



Mathematics Curriculum Overview

Key Stage 3- Year 7

Students continue their journey of discovery in mathematics. This is done through an accompaniment of teacher-led learning, project-based learning and student-led discovery. Students use a mixture of mathematical software where possible and gain experience using a calculator in mathematics. They get taught problem-solving techniques and apply computational thinking to problems where possible in the form of algorithmic approaches. This is all accompanied by a focus on mathematical rigor, alongside an emphasis on appropriate use of mathematical vocabulary and associated spellings. Students are also exposed to mental strategies throughout the year, as well as frequent exposure to mental mathematics – to aid in not only mathematical vocabulary but listening to mathematics in English.

During Year 7, students further reinforce and move to look at applying their knowledge of number to algebra.

Number

Students begin with a review of the four operations including formal addition and subtraction, alongside mental strategies for multiplying and dividing. Students review multiples and factors and this leads into finding the prime decomposition of numbers and using this to find the lowest common multiple (LCM) and highest common factor (HCF) of two or more numbers and representing this pictorially on Venn diagrams. Students continue to work with fractions, decimals and percentages and using the four operations with these. Some students will go on to use percentage multipliers to calculate simple and compound interests. We review order of operations and ensure a mastery before applying this to algebra and solving equations. Students look at the basic index laws in preparation for applying this to algebra. Students then look at rounding numbers, firstly rounding to positive powers of ten and whole numbers and then to nearest decimal places, students then move on to using rounding to estimate calculations. Students look at how to find number sequences and finding terms in a number sequence.

Sets: students look at representing numbers in Venn diagrams.

Shape & Space

Students begin with reviewing terminology of shapes starting with polygons and the naming conventions for these. They then move on to finding the area of triangles and different quadrilaterals. Students use their knowledge of these to then move to looking at algebra involving the area of triangles and quadrilaterals. Students look at applying their knowledge of polygons to finding the perimeter and area of compound/composite shapes. Students review angle types and the appropriate terminology for these. Students look at angles in polygons and derive the formula for finding the sum of interior angles of a polygon, they then apply this to find individual interior and exterior angles. They review angles in parallel lines and combine this with their knowledge of angles in polygons. Students move on to looking at 3D shapes and the naming conventions for these, and then look at finding the surface area and volume of prisms.



Algebra

Students continue their journey into algebra. They begin by looking at vocabulary in algebra. They move on to basic simplifying by collecting like terms in algebraic expressions. Students review index laws in algebra and multiply algebraic terms. With this knowledge they then move on to expanding single brackets and simplifying expressions involving single brackets. They then move on to factorising single brackets. Some students then move on to expanding double brackets, and factorising quadratics, time permitting. Students will look at both expanding and factorising in applied contexts such as geometry and sequences. Students will then move on to solving linear equations, firstly with integer solutions and then moving onto rational solutions. Some students will look at solving equations with powers greater than one. Students continue to look at formulae in their applications to geometry and in data handling, as well as in their own studies by looking at rearranging the subject of a formula.

Data

Students begin with an introduction to the different types of data (discrete, continuous etc) before moving towards collecting data. Students collect data in the form of tallies, frequency tables and questionnaires. Students then move on to representing data. They use tally charts, pictograms to begin with and then move on to looking at bar charts & comparative bar charts before moving on to scatter graphs to represent data and looking at correlation of sets of data. Students look at representing data in Venn diagrams, and reading worded problems leading to Venn diagrams. Some students will be introduced to terminology relating to sets and Venn diagrams. Students will be introduced to the basics of probability, beginning with the probability scale, and then looking at single event probability (finding probability of die rolls, cards in a deck, spinners etc). Some students may go on to finding probability of multiple events using tree diagrams.

Technology

Students will learn through a myriad of digital mediums. Students will become proficient in their use of Microsoft Teams, OneNote, Outlook and the Office packages including Excel. Students will explore and investigate mathematics using mathematics specific software such as Geogebra and Desmos where possible. Alongside this, students will continue to gain confidence in the use of a scientific calculator and improved dexterity and speed in calculating. We also use MyiMaths and Dr Frost Maths for students to practice fluency problems and so that students can receive instantaneous feedback alongside additional teacher feedback when appropriate.

Recommended Resources for Deeper Understanding

MyiMaths, a service we often use to assign homework. All students have a log in and can access any task from KS3 to KS5. We suggest students review classwork on here. <https://www.myimaths.com/>

Dr Frost Maths is an additional service that focuses on exam-style questions. Students can also access this and will be given a log in if they desire. <https://www.dr frostmaths.com/>



Mathtrainer is a website for students to practise their basic understanding of four operations, the website acts like an app and saves their scores. We recommend this for frequent practise. <https://www.mathtrainer.org/>

Complete Mathematics Timestables are fantastic for students to practise their timetables. They include different tasks as opposed to classic calculations such as arrays and recognising division facts.

<https://completemaths.com/teaching-tools/digital-manipulatives/timestables>

Applications for Students

Sumaze! is a series of educational puzzle apps developed by MEI (Mathematics Education Innovation). A phone/tablet app available in four different versions depending on students' age. <https://sumaze.mei.org.uk/>

Geogebra applications. A collection of Geogebra features are available for download on a mixture of devices. A personal favourite of ours is the 3D calculator – students can use AR (augmented reality) to plot 3D objects around them.

<https://www.geogebra.org/download?lang=en>

Desmos. A beautiful and simple graphing calculator for students to explore functions and more, its often updated with new features and extends to some unusual, weird and funky functions. <https://www.desmos.com/>

Euclidea is an elegantly designed app for students to explore constructions using a straight-edge and pairs of compasses, all performed on their device. <https://www.euclidea.xyz/>