

Priory's Mathematics Curriculum - Implementation

Key Stage 3 (years 7,8 & 9) – In Key Stage 2 students work to gain a basic understanding of number, algebra, shape and statistics as outlined in the Key Stage 2 national curriculum. In Key Stage 3 they need to broaden their knowledge within these strands as well as explore aspects of each strand in a greater depth in order to gain a better understanding of the most underpinning topics of mathematics. Throughout the course of Key Stage 3 Mathematics at Penwortham Priory students acquire knowledge, develop fluency and learn to problem solve and reason mathematically in various different topics.

Year 7

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Algebraic Thinking						Place Value and Proportion					
	Sequences		Understand and use algebraic notation		Equality and equivalence		Place value and ordering integers and decimals			Fraction, decimal and percentage equivalence		
Spring	Applications of Number						Directed Number		Fractional Thinking			
	Solving problems with addition & subtraction		Solving problems with multiplication and division			Fractions & percentages of amounts	Operations and equations with directed number			Addition and subtraction of fractions		
Summer	Lines and Angles						Reasoning with Number					
	Constructing, measuring and using geometric notation			Developing geometric reasoning			Developing number sense		Sets and probability		Prime numbers and proof	

Year 8

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Proportional Reasoning						Representations					
	Ratio and scale		Multiplicative change		Multiplying and dividing fractions		Working in the Cartesian plane		Representing data		Tables & Probability	
Spring	Algebraic techniques						Developing Number					
	Brackets, equations and inequalities				Sequences	Indices	Fractions and percentages		Standard index form		Number sense	
Summer	Developing Geometry						Reasoning with Data					
	Angles in parallel lines and polygons			Area of trapezia and circles		Line symmetry and reflection	The data handling cycle			Measures of location		

Year 9

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Reasoning with Algebra						Constructing in 2 and 3 Dimensions					
	Straight line graphs		Forming and solving equations		Testing conjectures		Three-dimensional shapes		Constructions and congruency			
Spring	Reasoning with Number						Reasoning with Geometry					
	Numbers		Using percentages		Maths and money		Deduction		Rotation and translation		Pythagoras' Theorem	
Summer	Reasoning with Proportion						Representations and Revision					
	Enlargement and similarity		Solving ratio & proportion problems		Rates		Probability		Algebraic representation		Revision	

In Year 7, students build upon prior mathematical knowledge in numbers and the number system, algebra, ratio and proportion and geometry. Students develop their reasoning skills through challenging problems written in unfamiliar contexts. Lessons will synthesize core learning with previously learned material that extends where appropriate.

During Year 8, students build upon knowledge learned at KS2 and Year 7, in numbers and the number system, algebra, ratio and proportion and geometry. Students develop their reasoning skills through challenging problems written in unfamiliar contexts. Lessons will synthesize core learning with previously learned material that extends where appropriate.

During Year 9, students build upon knowledge learned in previous years, in numbers and the number system, algebra, ratio and proportion, geometry, statistics and probability. Students develop their reasoning skills through challenging problems written in unfamiliar contexts. Lessons will synthesize core learning with previously learned material that extends where appropriate, whilst learning to become increasingly independent, demonstrating application on concepts learned.

The following information provides guidance upon what students will learn and what skills they will develop at Key Stage 3, considering mathematical fluency, reasoning and problem solving:

