

YEAR SEVEN

At KS3 mathematics is broken into 4 strands, each of which is detailed below including the topics that are covered in this year of study.

ALGEBRA

As an introduction to algebra, in year seven, all students will be introduced to the concept of function machines and sequences. For some this will include finding unknown terms in sequences and investigating the "nth" term. Pupils will be familiar with algebraic notation and at a higher level will begin to expand and simplify expressions and solve equations. There may also be an opportunity to use formulae and start linking algebra to graphing.

GEOMETRY AND MEASURES

All students will spend some time recapping the basic geometrical principles taught in Key Stage 2. This will include work on length, perimeter and area as well as defining 3D shapes and drawing their nets. The concept of symmetry (both line and rotational) will be revisited and students will be introduced to transformation geometry. For all this will be rotating and reflecting shapes and for some there will be an option to progress onto translation and enlargement. Constructing and measuring angles using a protractor correctly will be studied and all pupils will revise angle properties and basic identification of triangles. Students will also learn to tessellate accurately. The 3D element of this strand of Mathematics will focus on basic solids. For all students this will mean the correct identification of 3D shapes and for some this will include calculating the volume and surface area. There may also be the opportunity to start solving more complex geometrical puzzles.

NUMBER

At the centre of the year seven syllabus is pupils work with number. All students will learn to be proficient in all four of the number operators, should be confident with place value and the number system and be able to correctly use a calculator. All students will revisit and revise negative number and fraction work from Key Stage 2 including improper fractions and mixed numbers, equivalent fractions and fractions of quantities. Number work will also ensure a good understanding of decimals, percentages, ratio and proportion. Some of the students will begin to focus on the more specific rules of number and will begin to calculate both with units of measure and fractions. There will also be the opportunity to start using subject specific notation and vocabulary.

STATISTICS

All students will start to learn the specific terminology related to this strand of the syllabus. This includes mode, median and mean averages and range. Pupils will revisit data collection and data display such as bar charts, tally charts and pictograms. Work on probability is also continued in year seven with all pupils looking at basic probability and some investigating the differences between theoretical and experimental probability. There may also be the opportunity to look at how grouped frequencies affect data and data collection.

YEAR EIGHT

At KS3 mathematics is broken into 4 strands, each of which is detailed below including the topics that are covered in this year of study.

ALGEBRA

In year eight algebra starts to become a more prominent part of the syllabus. All students will become proficient in writing algebraic expressions and will learn to use algebra to find unknowns. They will learn to collect like terms and to use function machines to solve equations and generate straight line graphs. Students will also use formulae and learn to correctly substitute values from which they can create and use coordinates to plot graphs. Most students will also start to use algebra with shape and learn to use and expand brackets. There will be the opportunity not only to solve equations but also to learn how to create equations in order to problem solve. Distance-time graphs will also be introduced at this stage. For some students there will be more advanced equation solving including negatives and unknowns on both sides and they will learn how to use algebra to find the gradient of a graph and learn how to change the subject of a formula. Factorising and trial and improvement may also be introduced at year eight.

NUMBER

In year eight there is continued emphasis for all students on correct application of the four number operators and the correct order of operations (BODMAS). Pupils will continue to work with negative numbers, fractions, decimals and percentages and with powers of 10 and rounding also being introduced or revisited. Most students will learn how to identify the highest common factor and lowest common multiple of numbers and will begin to work with prime numbers and factors. Percentages will be furthered to include percentage increase and decrease and pupils will start to multiply and divide with decimals. For some pupils there will be work with higher powers and roots but all pupils will learn to square numbers.

GEOMETRY

In year eight all students will continue to work out the area and perimeter of 2D shapes, for most this will include compound shapes and for some, shapes such as triangles, parallelograms, trapeziums and circles will be included in the work. All students will continue to use a variety of scales in their work and some will be required to create accurate scale drawings as well as plans and elevations of 3D shapes. All students will need to be able to accurately draw and measure angles but there will also be a requirement to calculate angles in straight lines and in triangles. For most students they will extend this skill to quadrilaterals and for some to parallel lines. All students will continue to study transformation geometry and to accurately construct shapes. Most will now be expected to combine different transformations and recognise when shapes are congruent. Some students will start to look at more complicated prisms and work out volumes and surface area. There is also an introduction to bearing in year eight.

STATISTICS

In year eight all students will start to look at pie charts in detail. All should be able to read a pie chart and most will be able to create a simple one. Pupils will continue to work with a variety of averages and will be expected to understand how to work each of these out. Most of our students will now start to complete more detailed data analysis and will understand how to use probability scales and calculate experimental probability. Some students will also start to use scatter graphs to make predictions. They will also use and understand the terms assumed mean and mutually exclusive.

