



Mathematics and Statistics

	Content
Year 7 HT1	Pupils will solve increasingly challenging problems involving time, developing confidence and resilience whilst they apply concepts to real life contexts. Pupils will then begin to develop a rich understanding of fractions from shading and simplifying to finding fractions of quantities and problem solving with fractions. Pupils will explore proportional relationships, identifying best buys, manipulating ratios and applying these contextually such as with recipes. Pupils will be given the opportunity to explore percentages, percentage change and interest rates building solid foundations for future learning. Woven throughout will be opportunities for decoding questions and developing fluency and oracy through a range of activities.
Year 7 HT2	This half term students study area and perimeter. Students will have had exposure to the area and perimeter of basic 2D shapes in KS2. However, they may not have taken these past squares and rectangles and will not have looked at surface area. This topic will develop a greater understanding into the calculations involved in finding the area of all types of quadrilaterals with the option of moving onto circles for the more able. This unit is also used as an opportunity to check students' understanding of the core arithmetic procedures with integers as well as with decimals.
Year 7 HT3	This half term students get an introduction to algebra. Students in year 6 only look at a small amount of algebra mostly focussing only on number sequences and missing number problems. Within this unit students continue from year 6 to solidify their understanding of the order of operations and negative numbers. These areas of numeracy are fundamental in being able to create and manipulate algebraic expressions. Algebraic manipulation is the foundation of all other algebraic content so it is vital that this content is taught in sufficient depth to build all future learning on. The content of the unit will be revisited in year 8, 9 & 10 explicitly however it will also be interleaved within the second algebra unit which will be taught after Easter. Links will be made to HT2 linking area with additional understanding of how algebra can be used. Then again links will be made in HT6 within the angles and shape unit.
Year 7 HT4	This half term students study probability. They study this branch of mathematics which deals with the occurrence of a random event. Probability predicts how likely events are to happen. Within this topic students will progress from year 6 to allow students to solidify their understanding of fractions, decimals, and percentages through probability. Decimal work will focus on decimals between 0 and 1 as preparation for its inclusion in probability. All four operations of fractions will be explicitly taught despite division of fractions not being necessary for probability. The content of the unit will be revisited in year 10 allowing for all students to revisit the topics they are taught in year 7 before moving on to more difficult content.
Year 7 HT5	This half term students study a second algebra unit. This unit builds on the foundations of algebra that were covered during HT3. Within this unit students will recap negative numbers which is important when students are substituting and solving equations. Negative integers will be taught within algebra in substitution and as solutions for equations as a way to stretch the more able. Volume is covered after substitution and is a good chance to recap previous work on area. Inequalities are also introduced after solving equations to allow students to solve inequalities as well. Various elements of algebra will be covered every year within the mathematics curriculum as it makes up 20-30% of the final GCSE exams.
Year 7 HT6	This half term students will be looking at angles and shapes, some of which will have been seen at primary age to varying levels. Students have the opportunity to look at shape properties and also missing angle problems within simple 2D shapes. Students will take this further as they move on to missing angles in polygons at the higher end. Bearings will also be introduced to some of the students as an upgrade to compass directions which they will have seen before. Coordinates will be used in conjunction with shapes to solve coordinate geometry problems. Students will be taught to work without calculators to help them to solidify their written methods before revisiting angles again in Year 9.



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Content

Within year 8 students will be consolidating and extending previous knowledge from KS2 and Year 7. Students will start to follow a path that suits their particular needs; Teachers will scaffold work to support less confident and offer extension activities and higher grade content to the more able. The topics they will cover are below.

Year 8 Unit 1

The first unit in year 8 is an extension of the year 7 unit of ratio and proportion. It allows for students to consolidate their learning from year 7, while pushing on with each of the topics within the unit. As year 8 introduces the wider use of a calculator, this unit also brings in many topics that would not have been covered within the year 7 unit. It also incorporates new calculator methods to previously taught content.

Year 8 Unit 2

The second unit in year 8 is an extension of the year 7 unit of 'Geometry I'. It also includes further work on volume which was first introduced in the year 7 unit of 'Algebra II'. This unit revisits place value work that students saw in year 7 with some getting their first look at estimation. The focus though will be on rounding, as it links to the area and perimeter of circles. Higher-ability students will also get the opportunity to look at error intervals. It also revisits the area and perimeter content that students saw in year 7 before applying this to circles in the form of the circumference and area of a circle, and for the higher ability, parts of circles. Students will combine the work they did on 3d shapes across the year with surface area and volume. For some, this will allow them to go beyond cuboids for the first time whereas the higher ability will allow them to add to their work on circles and look at cylinders. Linking back to the ratio and proportion unit students will look at similar shapes scaling for the first time. This links well with the shape work they will have already completed in the unit with the area and perimeter of triangles.