	NC statement	Some key strands	Some key blocks
Develop Fluency – KS3	consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals, fractions, powers and roots	- Number: Understand and represent number - Number: Calculations - Number: Understand fractions and decimals	- Y7 Autumn 4 to 5 – Place Value & Proportion - Y8 Spring 4 to 6 – Developing Number - Y9 Spring 1 to 3 – Reasoning with Number
	select and use appropriate calculation strategies to solve increasingly complex problems	Number: Calculations	- Y7 Spring 1 to 3 – Application of Number - Y8 Spring 4 to 6 – Developing Number - Y9 Spring 1 to 3 – Reasoning with Number
	use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships	Algebra: Understand Notation and Substitute	- Y7 Autumn 1 to 3 – Algebraic Thinking - Y8 Spring 1 to 3 – Algebraic Techniques - Y9 Autumn 1 to 3 – Reasoning with Algebra
	substitute values in expressions, rearrange and simplify expressions, and solve equations	- Algebra: Understand Notation and Substitute - Algebra: Equivalence and Proof - Algebra: Solve Equations	- Y7 Autumn 1 to 3 – Algebraic Thinking - Y8 Spring 1 to 3 – Algebraic Techniques - Y9 Autumn 1 to 3 – Reasoning with Algebra
	move freely between different numerical, algebraic, graphical and diagrammatic representations [for example, equivalent fractions, fractions and decimals, and equations and graphs]	- Number: Understand fractions and decimals - Algebra: Linear Graphs - Algebra: Non-linear Graphs	- Y7 Spring 5 – Fractional Thinking - Y8 Autumn 4 to 6 – Representations - Y9 Autumn 1 to 3 – Reasoning with Algebra - Y9 Summer 5 – Algebraic Representations
	develop algebraic and graphical fluency, including understanding linear and simple quadratic functions	- Algebra: Linear Graphs - Algebra: Non-linear Graphs	- Y7 Autumn 1 to 3 – Algebraic Thinking - Y8 Autumn 4 – Working in the Cartesian Plane - Y9 Autumn 1 to 3 – Reasoning with Algebra
	use language and properties precisely to analyse numbers, algebraic expressions, 2-D and 3-D shapes, probability and statistics	- Number: Understand and represent number - Algebra: Understand Notation and Substitute - Geometry and Measures: Shape properties - Probability - Statistics: Represent and Interpret Data	- Y7 Summer 4 to 6 – Reasoning with Number - Y8 Summer 4 to 5 – Reasoning with Data - Y9 Summer 5 – Probability

	NC statement	Some key strands	Some key blocks
Reason mathematically– KS3	extend their understanding of the number system; make connections between number relationships, and their algebraic and graphical representations	- Number: Understand and represent number - Algebra: Understand Notation and Substitute - Algebra: Linear Graphs - Algebra: Non-linear Graphs	- Y7 Autumn 4 to 5 – Place Value & Proportion - Y7 Autumn 1 to 3 – Algebraic Thinking - Y8 Autumn 4 – Working in the Cartesian Plane - Y9 Autumn 1 to 3 – Reasoning with Algebra
	extend and formalise their knowledge of ratio and proportion in working with measures and geometry, and in formulating proportional relations algebraically	- Ratio, Proportion, Rates of Change: Multiplicative Relationships - Geometry and Measures: Construct and Transform Geometric Figures	- Y8 Autumn 1 to 3 – Proportional Reasoning - Y9 Summer 1 to 3 – Reasoning with Proportion
	identify variables and express relations between variables algebraically and graphically	- Algebra: Solve Equations and Inequalities - Algebra: Linear Graphs - Algebra: Non-linear Graphs - Algebra: Sequences	- Y7 Autumn 1 to 3 – Algebraic Thinking - Y8 Spring 1 to 3 – Algebraic Techniques - Y9 Autumn 1 to 3 – Reasoning with Algebra
	make and test conjectures about patterns and relationships; look for proofs or counterexamples	- Algebra: Equivalence and Proof - Algebra: Sequences	- Y7 Summer 4 to 6 – Reasoning with Number - Y8 Summer 1 – Angles in parallel lines and polygons - Y9 Autumn 1 to 3 – Reasoning with Algebra
	begin to reason deductively in geometry, number and algebra, including using geometrical constructions	- Geometry and Measures: Construct and Transform Geometric Figures - Geometry and Measures: Shape properties - Geometry : Geometrical Proof	- Y7 Summer 2 – Geometric Reasoning - Y8 Summer 1 to 3 – Developing Geometry - Y9 Spring 4 to 6 – Reasoning with Geometry
	interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning	- Number: Calculations - Ratio, Proportion, Rates of Change: Multiplicative Relationships - Ratio, Proportion, Rates of Change: Ratio & Rates	- Y7 Spring 1 to 3 – Application of Number - Y8 Autumn 1 to 3 – Proportional Reasoning - Y9 Summer 1 to 3 – Reasoning with Proportion
	explore what can and cannot be inferred in statistical and probabilistic settings, and begin to express their arguments formally	- Statistics: Represent and Interpret Data - Statistics: Statistical Measures - Probability	- Y7 Summer 4 – Sets & Probability - Y8 Autumn 5 – Representing Data - Y8 Summer 4 to 5 – Reasoning with Data - Y9 Summer 6 – Revision

