

# Maths Year 10 Foundation

Autumn Term Year 10 Foundation		
Topic Outline	Students should know and understand	Students should be able to
GRAPHS	<ul style="list-style-type: none"> <li>The relationship between equations of lines and their position on a coordinate grid and relate to real life situations</li> </ul>	<ul style="list-style-type: none"> <li>Find the midpoint of a line segment.</li> <li>Recognise, name and plot straight-line graphs parallel to the axes</li> <li>Generate and plot coordinates from a rule.</li> <li>Plot straight-line graphs from tables of values.</li> <li>Draw graphs to represent relationships.</li> <li>Find the gradient of a line.</li> <li>Identify and interpret the gradient from an equation.</li> <li>Understand that parallel lines have the same gradient.</li> <li>Understand what <math>m</math> and <math>c</math> represent in <math>y = mx + c</math>.</li> <li>Find the equations of straight-line graphs.</li> <li>Sketch graphs given the values of <math>m</math> and <math>c</math>.</li> <li>Draw and interpret graphs from real data.</li> <li>Use distance–time graphs to solve problems.</li> <li>Draw distance–time graphs.</li> <li>Interpret rate of change graphs.</li> </ul>
TRANSFORMATIONS	<ul style="list-style-type: none"> <li>How to recognise, describe and complete the four transformation methods</li> </ul>	<ul style="list-style-type: none"> <li>Use a column vector to describe a translation</li> <li>Draw a reflection of a shape in a mirror line.</li> <li>Draw reflections on a coordinate grid.</li> <li>Describe reflections on a coordinate grid.</li> <li>Rotate a shape on a coordinate grid.</li> <li>Describe a rotation.</li> </ul>

		<ul style="list-style-type: none"> <li>• Enlarge a shape by a scale factor.</li> <li>• Identify the scale factor of an enlargement.</li> <li>• Find the centre of enlargement.</li> <li>• Transform shapes using more than one transformation</li> <li>• Describe combined transformations of shapes on</li> </ul>
RATIO AND PROPORTION	<ul style="list-style-type: none"> <li>• The key ideas of ratio and proportion and reason with them in problems</li> </ul>	<ul style="list-style-type: none"> <li>• Use ratio notation.</li> <li>• Write a ratio in its simplest form.</li> <li>• Solve problems using ratios.</li> <li>• Solve simple problems using ratios.</li> <li>• Use ratios to convert between units.</li> <li>• Write and use ratios for shapes and their enlargements.</li> <li>• Divide a quantity into 2 parts in a given ratio.</li> <li>• Divide a quantity into 3 parts in a given ratio.</li> <li>• Solve word problems using ratios.</li> <li>• Use ratios involving decimals.</li> <li>• Compare ratios.</li> <li>• Solve ratio and proportion problems.</li> <li>• Use the unitary method to solve proportion problems.</li> <li>• Solve proportion problems in words.</li> <li>• Work out which product is better value for money.</li> <li>• Recognise and use direct proportion on a graph.</li> <li>• Understand the link between the unit ratio and the gradient.</li> <li>• Recognise different types of proportion.</li> <li>• Solve word problems involving direct and inverse proportion.</li> </ul>

Spring Term		
RIGHT-ANGLED TRIANGLES	<ul style="list-style-type: none"> <li>• How to use formulae and ratios to calculate sides and angles in right-angled triangles</li> </ul>	<ul style="list-style-type: none"> <li>• Understand Pythagoras' theorem.</li> <li>• Calculate the length of the hypotenuse in a right-angled triangle.</li> <li>• Solve problems using Pythagoras' theorem.</li> <li>• Calculate the length of a line segment AB.</li> <li>• Calculate the length of a shorter side in a right-angled triangle.</li> <li>• Understand and recall the sine ratio in right-angled triangles.</li> <li>• Use the sine ratio to calculate the length of a side in a right-angled triangle.</li> <li>• Use the sine ratio to solve problems.</li> <li>• Use the sine ratio to calculate an angle in a right-angled triangle.</li> <li>• Use the sine ratio to solve problems.</li> <li>• Understand and recall the cosine ratio in right-angled triangles.</li> <li>• Use the cosine ratio to calculate the length of a side in a right-angled triangle.</li> <li>• Use the cosine ratio to calculate an angle in a right-angled triangle.</li> <li>• Use the cosine ratio to solve problems.</li> <li>• Understand and recall the tangent ratio in right-angled triangles.</li> <li>• Use the tangent ratio to calculate the length of a side in a right-angled triangle</li> <li>• Use the tangent ratio to calculate an angle in a right-angled triangle.</li> <li>• Solve problems using an angle of elevation or depression.</li> </ul>

