Year 9, 10 & 11 Overview

Term		Year 9 Overview	Year 10 Overview	Year 11 Overview
Autumn	HT1	**Place Value and Calculations** Students will learn/ recap knowledge on how to perform the 4 operations at different levels including with decimals and negative numbers. Students will also learn the correct order of operations and how we apply this to multi-step problems **Comparing and Estimating** Students will learn how to use the inequality symbols to describe numbers or a set of numbers including fractions and decimals. They will also learn how to convert between and order sets of fractions, decimals and percentages. Students will explore ways of approximating numbers and checking answers	**Integers, Decimals and Place Value** Students will further develop their calculation skills using calculator and non-calculator methods. They will consider positive and negative numbers and powers of 10, as well as ensuring they have a confident grasp of using the correct order of operations. Students will be extended to perform to four operations with decimals. Students will be encouraged to check answers by rounding or using inverse operations. Some students will be introduced to standard form. **Types of Numbers** Students will recall knowledge of square and cube numbers and their roots. Students will learn how to perform calculations on numbers in index form including applying the laws of indices. Some students will consider negative and fractional indices. Students will recall how to identify factors and multiples. They will be encouraged to use Venn diagrams to sort information. Prime factorisation will be introduced to students who have not covered this previously. Students will further develop the uses of prime factor decomposition.	**Graphs** Students will recall how to draw, label and scale axis, and plot and identify points. They will learn how to plot and draw straight line graphs in the form y=a, x=a y=x and y=-x as well as $y=mx+c$ and $ax + by = c$. Student will learn about gradient and some students will discover parallel and perpendicular lines. Students will also consider linear graphs as a tool to solve equations. Students will consider how we can represent real life situations on graphs such as conversions and fuel bills. Students will also learn how to construct distance- time and velocity- time graphs and how to interpret information from them **Ratio and Proportion** Students will recall how to express the division of a quantity as a ratio and how to share in a given ratio. Students will learn how to use ratios to convert between unit of measure or currencies in real life context. Students will consider problems involving mixing, best buys, scaling up and conversions. Some students will be introduced to the concept of direct proportion, understand the relationship $y=kx$, and be able to recognise this in graph form.

	HT2	Angles Students will recall types of angles and basic angle facts including angles on a straight line and around a point. Students will further investigate angles in polygons. More able pupils will consider interior and exterior angles. Algebraic Proficiency We will ensure students understand the vocabulary and notation of algebra. Students will learn how to manipulate and simplify algebraic expressions. They will also learn how to substitute into expressions and formula	Algebraic Proficiency We will ensure students understand the vocabulary and notation of algebra. Students will further develop their skill of manipulation including applying the laws of indices to algebraic expressions. They will also learn how to substitute into expressions and formula. Tables, chart and Graphs Students will recall how to present data in simple charts and graphs such as bar charts and pictograms. Students will be introduced to Stem and leaf diagrams as a way of representing data. They will concentrate on the mode at this point and how to find the mode from different charts, graphs and tables. Other averages may be discussed but will be covered in more depth later in the year.	Transformations Students extend their learning from Key Stage 3, exploring all the transformations and constructions, relating these to symmetry and properties of shapes when appropriate. There is an emphasis on describing as well as performing transformations as using the language promotes deeper thinking and understanding Plans and Elevations Students will further develop skills to measure and draw accurately as well as using Isometric paper to draw 3D objects. The will consider how objects look from different viewpoints and draw front and side elevations and plans of shapes made from simple solids. Pythag and Trig Students recall knowledge of square numbers and roots and investigate the relationship between the sides of a right-angled triangle. Some students may have accessed this content in year 9. Students will explore using the theorem in a variety of context including on a coordinate axes with some considering the applications in 3 dimensions. Trigonometry is introduced as a special case of similarity within right-angled triangles. Emphasis is placed

				throughout the steps on linking the trig functions to ratios, rather than just functions.
Spring	HT3	**Numbers and the Number System** This topic extends students' previous knowledge on types of numbers including factors, multiples and primes. Students will learn how to find common factors and multiples and more able students will consider prime factorisation. Pupils will also explore powers and roots. **Ratio and Proportional Reasoning** Students will be introduced to ratio notation and consider how to simplify ratios or convert into the form 1:n and n:1. Students will learn how we can share in a given ratio and understand the connection between ratios and fractions. Students will also solve best buy problems and problems involving similar shapes.	**Further Charts and Graphs** Students will learn how to create and interpret pie charts. Students will recall their angle facts/ skills in order to represent data on a pie chart. Lower ability pupils may use simple fractions initially. Students will also learn how to create and interpret scatter graphs identifying outliers and using a line of best fit to make predictions. **Fractions and Percentages** Students will initially concentrate on calculating with fractions developing their skills in this area before considering how we can convert between fractions and decimals and percentages. Students will then develop their percentage skills. Students will learn how to calculate percentages both with and without a calculator. Calculator methods are essential for repeated percentage change and which will be taught in year 11 but can be introduced here to some pupils.	**Probability** Students build on their prior learning to calculate the probabilities of single and combined events. Students will be introduced to a variety of diagrams that support probability such as sample space, Venn and Two-way tables. Some students will look at tree diagrams considering how probabilities change with and without replacement. **Multiplicative Reasoning** Students will recall percentage skill and be introduced to repeat percentage problems, compound interest and reverse percentage problems. Students will consider compound measures of speed, density and pressure and some students will be able to convert between units of speed. Students will be introduced to direct and inverse proportion problems solving using algebraic or graphical representations. **Constructions, Loci and Bearings** Students will develop their knowledge of Loci from KS3. The learn how to construct lines and angles using a compass. Accurate drawing and use of scales will be vital, as is the use of parallel line angles rules covered at Key Stage 3. Students will also be introduced to bearings. With opportunities to reinforce their

