HIAS Scheme of Learning for Mathematics

Medium Term Plans for Year Nine

HIAS Maths Team
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Final version

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Overview

This document contains…
Long-term curriculum map for Y9
Medium-term overview plans for Y9

Points to consider when using this resource
This medium-term plan identifies the key objectives in each unit.
For more detail and a break-down of these objectives please refer to the relevant unit plan.
Unit plans identify a learning journey, required prior knowledge, misconceptions, key vocabulary, and suggested tasks.
Appropriate models, images , concrete resources, and visual representations are an implicit element in all units.

National curriculum statutory end of year objectives are in **bold.** The content of the lessons highlighted in red at the end of each year should be used to secure knowledge and understanding of the end of year objectives as required.
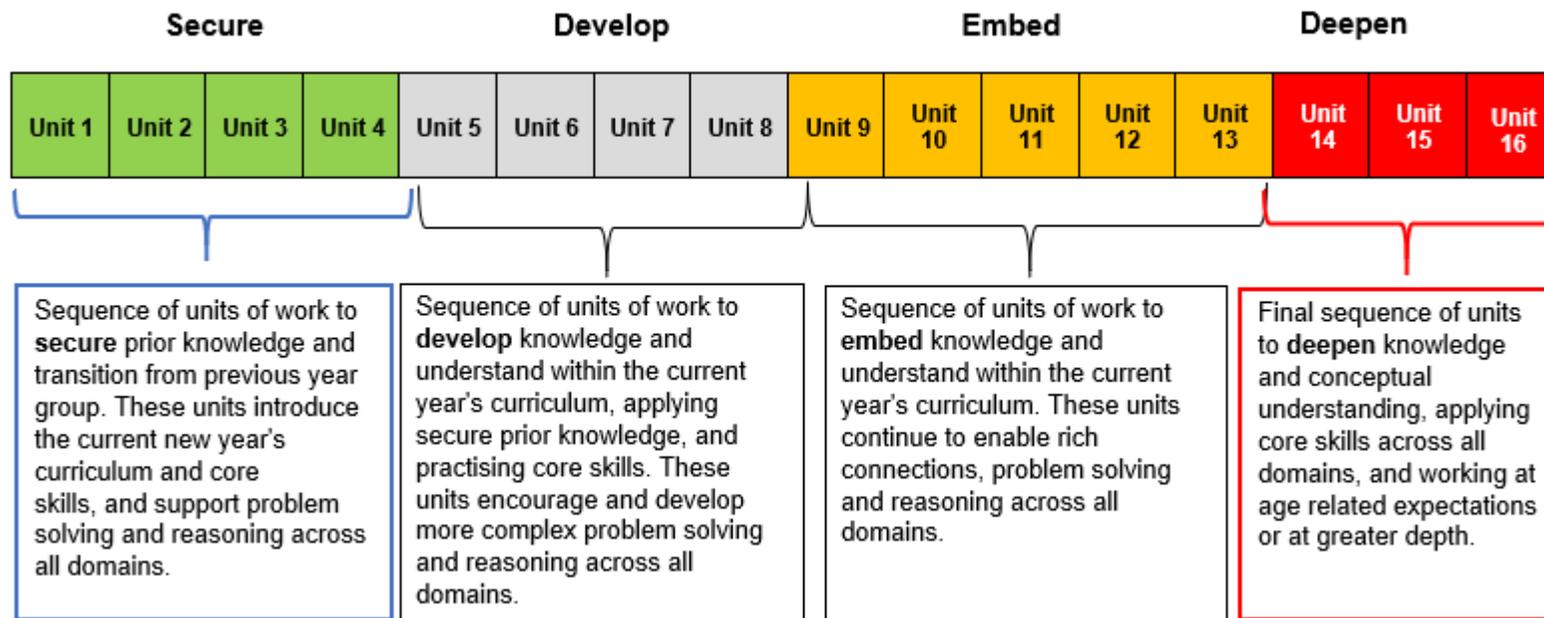
A suggested schedule for assessment is included as colour-coded bands, linked to the Hampshire Assessment Model if required.

Plans are based on a 10-week term to allow for assessment activities. They will need to be adjusted on a term-by-term basis according to timetabling and student need.