		<ul style="list-style-type: none"> <li>• Understand and recall trigonometric ratios in right-angled triangles.</li> <li>• Use trigonometric ratios to solve problems.</li> <li>• Know the exact values of the sine, cosine and tangent of some angles.</li> </ul>
PROBABILITY	<ul style="list-style-type: none"> <li>• The key ideas of how to write and calculate with probabilities and draw and interpret Venn diagrams.</li> </ul>	<ul style="list-style-type: none"> <li>• Calculate simple probabilities from equally likely events.</li> <li>• Understand mutually exclusive and exhaustive outcomes.</li> <li>• Use two-way tables to record the outcomes from two events.</li> <li>• Work out probabilities from sample space diagrams.</li> <li>• Find and interpret probabilities based on experimental data.</li> <li>• Make predictions from experimental data.</li> <li>• Use Venn diagrams to work out probabilities.</li> <li>• Understand the language of sets and Venn diagrams.</li> <li>• Use frequency trees and tree diagrams.</li> <li>• Work out probabilities using tree diagrams.</li> <li>• Understand independent events.</li> <li>• Understand when events are not independent.</li> <li>• Solve probability problems involving events that are not independent.</li> </ul>
MULTIPLICATIVE REASONING	<ul style="list-style-type: none"> <li>• How to work with percentages in different ways and use compound measure ideas.</li> </ul>	<ul style="list-style-type: none"> <li>• Calculate a percentage profit or loss.</li> <li>• Express a given number as a percentage of another in more complex situations.</li> <li>• Find the original amount given the final amount after a percentage increase or decrease</li> </ul>

		<ul style="list-style-type: none"> <li>• Find an amount after repeated percentage change.</li> <li>• Solve growth and decay problems.</li> <li>• Solve problems involving compound measures.</li> <li>• Convert between metric speed measures.</li> <li>• Calculate average speed, distance and time.</li> <li>• Use formulae to calculate speed and acceleration.</li> <li>• Use ratio and proportion in measures and conversions.</li> <li>• Use inverse proportions.</li> </ul>
Summer Term		
CONSTRUCTIONS, LOCI AND BEARINGS	<ul style="list-style-type: none"> <li>• How to use mathematical equipment to construct lines, arcs shapes and regions to satisfy rules</li> </ul>	<ul style="list-style-type: none"> <li>• Recognise 3D shapes and their properties.</li> <li>• Describe 3D shapes using the correct mathematical words.</li> <li>• Understand the 2D shapes that make up 3D objects.</li> <li>• Identify and sketch planes of symmetry of 3D shapes.</li> <li>• Understand and draw plans and elevations of 3D shapes.</li> <li>• Sketch 3D shapes based on their plans and elevations.</li> <li>• Make accurate drawings of triangles using a ruler, protractor and compasses.</li> <li>• Identify SSS, ASA, SAS and RHS triangles as unique from a given description.</li> <li>• Identify congruent triangles</li> <li>• Draw diagrams to scale.</li> <li>• Correctly interpret scales in real-life contexts.</li> </ul>

		<ul style="list-style-type: none"> <li>• Use scales on maps and diagrams to work out lengths and distances.</li> <li>• Know when to use exact measurements and estimations on scale drawings and maps.</li> <li>• Draw lengths and distances correctly on given scale drawings.</li> <li>• Accurately draw angles and 2D shapes using a ruler, protractor and compasses.</li> <li>• Construct a polygon inside a circle.</li> <li>• Recognise nets and make accurate drawings of nets of common 3D objects.</li> <li>• Draw accurately using rulers and compasses.</li> <li>• Bisect angles and lines using rulers and compasses.</li> <li>• Draw loci for the path of points that follow a given rule.</li> <li>• Identify regions bounded by loci to solve practical problems.</li> <li>• Find and use three-figure bearings.</li> <li>• Use angles at parallel lines to work out bearings.</li> <li>• Solve problems involving bearings and scale diagrams.</li> </ul>
<p>QUADRATIC EQUATIONS AND GRAPHS</p>	<ul style="list-style-type: none"> <li>• How to work confidently with quadratic methods - algebraically and graphically.</li> </ul>	<ul style="list-style-type: none"> <li>• Multiply double brackets.</li> <li>• Recognise quadratic expressions.</li> <li>• Square single brackets.</li> <li>• Plot graphs of quadratic functions.</li> <li>• Recognise a quadratic function.</li> <li>• Use quadratic graphs to solve problems.</li> <li>• Solve quadratic equations <math>ax^2 + bx + c = 0</math> using a graph.</li> <li>• Solve quadratic equations <math>ax^2 + bx + c = k</math></li> </ul>

