



# Curriculum Overview

Curriculum Area: Mathematics

Year: 9

## Year 9 Curriculum:

### **Autumn Term:**

#### **Autumn 1: Reasoning with Algebra:**

**Straight line graphs:** Pupils revisit the equation of a straight line, interpreting  $m$  and  $c$  in real-life contexts, and sketching graphs. The focus is on simplifying and rearranging formulae, with higher-level content including parallel and perpendicular lines.

**Equations and inequalities:** Pupils revisit forming and solving linear equations and inequalities. They explore rearranging formulae and differences between equations, formulae, identities, and expressions, reinforcing understanding.

**Testing conjectures:** Pupils test and make conjectures about patterns and relationships, including exploring prime numbers, factors, multiples, Pascal's triangle, and expanding binomials. This includes practicing non-calculator skills and translating problems into algebraic expressions.

#### **Autumn 2: Constructions in 2 and 3 Dimensions:**

**Three-dimensional shapes:** Pupils are introduced to 3-D shapes, learning associated vocabulary, and using practical equipment like cubes and isometric paper. They explore surface area, volume, plans, and elevations, with software to aid visualization. Higher-level pupils may investigate volumes of other 3-D shapes.

**Constructions and Congruency:** Pupils build on previous constructions, using a straight edge and compass to explore loci and congruency. Practical activities include "human geometry" to understand loci, comparing congruent figures, and formal identification of congruent triangles. They also learn to draw and measure geometric figures, use the standard ruler and compass for constructions, and describe geometric terms and notations.

### **Spring Term:**

#### **Spring 1: Reasoning with Number:**

**Numbers:** Pupils enhance their understanding of the number system, including rational and real numbers, and simple surds for higher-level pupils. They practice number skills, both with and without a calculator, revisiting standard form and HCF/LCM. Key concepts include operations with integers, decimals, fractions, and mixed numbers; prime numbers, factors, multiples, and factorization; and comparing numbers in standard form.

**Using Percentages:** Pupils connect percentages to fractions and decimals. They learn to solve reverse percentage problems, using both calculator and non-calculator methods, and apply decimal multipliers for calculations.

**Maths and Money:** Pupils apply number skills to financial contexts, learning about tax, wages, and percentages, including simple and compound interest. They solve problems involving percentage change and financial mathematics, using appropriate calculation strategies and understanding numerical problem structures.



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### Spring 2: Reasoning with Geometry:

**Deduction:** Pupils revisit and extend their knowledge of angle rules and shape properties, applying them to complex problems. They focus on geometric deduction and review previous constructions. Key concepts include using a ruler and compass for constructions, drawing and describing geometric figures, and understanding angle properties and relationships between parallel lines.

**Rotation and Translation:** Pupils study rotational symmetry and translation, described in vector form, comparing the effects of transformations to determine congruence.

**Pythagoras' Theorem:** Pupils revise squares and square roots, then investigate right-angled triangles, emphasizing the theorem's converse. They apply the theorem to various contexts, including 3-D shapes, coordinate axes, and use geometric constructions to derive results, solving problems involving right-angled triangles and interpreting mathematical relationships.

### **Summer Term:**

#### Summer 1: Reasoning with Proportion:

**Enlargement and Similarity:** Pupils study transformations including enlargement and similarity. Use scale factors and apply trigonometry in similar triangles. Solve problems using Pythagoras' Theorem and trigonometric ratios.

**Ratio and Proportion:** Pupils will learn to solve complex ratio problems. Studying inverse relationships and compound units. Explore proportional reasoning and alternative methods.

**Rates:** Pupils will explore speed, distance, and time relationships. Solve flow problems and work with compound units and apply their understanding of multiplicative relationships.

#### Summer 2: Representations and Revision:

**Probability:** Pupils calculate probabilities of single and combined events, focusing on independent events and the multiplication rule. They use various diagrams like sample spaces, Venn diagrams, and two-way tables to support probability. Higher steps include tree diagrams.

**Algebraic Representation:** Pupils interpret and create different types of graphs, including quadratic, reciprocal, and exponential graphs.

**Revision:** The final weeks are dedicated to reviewing KS3 curriculum areas based on pupil needs. Topics may include handling data, sequences, error intervals, and trigonometry, preparing pupils for transition to KS4.



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## Links to National Curriculum

Our curriculum for Year 9 is based on White Rose Maths Curriculum and has been adapted to meet the needs of our pupils. It aligns with the KS3 National Curriculum. Pupils demonstrate their understanding and progressively build core knowledge and skills across strands: Number, Algebra, Ratio, Proportion and Rates of Change, and Geometry and Measures. Each unit integrates the key aims of developing fluency, reasoning mathematically, and problem-solving. This comprehensive approach ensures that pupils meet national standards and are equipped with a deep understanding and the ability to apply mathematical concepts confidently in various contexts, preparing them for advanced mathematical learning and real-world applications. The curriculum enhances pupils' understanding of ratios, scales, and multiplicative relationships. Allows pupils to delve deeper into algebraic techniques, building on their previous knowledge. They learn to solve equations and inequalities, work with quadratic functions, and understand sequences. The curriculum emphasises geometric reasoning, including the properties and relationships of shapes, angles, and transformations. Pupils explore the Cartesian plane, construct and interpret geometrical figures, and apply theorems. Pupils are taught to collect, represent, and interpret data, fostering statistical literacy. They learn to use charts, graphs, and measures of central tendency, which are important for making informed decisions based on data in everyday life and in professional contexts. Throughout the curriculum, pupils develop reasoning and problem-solving skills. Pupils are encouraged to apply mathematical concepts to solve complex problems, think critically, and make connections between different areas of mathematics. By aligning with the National Curriculum, this ensures that pupils acquire the necessary skills and knowledge to succeed in further education and in their everyday lives, fulfilling the educational standards and goals set at the national level.

## Knowledge and understanding of this curriculum will be assessed by:

Knowledge will be assessed using prior knowledge starters, allowing teachers to build on pupils' existing knowledge and address any gaps. Teachers will layer new knowledge on this foundation. During lessons, pupils' understanding will be assessed through whiteboard activities and questioning. Verbal feedback will be provided, and questions and modelling will be adapted to ensure comprehension.

At the end of each unit, pupils will take an assessment, which will be marked and reviewed to address any misconceptions before progressing. This ensures a solid understanding and readiness for subsequent learning topics.

## Powerful Knowledge/Cultural Capital Opportunities

Mathematics is a creative and highly inter-connected discipline. Throughout Year 9 all pupils will continue to develop problem solving skills that can be transferred to other areas of the school curriculum and life outside of school. All pupils will use subject specific language and terminology as standard – they will learn to think and speak like mathematician.

**Proportional reasoning:** This knowledge is fundamental as it is widely applicable in subjects like science and geography, and in everyday contexts such as cooking and financial calculations.

**Algebra:** This progression is essential as algebra forms the basis for advanced mathematical concepts and is critical in various scientific and engineering fields.

**Geometry:** These skills are crucial for spatial awareness and are applicable in fields like architecture, engineering, and art.

**Data handling:** Pupils are taught to collect, represent, and interpret data, fostering statistical literacy. They learn to use charts, graphs, and measures of central tendency, which are important for making informed decisions based on data in everyday life and in professional contexts.