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## Maths Curriculum; Sequencing Overview



Academic Year  <u>Year 7</u>	Content Unit title and brief outline of content.	Skills taught in each unit	Assessment – what knowledge and skills will be assessed and how?
<b>Autumn A</b>	Unit 1: Factors and Multiples Unit 2: Sequences Unit 3: Perimeter and Area Unit 4: Negative Numbers	<p>Factors and Multiples The skills imparted to students will include: understanding the difference between multiples, factors and primes, finding all the factor pairs of any whole number and the HCF and LCM of two whole numbers.</p> <p>Sequences Unit 2 develops the skills necessary to: work out the terms of an arithmetic and geometric sequence using the term-to-term rule, work out the nth term in an arithmetic sequence, generate sequences and predict how they will continue, as well as looking at special sequences such as Fibonacci.</p> <p>Perimeter and Area This unit develops the skills necessary to: be able to calculate the area and perimeter of a rectangle, parallelogram, triangle and trapezium as well as compound shapes.</p> <p>Negative Numbers Add, subtract, multiply and divide positive and negative integers and apply the rules of BIDMAS to calculations</p>	One 45-minute cumulative assessment mid-way through the half term using exam questions (focus here is on synthesis and problem solving) and one 20-minute skills assessment (focus here is on low stakes assessment to test the skills most recently taught and for teachers to give feedback to students to help improve that skill)

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<b>Autumn B</b>	Unit 5: Averages Unit 6: Equivalent fractions Unit 7: Algebraic Expressions	<p><b>Averages</b>  Students will learn to choose the most appropriate average for a set of data, find the mode, median, mean and range for a set of data and compare sets of data using averages and the range. They should be able to recognise the difference between discrete and continuous data.</p> <p><b>Equivalent fractions</b>  Comparing and simplifying fractions, writing one number as a fraction of another and working out fractions of amounts, writing an improper fraction as a mixed number and converting between the two.</p> <p><b>Algebraic expressions</b>  Collecting positive and negative like terms and simplifying algebraic expressions, constructing an expression from a sentence using the four operations. The unit also includes substitution into a formula involving brackets and squares, expanding expressions involving brackets and simplifying if necessary, then factorising an algebraic expression.</p>	One 45-minute cumulative assessment mid-way through the half term using exam questions (focus here is on synthesis and problem solving) and one 20-minute skills assessment (focus here is on low stakes assessment to test the skills most recently taught and for teachers to give feedback to students to help improve that skill)
<b>Spring A</b>	Unit 8: Angles Unit 9: Decimals Unit 10: Linear Graphs	<p><b>Angles</b>  In Unit 8, students will be taught how to: state whether an angle is acute, obtuse or reflex, work out unknown angles when two or more lines meet or cross at a point, work out unknown angles involving parallel lines, describe the line and rotational symmetry of triangles, use properties of triangles to work out unknown angles, use the properties of isosceles and equilateral triangles to solve problems, describe the properties of quadrilaterals, solve problems involving quadrilaterals, recognise and name different polygons, work out the interior angle of a polygon, work out the interior and exterior angles of a polygon.</p> <p><b>Decimals</b>  Be able to order integers, state which number is bigger using an inequality sign, write decimals in ascending and descending order, round to the nearest whole number, 10, 100, 1000 or round to decimal places. Students will learn the skills necessary to add, subtract, multiply and divide decimal numbers.</p> <p><b>Linear Graphs</b></p>	One 45-minute cumulative assessment mid-way through the half term using exam questions (focus here is on synthesis and problem solving) and one 20-minute skills assessment (focus here is on low stakes assessment to test the skills most recently taught and for teachers to give feedback to students to help improve that skill)

