

## 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 | Algebra<br><b>Sequences</b>                                              |        | Algebra<br><b>Algebraic notation and substitution</b> |                                                      | Algebra<br><b>Expressions and equations</b> |        | Number<br><b>Place value, ordering and rounding</b> |        | Number<br><b>Four operations</b>                      |                                                     | Statistics<br><b>Averages and range</b>            | Number<br><b>Rounding and estimation</b> |
| Spring | Statistics<br><b>Graphing data</b>                                       |        |                                                       | Number<br><b>Fractions, decimals and percentages</b> |                                             |        | Number<br><b>Directed number</b>                    |        | Number<br><b>Fractions and percentages of amounts</b> |                                                     | Geometry and measures<br><b>Perimeter and area</b> |                                          |
| Summer | Ratio, proportion and rates of change<br><b>Speed, distance and time</b> |        |                                                       | Number<br><b>Properties of number</b>                |                                             |        | Number<br><b>Add and subtract fractions</b>         |        |                                                       | Geometry and measures<br><b>Angles and polygons</b> |                                                    |                                          |

### 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 | Ratio, proportion and rates of change<br><b>Ratio</b>                 |        | Ratio, proportion and rates of change<br><b>Proportion and scale</b> |                                              | Algebra<br><b>Algebraic manipulation</b> |        | Algebra<br><b>Coordinates and graphs</b> |                           |                                        | Number<br><b>Multiply and divide fractions</b> |                                                   | Geometry and measures<br><b>Symmetry and reflection</b> |
| Spring | Geometry and measures<br><b>Area, volume and density</b>              |        | Algebra<br><b>Equations and inequalities</b>                         |                                              | Number<br><b>Percentages</b>             |        |                                          | Algebra<br><b>Indices</b> |                                        | Number<br><b>Standard form</b>                 | Statistics<br><b>Interpret and represent data</b> |                                                         |
| Summer | Geometry and measures<br><b>Angles in parallel lines and polygons</b> |        |                                                                      | Probability<br><b>Tables and probability</b> |                                          |        | Geometry and measures<br><b>Circles</b>  |                           | Statistics<br><b>Graphs and charts</b> |                                                | Algebra<br><b>Sequences</b>                       | Consolidation                                           |

## 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 | Number<br><b>Properties of number</b>               |        | Number<br><b>Percentages</b>        |                                        | Geometry and measures<br><b>Area and volume</b> |                                                                      | Algebra<br><b>Equations, inequalities and formulae</b> |                                                              | Number<br><b>Fractions</b>                                   | Ratio, proportion and rates of change<br><b>Rates</b> |                                                                  | Number<br><b>Standard form</b> |
| Spring | Number<br><b>Maths and money</b>                    |        |                                     | Algebra<br><b>Straight line graphs</b> |                                                 | Ratio, proportion and rates of change<br><b>Ratio and proportion</b> |                                                        | Geometry and measures<br><b>Constructions and congruence</b> | Geometry and measures<br><b>Similarity</b>                   | Algebra<br><b>Algebraic manipulation</b>              |                                                                  |                                |
| Summer | Geometry and measures<br><b>Pythagoras' theorem</b> |        | Algebra<br><b>Non-linear graphs</b> |                                        | Probability<br><b>Sets and probability</b>      |                                                                      | Geometry and measures<br><b>Transformations</b>        |                                                              | Algebra<br><b>Simultaneous equations</b><br>(optional block) |                                                       | Geometry and measures<br><b>Trigonometry</b><br>(optional block) |                                |

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:

## Develop Fluency

| NC Statement                               | Key Strands                                        | White Rose V3 Blocks                                                                                                     |
|--------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Consolidate understanding of number system | Number, Fractions, Properties of Number, Indices   | Y7 Place Value, Four Operations; Y8 Fractions, Indices, Standard Form; Y9 Properties of Number, Fractions, Standard Form |
| Use calculation strategies                 | Calculations, Directed Number, Percentages         | Y7 Four Operations; Y8 Percentages; Y9 Percentages, Maths and Money                                                      |
| Use algebra to generalise                  | Algebraic Thinking, Expressions, Equations         | Y7 Algebraic Notation; Y8 Algebraic Manipulation; Y9 Equations, Inequalities and Formulae                                |
| Substitute, simplify and solve equations   | Substitution, Equivalence, Equations               | Y7 Expressions and Equations; Y8 Algebraic Manipulation; Y9 Equations, Inequalities and Formulae                         |
| Move between representations               | Graphs, Sequences, Coordinates                     | Y7 Sequences; Y8 Coordinates and Graphs; Y9 Straight Line Graphs, Non-linear Graphs                                      |
| Develop algebraic and graphical fluency    | Graphs, Functions, Sequences                       | Y8 Sequences; Y9 Straight Line Graphs, Non-linear Graphs                                                                 |
| Use language and properties precisely      | Number, Algebra, Geometry, Statistics, Probability | Y7 Data and Angles; Y8 Circles, Probability; Y9 Area and Volume, Similarity, Probability                                 |

## Develop Reasoning

| NC Statement                          | Key Strands               | White Rose V3 Blocks                                                                          |
|---------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------|
| Follow chains of reasoning            | Algebra, Number, Geometry | Y7 Expressions and Equations; Y8 Algebraic Manipulation; Y9 Equations, Similarity, Congruence |
| Deduce and infer                      | Statistics, Probability   | Y7 Graphing Data; Y8 Data and Probability; Y9 Sets and Probability                            |
| Interpret and communicate mathematics | Ratio, Proportion, Graphs | Y8 Ratio and Proportion; Y9 Rates, Straight Line Graphs                                       |

## Develop Problem Solving

| NC Statement                           | Key Strands                        | White Rose V3 Blocks                                                                      |
|----------------------------------------|------------------------------------|-------------------------------------------------------------------------------------------|
| Solve routine and non-routine problems | Ratio, Number, Algebra             | Y8 Ratio, Proportion and Scale; Y9 Percentages, Rates, Maths and Money                    |
| Translate problems mathematically      | Algebra, Geometry, Measures        | Y7 Expressions and Equations; Y8 Area, Volume and Density; Y9 Area and Volume, Pythagoras |
| Apply mathematics in context           | Ratio, Statistics, Financial Maths | Y8 Scale, Currency Conversion; Y9 Maths and Money, Interest, Similarity                   |

### 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, taking 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