Year 8 Unit 3

The third unit in year 8 is an extension of both of the year 7 algebra units covering algebraic manipulation and solving equations. Substitution and rearranging formulae will be covered later in the year. It continues to allow for students to consolidate their learning from year 7, while pushing on with each of the topics within the unit. Order of operations and negative numbers will be taught through creating expressions and simplifying expressions for middle and higher ability students. For lower ability students these will need to be explicitly taught to ensure that common errors are not made. This unit offers a lot of opportunities for students to learn new content while also revisiting previous learning. While some students will get their first sight of expanding and factorising others will move forward to expanding double brackets and factorising simple quadratics. All students will have looked at solving equations in some form during the 5th unit in year 7 but for all students this unit will allow them to increase their understanding of solving more difficult equations. It will also provide the first opportunity for some students to study simultaneous equations.

Year 8 Unit 4

The fourth unit in year 8 covers factors, multiples, and primes which were covered during the probability module of year 7. However, this is then expanded to include prime factorisation and HCF and LCM using Venn diagrams. It also includes further work on powers and roots having completed some work on this during the previous unit while discussing order of operations. This then expands into more in depth work on powers and roots, and then further to include index laws including negative and unit fractional indices for the higher ability. This unit also looks at standard form. Students will have seen this during their science lessons so should be familiar with numbers written in standard form. In mathematics this is built in to include more manipulation of standard form and performing calculations with standard form. Substitution and Pythagoras have also been included in this unit due to the link to powers and roots with both being essential in the understanding of these topics.

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Year 8 Unit 5	<p>For the fifth unit in year 8, students will get their first chance to look at sequences and graphs. The substitution work that students completed in the previous unit provides a prerequisite to both the sequences and the plotting graphs sections of the unit. Sequences are taught before graphs as links can be made between the linear sequences and the linear graphs that are being plotted.</p> <p>Coordinates and axes were covered at the end of year 7 but are revisited here as another prerequisite to plotting graphs. At the higher end this now includes calculating the distance between two points building on the Pythagoras work that was also completed in the previous unit of work.</p> <p>For some students and to extend their knowledge of graphs further, understanding the equation of a line and the information that comes with it, such as opportunities to rearrange formulae to calculate the gradient, which is why this is also included within this unit of work.</p> <p>Finishing off this unit is students first chance to look at transformation and is placed here to enable students to build on the work with coordinates, specifically supporting work with reflections. Students at the higher end will also get to look at column vectors in more detail.</p>
Year 8 Unit 6	<p>For unit 6 in year 8, students will get their first chance to look at the majority of the statistics content. This includes all work on averages and range as well as looking at the many ways of displaying statistical data. Students will also get a chance to look at sampling and the impact of bias. Some students will look predominantly at the different types of data and how they can be obtained while others may look at random and stratified sampling.</p> <p>Students will have the opportunity to build on the average work that they may have done during KS2, however this focuses mainly on the mean. Students will look at all three averages and the positives and negatives of them as well as the range. This may also lead some students to calculating these averages from frequency tables including the estimate of the mean.</p> <p>Students will have looked at some forms of displaying statistical data in KS2, mainly looking at bar charts, pie charts etc. Students get an opportunity to build on this work while also getting the chance to look at other charts including frequency polygons and cumulative frequency graphs.</p>
<p>Within year 9 students will be consolidating and extending previous knowledge from Year 7&8. Students will start to follow a path that suits their particular needs. Teachers will scaffold work to support less confident and offer extension activities and higher grade content to the more able. Towards the end of Year 9 students will start to follow a foundation or higher GCSE course. The topics they will cover are below.</p>	
Year 9 HT1	<ul style="list-style-type: none"> •Calculations including negatives and BIDMAS •Algebraic manipulation •Fractions*
Year 9 HT2	<ul style="list-style-type: none"> •Indices (this will cover roots and Surds for the Higher students) •Area and volume*
Year 9 HT3	<ul style="list-style-type: none"> •Angles* (this will lead to Pythagoras and trigonometry for the Higher GCSE course)
Year 9 HT4	<ul style="list-style-type: none"> •Equations and inequalities
Year 9 HT5	<ul style="list-style-type: none"> •Sequences and graphs •Representing data*
Year 9 HT6	<ul style="list-style-type: none"> •Averages