Mathematics at Key Stage 3 at Cottenham Village College aims to ensure that all students are fluent in the key skills that underpin mathematics and are developing a deep understanding of the key concepts. We encourage students to make connections between different topics and apply their skills to tackle complex and unfamiliar problems. At Cottenham Village College we routinely use a range of strategies to formatively assess and give feedback to students about their progress. In mathematics these strategies include the use of questioning within the classroom, analysis of students' homework on Sparx maths and half termly assessments which assess both current and prior learning. Students will receive whole an analysis sheet from their assessment and will receive feedback in lessons following the assessment.

Autumn Term (first half)	Sequences	Fractions	Probability
Key subject knowledge	Generate terms of a sequence from either a term-to-term or a position-to-term rule Write the term-to-term definition of a sequence in words Find the nth term of a linear sequence Recognise and use sequences of triangular, square and cube numbers Use the nth term of an arithmetic sequence to decide if a given number is a term in the sequence, or find the first term over a certain number Use the nth term of an arithmetic sequence to find the fist term greater / less than a certain number *Identify Fibonacci sequences and simple geometric progressions *Continue a geometric progression and find the term-to-term rule *Identify a quadratic sequence *Find the nth term of simple quadratic sequences	Express a smaller whole number as a fraction of a larger one Convert between improper fractions and mixed numbers Add and subtract fractions with common denominators Add and subtract fractions with different denominators Multiply and divide fractions by an integer Use a fraction as an operator Multiply and divide by other fractions *Understand how to apply fraction arithmetic to simple algebraic contexts *Begin converting simple recurring decimals into fractions.	Calculate the probability of multiple events using tree diagrams (with replacement) *Calculate the probability of multiple events using tree diagrams (without replacement) *Write expressions for probabilities in simple algebraic contexts *Begin to understand set notation for regions of a Venn diagram
Summative assessment strategies	Will be assessed via a written assessment in lessons before October half term.		

How does this unit prepare students for future study?	The units in this half term consolidate and build on the students' learning in Year 7. Introducing sequences allows students to develop their understanding of patterns in maths, and how they relate to linear expressions and linear graphs. It supports their future work on sequences, as well as other topics within algebra. Developing students' understanding of fractions ensures they have the necessary knowledge to be successful in the probability unit, as well as the percentages and proportion module later in Year 8.

Autumn Term (second half)	Geometry	Expressions and Equations
Key subject knowledge	Know the sum of angles at a point, on a straight line an in a triangle. Be able to identify congruent angles in parallel lines, knowing the names of "vertically opposite", "alternate", "corresponding" and "co-interior" angles. Understand the definition of an interior angle and an exterior angle. Know and use the formula for the sum of interior angles of polygons. Know that the exterior angles of polygons always sum to 360 degrees.	Solve linear equations involving fractions with the unknown on the numerator. Solve linear equations involving fractions with the unknown on the denominator. Expand double brackets. Understand that squaring a bracket requires a double bracket expansion. *Expand and recognise a 'difference of two squares'.
Summative assessment strategies	Will be assessed via a written assessment in lessons before the Christmas holiday.	
How does this unit prepare students for future study?	These units continue to build on the students' learning in Year 7. Geometry builds on the angles unit that students study in Year 7, developing students' understanding of angles in all different types of polygons. Expressions and equations furthers students' learning from Introduction to Algebra in Year 7, enabling them to solve more complex linear equations.	

Spring Term (first half)	3D Shapes	Formulae
Key subject knowledge	Be able to draw plan views, front and side elevations of 3D shapes. *Be able to draw 3D shapes on isometric paper, given the plan and elevations. Recognise nets of 3D shapes, identifying whether they are correct. Be able to construct nets of simple solids such as cuboids. *Be able to construct nets of more complex solids such as pyramids. *Find the volume and surface area of simple cuboids and prisms.	Review of key definitions: expression, equation, formula, function. Introduction to the concept of rearranging a formula to make a particular variable the subject in simple linear cases. Be able to rearrange formulae with a context, e.g. the area of a rectangle. *Be able to rearrange more complex formulae involving fractions, indices and brackets. Introduce the definition of a 'function' of a variable with an input and an output, using f(x) notation. Substitute into functions in simple cases, e.g. finding f(2). *Substitute into more complex functions involving brackets, fractions and indices.
Summative assessment strategies	Will be assessed via a written assessment in lessons after February half term.	
How does this unit prepare students for future study?	The 3D Shapes module builds on the students' learning in Year 7 around 2D and 3D shapes, allowing them to access more complex problems involving shape in Year 9 and Key Stage 4. Formulae builds on their understanding of algebra, developing it from how to solve linear equations and applying this knowledge to the more abstract concept of formulae. Securing this understanding now will support them when tackling more complex algebra problems as they move through the units of work.	

