

Mathematics Curriculum Plan

Year 7

	Autumn Group 1	Autumn Group 2	Spring Group 1	Spring Group 2	Summer Group 1	Summer Group 2
Unit/Topics	Basic Number Problems Using Bar Lines Significant Figures Using the Calculator Negative Numbers Introduction to Algebra & Simplifying Expressions Expanding Brackets Angle Rules Simplifying Ratio Averages Area of Rectangles & Triangles Circles - Circumference Using Decimals & Percentages Solving Linear Equations Construction of Triangles Questionnaires	Powers of 10 Written Arithmetic Using the Calculator Percentages of Amounts Properties of Shapes Introduction To Algebra & Simplifying Expressions Sequences Squares & Roots Mean & Range Using Measurements Maps & Scale Drawing	Fractions Review Properties of Shapes Index Notation Order of Operations Plans & Elevations Time Algebraic Substitution Probability Linear Graphs Volume Reflection Rotations	Basic Angles Solving Linear Equations Area of Rectangles & Triangles Negative Numbers Time Frequency Tables & Diagrams Coordinates Reflection Equivalent Fractions Rounding Using Place Value Probability	Unitary Method in Proportion Pie Charts Reciprocals Mutually Exclusive Events Real-Life Graphs Two-Way Tables Constructions & Perpendicular Lines Speed Real-Life Measures	Proportion in Recipes Trial & Improvement Frequency Trees Two-Way Tables Substitution into Formulae Factors, Multiples & Primes Review Function Machines Fractions, Decimals & Percentages Cubes & Roots Median & Mode Time Problems Expanding Brackets Real-Life Measures
Key Assessment	Half Term assessments Individual Assessment Analysis Exit tickets – End of topics tests		Half Term assessments Individual Assessment Analysis Exit tickets – End of topics tests		End of year assessments in exam venue and in classrooms Individual Assessment Analysis Exit tickets – End of topics tests	
Why is it studied?	<p>Builds on KS2 knowledge of numeracy as well as introducing fundamentals of skills and knowledge required for the rest of the year.</p> <p>The maths curriculum aims to revisit and reinforce previous knowledge while pushing students understanding a bit further each time.</p> <p>At KS3 and KS4 the calculator is a core piece of equipment that needs to be understood and used as a tool. Calculators have not been used at primary school and students do not understand the many different keys and symbols, hence the need for early introduction.</p>	<p>Builds on KS2 knowledge of numeracy as well as introducing fundamentals of skills and knowledge required for the rest of the year.</p> <p>The maths curriculum aims to revisit and reinforce previous knowledge while pushing students understanding a bit further each time.</p> <p>At KS3 and KS4 the calculator is a core piece of equipment that needs to be understood and used as a tool. Calculators have not been used at primary</p>	<p>At KS2 students have had good exposure of fractions, hence the recap in term 2.</p> <p>Having completed work on area, and circumference the next phase of geometry is volume.</p> <p>Properties of shape supports the teaching of the transformations rotation and reflection.</p> <p>Having been introduced to algebra and collecting terms; the next steps are substitution and then using that skill to plot linear graphs. This will then lead to the teaching of quadratic graphs and equations in subsequent terms.</p>	<p>At KS2 negative numbers are studied however, students find these a difficult concept to recall. Hence the return to the subject in term 2.</p> <p>At KS2 students have had good exposure to fractions, however, many students find them a challenge, hence the recap in term 2.</p> <p>Students have had very little exposure to probability before, hence the topic occurring in term 2.</p>	<p>Proportion uses the calculator and develops students’ skills in problem solving.</p> <p>Having constructed triangles in term 1, by term 3 we are constructing perpendicular lines, skills needed to support the difficult topic of Loci in later years.</p> <p>Towards the end of the year, we use measuring equipment to measure distances and areas around the school.</p>	<p>Proportion uses the calculator and develops students’ skills in problem solving.</p> <p>Having been introduced to algebra and solving basic equations we then move on to using formula and substitution.</p> <p>Towards the end of the year, we use measuring equipment to measure distances and areas around the school.</p>



	<p>At KS2 small amounts of algebra have been seen, in term one we do more work on simplifying terms and then solving basic equations.</p>	<p>school and students do not understand the many different keys and symbols, hence the need for early introduction.</p> <p>At KS2 small amounts of algebra have been seen, in term one we do more work on simplifying terms and then solving basic equations.</p>				
--	---	--	--	--	--	--

