

**Beths Grammar School KS4 Mathematics Curriculum Map**

**GCSE Mathematics**

**Exam Board: Edexcel**

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Term	<b>INTENT</b>	<b>IMPLEMENTATION</b>	<b>IMPACT</b>
	<p><b>Substantive Knowledge</b> This is the specific, factual content for the topic, which should be connected into a careful sequence of learning.</p>	<p><b>Disciplinary Knowledge (Skills)</b> This is the action taken within a particular topic in order to gain substantive knowledge.</p>	<p><b>Assessment opportunities</b> What assessments will be used to measure student progress? Evidence of how well students have learned the intended content.</p>
<p><b>Autumn Term Y10 1A</b></p>	<p><b>Graphs</b> Straight Line Graphs Quadratic Graphs Cubic Graphs Reciprocal Graphs Circle Graphs Distance-Time Graphs Velocity-Time Graphs</p> <p><b>Representations of data</b> Box Plots Histograms</p>	<ul style="list-style-type: none"> <li>• Plot/draw graphs of the form <math>y=mx+c</math></li> <li>• Recognise equations of the form <math>y=mx+c</math> corresponds to straight-line</li> <li>• Identify and interpret the gradient and y-intercept of a linear graph</li> <li>• Identify and interpret gradient from <math>ax+by=c</math></li> <li>• Find equation of a line</li> <li>• Draw and interpret distance-time graphs</li> <li>• Draw and interpret velocity-time graphs</li> <li>• Recognise a linear, quadratic, cubic, reciprocal and circle graph from its shape</li> <li>• Find approximate solutions of a quadratic equation from the graph of the corresponding quadratic function</li> <li>• Interpret graphs from real-life problems</li> <li>• Recognise equation of the form <math>x^2+y^2=r^2</math> is a circle, centre (0,0) and radius r</li> <li>• Produce box plots from raw data and when given quartiles, median and identify any outliers</li> <li>• Interpret box plots to find median, quartiles, range and interquartile range and draw conclusions</li> <li>• Construct and interpret histograms from class intervals with unequal width</li> <li>• Use and understand frequency density</li> <li>• Complete grouped frequency tables from Histograms</li> <li>• Understand and define frequency density</li> </ul>	<p>Knowledge recall starter activity</p> <p>Homework to develop fluency, problem solving, reasoning and mastery</p> <p>Teacher assessment during lesson</p> <p>End of unit assessment via textbook</p>

