



Unit:	Lesson Sequence		
	<p><b>Transformations</b></p> <ol style="list-style-type: none"> <li>1. Enlargement (positive scale factor)</li> <li>2. Enlargement from a point (positive scale factor)</li> <li>3. Enlargement (fractional scale factor)</li> <li>4. Enlargement (negative scale factor) (E)</li> <li>5. Describe an enlargement</li> <li>6. Rotation about a point</li> <li>7. Describe a rotation</li> <li>8. Translation</li> <li>9. Describe a translation</li> <li>10. Reflection</li> <li>11. Find the result of a series of transformations (E)</li> </ol>	<p><b>Simultaneous Equations (Optional TBC)</b></p> <ol style="list-style-type: none"> <li>1. Use one value to find another</li> <li>2. Introduction to simultaneous equations</li> <li>3. Solve simultaneous equations using graphs</li> <li>4. Solve simultaneous equations (no adjustments)</li> <li>5. Manipulating equations</li> <li>6. Solve simultaneous equations (adjust one)</li> <li>7. Solve simultaneous equations (adjust both) (E)</li> <li>8. Solve simultaneous equations by substitution (E)</li> </ol>	<p><b>Trigonometry (Optional TBC)</b></p> <ol style="list-style-type: none"> <li>1. Identify hypotenuse, opposite and adjacent sides</li> <li>2. Use the tangent ratio to find unknown side lengths</li> <li>3. Use sine and cosine ratios to find unknown side lengths</li> <li>4. Use sine, cosine and tangent ratios to find unknown angles</li> <li>5. Choose the right method</li> <li>6. Key angles in right-angled triangles (E)</li> <li>7. Trigonometry in 3-D shapes (E)</li> </ol>
<p><b>Knowledge &amp; Skills development</b></p>	<p><b>Fluency:</b></p> <ul style="list-style-type: none"> <li>• Perform and describe translations, reflections, rotations, and enlargements of shapes.</li> <li>• Apply multiple transformations in sequence and describe the resulting image.</li> <li>• Recognize and identify transformations on a coordinate grid or within geometric shapes.</li> </ul> <p><b>Reasoning:</b></p> <ul style="list-style-type: none"> <li>• Explain the properties of transformations, such as congruency in reflections or scale in enlargements.</li> <li>• Justify the effect of each transformation on a shape (e.g., why a rotation changes orientation but not size).</li> </ul>	<p><b>Fluency</b></p> <ul style="list-style-type: none"> <li>• Solve simultaneous equations using substitution and elimination methods accurately</li> <li>• Manipulate algebraic expressions to isolate variables and simplify equations</li> <li>• Understand and use graphical methods to find solutions to simultaneous equations</li> </ul> <p><b>Reasoning</b></p> <ul style="list-style-type: none"> <li>• Explain the meaning of the solution as the point of intersection of two lines or curves</li> <li>• Justify the choice of method (substitution, elimination, or graphical) based on the problem</li> <li>• Interpret the nature of solutions (one solution, no solution, infinite solutions) and explain why they occur</li> </ul> <p><b>Problem-Solving</b></p>	<p><b>Fluency</b></p> <ul style="list-style-type: none"> <li>• Recall and use the basic trigonometric ratios: sine, cosine, and tangent</li> <li>• Calculate missing sides or angles in right-angled triangles using trigonometric ratios</li> <li>• Convert between degrees and radians when necessary</li> </ul> <p><b>Reasoning</b></p> <ul style="list-style-type: none"> <li>• Explain why the trigonometric ratios apply specifically to right-angled triangles</li> <li>• Understand and justify the relationships between angles and side lengths in triangles</li> <li>• Use reasoning to choose the appropriate trigonometric ratio based on the sides involved</li> </ul> <p><b>Problem-Solving</b></p> <ul style="list-style-type: none"> <li>• Solve real-world problems involving heights, distances, and angles of elevation or depression</li> </ul>