Year 8

	Autumn	Autumn	Autumn	Spring	Spring	Spring	Summer	Summer	Summer
Unit/Topics	Using the Calculator Fractions & Decimals Review Speed, Density & Population Density Index Laws Percentages Compound Change nth Term BIDMAS Expanding Quadratics Circumference & Area of Circles Ratio Problems Standard Form Prime Factors, HCF & LCM Probability Relative Frequency Formulae & Substitution Changing the Subject of a Formula Geometric Sequences	Using the Calculator Negative Numbers Square Numbers, Cube Numbers, Roots & Index Notation Simplifying Algebra, Classify Properties of Polygons & 3D Shapes Ratio Simplifying Finding Averages Rounding Fractions Linear Sequences Angles Probability Expanding Brackets Problem Solving, Money Problems Questionnaires	Squares & Roots Negative Numbers Substitution Angles in Parallel Lines Arithmetic with Decimals Probability Equivalent Fractions Convert between Fractions, Decimals & Percentages Area Factors, Multiples & Primes Sequences Estimation Significant Figures Quadrilaterals Time Problem Solving Time Problems Equations Function Machines	Probability - Mutually Exclusive Events Factorising Angles in Parallel Lines Inequalities Algebraic Fractions Pythagoras Significant Figures Upper & Lower Bounds. Difference of Two Squares Area of Trapezium Compound Shapes Direct Proportion Mean from Grouped Data Linear Graphs Surface Area & Volume of Prisms	Converting Fractions, Decimals & Percentages Factorising Area & Perimeter Factors, HCF & LCM Order of Operations Equations Circumference Time Problems Straight Line Graphs Properties of 3D Shapes Nets Volume of Cuboids Translations Order of Rotation	Mode, Median, Mean & Range Bar Models Squares, Cubes & Roots Coordinates Bar Charts Tally Charts Pictograms Pie Charts Algebraic Manipulation Percentages: Properties of Cuboids & Prisms Linear Graphs	Factorise Quadratics Construction of Perpendiculars & Bisectors Maps & Bearings Angles in Polygons Trial & Improvement. Use & Generate Formulae Scale Drawing	Ratio Sharing Construction of Triangles Reciprocals Angles in Parallel Lines Stem & Leaf Reflections, Rotations & Translations	Rotations, Reflections & Translations Ratio Cancelling Measurement Scale Drawing Constructing Triangles
Key Assessment	Half Term assessments Individual Assessment Analysis Exit tickets – End of topics tests			Half Term assessments Individual Assessment Analysis Exit tickets – End of topics tests			End of year assessments in exam venue and in classrooms Individual Assessment Analysis Exit tickets – End of topics tests		
Why is it studied?	Having looked at percentage at KS2 and now regularly using a calculator at this stage we now use calculators as tools to solve more complex percentages and compound percentages. Algebra now moves into more complex expanding and uses the skills including solving equations and rearranging the subject of basic formula.	Building on from the algebra studied in year 7, students go onto expanding brackets and further develop these skills. Students have looked at 2D shapes in year 7 and therefore move on to 3D in year 8. Students will use their developed numbers skills from year 7 to solve more complex problems,	Building on from year 7 algebra , students go onto use function machines and solve equations, developing their algebra skills. Students will further reinforce their number skills to imbed this knowledge at this crucial stage.	Students understanding of probability is developed from simple sample spaces to include mutually exclusive events. Having studied averages from listed data these skills are used in finding means from grouped data. Solid shapes are made up of	Students will be consolidating their knowledge of 2D shapes by working with areas and perimeters. This will be further developed by studying 3D shapes and their properties and volume. They are also challenged to develop graph skills which were	Students will build on their median and mode work in year 7 by adding mean and range. How data is represented graphically and pictorially helps students to have a wide variety of ways to compare and present data. They will also develop their knowledge of percentages as well	Having used compasses in year 7 to start construction, now students increase their geometry skills by looking at bisectors. Angles knowledge is advanced from basic angles studied in year 7 and formal rules with parallel lines last term, we now start to look at interior	Students will use their geometric knowledge to start constructing triangles using the measuring skills learned in year 7. Students will then also develop their spatial reasoning skills building on their knowledge of transformations (reflections) in year 7 to cover rotations and translations.	Students will consolidate their geometric knowledge to start constructing triangles using the measuring skills learned in year 7 and revisited this term. Students will then also develop their spatial reasoning skills building on their knowledge of transformations (reflections) in year



		with and without a calculator.		multiple compound solids. So at this point students work with prisms and compound 3D solids.	introduced in year 7.	as progressing to work with 3D on top of the 2D shapes previously learned in Year 7.	and exterior angles in polygons.		7 to cover rotations and translations.
--	--	--------------------------------	--	--	-----------------------	--	----------------------------------	--	--