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		Work out the midpoint of a line segment, draw straight-line graphs	
<b>Spring B</b>	Unit 11: Percentages Unit 12: 3D shapes Unit 13: Probability	Percentages Work out the original value of something after a percentage change and solve problems, work out percentage increases / decreases, understand multipliers and powers depending on the number of years with an investment. 3D shapes sketch nets of 3D solids, calculate the volume and surface area of cubes and cuboids, convert between metric measures for area and volume Probability Unit 13 develops the skills necessary to: be able to find probabilities from two-way tables, interpret Venn Diagrams, work out the expected number of successful outcomes in n trials, solve harder problems and to identify factors that affect experimental probabilities (eg more trials closes the gap between experimental and theoretical probabilities), identify outcomes of 2 events in an experiment and to record them in sample space diagrams, be able to draw a tree diagram showing the outcomes and their probabilities for an experiment	One 45-minute cumulative assessment mid-way through the half term using exam questions (focus here is on synthesis and problem solving) and one 20-minute skills assessment (focus here is on low stakes assessment to test the skills most recently taught and for teachers to give feedback to students to help improve that skill)
<b>Summer A</b>	Unit 14: Ratio, Proportion and Rate of Change Unit 15: Symmetry Revision and Examination	Ratio, Proportion and Rate of Change Unit 14 develops the skills necessary to: convert between metric and imperial units, simplify a ratio expressed in fractions or decimals, share a quantity in 2 or more parts in a given ratio, convert between fractions and percentages, simplify fractions and ratios, solve simple word problems involving ratio and direct and inverse proportion, write ratios in the form 1:n and solve best buy problems. Symmetry	One 45-minute cumulative assessment mid-way through the half term using exam questions (focus here is on synthesis and problem solving) and one 20-minute skills assessment (focus here is on low stakes assessment to

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		Recognise and be able to correctly reflect shapes in vertical, horizontal and diagonal lines of symmetry.	test the skills most recently taught and for teachers to give feedback to students to help improve that skill)
<b>Summer B</b>	End of Year Therapy Unit 16: Solving Equations	Solving Equations Unit 16 develops the skills necessary to: write and solve simple equations, two-step equations, those with brackets, write and solve equations with letters on both sides, that include high powers of x.	End of year exams – one 60 minute paper which assesses all content from Year 7.

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*Key Stage 2 content summary; fundamentals of the number system including addition, subtraction, multiplication and division, basic algebra, ratio and proportion and links to decimals, fractions and percentages, basic geometry including angles, shapes and measurements, time, representing data*

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<p><b>Year 7 Content</b> <i>These units form the foundations of Maths. Without teaching these units, students would not have the basic knowledge to build upon over time.</i></p> <p>Factors and Multiples, Sequences, Perimeter and Area, Negative Numbers, Averages,</p>	<p><b>Skills taught.</b> <i>Are the skills taught in a spiral curriculum? What is the rationale for your sequencing of skills</i></p> <p><i>Maths has a spiral curriculum for both knowledge and skills. The skills learned in KS3 are subsequently built upon as students move in to KS4. They do not exist in isolation from each other, rather each is a necessary step in order to build the complexity and understanding of the range of mathematical knowledge and understanding that is required.</i></p> <p>Year 7:</p> <ul style="list-style-type: none"> <li>- define, list, calculate and solve problems with factors, multiples, primes as well as HCF and LCM</li> <li>- add, subtract, multiply and divide positive and negative integers and apply the rules of BIDMAS to calculations</li> </ul>
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<p>Equivalent fractions, Algebraic Expressions, Angles, Decimals, Linear Graphs, Percentages, 3D shapes, Probability, Ratio, Proportion and Rate of Change, Symmetry, Solving Equations.</p>	<ul style="list-style-type: none"> <li>- square, cube, square root and cube root integers and link these skills to BIDMAS</li> <li>- form equations and expressions, simplifying them where necessary, solve the equations, and substitute in to formulae or expressions</li> <li>- expand brackets and factorise expressions</li> <li>- working with fractions, decimals and percentages including simplifying, adding, subtracting, multiplying and dividing, and conversion between forms. Expressing one amount as a quantity of another.</li> <li>- recognising, drawing and calculating with angles. Using parallel lines, triangles, quadrilaterals and other polygons.</li> <li>- simplifying and sharing terms in a given ratio.</li> <li>- calculating perimeter, area and volume of 2D and 3D shapes respectively, properties of 2D and 3D shapes</li> <li>- recognising and continuing sequences, finding the nth term</li> </ul>
<p><b>Year 8 Content</b> <i>These units build upon the foundations of KS2 and Year 7 content and deliver the basics that can then be layered upon with more complexity in the next key stage.</i></p> <p>Sequences, Percentages, Probability, Using Data, Pencil and Paper Calculations, Transformations, Working with Numbers, Percentage Change, Graphs, Congruence and Scaling, Algebraic Expressions, Working with Fractions, Circles, Finding Probabilities, Equations and Formulae, Expressions and Equations</p>	<p>Year 8:</p> <ul style="list-style-type: none"> <li>- to be able to identify numbers in index form and apply the laws of indices</li> <li>- to be able to round numbers to appropriate degrees of accuracy based on significant figures or decimal places</li> <li>- to be able to estimate calculations using rounding to assist with reducing the complexity</li> <li>- to be able to simplify expressions using the index laws and apply to problem solving</li> <li>- to be able to substitute values and solve equations</li> <li>- recognise values are in direct proportion and interpret their meaning when put in context</li> <li>- to be able to recognise and perform transformations</li> <li>- to be able to work with terminating and recurring decimals</li> <li>- to be able to use percentages and calculate percentage change</li> <li>- to be able to calculate probabilities and draw and complete probability diagrams and tree diagrams</li> <li>- to be able to make scale drawings, use bearings and be able to draw and recognise congruent and similar shapes. To apply this to problem solving</li> <li>- to be able to plot linear graphs and use the equation <math>y=mx+c</math>, including working with parallel and perpendicular lines and inverse functions.</li> </ul>
<p><b>Year 9 Content</b> <i>These units map out the start of GCSE and use all of the KS3 content to deepen the complexity and understanding of Maths. The majority of students follow the higher tier content, those studying foundation tier will not study every topic listed.</i></p>	<p>Year 9:</p> <ul style="list-style-type: none"> <li>- extend calculations to those involving numbers in standard form, surds and indices (zero, negative and fractional)</li> </ul>

