

# KS3 Curriculum Overview

# Mathematics

## Curriculum Intent

By the end of year 9, we intend for students to be confident in the 6 key areas of Mathematics:

- Number and calculations
- Proportional reasoning
- Expressions and equations
- Sequences and graphs
- Geometry and measure
- Probability and statistics

Students will have strong declarative and procedural knowledge, be able to solve multi step problems in both real life and abstract contexts, and use mathematical reasoning in both their written work and orally in class.

## How does the KS3 curriculum build on that from KS2?

The main purpose of our Key Stage 3 curriculum is to challenge all students and for them to aspire to maximise their potential in the subject. The Key Stage 2 curriculum places a large focus on the skill element of mathematics and learners are expected to remember and retrieve key facts methods to answer questions. Our Key Stage 3 curriculum takes their core skills and places the emphasis on application and problem solving. This allows for a deeper understanding of the topic and allows students to feel confident in applying knowledge in a number of ways. Year 7 study several new topics including dividing by a decimal, solving inequalities, rearranging formulae and calculating angles in parallel lines.

## What do students *do* with this knowledge or these skills?

Students will apply their knowledge to solve different types of problems. They will regularly practise key skills such as calculating areas, expanding brackets or calculating with percentages. Increasingly throughout units, they will be faced with multi-step problems in both real-life and abstract ways and will develop their conditional knowledge by recognising which skills to apply.

## How does the KS3 curriculum align to the National Curriculum?

Our KS3 curriculum exceeds the National Curriculum. We cover all content from the National Curriculum as well as:

- Fractional and negative indices
- Surds
- Factorising and solving quadratics
- Equations of parallel and perpendicular lines
- Nth term of quadratic sequences
- Combining ratios
- Algebraic ratio problems
- Volume and surface area of cylinders

In addition to our normal curriculum, we also enter our most able students into the UKMT challenges.

### What new knowledge or skills are students taught?

Term	Year 7	Year 8	Year 9
<b>Autumn</b>	<ul style="list-style-type: none"> <li>• Arithmetic</li> <li>• Factors, multiples and primes</li> <li>• Product of prime factors</li> <li>• Indices</li> <li>• Measuring and drawing angles</li> <li>• Angles in triangles and quadrilaterals</li> <li>• Forming and simplifying expressions</li> <li>• Substitution into formulae</li> <li>• Nth term</li> <li>• Coordinates and midpoints</li> <li>• Linear graphs</li> </ul>	<ul style="list-style-type: none"> <li>• Fraction arithmetic</li> <li>• Expanding and factorising</li> <li>• Forming and solving linear equations</li> <li>• Trial and improvement</li> <li>• Laws of indices</li> <li>• Negative indices</li> <li>• Standard form</li> <li>• Mutually exclusive events</li> <li>• Sample space diagrams</li> <li>• Two way tables</li> <li>• Percentage increase and decrease</li> <li>• Calculating change as a percentage</li> <li>• Repeated percentage change</li> </ul>	<ul style="list-style-type: none"> <li>• Negative and fractional indices</li> <li>• Calculating with standard form</li> <li>• Bearings</li> <li>• Constructions and loci</li> <li>• Solving linear equations with fractions</li> <li>• Rearranging equations with fractions</li> <li>• Linear inequalities</li> <li>• Compound measures</li> <li>• Imperial/metric conversions</li> <li>• Relative frequency and expected outcomes</li> <li>• Frequency trees</li> <li>• Enlargements</li> <li>• Negative enlargements</li> <li>• Circumference and area of circles</li> </ul>
<b>Spring</b>	<ul style="list-style-type: none"> <li>• Rounding and estimating</li> <li>• Decimal Arithmetic</li> <li>• Fractions of amounts</li> <li>• Fractions, decimals and percentages</li> <li>• Percentages of amounts</li> <li>• Probability of events</li> <li>• Expected outcomes</li> <li>• Area of triangles and quadrilaterals</li> <li>• Dividing into a ratio</li> </ul>	<ul style="list-style-type: none"> <li>• Reflection, rotation and translation</li> <li>• Volume and surface area of cubes and cuboids</li> <li>• Arithmetic sequences</li> <li>• Non-linear sequences</li> <li>• Angles in polygons</li> <li>• Scales</li> <li>• Constructing triangles</li> <li>• Congruent and similar shapes</li> <li>• Units of measure</li> </ul>	<ul style="list-style-type: none"> <li>• <math>y = mx + c</math></li> <li>• Equations of parallel and perpendicular lines</li> <li>• Quadratic graphs</li> <li>• Reverse percentages</li> <li>• Ratio</li> <li>• Median and quartiles</li> <li>• Averages from frequency tables</li> <li>• Cumulative frequency and box plots</li> <li>• Scatter graphs</li> <li>• Pythagoras</li> <li>• Trigonometry</li> </ul>

<p><b>Summer</b></p>	<ul style="list-style-type: none"> <li>• Solving linear equations</li> <li>• Solving linear inequalities</li> <li>• Rearranging formulae</li> <li>• Angles in parallel lines</li> <li>• Mean, median, mode and range</li> <li>• Representing data</li> <li>• Comparing data</li> </ul>	<ul style="list-style-type: none"> <li>• Pie charts</li> <li>• Stem and Leaf diagrams</li> <li>• Comparing data</li> <li>• Direct proportion</li> <li>• Conversion graphs</li> <li>• Distance-time graphs</li> <li>• Gradients</li> <li>• <math>y = mx + c</math></li> </ul>	<ul style="list-style-type: none"> <li>• Sectors</li> <li>• Volume of prisms</li> <li>• Volume and surface area of cylinders</li> <li>• Factorising quadratics</li> <li>• Surds</li> </ul>
<p><b>Rationale for this sequencing</b></p>	<p>We start with a unit on number because this underpins all other parts of maths. Without these skills, students are unable to appreciate the rules of algebraic manipulation. Within the first half term, students also learn to use mathematical equipment such as a scientific calculator and a protractor.</p> <p>Year 7 are introduced to topics from all of our 6 strands of mathematics. These were chosen as the foundations for further study throughout year 8 and 9.</p>	<p>Year 8 topics build on the skills developed in year 7. For example, percentages are extended to include percentage change and repeated percentage changes.</p>	<p>Year 9 topics build on skills learnt throughout year 7 and 8. This year focuses more on developing conditional knowledge as well as acquiring further declarative and procedural knowledge of topics such as factorising quadratics. As students deepen their knowledge of topics, they are more frequently required to recall different facts and methods to identify the correct process to solve a problem.</p>