Year 9

	Autumn	Autumn	Autumn	Spring	Spring	Spring	Summer	Summer	Summer
Unit/Topics	Percentage Increase And Decrease Reverse Percentage Repeated Percentage Formulae Linear Equations Convert to Algebra Comparing & Contrasting Area, Perimeter & Volume Algebraic Lengths & Areas Significant Figures Expand, Factorise & Solve Quadratics Factorising Quadratics - where the Coefficient of $x^2 \neq 1$ Expanding Triple Brackets Cumulative Frequency Diagrams & Box Plots Compare Distributions Index Laws	Decimals Substitution Ratio Calculating with Ratio Significant Figures Rounding & Estimation Probability & Sample Spaces Construction - Perpendicular Bisectors Angles in Parallel Lines Angles in Polygons Averages - Mean from a Table Index Laws	Factors, Multiples & Primes Substitution Ratio & Proportion Fractions to Decimals Angles on Parallel Lines Algebraic Manipulation Cubes & Roots Equations Circumference & Area Adding Fractions Using the Calculator Harder Negative Numbers	Transformations Standard Form Problems Simultaneous Equations & Problems Scatter Graphs Algebraic Fractions Pythagoras & Trigonometry Similar Triangles & Similar Shapes Proportion	Solving Equations, Unknown on Both Sides & Brackets Direct Proportion - Unitary Method, Recipes Pie Charts Fractions Recap Area Angles in Polygons Factorising Linear Expressions Speed & Density Percentages Repeated Percentage Change Multiplying & Dividing by Less than 1.	Order of Operations Index Notation Volume of Cuboids & Compound Solids Expanding & Factorising Brackets Percentage Increase Rotations & Reflections Basic Graphs	Equation of a Straight Line Quadratic, Cubic & Other Complex Graphs Surds Kinematics Bearings (Including Trigonometry)	Expand Quadratics Rotation Area & Circumference of a Circle Pythagoras Enlargement Maps & Bearings Factor Trees Straight Line Graphs Money Problems Volume Of Prisms Surface Area of Cubes, Cuboids & Triangular Prisms Probability Relative Frequency & Frequency Trees Real Life Graphs	Construct Triangles Two Way Tables Maps & Bearings Probability Mutually Exclusive Events Recognise a Reciprocal Simple Trial & Improvement
Key Assessment	Half Term assessments Individual Assessment Analysis Exit tickets – End of topics tests			Half Term assessments Individual Assessment Analysis Exit tickets – End of topics tests			End of year assessments in exam venue and in classrooms Individual Assessment Analysis Exit tickets – End of topics tests		
Why is it studied?	Students will continue their work with percentages to challenge their skills acquired in earlier years and apply them in more real-life contexts. They will also progress their expanding and factorising to include more difficult quadratics and the difference of two squares.	Students will continue to reinforce their knowledge of probability applying it to multiple events using sample spaces. Students will continue their work with ratio to challenge their skills acquired in earlier years.	Students will continue to reinforce their fundamental knowledge with any gaps addressed during the autumn term. Students will consolidate knowledge in factors, multiples and primes as well as algebra and fractions to prepare students for topics building on these skills such as expanding and factorising in the following terms.	Having worked with equations throughout year 7 and 8, students begin their work with simultaneous equations to push their knowledge and skills further. Trigonometry will be introduced and Pythagoras’ Theorem recapped to build on their knowledge in shape, space and measures.	Having worked with basic equations and simplifying in earlier years, students progress to harder equations and factorising.	Students reinforce their number skills by concentrating on index notation. Students progress with their geometry moving from area to volume. They will then add to their algebra skills by looking closely at brackets.	Year 9 are challenged in the last term of the year to further their knowledge of graphs including more complex graphs to begin their transition to year 10. They are also introduced to surds to allow for more complex methods and solutions next year.	Year 9 are challenged in the last term of the year to further their knowledge on algebra by looking at quadratic expressions. Their area knowledge is supported and developed by looking closely at circles and part circles.	Year 9 are challenged in the last term of the year by focusing on construction and bearings which uses a variety of mathematical equipment.