<p>PERIMETER, AREA AND VOLUME 2</p>	<ul style="list-style-type: none"> <li>• How to recall and apply formulae for different shapes with and without a calculator.</li> </ul>	<ul style="list-style-type: none"> <li>• Using a graph.</li> <li>• Calculate the circumference of a circle.</li> <li>• Solve problems involving the circumference of a circle.</li> <li>• Calculate the circumference and radius of a circle.</li> <li>• Work out percentage error intervals.</li> <li>• Work out the area of a circle.</li> <li>• Work out the radius or diameter of a circle.</li> <li>• Solve problems involving the area of a circle.</li> <li>• Give answers in terms of <math>\pi</math>.</li> <li>• Understand and use maths language for circles and perimeters.</li> <li>• Work out areas of semicircles and quarter circle and perimeters.</li> <li>• Solve problems involving sectors of circles.</li> <li>• Solve problems involving areas and perimeters of 2D shapes.</li> <li>• Work out the volume and surface area of cylinders.</li> <li>• Work out the volume of a pyramid.</li> <li>• Work out the surface area of a pyramid.</li> <li>• Work out the volume of a cone.</li> <li>• Work out the surface area of a cone.</li> <li>• Work out the volume of a sphere.</li> <li>• Work out the surface area of a sphere.</li> <li>• Work out the volume and surface area of composite solids.</li> </ul>
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# Maths Year 11 Foundation

Topic Outline	Students should know and understand	Students should be able to
Autumn Term		
FRACTIONS, INDICES AND STANDARD FORM	<ul style="list-style-type: none"> <li>• How to use fractions calculation methods and work with numbers using standard form</li> </ul>	<ul style="list-style-type: none"> <li>• Multiply and divide mixed numbers and fractions</li> <li>• To know and use the laws of indices.</li> <li>• Write large numbers in standard form.</li> <li>• Convert large numbers from standard form into ordinary numbers.</li> <li>• Write small numbers in standard form.</li> <li>• Convert numbers from standard form with negative powers of ordinary numbers</li> <li>• To multiply and divide numbers in standard form.</li> <li>• To add and subtract numbers in standard form.</li> </ul>
CONGRUENCE, SIMILARITY AND VECTORS	<ul style="list-style-type: none"> <li>• How to use similarity and congruence in shapes and us vectors ideas to add, subtract and find multiples.</li> </ul>	<ul style="list-style-type: none"> <li>• Understand similarity.</li> <li>• Use similarity to solve angle problems.</li> <li>• Find the scale factor of an enlargement.</li> <li>• Use similarity to solve problems.</li> <li>• Understand the similarity of regular polygons.</li> <li>• Calculate perimeters of similar shapes.</li> <li>• Recognise congruent shapes.</li> <li>• Use congruence to work out unknown angles.</li> <li>• Use congruence to work out unknown sides.</li> <li>• Add and subtract vectors.</li> <li>• Find the resultant of two vectors.</li> <li>• Subtract vectors.</li> <li>• Find multiples of a vector.</li> </ul>



MORE ALGEBRA	<ul style="list-style-type: none"><li>• How to draw graphs, solve simultaneous equations, change the subject of a formula and identify types of algebra.</li></ul>	<ul style="list-style-type: none"><li>• Draw and interpret graphs of cubic functions.</li><li>• Draw and interpret graphs of <math>y = 1/x</math>.</li><li>• Draw and interpret non-linear graphs to solve problems</li><li>• Solve simultaneous equations by drawing a graph.</li><li>• Write and solve simultaneous equations.</li><li>• Solve simultaneous equations algebraically.</li><li>• Change the subject of a formula.</li><li>• Identify expressions, equations, formulae and identities.</li><li>• Prove results using algebra.</li></ul>
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