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## Maths Curriculum; Sequencing Overview



Academic Year <u>Year 8</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 2: Sequences Unit 11: Percentages Unit 13: Probability Unit 17: Using Data	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 $n$ th term in an arithmetic sequence, generate sequences and predict how they will continue, as well as looking at special sequences such as Fibonacci. 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. 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>Autumn B</b>	Unit 18: Pencil and Paper Calculations Unit 19: Transformations Unit 20: Working with Numbers	Pencil and Paper Calculations Unit 18 develops the skills necessary to perform calculations using written methods rather than calculators, and estimate answers using rounding. Transformations Draw and reflect shapes using coordinate axes and describe a reflection given the object and its image on coordinate axes, enlarge a shape using a scale factor that is a positive whole number and to describe an enlargement using this method, rotate a shape on coordinate axes and to describe a rotation, enlarge a shape	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

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	Unit 21: Percentage Change	using a fractional scale factor and to describe an enlargement this way, translate a shape using column vectors and describe combinations of translations.	and for teachers to give feedback to students to help improve that skill)
<b>Spring A</b>	Unit 22: Graphs Unit 24: Congruence and Scaling Unit 25: Algebraic Expressions	<p>Graphs Unit 22 develops the skills necessary to: Plot a straight line graph, Calculate the gradient of a line and apply this in context, Plot a linear graph without a table of values for negative and fractional gradients, decide whether a point is on a line for equations not in the form <math>y=mx+c</math>, solve problems with parallel and perpendicular lines, find the inverse of a function, use real life graphs to make predictions.</p> <p>Congruence and Scaling Unit 24 develops the skills necessary to: Create scale drawings based on real life information, be able to measure and draw and bearing between two points using a scale, Draw accurate scale drawings using scales given in the form of a ratio, Identify similar and congruent shapes and explain why with reasons and use similarity to find missing lengths, Identify similar triangles using angle properties and explain why with reasons.</p> <p>Algebraic Expressions Simplify expressions involving powers and brackets, Use the index laws in algebraic calculations and expressions, Write and simplify expressions involving brackets and powers, Substitute integers into expressions and simplify.</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>Spring B</b>	<p>Unit 26: Working with Fractions</p> <p>Unit 27: Circles</p> <p>Unit 28: Finding Probabilities</p>	<p><b>Working with Fractions</b> The skills taught in Unit 26 include: 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. Additionally, students will learn to add and subtract fractions (including mixed numbers), work with equivalent fractions, decimals and percentages, use division to write a fraction as a decimal, divide an integer and a fraction by a fraction, multiply a fraction by a fraction (including mixed numbers).</p> <p><b>Circles</b> Calculate the circumference of a circle and calculate the radius or diameter when you know the circumference or area, Calculate the volume and surface area of a cylinder.</p> <p><b>Finding probabilities</b> Unit 28 develops the skills necessary to: Use the product rule for finding the number of outcomes for two or more events, List all the possible outcomes of two events in a sample space diagram, Identify mutually exclusive outcomes and events in complex cases, Solve complex problems involving probabilities of mutually exclusive outcomes and events, Solve complex problems involving probability of an event not happening, Work out the expected results for experimental and theoretical probabilities for complex problems, Compare real results with theoretical expected values to see if a game is fair for complex problems, Calculate probabilities of repeated events for complex cases, Draw and use complex probability tree diagrams, Draw and use more complex tree diagrams to calculate conditional probability, Use complex Venn diagrams to calculate conditional probability.</p>	<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)</p>
<b>Summer A</b>	<p>Unit 29: Equations and Formulae</p> <p>End of Year Revision</p>	<p><b>Equations and Formulae</b> Derive an algebraic formula from information given, Change the subject of a formula, Find a general formula for the <math>n</math>th term of an arithmetic sequence, Determine whether a particular number is a term of a given arithmetic sequence.</p>	<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</p>

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			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 B</b>	End of Year Examination End of Year Therapy Unit 35: Expressions and Equations	Expressions and Equations Unit 35 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 8.

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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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<b>Year 7 Content</b> <i>These units form the foundations of Maths. Without teaching these units, students would not have the</i>	<b>Skills taught.</b> <i>Are the skills taught in a spiral curriculum? What is the rationale for your sequencing of skills</i>
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<p><i>basic knowledge to build upon over time.</i></p> <p>Factors and Multiples, Sequences, Perimeter and Area, Negative Numbers, Averages, Equivalent fractions, Algebraic Expressions, Angles, Decimals, Linear Graphs, Percentages, 3D shapes, Probability, Ratio, Proportion and Rate of Change, Symmetry, Solving Equations.</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><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 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> <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 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</i></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> </ul>

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<p><i>of Maths. The majority of students follow the higher tier content, those studying foundation tier will not study every topic listed.</i></p> <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 or prisms, circles, cones and pyramids, transformations and constructions.</p>	<ul style="list-style-type: none"> <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>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> <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>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>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>
<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. Quadratic equations, simultaneous equations, inequations, probability, compound measures, similarity and congruence, sine and cosine rules, further statistics, solving equations graphically.</i></p>	

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<p><b><u>Year 11 Content</u></b> – <i>see above for rationale.</i></p> <p>Circle theorems, algebraic fractions, functions, proof, vectors, direct and inverse proportion, translating graphs of functions.</p>	
<p><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></p>	