Year 10

	Autumn	Autumn	Spring	Spring	Summer	Summer
Unit/Topics	Factors & Multiples Expanding Binomials Factorising Completing the Square Algebra Proof Bounds, Checking Calculations Area, Volume & Surface Area Pythagoras Trigonometry Substitution & Rearranging Statistical Sampling Histograms Cumulative Frequency & Box Plots	Factors & Multiples Algebra Expansion Algebra Factorising Angles Ratio Decimals Algebra Substitution into Formula Rounding Perimeter Area & Volume Statistics Mean Charts	Loci Angles Angles in Polygons Ratio & Direct Proportion Inverse Proportion Percentage Change & Compound Simultaneous Equations Linear & Graphs Factorising Quadratics Completing the Square & Quadratic Formula Fractions & Algebraic Fractions Decimals & Fractions Scatter Graphs & Correlation Indices	Pythagoras Basic Number Construction & Loci Angles In Polygons Direct Proportion Inverse Proportion Percentage Compound Percentage Solve Equations Compound Measures	Equation of a Line, Parallels & Perpendiculars Standard Form Exact Values Surds Solving Linear & Quadratic Inequalities Inequality Shading for Two Variables Compound Units 3D Trig & Pythagoras with Plans & Elevations Area of a Triangle, Sine Rule & Cosine Rule Estimating - Including Roots	Fractions Scatter Graphs Basic Number Indices Standard Form Linear Equations & Inequalities Linear Graphs Quadratic Graphs Simultaneous Equations Scale Diagrams & Bearings Plans & Elevations Exact Calculations
Key Assessment	Half Term assessments Individual Assessment Analysis Exit tickets – End of topics tests		Half Term assessments Individual Assessment Analysis Exit tickets – End of topics tests		End of year PPE in exam venue Individual Assessment Analysis Exit tickets – End of topics tests	
Why is it studied?	<p>The beginning of the year 10 higher curriculum aims to consolidate knowledge acquired at KS3 as well as running parallel to foundation groups in the beginning to allow students to be placed in the group which will ensure the best outcomes.</p> <p>Students then develop their knowledge to encounter problems and questions which will be required of them at the end of year 11. Students are challenged to use their algebraic knowledge in algebraic proofs as well as learning new ways to solve quadratic equations.</p>	<p>The beginning of the year 10 foundation curriculum aims to consolidate knowledge acquired in KS3 as well as to build confidence with topics that they have seen before. It begins by running parallel to the higher group to allow students to be placed in a group which will ensure the best outcome.</p> <p>Number, ratio, algebra, shape and statistics topics are all chosen to ensure that the fundamental skills of maths are in place</p>	<p>Students will develop their knowledge of solving quadratics by learning other methods such as the quadratic formula and further completing the square. Students will also apply their algebraic knowledge learned in term 1 into other areas of maths such as proportion and fractions.</p>	<p>Students will recall and develop further their knowledge of Pythagoras and solving problems based around the theorem. Students expand their knowledge of proportion using more formal methods to solve direct and inverse problems.</p>	<p>In preparation for year 11, students will consolidate their work in year 10 and develop their algebraic knowledge with more graphs and inequalities. Students will also expand their trigonometric knowledge learned earlier this year and incorporate it with this algebra to work in 3 Dimensions and with non-right-angled triangles with the sine and cosine rule.</p>	<p>In preparation for year 11, students will consolidate their work in year 10 and develop their algebraic knowledge with more complex graphs, simultaneous equations, and inequalities.</p>

		in order to continue with the GCSE qualification.				
--	--	---	--	--	--	--

Year 11

	Autumn	Autumn	Spring	Spring	Summer	Summer
Unit/Topics	Circle Geometry Geometry Proofs Probability, Sample Spaces, Venn Diagrams & Set Theory Probability Tree Diagrams Linear & Quadratic Sequences Special Sequences Rates of Change Using Graph Gradients Area Under a Graph Graph Sketching - Sine, Cosine, Tangent	Recap Pythagoras & Trigonometry Straight Line Graphs Probabilities Expected Outcomes & Sample Spaces Venn Diagrams Tree Diagrams Enlargement Sequences Harder Sequences Straight Line Graphs & Pythagoras Gradient Interpretation Reflection & Rotation	Equation of a Circle Transformations Similar Triangles & Congruent Proofs Enlargement Similar Shapes Sketching Polynomials Inverse & Composite Functions Translations & Reflections of Graphs Plotting Polynomials Vectors Vector Proofs	Basic Rounding Rotation & Translation Congruency Similarity in Triangles Similarity in Other Shapes Quadratic & Other Graphs Sketch Graphs Basic Functions Vectors	Revision for exams	Revision for exams
Key Assessment	PPE in exam venue Individual Assessment Analysis Exit tickets – End of topics tests		PPE in exam venue Individual Assessment Analysis Exit tickets – End of topics tests		GCSE Exams	

