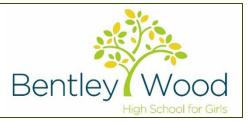# Maths Department Curriculum Overview

Maths students at Bentley Wood will become fluent in the fundamentals of mathematics, through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.

This can be seen through:

- An ambitious and accessible scheme of learning (SoL) that enables progress for all students.
- A SoL that develops fluency, reasoning and problem solving through deliberate practice, interleaving and regular low-stakes testing.
- A sequenced curriculum with interleaved topics to allow continuous recall.
- Each stage of the curriculum builds on prior skills and knowledge allowing a smooth transition to the next stage

Maths students at Bentley Wood will be able to reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language. The ideal aim is for pupils to attain proficiency, not just collective moments of understanding, familiarity or experience. This will help pupils to develop motivation in the subject.

This can be seen though:

- Well-chosen examples, questions that link across strands of topics that involve several steps of problem solving
- Use of correct and accurate language is promoted throughout the SoL and resources used.
- Useful facts and efficient and accurate methods are paired within a topic sequence.
- Strategies for solving problem types are taught and learned once pupils can recall and deploy facts and methods with speed and accuracy.
- Teachers balance introducing new content with pupils' need to spend time revisiting content.

Maths students at Bentley Wood will be able to solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

This can be seen though:

- Regular assessment of the strands of fluency, reasoning and problem solving which are clearly seen in the assessments.
- Students receiving regular and individualised feedback which enables them to understand how to move forward.
- Built in time in our SoL for students to reflect and work on misconceptions and errors identified through their assessments.

Maths students at Bentley Wood are offered a variety of opportunities and experiences that widen their appreciation of mathematics and the world around them.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7	Identify different types of number and work with multiples, factors and primes. Calculate with negative numbers. Use written methods of addition, subtraction, multiplication and division. To understand the order of operations and use a calculator effectively. Apply different skills when working with fractions Place decimals in order. convert between fractions and decimals. Find a percentage of an amount and to increase/decrease a value by a percentage.	To understand the order of operations and use a calculator effectively. Simplify algebraic expressions and expand brackets. Form expressions and substitute into expressions. Plan and carry out an experiment in order to test a hypothesis. Calculate the mean, median, mode and range of a set of data, and to use these to compare different data sets Draw and interpret different graphs and charts.	Work and reason with basic angle facts. Form and solve equations based on picture balance puzzles. Solve equations using inverse operations Form and solve equation. Work with ratio and solve simple proportion problems.	Calculate the area/perimeter of 2D shapes. Draw 2D and 3D representations of 3D shapes. Work with theoretical and experimental probability.	Work with sequences, both visually and algebraically. Recognise reflection and rotation symmetry. Work with coordinates in four quadrants. Perform and describe reflections, rotations and translations. Construct triangles.	Consolidation of topics learnt throughout the previous terms and revision. This term there will be tests assessing their progress in year 7 in relation to the curriculum.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
		Identify 2D shapes and their properties Measure and draw angles				
Year 8	Deal with factors and multiples, including HCF, LCM and prime factorisation. Use mental and written methods in order to perform calculations. Perform calculations involving negative numbers. Perform calculations involving positive integer powers and roots. Round to a required degree of accuracy and estimate calculations. Simplify algebraic expressions. Expand single brackets and factorise into single brackets. Solve equations. Form equations to solve problems in context.	Draw, read and interpret graphs involving rates of change including distance-time graphs. Calculate averages and range and use them to compare data sets. Calculate averages from frequency tables. Draw and interpret scatter graphs. Interpret graphs in context. Add, subtract, multiply and divide with fractions and simple algebraic fractions. Convert between fractions, decimals and percentages .	Simplify algebraic expressions. Expand single brackets and factorise into single brackets. Solve equations. Form equations to solve problems in context. Calculate the area/perimeter of 2D Shapes. Represent 3D shapes. Solve problems involving volume . Find the theoretical probability of a single event.	Complete Venn Diagrams and find probabilities. Work with experimental probability. Compare probabilities. Perform and describe each of the four transformations. Use Pythagoras' Theorem. Work with proportion and pie charts. Share into a ratio and compare ratios. Work with rates of change.	Work with the basic angle facts. Understand and use loci.	Consolidation of topics learnt throughout the previous terms and revision. This term there will be tests assessing their progress in year 8 in relation to the curriculum.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
		Work with percentages and percentage change.				
Year 9	Higher (sets 1 to 4): Area and Volume Types of numbers, factors and percentages Foundation (set 5): Area and perimeter of circles and volume of prisms Types of numbers and fraction arithmetic	Higher (sets 1 to 4): Averages, scatter graphs and pie charts Algebraic Manipulation and equations Foundation (set 5): Averages and frequency tables Algebraic Manipulation and forming and solving	Higher (sets 1 to 4): Bearings, scales, loci and Pythagoras Simultaneous, substitution and sequences Foundation (set 5): Bearings, scale Drawings, Construction, loci and Pythagoras Substitution and sequences	Higher (sets 1 to 4): Angles and Trigonometry Linear graphs Foundation (set 5): Angles Linear graphs	Higher (sets 1 to 4): Cumulative frequency Inequalities and linear programming Foundation (set 5): Scatter graphs Inequalities Rounding, estimating & bounds	Higher (sets 1 to 4): Revision & EOY Exams Foundation (set 5): Revision & EOY Exams