YEAR NINE

At KS3 mathematics is broken into 4 strands, each of which is detailed below including the topics that are covered in this year of study.

ALGEBRA

In year nine some of the more abstract elements of algebra are built on to the foundations taught in years seven and eight. All students will continue to work with sequences and function machines and graphing will continue to be developed. All students will become proficient in simplifying expressions as well as expanding brackets and using formulae and equations. Most students will focus on linear sequences and the "nth" term but for some there will be the opportunity to work with quadratic sequences. Pupils will be introduced to the different approaches for solving multi-step equations including those with unknowns on both sides and for some this will include equations involving fractions, quadratics and fractional powers. Most pupils will further develop their trial and improvement skills and some will learn how to use algebra in a more specific approach by solving simultaneous equations. Graphing work will be more comprehensive with most graphing straight lines and showing direct proportion graphically. For some, cubic and quadratic graphs will be introduced at this stage. Year nine also sees the introduction of more detailed factorising and may students will see their first use of Pythagoras' theorem.

NUMBER

The underlying techniques surrounding the four number operators continue to underpin all areas of Mathematics in year nine. All students will be proficient in adding, subtracting, multiplying and dividing and should be able to round accurately and work comfortably with fractions, decimals and percentages. Most pupils will now also start to work with larger numbers including powers of 10 and for some they will be introduced to standard form notation. There will be continued work on ratio and direct and inverse proportion and for some students this will be coupled with geometry to find the ratio of areas and volumes of shapes. All students will start to use some of the specialist functions on their calculators and will learn to be accurate and efficient in calculations. Work on percentages will include reverse percentage for most and the introduction of compound interest for some. Fractions will be looked at in more details and many students will look at the rules specifically used to govern fractions. For some students there will also be the chance to look at reciprocals.

STATISTICS

In year nine the focus in statistics is very much towards correct use of diagrams and evidencing from investigation. All pupils will be expected to work out experimental probability and for some this will also mean using mutually exclusive events. All pupils will need to calculate probabilities and correctly use the probability scale with most also expected to estimate probability for a given set of events. All averages are studied in further detail and for some students there will be the chance to estimate means using grouped data. Pupils are expected to continue employing a variety of diagrams to display and compare data. All students will work with pie charts, 2 way tables and stem and leaf diagrams with some advancing further to the use of tree diagrams, cumulative frequency and scatter graphs with lines of best fit.

GEOMETRY AND MEASURE

All pupils will now be expected to calculate the areas and perimeters of a variety of 2D shapes including triangles, parallelograms and compound shapes. For some this will include the area and circumference of circles and arc length and sector area. All students will be expected to work out both reflective and rotational symmetry and for most they will need to link this to the properties of regular and irregular shapes. All students will learn to be proficient in coordinates in all 4 quadrants and for most this will be extended to include working with line segments and mid points. Calculation of missing angles using geometrical reasoning becomes more prolific in year nine. All students are expected to calculate the missing angles in triangles, on a straight line and around a point. For most they will work with polygons and for some this will include an introduction to circle theorems. All students will look at basic surface area and volume and depending on progress will be introduced to increasingly more demanding 3D shapes. Students will be expected to accurately construct triangles and for some there will be the chance to bisect lines and angles using mathematical techniques. Year nine also sees the introduction of Pythagoras and trigonometry as part of the work with right angle triangles.

GCSE MATHS

At KS4 mathematics is broken into five topic areas, as summarised in the table below.

<u>GCSE MATHS</u>	Weighting	
	Foundation	Higher
Number	25%	15%
Algebra	20%	30%
Ratio, Proportion and Rates of Change	25%	20%
Geometry and Measure	15%	20%
Statistics and Probability	15%	15%

The teaching time allocated to each topic area over the two year period will roughly reflect the weightings given above.

At the beginning of year ten all pupils will focus on number paying particular attention to the order of operations, directed numbers, fractions, decimals and percentages. Pupils will then branch out into the other topic areas that include indices, surds, equations, inequalities, straight line graphs, sequences, ratio, conversions, direct/indirect proportion, best buys, constructions, mensuration, vectors, probability, averages and statistical diagrams.

At the end of year eleven pupils will sit three exam papers; one non-calculator paper and two calculator papers each last one and a half hours. Each paper will contribute 33.3% to the pupil's over GCSE maths grade and the tier of entry will be determined after the mock examination.