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Long term curriculum map for Year 9

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
Autumn	9.1 Number: Standard Form Roots, powers & reciprocals Compound measure			9.12 Geometry Area, perimeter and property of shape		9.3 Algebra and statistics (linear and quadratic graphs)		9.4 Probability (sample spaces)	9.5 Geometry Prisms & cylinders Congruence Pythagoras	
Spring	9.6 Probability (sets and Venns)	9.7 Statistics (bivariate data)	9.8 Proportion (direct and indirect) Powers and roots			9.9 Approximation Compound units		9.10 Geometry Pythagoras and trigonometry Constructions		9.11 Algebra Functions
Summer	9.12 Pythagoras and trigonometry		9.13 Number: Standard Form Integers, powers and roots Accuracy			9.14 Probability		9.15 Statistics Averages Stem &Leaf Frequency tables	9.16 Algebra Functions (graphs) Manipulation of equations	

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Overview of curriculum intent

Secure	Develop	Embed	Deepen

Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9	Unit 10	Unit 11	Unit 12	Unit 13	Unit 14	Unit 15	Unit 16

Sequence of units of work to **secure** prior knowledge and transition from previous year group. These units introduce the current new year's curriculum and core skills, and support problem solving and reasoning across all domains.	Sequence of units of work to **develop** knowledge and understand within the current year's curriculum, applying secure prior knowledge, and practising core skills. These units encourage and develop more complex problem solving and reasoning across all domains.	Sequence of units of work to **embed** knowledge and understand within the current year's curriculum. These units continue to enable rich connections, problem solving and reasoning across all domains.	Final sequence of units to **deepen** knowledge and conceptual understanding, applying core skills across all domains, and working at age related expectations or at greater depth.

Key for assessment bands

AM1	AM2	AM3	ARE
Assessment Milestone 1	Assessment Milestone 2	Assessment Milestone 3	Assessment ARE

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YEAR 9 Autumn Term

Subsequent units should continue to revisit material from previous units to deepen learning, encourage automaticity and allow rich connections to be made across the year.

A.M	Unit	Hours	Domain	Y9 objectives
	9.1	5	Number: Standard Form	• **Interpret and compare numbers in standard form A x 10n 1≤Awhere n is a positive or negative integer or zero** • **Apply appropriate calculation strategies and degrees of accuracy to increasingly complex problems**
		5	Number: Roots, powers and reciprocals	• **Interpret when the structure of a numerical problem requires multiplicative or proportional reasoning** • **Use conventional notation for powers, roots, and reciprocals** • **Use integer powers and associated real roots when solving problems** • **Appreciate the infinite nature of the sets for integers, real and rational numbers**
		5	Rates of change: Percentage change and compound measures	• **Interpret when the structure of a numerical problem requires multiplicative or proportional reasoning** • **Solve problems involving percentage change** • **Use compound units such as speed and unit pricing to solve problems**

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A.M	Unit	Hours	Domain	Y9 objectives
	9.2	5	Geometry: Area and perimeter	• **Calculate and solve problems involving the perimeters and areas of 2-D shapes including circles, areas of circles and composite shapes.** • **Interpret mathematical relationships both algebraically and geometrically**
		5	Geometry: Property of shape	• **Draw and measure line segments and angles in geometric figures.** • **Derive and illustrate properties of triangles, quadrilaterals, circles, and other place figures using appropriate language and technologies.**
			Half Term	

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A.M	Unit	Hours	Domain	Y9 objectives
	9.3	5	Algebra: Linear and quadratic graphs	• **Recognise, sketch, and produce graphs of linear and quadratic functions in one variable with appropriate scaling, using equations in x and y and the Cartesian plane** • **Reduce a given linear equation in two variables to the standard form y=mx+c**
			Statistics: Graphs and charts	• **Construct and interpret pie charts and line graphs** • **Describe, interpret and compare measures of central tendency**
	9.4	5	Probability: Sample spaces	• **Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities.** • Introduce tree diagrams for independent events.
	9.5	5	Geometry: Prisms and cylinders	• **Derive and apply formulae to calculate and solve problems involving prisms including cylinders**
		5	Geometry: Congruence and Pythagoras	• **Know and use the criteria for the congruence of triangles** • **Apply angle facts, triangle congruence, similarity, and properties of quadrilaterals to derive results about angles and sides, including Pythagoras' Theorem, and use known results to obtain simple proofs** • Introduce trigonometric ratios in similar triangles
			Christmas	