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<p><b>Autumn Term 1B</b></p>	<p><b><u>Transformations</u></b>            Translation            Reflection            Rotation            Enlargement</p> <p><b><u>Constructions</u></b>            Plans and Elevations            Bearings            Constructing triangles            Perpendicular Bisector            Angle Bisector            Loci</p> <p><b><u>Quadratics</u></b>            Quadratic Equations            Quadratic Inequalities</p>	<ul style="list-style-type: none"> <li>• Estimate the mean/median from a histogram</li> <li>• Translate a given shape by a vector</li> <li>• Recognise and describe single translations using column vectors on a coordinate grid</li> <li>• Enlarge a shape on a grid without a centre specified</li> <li>• Describe and transform 2D shapes using enlargements by a positive integer, positive fractional, and negative scale factor</li> <li>• Enlarge a given shape using a given centre as the centre of enlargement by counting distances from centre, and find the centre of enlargement by drawing</li> <li>• Recognise and describe rotations</li> <li>• Rotate 2D shapes using the origin or any other point</li> <li>• Identify the equation of a line of symmetry</li> <li>• Recognise and describe reflections on a coordinate grid</li> <li>• Reflect 2D shapes using specified mirror lines, including lines parallel to the axes and also <math>y=x</math> and <math>y=-x</math></li> <li>• Describe and transform 2D shapes using combined rotations, reflections, translations or enlargements</li> <li>• Understand and draw front and side elevations and plans of shapes made from simple solids</li> <li>• Given the front and side elevations and the plan of a solid, draw a sketch of the 3D solid</li> <li>• Use and interpret maps and scale drawings, using a variety of scales and units</li> <li>• Calculate bearings and solve bearings problems, including on scaled maps, and find/mark and measure bearings</li> <li>• Construct Perpendicular bisector of a line segment</li> <li>• Bisect a given angle</li> <li>• Construct a region bounded by a circle and an intersecting line</li> <li>• Construct a given distance from a point and a given distance from a line</li> </ul>	<p>Knowledge recall starter activity</p> <p>Homework to develop fluency, problem solving, reasoning and mastery</p> <p>Teacher assessment during lesson</p> <p>End of unit assessments via textbook</p> <p>End of term assessment</p>
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		<ul style="list-style-type: none"> <li>• Construct equal distances from two points or two line segments</li> <li>• Construct regions which may be defined by 'nearer to' or 'greater than'</li> <li>• Use constructions to solve loci problems including with bearings</li> <li>• Know that the perpendicular distance from a point to a line is the shortest distance to the line</li> <li>• Find and describe regions satisfying a combination of loci, including in 3D</li> <li>• Solve quadratic equations by factorisation</li> <li>• Solve quadratic equations by completing the square</li> <li>• Solve quadratic equations by using the quadratic formula</li> <li>• Solve quadratic inequalities and display solution in set notation</li> </ul>	
<p><b>Spring Term 2A</b></p>	<p><b>Trigonometry</b>            Exact Trig Values            Trigonometric Graphs            Area of any triangle            Sine Rule            Cosine Rule            3D Trigonometry</p>	<ul style="list-style-type: none"> <li>• Know the exact values of <math>\sin \theta</math> and <math>\cos \theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ</math> and <math>90^\circ</math> and exact value of <math>\tan \theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ</math> and <math>60^\circ</math> and find them from graphs using special triangles</li> <li>• Recognise properties, sketch and interpret graphs of <math>\sin</math>, <math>\cos</math> and <math>\tan</math></li> <li>• Apply to the graph of <math>y = f(x)</math> the transformations <math>y = -f(x)</math>, <math>y = f(-x)</math> for sine, cosine and <math>\tan</math> functions <math>f(x)</math>.</li> <li>• Apply to the graph of <math>y = f(x)</math> the transformations <math>y = f(x) + a</math>, <math>y = f(x + a)</math> for sine, cosine and <math>\tan</math> functions <math>f(x)</math>.</li> <li>• Know and apply <math>\text{Area} = \frac{1}{2} ab \sin C</math> to calculate the area of any triangle</li> <li>• Know and apply <math>\text{Area} = \frac{1}{2} ab \sin C</math> to calculate the sides or angles of any triangle</li> <li>• Know the sine rule, and use to solve 2D problems (including involving bearings)</li> <li>• Know the cosine rule, and use to solve 2D problems (including involving bearings)</li> <li>• Use a combination of the sine and cosine rules to find missing lengths and angles</li> </ul>	<p>Knowledge recall starter activity</p> <p>Homework to develop fluency, problem solving, reasoning and mastery</p> <p>Teacher assessment during lesson</p> <p>End of unit assessments via textbook</p>