Spring Term (second half)	Percentages and Proportion	Transformations
Key subject knowledge	Understanding percentage as "so many hundredths of". Be able to give one number as a percentage of another. Understand the equivalence of fractions, decimals and percentages to be able to compare proportions. Be able to simplify ratios. Divide a quantity into two or more parts in a given ratio. To be able to calculate a percentage of an amount, and find the outcome of a given percentage increase of decrease. *Develop an understanding of direct proportion reasoning, and be able to use algebraic methods to solve direct proportion problems.	Be able to identify the midpoint of a line using coordinates. Be able to transform 2D shapes by rotation, reflection and translation. Be able to enlarge 2D shapes given a centre of enlargement and a scale factor. Be able to use the language of "congruent" and "similar". *Be able to describe simple transformations. *Understand scale factor of an enlargement as a ratio of lengths of any two corresponding line segments.
Summative assessment strategies	Will be assessed via a written assessment in lessons before the Easter holiday.	
How does this unit prepare students for future study?	Percentages and proportion builds on students' understanding of fractions, decimals and percentages in Year 7, allowing them to develop their proportional reasoning when tackling mathematical problems in the future. Transformations develops students' understanding of 2D shape and will allow them to access more complex transformations work, including combined transformations and negative scale factors, in the future.	

Summer Term (first half)	Handling Data	Accurate and Scale Drawings
Key subject knowledge	Collect data using suitable methods. Be able to construct frequency tables. Be able to represent data using a variety of graphical representations. Be able to work out the range, mean, median and mode of data sets to be able to compare data sets. *Be able to work out the range, mean, median and mode of a data set organised into a frequency table. *Be able to assess which type of average is most appropriate when comparing two data sets.	Be able to accurately construct triangles given three sides, two angles and the side between them, or two sides and the angle between them. Accurately measure and describe bearings. Construct simple loci.
Summative assessment strategies	Will be assessed via a written assessment in lessons before May half term.	
How does this unit prepare students for future study?	Students will continue to develop their understanding of statistics and different ways of analysing data to be able to compare different data sets. This will allow them to critically evaluate data in the future. Accurate and scale drawings develops students' ability to accurately use key mathematical equipment, such as compasses and protractors. It builds on their understanding of 2D shape.	

Summer Term (second half)	Lines with a Purpose	Circles
Key subject knowledge	Plot linear functions from real-life, such as a distance time graph. Be able to use y = mx + c to generate coordinates for a straight-line graph. Be able to plot the coordinates of a straight-line graph. *Be able to plot linear functions where y is given implicitly in terms of x (e.g. ay + bx = 0, y + bx + c = 0). *Understand that 'm' is the gradient, and 'c' is the y intercept. *Be able to work out the gradient and identify the y intercept from a graph.	Know and use the formulae for the circumference and area of a circle. Be able to work out the volume of cylinders. *Be able to work out the volume of part cylinders. *Be able to work out the surface area of cylinders.
Summative assessment strategies	Will be assessed via a written assessment in lessons before May half term.	
How does this unit prepare students for future study?	Lines with a purpose builds on students' understanding of algebra, using the skills of solving equations, substitution and rearranging formulae that they have learned earlier in the year. It will support their understanding of more complex graph work as they move through the remainder of the Key Stage 3, and into the Key Stage 4 curriculum. Being able to work out the area and circumference of circles and part circles builds on their work on 2D shape in Year 7, and ensures they have the requisite knowledge to be able to work out the area of sectors, and the lengths of arcs when they move in to Year 9.	