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 10		Higher (sets 1 to 4): Rounding Indices & standard form Inequalities and linear programming Foundation (set 5): Rounding, estimating & Bounds Compound Measures Equations, lines and inequalities	Higher (sets 1 to 4): Compound Measures Quadratics Probability Foundation (set 5): Probability Quadratics	Higher (sets 1 to 4): Transformation and vectors Trig Graphs and Transforming Graphs Foundation (set 5): Congruence, Similarity & Transformations Ratio and percentages	Higher (sets 1 to 4): Trigonometry in non-RA triangles Ratio, Proportion, Percentage and growth Foundation (set 5): Indices and standard form Pie charts and averages from a frequency table	Higher (sets 1 to 4): Ratio, Proportion, Percentage and growth Function notation Sequences and Iteration Foundation (set 5): Proportion and rates Angles and trigonometry	Higher (sets 1 to 4): Histograms and Sampling Foundation (set 5): Distance & equation between two points & non linear graphs Revision & EOY Exams for both tiers
Year 11		Higher: Compound measures (focus more on speed problem solving) Rates of Change Proof, Congruence, Similarity	Higher: Circle theorems Revision topics - Rounding, Bounds & Standard form FDP & Comparing decimals Consolidation & Exam practice Mock 1	Higher: Revision topics Ratio Angles in parallel lines & angles in triangles and regular polygons Mean from grouped frequency tables & choosing an appropriate average	Higher: Revision topics Setting up & solving linear equations Quadratics Consolidation & Exam practice Mock 2	Higher: Revision topics Solving simultaneous equations (include non linear sim. equations) Area & volume (focus on circles & parts of cirlces, cylinders & cones, incl. algebraic manipulation)	External GCSE

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Foundation: Distance and equation between two points Substitution and sequences Vectors	Foundation: Vectors (continued) Arcs and Sectors, Cones and Pyramids Consolidation & Exam practice Mock 1	Foundation: Revision topics FDP Ratio & Proportion Best buys & Money problems	Foundation: Revision topics **Properties of shapes & transformations** Consolidation & Exam practice Mock 2	Consolidation & Exam practice GCSE External Exams Foundation: Perimeter, Area & Volume Consolidation & Exam practice GCSE External Exams	Exams for both Higher & Foundation tiers
Year 12	<u>**Pure 1**</u> Unit 1 – Algebra and Functions Unit 2 – Coordinate Geometry Unit 3 – Further Algebra	<u>**Pure 1**</u> Unit 4 – Trigonometry Unit 5 – Vectors Unit 6 – Differentiation Unit 7 Integration	<u>**Pure 1**</u> Unit 8 – Exponentials and Logarithms <u>**Applied 1**</u> Unit 1 – Statistical Sampling Unit 2 – Data presentation and interpretation Unit 3 Probability Unit 6 Quantities and units in mechanics	<u>**Applied 1**</u> Unit 7 Kinematics 1 Applied Unit 4 – Statistical distributions Applied Unit 5 Statistical Hypothesis testing Applied unit 8 Forces and Newtons Law Applied Unit 9 Kinematics 2	**Exam Revision and Practice** **External AS Exam**	<u>**Pure 2**</u> Unit 1 – Proof Unit 2 – Algebraic and partial fractions Unit 3 – Functions and modelling Unit 4 – Series and Sequences Unit 5 – The Binomial Expansion

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 13	**Pure 2** Unit 6 – Trigonometry Unit 7 – Parametric Equations Unit 8 - Differentiation	**Pure 2** Unit 9 – Numerical Methods Unit 10 – Integration 1	**Pure 2** Unit 11 – Integration 2 Unit 12 – Vectors **Applied 2** Unit 1 – Regression and correlation Unit 2 - Probability Unit 4 – Moments Unit 5 – Forces at any angle	**Applied 2** Unit 3 – The Normal distribution Unit 7 – Applications of kinematics and projectiles Unit 8 – Further Kinematics	**Exam Revision and Practice** **External A Level Exam**	