Year 9 Spring Term

A.M		Unit	Hours	Domain	Y9 objectives
		9.6	5	Probability: Sets and Venn diagrams	• **Enumerate sets and unions/ intersections of sets systematically, using tables, grids and Venn diagrams**
		9.7	5	Statistics: Bivariate data	• **Describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs.** • **Describe and interpret correlation.** • **Develop statistical reasoning and begin to express arguments formally**
		9.8	10	Proportion: Direct and Inverse	• **Solve problems involving direct and inverse proportion, including graphical and algebraic representations**
			5	Powers and roots	• **Use integer powers and associated real roots (square, cube and higher).** • **Recognise powers of 2,3,4,5 and distinguish between exact representations of roots and their decimal approximations.**
Half Term					

A.M			Unit	Hours	Domain	Y9 objectives
			9.9	5	Approximation	• **Use approximation through rounding to estimate answers and calculate possible resulting errors using inequality notation a < x ≤ b**
				5	Compound units	• **Use compound units such as density to solve problems**
			9.10	5	Geometry: Pythagoras and trigonometry	• **Use Pythagoras Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles**
				5	Geometry: Constructions	• **Derive and use the standard ruler and compass constructions: perpendicular bisector of a line segment; constructing a perpendicular to a given line from/ at a given point; bisecting a given angle.** • **Recognise and use the perpendicular distance from a point to a line as the shortest distance to the line.**
			9.11	5	Algebra: Functions	• **Find contextual approximate solutions to problems from the given graphs of a variety of functions, including piece-wise linear, exponential, and reciprocal graphs.**
Easter						

Y9 Summer Term

A.M			Unit	Hours	Domain	Y9 objectives
			9.12	5	Pythagoras	• **Use Pythagoras' Theorem in similar triangles to solve problems involving right-angled triangles** • **Reason deductively in geometry** • **Apply elementary knowledge to multi-step ad increasingly sophisticated problems** • Introduce Pythagoras' Theorem in 3-D
				5	Trigonometry	• **Use trigonometric ratios in similar triangles to solve problems involving right-angled triangles** • Introduce trigonometric function graphs (y=sin x ; y=cos x; y = tan x) • Introduce exact trigonometric values using a right-angled isosceles triangle and an equilateral triangle
			9.13	5	Number: Standard Form	• Calculate and solve problems involving numbers in both ordinary and standard form.
				5	Number: Integers, powers and roots	• Apply appropriate calculation strategies and degrees of accuracy to increasingly complex problems • **Use integer powers and roots** to solve problems • Introduce fractional and negative powers
				5	Number: Accuracy	• **Round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places or significant figures].** **Use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation $a < x \leq b$**
Half Term						

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A.M	Unit	Hours	Domain	Y9 objectives
	9.14	5	Probability	• **Enumerate sets and unions / intersections of sets systematically, using tables, grids and Venn diagrams** • **Solve probability problems and calculate theoretical probabilities using sample space and tree diagrams for mutually exclusive and independent events**
	9.15	5	Statistics: Averages, charts, and tables.	• **Construct and interpret tables, charts, and diagrams** • **Describe , interpret, and compare measures of central tendency and spread**
		5	Statistics: Stem-and-leaf diagrams Frequency tables	• **Construct and interpret tables, charts and diagrams including stem and leaf diagrams and frequency tables**
	9.16	5	Functions and graphs	• Solve problems involving functions and graphs • **Move fluently between different mathematical representations including algebra, graphs and diagrams** • **Model** real-life **situations by translating them into functions and graphs**
		5	Algebra: Factorising, expanding and manipulations	• **Substitute numerical values into formulae and expressions, including scientific formulae** • **Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors** • **Simplify and manipulate algebraic expressions to maintain equivalence by collecting like terms; multiplying a single term over a bracket; taking out common factor; expanding products of two or more binomials.** • **Rearrange formulae to change the subject** • **Model situations or procedures by translating them into algebraic expressions or formulae**
				Summer

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