	NC statement	Some key strands	Some key blocks
Solve problems – KS3	develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems	- Number: Calculations - Number: Percentages - Algebra: Solve Equations and Inequalities - Geometry and Measures: Perimeter, Area and Volume - Geometry and Measures: Angles	- Y7 Spring 1 to 3 – Application of Number - Y7 Spring 4 – Directed Number - Y7 Summer 2 – Geometric Reasoning - Y8 Spring 4 to 6 – Developing Number - Y9 Spring 4 to 6 – Reasoning with Geometry
	develop their use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics	- Number: Calculations - Number: Percentages - Geometry : Geometrical Proof - Algebra: Equivalence and Proof - Probability	- Y7 Spring 1 to 3 – Application of Number - Y7 Summer 2 – Geometric Reasoning - Y8 Spring 4 to 6 – Developing Number - Y9 Spring 1 to 3 – Reasoning with Number
	begin to model situations mathematically and express the results using a range of formal mathematical representations	- Algebra: Solve Equations and Inequalities - Ratio, Proportion, Rates of Change: Multiplicative Relationships - Ratio, Proportion, Rates of Change: Ratio & Rates - Algebra: Linear Graphs - Algebra: Non-linear Graphs	- Y7 Autumn 1 to 3 – Algebraic Thinking - Y8 Autumn 1 to 3 – Proportional Reasoning - Y8 Spring 1 to 3 – Algebraic Techniques - Y9 Autumn 1 to 3 – Reasoning with Algebra - Y9 Summer 5 – Algebraic Representation
	select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems; interpret their solution in the context of the given problem	- Number: Calculations - Number: Percentages - Algebra: Solve Equations and Inequalities - Probability - Statistics: Represent and Interpret Data - Statistics: Statistical Measures - Statistics: Bivariate Data	- Y7 Spring 1 to 3 – Application of Number - Y7 Summer 4 to 6 – Reasoning with Number - Y8 Spring 4 to 6 – Developing Number - Y8 Summer 4 and 5 – Reasoning with Data - Y9 Summer 1 to 3 – Reasoning with Proportion

How will students learn this content?

You will learn through various different strategies inside and outside of the classroom where appropriate. These will include teacher exposition and modelling, mini-whiteboards, targeted questioning, yellow box notes, treasure hunts, tarsia puzzles, 3-act maths, goal-free problems, retrieval practice and low stakes quizzes.

Outside the classroom you will be expected to complete homework on Sparx once per week. You will have the opportunity to take part in whole school maths activities during Pi Day as well as taking part in challenges such as UKMT, Lusom challenge and the Runshaw challenge.

Key Stage 4

Students at Priory study the OCR GCSE in Mathematics J560 at Higher or Foundation tier.

OCR's GCSE (9–1) in Mathematics provides a broad, coherent, satisfying and worthwhile course of study. It encourages learners to develop confidence in, and a positive attitude towards mathematics and to recognise the importance of mathematics in their own lives and to society. It also provides a strong mathematical foundation for learners who go on to study mathematics at a higher level, post-16.

It emphasises and encourages:

- Sound understanding of concepts
- Fluency in procedural skill
- Competency to apply mathematical skills in a range of contexts
- Confidence in mathematical problem solving.

Assessment overview

Students are entered for either foundation tier (paper 01, paper 02 and paper 03) or higher tier (paper 04, paper 05 and paper 06).

Content is arranged by topic area and applies to both tiers as detailed in the specification. Topics may be assessed on any paper.

- Number operations and integers
- Calculations with integers
- Whole number theory
- Combining arithmetic operations
- Inverse operations
- Fractions, decimals and percentages
- Fractions
- Decimal fractions
- Percentages
- Ordering fractions, decimals and percentages
- Indices and surds
- Powers and roots
- Standard form
- Plane vector geometry
- Similarity
- Mensuration
- Units and measurement
- Perimeter calculations
- Area calculations
- Volume and surface area calculations
- Triangle mensuration

- Exact calculations
- Approximation and estimation
- Ratio, proportion and rates of change
- Calculations with ratio
- Direct and inverse proportion
- Discrete growth and decay
- Algebra
- Algebraic expressions
- Algebraic formulae
- Algebraic equations
- Algebraic inequalities
- Language of functions
- Sequences
- Graphs of equations and functions
- Probability
- Basic probability and experiments
- Combined events and probability diagrams
- Statistics
- Sampling
- Interpreting and representing data
- Analysing data

- Straight line graphs
- Transformations of curves and their equations
- Interpreting graphs
- Basic geometry
- Conventions, notation and terms
- Ruler and compass constructions
- Angles
- Properties of polygons
- Circles
- Three-dimensional shapes
- Congruence and similarity
- Plane isometric transformations
- Congruence