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<p>Number, place value, factors, powers, standard form, surds, fundamentals of algebra (simplifying, solving, substitution, sequences), interpreting and representing data, fractions, ratio and percentages, angles and trigonometry, graphs (linear, quadratic, cubic, reciprocal, real-life), area and volume of prisms, circles, cones and pyramids, transformations and constructions.</p>	<ul style="list-style-type: none"> <li>- use and implement the manipulation of algebra including sequences, expanding, factorising equations, expressions and formulae</li> <li>- summarise, infer, interpret and compare data with the use of statistical diagrams and with the calculation of averages and range</li> <li>- organise, outline and integrate skills of manipulation for fractions, decimals and percentages</li> <li>- develop the fluency to use all prior knowledge to integrate problem solving and ratio</li> <li>- apply the trigonometric ratios to solve problems with right angled triangles</li> </ul>
<p><b>Year 10</b> <i>These units are the culmination of content taught in previous years and require a firm grasp of skills and content before. They cannot be taught any earlier.</i> Quadratic equations, simultaneous equations, inequations, probability, compound measures, similarity and congruence, sine and cosine rules, further statistics, solving equations graphically.</p>	<p>Year 10:</p> <ul style="list-style-type: none"> <li>- combine the skills of solving, completing the square, factorising, substituting in to formulae in order to solve quadratic equations</li> <li>- combine the skills of algebraic manipulation and substitution in order to solve simultaneous equations</li> <li>- represent solutions to inequalities on a number line and plot them on a graph</li> <li>- construct a frequency tree, tree diagram, Venn diagram and use it to calculate probabilities</li> <li>- prove geometrical identities using clear mathematical reasoning and language</li> <li>- plot histograms, cumulative frequency graphs, box plots and draw comparisons between data sets using the graphs to help</li> </ul>
<p><b>Year 11 Content</b> – see above for rationale. Circle theorems, algebraic fractions, functions, proof, vectors, direct and inverse</p>	<p>Year 11:</p> <ul style="list-style-type: none"> <li>- apply the circle theorems to problems using the angle rules, explaining reasoning clearly</li> <li>- balancing and rearranging equations and formulae</li> <li>- interpreting real-life data and graphs and calculating gradients of tangents, chords and the area under graphs</li> <li>- using mock exam to develop exam technique, interpreting questions and markschemes, timing, checking working, attention to detail, and approaching questions in a methodical way</li> </ul>

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proportion, translating graphs of functions.	
<b><u>Is all of the NC Ks3 content taught in Year 7 &amp; 8? If not, where is this made up?</u></b> <i>The NC KS3 content is delivered in Year 7-9 in Maths. In Year 9, students start the GCSE course with any KS3 gaps delivered then.</i>	