Thomas Mills
High School & Sixth Form

CURRICULUM OVERVIEW: Mathematics

At Thomas Mills, our Key Stage 4 Mathematics curriculum is designed to equip pupils with the knowledge, skills, and confidence required to succeed in their GCSE examinations and beyond. We aim to develop mathematically fluent, logical, and independent learners who can apply their understanding to solve problems in both familiar and unfamiliar contexts.
Our intent is for all KS4 pupils to:

- **Master key mathematical concepts and techniques** with accuracy and efficiency, ensuring strong fluency across all areas of the GCSE syllabus.
- **Develop sophisticated mathematical reasoning** by constructing clear, logical arguments and critically evaluating mathematical information.
- **Apply their mathematics confidently to solve complex problems**, demonstrating creativity, perseverance, and the ability to interpret and model real-world situations.

The KS4 curriculum is structured to build on prior knowledge from KS3, consolidating and extending skills with increasing challenge. It provides a balanced approach between procedural fluency, conceptual understanding, and problem solving, ensuring pupils are well-prepared for both foundation and higher-tier GCSE examinations.
We strive to foster a positive and resilient mindset by:

- Emphasizing the relevance of mathematics in everyday life, higher education, and careers.
- Encouraging independent learning, self-reflection, and continuous improvement.
- Providing targeted support and stretch opportunities to meet the needs of all learners.

By the end of Key Stage 4, pupils will be confident, competent mathematicians ready to progress to further study or employment, equipped with the mathematical skills essential for success in the modern world.

Year 10 Term	Topic	Knowledge and Skills	Useful Links
1	**Unit 12 – Similarity**	**Knowledge and Skills:** Pupils will learn:	Similar shapes - Enlargements/Similar shapes - Intermediate & Higher tier - WJEC - GCSE Maths Numeracy (WJEC) Revision - BBC Bitesize

		• how to work out the scale factor for two similar shapes • how to work out lengths of sides in similar shapes • how to work out areas and volumes of similar shapes.	Scale factors of similar shapes - Higher - Transformations - Eduqas - GCSE Maths Revision - Eduqas - BBC Bitesize
	Unit 13 – Exploring and applying probability	• how to work out the probabilities of outcomes of events, using theoretical or experimental models • how to recognise mutually exclusive, exhaustive and complementary outcomes • how to predict the likely number of successful outcomes, given the number of trials and the probability of any one outcome • how to use two-way tables to solve probability problems • how to use Venn diagrams to solve probability problems.	The AND rule - Further probability - Intermediate & Higher tier – WJEC - GCSE Maths Revision - WJEC - BBC Bitesize Conditional probability - Higher - Probability - Edexcel - GCSE Maths Revision - Edexcel - BBC Bitesize Higher Probability (Conditional and Further Set Notation) KS4 | Y11 Maths Lesson Resources | Oak National Academy
	Unit 14 – Powers and standard form	• how to calculate using powers (indices) • how to write numbers in standard form • how to calculate with standard form.	Powers and roots - Higher - Multiples, factors, powers and roots - OCR - GCSE Maths Revision - OCR - BBC Bitesize Standard form - Standard form - AQA - GCSE Maths Revision - AQA - BBC Bitesize
Assessments		At the end of each unit, pupils will complete a written assessment designed to evaluate their understanding of the key concepts, methods and problem-solving skills covered throughout the unit. These assessments provide	

		an opportunity for pupils to demonstrate their mathematical thinking, fluency and application of knowledge in a range of contexts.	
2	**Unit 15 – Equations and inequalities**	**Knowledge and Skills:** Pupils will learn: • how to set up and solve linear equations with fractions, brackets and variables on both sides • how to solve linear simultaneous equations • how to solve a linear inequality and represent the solution on a number line • how to find a region on a graph that obeys a linear inequality in two variables • how to use trial and improvement to solve non-linear equations.	Simultaneous equations - Solving simultaneous equations - AQA - GCSE Maths Revision - AQA - BBC Bitesize Graphs of inequalities – Higher tier GCSE Maths Revision - BBC Bitesize Trial and improvement - BBC Bitesize
	Unit 16 – Counting, accuracy, powers and surds	• how to work out a reciprocal • how to convert fractions to terminating or recurring decimals and vice versa • how to estimate powers and roots of positive numbers • how to work with negative and fractional powers • how to calculate with surds • how to work out the error interval for rounded numbers • how to use limits of accuracy in calculations • how to use the product rule for counting.	Fractional indices - Higher - Laws of indices - Edexcel - GCSE Maths Revision - Edexcel - BBC Bitesize Surds - Higher - Surds - Higher - Edexcel - GCSE Maths Revision - Edexcel - BBC Bitesize GCSE maths questions - SURDS GCSE maths revision - BBC Bitesize
		• how to draw quadratic graphs	

