shape
- Rotate a shape about a point not on a shape
- Translate points and shapes by a given vector
- Compare rotation and reflection of shapes
- **Find the result of a series of transformations (H)**

##### REMDINER – Strategies for teaching.

- Tracing paper should be used for rotations and for checking solutions
- Diagonal reflections- turn the page so that the mirror line looks vertical

##### Links and interleaving

- Degrees and fractions of turn
- Equations of horizontal, vertical and basic diagonal ( $y=x$  and  $y=-x$ ) lines
- Congruent shapes
- Coordinates and axes

#### Skills/Assessment Objective Links

#### UNIT 11: PYTHAGORAS' THEOREM, (7 lessons)

##### *Previously met:*

- This is new content, however the skills required have been met before (square and roots, addition. Subtraction, area of squares)

To be able to:

- Find squares and square roots (R)
- Identify the hypotenuse of a right-angled triangle
- Determine whether a triangle is right-angled
- Calculate the hypotenuse of a right-angled triangle
- Calculate missing sides in right-angled triangles
- Use Pythagoras' Theorem on coordinate axes
- Explore proofs of Pythagoras' Theorem
- **Use Pythagoras' Theorem in 3D shapes (H)**

	<p><b><u>REMINDER – Strategies for teaching.</u></b></p> <ul style="list-style-type: none"> <li>• Avoid introducing the formula for Pythagoras’ Theorem, aim for understanding the link between areas.</li> <li>• Physically drawing the squares on the sides when introducing the topic. This strategy can be used throughout with weaker classes</li> </ul> <p><b><u>Links and interleaving</u></b></p> <ul style="list-style-type: none"> <li>• Trigonometry</li> <li>• Scale drawing</li> <li>• Bearings</li> <li>• Unit conversions</li> </ul> <p><b>UNIT 12: ENLARGEMENT AND SIMILARITY, (7 lessons) to be continued after Easter</b></p> <p><b><i>Previously met:</i></b></p> <ul style="list-style-type: none"> <li>• This is new content</li> </ul> <p>To be able to:</p> <ul style="list-style-type: none"> <li>• Recognise enlargement and similarity</li> <li>• Enlarge a shape by a positive integer scale factor</li> <li>• Enlarge a shape by a positive integer scale factor from a point</li> <li>• Enlarge a shape by a positive fractional scale factor</li> <li>• <b>Enlarge a shape by a negative scale factor (H)</b></li> <li>• Work out missing sides and angles in a pair of given similar shapes</li> <li>• <b>Solve problems with similar triangles (H)</b></li> <li>• <b>Explore ratios in right-angled triangles (H)</b></li> </ul> <p><b><u>REMINDER – Strategies for teaching.</u></b></p> <ul style="list-style-type: none"> <li>• Teach enlargement by counting squares, check using ray lines</li> <li>• If beginning trig., ‘science’ triangles should not be used</li> </ul> <p><b><u>Links and interleaving</u></b></p> <ul style="list-style-type: none"> <li>• Interior angles</li> <li>• Multiplying and dividing by integers and fractions</li> </ul>
<b>Spiritual, moral, social, and cultural development</b>	<p><b>SMSC:</b> 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.</p> <p><b>PSHE/British Values:</b> Working collaboratively, being respectful during discussion and valuing contributions made by others</p> <p><b>Skills Builder: Key skills in numeracy used in all topic areas.</b></p>
<b>Numeracy</b>	<b>Focus on key skills.</b>
<b>Literacy</b>	<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>

<p><b>Becoming future ready</b></p>	<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>
<p><b>Adaptation</b></p> <p><b>QFT/SEND Provision</b></p>	<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>
<p><b>Implementation Curriculum Delivery</b></p> <p><b>Learning Outcomes (Most Powerful Knowledge)</b></p>	<p><b>Support (S), Core (C), Extension (E).</b></p> <p><b>Rotation and Translation – small steps</b></p> <ul style="list-style-type: none"> <li>• Identify the order of rotational symmetry of a shape (S)</li> <li>• Compare and contrast rotational symmetry with lines of symmetry (S)</li> <li>• Rotate a shape about a point on a shape (S/C/E)</li> <li>• Rotate a shape about a point not on a shape (C/E)</li> <li>• Translate points and shapes by a given vector (S/C/E)</li> <li>• Compare rotation and reflection of shapes (C/E)</li> <li>• Find the result of a series of transformations (E)</li> </ul> <p><b>Pythagoras' Theorem – small steps</b></p> <ul style="list-style-type: none"> <li>• Find squares and square roots (S)</li> <li>• Identify the hypotenuse of a right-angled triangle (S)</li> <li>• Determine whether a triangle is right-angled (S/C)</li> <li>• Calculate the hypotenuse of a right-angled triangle (S/C/E)</li> <li>• Calculate missing sides in right-angled triangles (C/E)</li> <li>• Use Pythagoras' Theorem on coordinate axes (C/E)</li> <li>• Explore proofs of Pythagoras' Theorem (E)</li> <li>• Use Pythagoras' Theorem in 3D shapes (E)</li> </ul> <p><u>Extension tasks</u></p> <ul style="list-style-type: none"> <li>• Pythagoras' Theorem and Bearings</li> </ul> <p><b>Enlargement and Similarity - small steps</b></p> <ul style="list-style-type: none"> <li>• Recognise enlargement and similarity (S)</li> <li>• Enlarge a shape by a positive integer scale factor (S)</li> <li>• Enlarge a shape by a positive integer scale factor from a point (S/C/E)</li> <li>• Enlarge a shape by a positive fractional scale factor (C/E)</li> <li>• Enlarge a shape by a negative scale factor (C/E)</li> <li>• Work out missing sides and angles in a pair of given similar shapes (C/E)</li> <li>• Solve problems with similar triangles (C/E)</li> <li>• Explore ratios in right-angled triangles (E)</li> </ul> <p><u>Extension tasks</u></p> <ul style="list-style-type: none"> <li>• Finding missing sides and angles using trigonometry</li> </ul>
<p><b>Current learning to be developed in the future within:</b></p>	<p><b>Rotation and Translation</b></p> <ul style="list-style-type: none"> <li>• Vectors (<b>Year 10, Spr 1</b>)</li> <li>• Congruence, similarity and enlargement (<b>Year 10, Aut 2</b>)</li> <li>• Transforming and Construction (<b>Year 11 Aut 1</b>)</li> </ul>

	<p><b><u>Pythagoras' Theorem</u></b></p> <ul style="list-style-type: none"> <li>• Trigonometry (<b>Year 10 Aut 2</b>)</li> <li>• Geometric Reasoning (<b>Year 11 Spr 1</b>)</li> </ul> <p><b><u>Enlargement and Similarity</u></b></p> <ul style="list-style-type: none"> <li>• Congruence, similarity and enlargement (<b>Year 10, Aut 2</b>)</li> <li>• Geometric Reasoning (<b>Year 11 Spr 1</b>)</li> <li>• Transforming and Construction (<b>Year 11 Aut 1</b>)</li> </ul>
<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.