	<ul style="list-style-type: none"> <li>Reason through how combinations of transformations can result in equivalent or different outcomes.</li> </ul> <p><b>Problem-Solving:</b></p> <ul style="list-style-type: none"> <li>Solve geometric problems involving single or multiple transformations (e.g., determining the position of a shape after transformations).</li> <li>Apply transformations to real-world problems, such as design, architecture, or map-making.</li> <li>Use transformations in complex scenarios, like pattern creation or motion problems, combining various types of transformations.</li> </ul>	<ul style="list-style-type: none"> <li>Apply simultaneous equations to solve real-world problems involving two unknowns</li> <li>Tackle multi-step problems that require setting up and solving systems of equations from word problems</li> <li>Use reasoning to check solutions by substitution back into original equations</li> <li>Extend to solving simultaneous equations involving non-linear equations where appropriate</li> </ul>	<ul style="list-style-type: none"> <li>Apply trigonometry in multi-step problems, including those involving bearings or non-right-angled triangles (using the sine and cosine rules)</li> <li>Combine trigonometry with other geometry concepts to analyse complex shapes</li> <li>Verify solutions by checking calculations and considering the context of the problem</li> </ul>
<b>Assessment / Feedback Opportunities</b>	<p><b>Formative Assessment</b> Assessment for learning is integrated throughout each small step with suggested questions, activities and checks for understanding that are adapted for the setting.</p>		<p><b>Summative assessment</b> Summative assessment includes end of block assessments and mark schemes as well as interleaved end of term assessments and mark schemes.</p>
<b>Key Vocabulary</b>	Transformation, translation, rotation, reflection, enlargement, scale factor, centre of rotation, centre of enlargement, angle of rotation, line of reflection, coordinates, image, pre-image, vector, direction, magnitude, mirror line, congruent, similar	Simultaneous equations, equation, variable, solution, substitute, eliminate, rearrange, solve, linear equation, intersection, coordinate, graph,	Trigonometry, right-angled triangle, hypotenuse, opposite, adjacent, sine, cosine, tangent, SOHCAHTOA, angle, ratio, solve, length, angle of elevation, angle of depression, Pythagoras' theorem, calculator, inverse sine, inverse cosine, inverse tangent
<b>Reading opportunities</b>	Murderous Maths: Series of books by Kjartan Poskitt		
<b>Personal Development (Including British Values, RSE, Citizenship)</b>	<p><b>British Values.</b> Rule of Law: Following precise rules for transformations, solving simultaneous equations, and applying trigonometric ratios reflects the importance of fairness and order in society. Individual Liberty: Pupils develop confidence to choose and apply various transformation types, solve systems of equations, and decide on trigonometric methods independently.</p>		

	<p>Mutual Respect &amp; Tolerance: Collaborative work on complex problems fosters respect for diverse problem-solving strategies and mathematical reasoning.</p> <p><b>RSE.</b></p> <p>Communication Skills: Explaining transformation steps, equation solutions, and trigonometric reasoning promotes clear communication essential for effective teamwork.</p> <p>Problem Solving: Tackling multi-step transformations, simultaneous equations, and trigonometry challenges resilience, critical thinking, and adaptability.</p> <p>Respect and Empathy: Group discussions encourage patience and appreciation of different methods and perspectives in approaching problems.</p> <p><b>Citizenship.</b></p> <p>Decision Making: Using logical reasoning in transformations, simultaneous equations, and trigonometry supports informed decision-making in academic and real-world situations.</p> <p>Financial Literacy: Skills in algebra and trigonometry underpin modelling and problem-solving relevant to engineering, technology, and financial contexts.</p> <p>Social Responsibility: Collaborative problem-solving builds teamwork, accountability, and shared success in complex mathematical tasks.</p>
<p><b>Career Opportunities</b></p>	<p>Transformations, Simultaneous Equations, and Trigonometry are closely linked to careers that involve geometry, spatial reasoning, and analytical problem solving. Transformations, including reflections, rotations, translations, and enlargements, are essential in fields such as graphic design, animation, architecture, and engineering. Professionals in these areas use transformations to manipulate shapes, create visual effects, and design structures or components with precise symmetry and movement.</p> <p>Simultaneous Equations are used in various scientific, technical, and financial careers to solve problems involving multiple variables. Engineers apply them when working with systems that require balancing different forces or conditions, while economists and financial analysts use them to model supply and demand or optimize business strategies involving several constraints. In computer science and robotics, simultaneous equations help model systems that require coordination between multiple parts.</p> <p>Trigonometry is vital in careers that involve measurement, angles, and wave patterns. Surveyors use it to calculate distances and angles when mapping land. Architects and civil engineers apply trigonometry to design buildings and infrastructure, ensuring stability and accurate dimensions. In physics and electrical engineering, it helps model sound waves, light behaviour, and alternating current systems. Pilots and navigators also use trigonometric principles in determining flight paths and positions.</p>