				understanding of trigonometry and Pythagoras from earlier this year, applying their skills in another context as well as using mathematics to model real-life situations.
	HT4	Calculating with Fractions and Percentages Students will further develop skills taught in HT1 and apply the 4 operations to fractions. They will also learn how to find fractions of amounts and percentages of amounts. Students will also learn about percentage change. More able pupils will consider repeat percentage change, compound interest and reverse percentage problems. Solving Equations and Inequalities Students will start by revisiting their basic skills on algebraic notation and manipulation. Students will then explore ways of solving equations and inequalities.	Equations and Inequalities Students will start by revisiting their basic skills on algebraic manipulation and ways of solving equations and inequalities. Students will further develop their ability to solve a range of different types of equations and inequalities and show solution sets on number lines. Some students will also be introduced to simultaneous linear equations and quadratic equations. Sequences Students will further develop their ability to create and describe number and picture sequences. Students will be encouraged to use the Nth term as a method of generating and describing a sequence. Students will consider sequences with negative, fractional and decimal terms. Some students will consider quadratic sequences.	Similarity Congruence Building on their experience of enlargement and similarity, this unit looks more formally at dealing with topics such as similar triangles. Parallel line angle rules are revisited to support establishment of similarity. Congruency is introduced through considering what information is needed to produce a unique triangle. Vectors Students will have met vectors to describe translations during Key Stage 3. This will be revisited and used as the basis for looking more formally at vectors, discovering the meaning of $-\boldsymbol{a}$ compared to $\boldsymbol{a}$ to make sense of operations such as addition, subtraction and multiplication of vectors. This will connect to exploring 'journeys' within shapes linking the notation AB with $\boldsymbol{b}-\boldsymbol{a}$ etc. Further Shape - Circles, Cylinders and Spheres Some students will already have knowledge of calculating area and circumference of circles when stretched in year 10, for others this will be a new topic. Students will know or learn the formulas for area and circumference and consider how to apply them when calculating volume or surface area of cylinders. Students

				will also be introduced to the formula for the volume of a Sphere.
Summer	HT5	**Calculating Space** Students will further develop their knowledge of area and perimeter. Students will learn how to use and apply formula to calculate the areas of different shapes. Students will consider 3D shapes, investigating surface area and exploring volume. More able students will consider circles and use of pi. **Patterns** This topic extends students' previous knowledge on number patterns. They will further explore both number and picture sequences and how we can use rules to describe or generate a sequence.	**Angles** We will ensure students understand and use the correct notation for lines and angles. Students will learn about angles in parallel lines as well as further developing their knowledge of angles in polygons. **Statistics** Following from HT2/3 students will further develop their skills in statistical analysis. Students will consider how different types of data is collected, how data may be biased and no representative. Students will deepen their understanding of using the averages and range to analyse and compare data, including the advantages and disadvantages of the different methods. Students will consider different charts, tables and graphs including grouped data.	**Further Number - Fractions, Reciprocals, Indices and Standard Form** Students will further develop their abilities to calculate with fractions and be introduced to the concept of a reciprocal. Students will also recall laws of indices and further develop these skills before moving on to standard form. Standard Form will have been seen by some students in year 10 but will be a new concept for the majority of learners. **Further Algebra- Graphs and Equations** Here students will further develop algebra skills including expanding and factorising and extend their solving equation skills to include quadratics. Students then move on to the solution of simultaneous equations by both algebraic and graphical methods. Links will be made to graphs and forming the equations will be explored as well as solving them. Finally, students will develop their knowledge of linear and non-linear graphs recognising the different shapes. **Revision and GCSE Exams**

	HT 6	Outdoor Education and Enrichment Revision and EOY Assessments Measuring and Presenting Data Students will recall the ways in which we find the averages of a set of data. They will consider how to present data in different charts and graphs as well as the advantages/disadvantages to using different methods to present data. Probability Students will develop their understanding of the meaning of probability and how we can describe probability using specific language and the probability scale. Students will consider different experiments and their outcomes.	Outdoor Education Work Experience Revision and EOY Assessments Perimeter, Area and Volume Students will further explore the ways in which we measure space. They will develop their skills of calculating perimeter, area and volume as well as solving problems. Some pupils will extend their skills to include circles.