# 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 practice 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? | | | |
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| **Term** | **Year 7** | **Year 8** | **Year 9** |
| **Autumn** | • Exploring rounding numbers through the use of different methods such as significant figures and estimating.<br>• Using and applying BIDMAS<br>• Writing numbers in standard form and how these numbers are interpreted and displayed on a calculator.<br>• Sequences and patterns in a real life.<br>• Working with fractions | • Algebraic manipulation including expanding of brackets and factorising, leading into geometric and quadratic sequences.<br>• Calculating interior and exterior angles of polygons.<br>• Fraction arithmetic.<br>• Transformations - rotations, reflections, enlargements and translations.<br>• Percentage calculations including decimal multipliers. | • Indices and Standard Form.<br>• Compound measures such as a speed, pressure and density. Converting between units of compound measures.<br>• Algebraic proof, linked to sequences and geometry.<br>• Bearings.<br>• Solving the most complex linear equations including fractions and multiple terms.<br>• Relative frequency. Similarity and Enlargements.<br>• Interquartile range, cumulative frequency and box lots. |
| **Spring** | • Decimal Arithmetic and the relationship between fractions decimals and percentages.<br>• Drawing and interpreting graphs of linear functions.<br>• Surface area of 2D shapes | • 3d shapes, representation, surface area and volumes<br>• Fractions decimals and percentages with a focus on percentage problems<br>• Plotting straight line graphs and the relationship between a graph and its equation | • Right angled trigonometry/ Pythagoras<br>• Circles, including Sector Area and Arc Length.<br>• Graph working including parallel and perpendicular lines and non-linear functions.<br>• Constructions and Loci. |

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| **Summer** | • Writing and solving equations and basic inequalities.<br><br>• Calculating averages and presenting data using bar charts and pie charts.<br><br>• Calculating Ratio and distribution in real life scenarios. | • Metric units and solving problems using direct proportion. Understanding inverse proportion.<br><br>• Collecting data, data and analysing data sets which may need to be grouped. | • Simultaneous equations. (Linear)<br><br>• Advanced ratio.<br><br>• Surds.<br><br>• Algebraic fluency and quadratic equations.<br><br>• Advanced problem solving from UKMT. |
| **Rationale for this sequencing** | 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.<br><br>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. | Year 8 topics build on the skills developed in year 7. For example, percentages are extended to include percentage change and repeated percentage changes. | 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.<br>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. | |

| **Additional support at home** | |
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| **Additional reading**<br>for enjoyment, enhancement and extension | **KS3 (Higher)**<br>• The Joy of x (by Strogatz)<br>• The wonder book of Geometry (by David Acheson)<br>• Maths that made us (Micheal Brooks)<br><br>**KS3 (Foundation)**<br>• Maths games for clever kids. (by Gareth Moore)<br>• Maths riddles for smart kids. (by M Prefontaine) |
| **Online resources**<br>to practice, consolidate and revise | • Dr Frost Maths<br>• Corbett Maths |
| **Workbooks & revision guides**<br>to practice, consolidate and revise | • CGP Higher KS3 Revision Guide and Practice<br>• CGP Foundation KS3 Revision Guide and Practice |