

Mathematics

National Curriculum Programme of Study

'Mathematics is a creative and highly interconnected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.'

Our curriculum for mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils can develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately;*
- reason mathematically by following a line of enquiry conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language*
- can 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.*

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects and disciplines.

Year 8 - Autumn Term

Key Knowledge and Skills

Multiplicative reasoning

- Multiplying and dividing fractions
 - Multiply and divide using proper fractions
 - Understand the use of reciprocals
 - Work with mixed numbers.
- Ratio and scale
 - Understand and use ratio in different contexts including sharing amounts.
 - Understand π as a ratio (diameter to circumference)
 - Use π to find the circumference of a circle.
 - Introduction to similar shapes and length scale factors
- Multiplicative change (proportional thinking)
 - Understand and use direct proportion.
 - Understand and use scale factors.

Data and probability

- Representing data
 - Understand and use scatter graphs, correlation and lines of best fit.
 - Read and interpret different types of frequency tables, including two-way tables.
 - Represent discrete data and continuous data.
- Probability
 - Understand and use sample spaces.
 - Find probabilities from a variety of tables and diagrams.

Algebra

- Sequences
 - Generate sequences from words and algebraic rules.
 - Find the n th term of a sequence.
- Indices
 - Using indices, including addition and subtraction laws.
 - Simplifying algebraic expressions by multiplying and dividing indices.
 - Powers of powers.
- Brackets
 - Use directed number with algebra.
 - Expand brackets and factorise into brackets.

Key Knowledge and Skills

Algebra

- **Cartesian plane**
 - Use coordinates in all four quadrants.
 - Identify, draw and recognise lines on graphs which follow rules.
 - Link graphs to sequences.
- **Brackets, equations and inequalities**
 - Expand brackets and simplify.
 - Form and solve equations, including those with brackets.
 - Understand, form and solve inequalities.
 - Form and solve equations with unknowns on both sides.

Shape and Space

- **Angles in parallel lines and polygons**
 - Identify and calculate alternate, corresponding and co-interior angles.
 - Construct triangles and quadrilaterals.
 - Understand and use the sum of exterior and interior angles in polygons.
 - Construct bisectors.

Number

- **Fractions and percentages**
 - Convert between decimals and percentages.
 - Percentage increases and decreases with multipliers.
 - Express one number as a fraction or percentage of another.
 - Find the original amount given the percentage.
- **Standard form**
 - Understand and use standard form, including negative powers of ten.
 - Add, subtract, multiply and divide with numbers in standard form.
 - Negative and fractional indices.
- **Number sense**
 - Round decimal numbers.
 - Convert units of measure and currency.
 - Solve problems involving time and calendar.

Year 8 - Summer Term

Key Knowledge and Skills

Geometry

- **Area of trapezia and circles**
 - Calculate the area of a trapezium.
 - Calculate the perimeter and area of compound shapes.
 - Calculate the circumference and area of a circle and parts of a circle.
- **Line symmetry and reflection**
 - Recognise line symmetry.
 - Reflect shapes in horizontal, vertical and diagonal lines.

Data Handling

- **The data handling cycle**
 - Draw and interpret multiple bar charts, pie charts and line graphs.
 - Represent and interpret grouped data.
 - Find and interpret the range.
 - Compare distributions.
 - Identify misleading graphs.
- **Measures of location**
 - Understand and use the mean, median and mode.
 - Choose an appropriate average.
 - Find the mean from grouped and ungrouped frequency tables.
 - Identify outliers.
 - Compare distributions using averages and the range.

Enrichment and Home Learning

- Dr Frost Maths Homework (DFM): Weekly home learning tasks and optional challenges
- TTRS