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		<ul style="list-style-type: none"> <li>• Use the sine rule and cosine rule to solve 3D problems</li> <li>• Solve geometrical problems on coordinate axes</li> </ul>	
<p><b>Spring Term 2B</b></p>	<p><b><u>Probability</u></b>            Sample Space            Venn Diagrams            Two-Way Tables            Conditional Probabilities            Tree Diagrams</p> <p><b><u>Geometry</u></b>            Similarity            Congruence</p> <p><b><u>Equations and Graphs</u></b>            Sketching graphs            Simultaneous Equations graphically            Iteration</p>	<ul style="list-style-type: none"> <li>• Write probabilities using fractions, percentages or decimals</li> <li>• Know that sum of probabilities of all outcomes is 1</li> <li>• List all outcomes for single events, and combined events</li> <li>• Compare experimental and theoretical probabilities</li> <li>• Estimate number of times an event will occur, given the probability and the number of trials</li> <li>• Find the probability of successive events, such as several throws of a single dice</li> <li>• Draw sample space diagrams and use them for adding simple probabilities</li> <li>• Work out probabilities from Venn diagrams to represent real-life situations</li> <li>• Use union and intersection notation</li> <li>• Use Venn Diagrams to calculate conditional probability</li> <li>• Find a missing probability from a list or two-way table</li> <li>• Use two-way table to calculate conditional probability</li> <li>• Understand conditional probabilities and decide if two events are independent</li> <li>• Draw probability tree diagram based on given information, and use this to find probability and expected number of outcome</li> <li>• Understand selection with or without replacement</li> <li>• Use a tree diagram to calculate conditional probability</li> <li>• Understand and use SSS, SAS, ASA and RHS conditions to prove the congruence of triangles using formal arguments, and to verify standard ruler and pair of compasses constructions</li> <li>• Solve angle problems by first proving congruence</li> <li>• Understand similarity of triangles and of other plane shapes, and use this to make geometric inferences</li> </ul>	<p>Knowledge recall starter activity</p> <p>Homework to develop fluency, problem solving, reasoning and mastery</p> <p>Teacher assessment during lesson</p> <p>End of unit assessments via textbook</p>

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		<ul style="list-style-type: none"> <li>• Understand the effect of enlargement on angles, perimeter, area and volume of shapes and solids</li> <li>• Know the relationships between linear, area and volume scale factors of mathematically similar shapes and solids</li> <li>• Use the relationship between enlargement and areas and volumes of simple shapes and solids</li> <li>• Find missing lengths, areas and volumes in similar 3D solids</li> <li>• Use formal geometric proof for the similarity of two given triangles</li> <li>• Solve problems involving frustums of cones where you have to find missing lengths first using similar triangles</li> <li>• Sketch a graph of a quadratic function, by factorising or by using the formula, identifying roots, y-intercept and turning point by completing the square</li> <li>• Find approximate solutions to quadratic equations using a graph</li> <li>• Solve simultaneous equations graphically</li> <li>• Find graphically the intersection points of a given straight line with a circle</li> <li>• Solve simultaneous equations representing a real-life situation graphically, and interpret the solution in the context of the problem</li> <li>• Use iteration with simple converging sequences.</li> </ul>	
<p><b>Summer Term 3A</b></p>	<p><b><u>Circles</u></b> Circle Theorems Circle Geometry</p> <p><b><u>FDP</u></b> Fractions Decimals Percentages Ratio Proportion</p>	<ul style="list-style-type: none"> <li>• Recall the definition of a circle and identify (name) and draw parts of a circle, including sector, tangent, chord, segment</li> <li>• Understand and use the fact that the tangent at any point on a circle is perpendicular to the radius at that point</li> <li>• Prove and use the facts of all circle theorems</li> <li>• Recognise and construct the graph of a circle using <math>x^2 + y^2 = r^2</math> for radius <math>r</math> centred at the origin of coordinates</li> <li>• Find the equation of a tangent to a circle at a given point</li> </ul>	<p>Knowledge recall starter activity</p> <p>Homework to develop fluency, problem solving, reasoning and mastery</p> <p>Teacher assessment during lesson</p> <p>End of unit assessments via textbook</p>

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<p><b>Summer Term 3B</b></p>	<p><b><u>Algebra</u></b>          Algebraic Fractions          Algebraic Proof          Functions          Rearranging formulae</p> <p><b><u>Surds</u></b>          Simplifying          Operations          Rationalising the denominator</p>	<ul style="list-style-type: none"> <li>• Simplify algebraic fractions</li> <li>• Multiply and divide algebraic fractions</li> <li>• Change the subject of a formula</li> <li>• Solve 'Show that' and proof questions using consecutive integers , squares, even numbers, odd numbers</li> <li>• Rationalise the denominator involving surds</li> <li>• Use function notation</li> <li>• Find the inverse of a function</li> <li>• Find composite functions</li> </ul>	<p>Knowledge recall starter activity</p> <p>Homework to develop fluency, problem solving, reasoning and mastery</p> <p>Teacher assessment during lesson</p> <p>End of unit assessments via textbook</p> <p>End of year assessments</p>