

Mathematics: Year 10 (higher)

Intent:

At Brayton Academy, we recognise the importance of mathematics as a life skill in society and industry, as well as a beautiful and elegant subject in its own right.

We have carefully sequenced the foundational skills to be consistently developed throughout pupils' time at school, to provide students with the fluency they need to tackle problems confidently.

Our curriculum is grounded in using assessment to identify where students are and builds up knowledge securely to ensure no gaps are left. Our expectations are very high; we expect pupils to take pride in their work, to complete homework to a high standard, bring a positive attitude to the classroom and always strive to be their best. This goes hand-in-hand with helping students to develop a love of learning maths by supporting them to be successful at every step through expert teaching. We believe that all students have the potential to learn maths to a high level when we take this approach.

- Create an atmosphere where ALL students feel comfortable to give their all to learning maths without being scared of making mistakes
- Open ALL students' eyes to the real world transferable skills that maths equips them with and the opportunities that arise from this
- Encourage ALL students to further develop their resilience skills with a determined mind-set when approaching new material and problem-solving tasks
- Eliminate any fear of maths through meeting ALL students at their level and supporting them to be successful

Implementation:

In year 10 pupils continue to study either the higher or foundation GCSE course. Staff constantly assess whether pupils are in the appropriate band and there is still the opportunity to move between tiers throughout the year if appropriate.

In year 10 pupils study the majority of the higher-tier-specific skills that they will need for their GCSE exam. Throughout the year the focus on applying knowledge to "exam-style" and problem solving questions increases. Staff will gradually begin to introduce concepts specific to the Further Mathematics GCSE to those pupils for whom this has been deemed suitable, wherever these topics link to the main class work.

Throughout the year pupils will be set homework on the Hegarty Maths platform that will revise content they have already studied, rather than focusing on what they are currently looking at in class. This gives them another opportunity to ensure that previously studied material is retained.

The following table lists core skills only. These are the concepts all pupils are expected to master. Some students will go on to study related extension material.

Term	Year 10 (higher)		
	Topic	Knowledge	Skills/Assessment
Term 1	Circumference and area	Arc length and sector area including working backwards	<p>All topics begin with an initial assessment, and prior knowledge gaps are filled in before moving on to new content.</p> <p>Pupils complete a revision quiz part-way through each half term to be marked by their teacher. This will allow gaps to be closed before the end of half-term assessment.</p> <p>At the end of each half-term there will be an assessment on all of the topics pupils have studied in that block.</p>
	Angles	Revision of all angle rules studied in years 7-9 in preparation for circle theorems, deriving and solving equations from angle diagrams	
	Circle theorems	Double angle, semi-circle, cyclic quadrilateral and same segment theorems, theorems relating to tangents, proving circle theorems using algebra	
	Equations and graphs	Understand when to rearrange equations before plotting, find equations of lines parallel or perpendicular to one given, complete the square of a quadratic equations and use to solve, identify the roots and turning point of a quadratic graph from its equation only, factorise quadratic expressions where the coefficient of x^2 is not equal to 1	
	Ratio and proportion	Direct and inverse proportion contextual problems, the relationship between ratios and equivalent fractions	
Constructions and loci	Construct the perpendicular from/to any point on a line, apply constructions skills to multi-faceted loci problems		
Term 2	Percentages and decimals	Convert recurring decimals to fractions, reverse compound interest and depreciation problems, application of percentage skills to multi-step exam style questions	<p>All topics begin with an initial assessment, and prior knowledge gaps are filled in before moving on to new content.</p> <p>Pupils complete a revision quiz part-way through each half term to be marked by their teacher. This will allow gaps to be closed before the end of half-term assessment.</p> <p>At the end of each half-term there will be an assessment on all of the topics pupils have studied in that block.</p>
	Data	Capture/ re-capture, stratified sampling, histograms, box plots, including comparisons, link different ways of presenting data to percentages and draw attention to different ways pupils need to use grouped data tables	
	Indices	Understand when and how to re-write numbers using a common base, including using to solve equations	
	Proportion	Solve algebraic direct and inverse proportion problems, understand how proportion is represented graphically	
	Probability	The product rule for counting, tree diagrams of independent and dependent events, Venn diagrams and set notation, problems combining algebra and probability	
	Real life graphs	Apply $y=mx+c$ to real life graphs, gradient as a rate of change, estimate gradients using tangents, estimate the area under a curve using strips of equal width, instantaneous vs. average rates of change	
Algebraic fractions	Simplify algebraic fractions		
Term 3	Further trigonometry	Application of trigonometric ratios and Pythagoras' theorem to 3D objects, the sine rule, the cosine rule (all including exact values)	<p>All topics begin with an initial assessment, and prior knowledge gaps are filled in before moving on to new content.</p> <p>Pupils complete a revision quiz part-way through each half term to be marked by their teacher. This will allow gaps to be closed before the end of half-term assessment.</p> <p>At the end of each half-term there will be an assessment on all of the topics pupils have studied in that block.</p>
	Simultaneous equations	Solve pairs of linear and linear/quadratic simultaneous equations algebraically (by elimination or substitution), set up pairs of simultaneous equations from contextual situations ready for solving	
	Standard form	Perform all 4 operations in standard form, substitute numbers written in standard form into algebraic expressions, work with standard form in "real life" contexts	
	Surface Area	Surface Area of any prism, calculate the surface area of cylinders and compound shapes including circles or simple fractions of circles surface area of spheres and cones	
	Volume	Calculate the volume of any prism, spheres, cones and pyramids, write volumes in terms of an unknown (such as x)	
Equations and graphs	Use the graph of one quadratic equation to find the roots of another by adding a suitable straight line, solve parallel and perpendicular lines problems without use of a coordinate grid		