	Unit 17 – Quadratic equations	• how to solve quadratic equations by factorisation, the quadratic formula and completing the square • how to solve problems involving quadratic equations • how to recognise and find the significant points of a quadratic graph • how to use graphs to solve a pair of simultaneous equations, one linear and one non-linear • how to use the method of intersection to solve one quadratic equation, using the graph of another quadratic equation and an appropriate straight line • how to solve quadratic inequalities.	Solving equations using iteration – Higher tier - Solving quadratic equations - AQA - GCSE Maths Revision - AQA - BBC Bitesize Module 4 (M4) - Algebra - Quadradic equations - BBC Bitesize https://thenational.academy/pupils/lessons/solve-a-quadratic-equation-by-factorising-cnk36c?share=true
	Unit 18 – Sampling and more complex diagrams	• how to collect data to obtain an unbiased sample • how to draw and interpret frequency polygons • how to draw and interpret cumulative frequency graphs • how to draw and interpret box plots • how to draw and interpret histograms.	Cumulative frequency diagrams – Higher tier - Representing data - OCR - GCSE Maths Revision - OCR - BBC Bitesize https://thenational.academy/pupils/lessons/constructing-a-cumulative-frequency-graph?share=true Histograms - Higher tier - Representing data - OCR - GCSE Maths Revision - OCR - BBC Bitesize https://thenational.academy/pupils/lessons/plot-a-histogram-60vk8e?share=true

			https://thenational.academy/pupils/lessons/histograms-with-unequal-bar-width?share=true
Assessments		At the end of each unit, pupils will complete a written assessment designed to evaluate their understanding of the key concepts, methods and problem-solving skills covered throughout the unit. These assessments provide an opportunity for pupils to demonstrate their mathematical thinking, fluency and application of knowledge in a range of contexts.	
3	**Unit 19 – Combined events**	**Knowledge and Skills:** Pupils will learn: • how to work out the probability of two events • how to draw and use tree diagrams • how to use probability for independent events • how to use conditional probability.	Tree diagrams - Probability - Edexcel - GCSE Maths Revision - Edexcel - BBC Bitesize The AND rule - Further probability - Intermediate & Higher tier – WJEC - GCSE Maths Revision - WJEC - BBC Bitesize https://thenational.academy/pupils/lessons/algebra-in-tree-and-venn-diagrams?share=true https://thenational.academy/pupils/lessons/conditional-probability-in-a-tree-diagram?share=true
	Unit 20 – Properties of circles	• how to prove and use circle theorems to work out angles • how to work out angles in cyclic quadrilaterals • how to use tangents, chords and alternate segment theorem to work out angles in circles.	Circle theorems - Higher - Circle theorems - Higher - AQA - GCSE Maths Revision - AQA - BBC Bitesize Chords - Higher - Circle theorems - Higher - AQA - GCSE Maths Revision - AQA - BBC Bitesize https://thenational.academy/pupils/lessons/problem-solving-with-circle-theorems?share=true

	Unit 21 – Variation	• how to solve problems where two variables are connected by a relationship in which they vary in direct proportion • how to solve problems where two variables are connected by a relationship in which they vary in indirect proportion • how to recognise graphs that illustrate direct and inverse proportion.	Direct proportion - Intermediate and Higher tier - Ratio - WJEC - GCSE Maths Numeracy (WJEC) Revision - BBC Bitesize Direct and inverse proportion - Direct and inverse proportion - Edexcel - GCSE Maths Revision - Edexcel - BBC Bitesize https://thenational.academy/pupils/lessons/problem-solving-with-direct-and-inverse-proportion?share=true
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