<p>Why is it studied?</p>	<p>At the beginning of year 11, students begin developing knowledge learned last year such as moving from trigonometry to seeing the link between the functions and their graphs. Students will also begin working with rates of change in curved graphs using their knowledge from linear graphs to achieve this.</p> <p>Students also recap their probability skills and use them to solve more problems akin to those they are likely to see in their GCSE assessments.</p>	<p>At the beginning of year 11, students focus on recall and revision of some of the more difficult areas of year 10 such as gradient & Pythagoras, which then leads onto Trigonometry which has strict methods to be followed and therefore learned.</p> <p>Students also recap their probability skills and use them to solve more problems akin to those they are likely to see in their GCSE assessments.</p>	<p>Students will recap and further develop their skills in transformations to prevent them being overlooked in revision and then apply this knowledge in the transformation of graphs. Students will gain a deeper understanding of linear, quadratic, cubic, reciprocal and exponential graphs and learn to identify key characteristics which will allow the sketching of these graphs on top of the plotting already covered.</p>	<p>Students will consolidate their knowledge and use it to study the most advanced parts of mathematics on the foundation GCSE. Quadratics, cubics and reciprocal graphs are added to the straight line graphs already learned to stretch students’ understanding. Students will also use their 2D shape skills to be able to identify mathematical similarity and congruence. They will link this to constructions which was studied last year and learn to develop more links between each area of maths.</p>	<p>Students undertake targeted revision for the last few weeks of their GCSE course. This will include past papers to familiarise them with the style of questioning as well as focusing on key topics identified as requiring extra time and study.</p>	<p>Students undertake targeted revision for the last few weeks of their GCSE course. This will include past papers to familiarise them with the style of questioning as well as focusing on key topics identified as requiring extra time and study.</p>
----------------------------------	--	---	--	---	--	--

Year 12

	Autumn	Spring	Summer
Unit/Topics	Coordinate Geometry Equations of Lines Equations of Circles Vectors Graphs & Transformations Polynomial Equations Inequalities Algebra & Functions Binomial Expansion Polynomials & Graphs Differentiation & Gradients Gradient Functions & 2nd Derivatives Equations Of Tangents & Normal Stationary Points Probability	1st Principles of Differentiation Exponentials & Logarithms Exponential Graphs Modelling with Exponentials Trigonometry Trigonometry Functions Fundamental Theorem of Calculus Definite Integrals Area Between Curve & x-axis Proof Hypothesis Testing with Binomial Distributions Measures of Central Tendency & Outliers Correlation Forces	Algebra & Functions Series & Sequences AP & GP Radians, Arcs & Sectors Radians & Trigonometry Numerical Methods Newton-Raphson

	<p>Binomial Distributions Data Presentation Sampling</p> <p>Units & Kinematics Kinematic Graphs SUVAT Equations</p>	<p>Newton’s Third Law Equilibrium Variable Acceleration</p>	
Key Assessment	September assessment based on summer work and initial lesson topics	January assessment; exam questions on first term topics	June assessment exam questions on first year work in Pure Mathematics, Statistics and Mechanics.
Why is it studied?	<p>The year 12 curriculum begins by revisiting coordinate geometry as well as surds and indices to ensure key knowledge is embedded.</p> <p>Students will then advance to cover topics such as differentiation and Polynomials to ensure foundational knowledge is secure before they link to applied maths and more in-depth differentiation methods.</p> <p>We also introduce students early to Probability and Statistics as well as Kinematics in mechanics to allow students to begin seeing links between the pure and applied mathematics such as vectors in kinematics.</p>	<p>In the spring, students will be shown and will work themselves with some of the proofs for topics already covered in order to gain a deeper understanding of why the mathematics works in the way it does. Students will also be challenged to develop accuracy in their notation in these topics.</p> <p>Students will begin to test hypotheses by using the distribution methods learned in the first term and will combine their knowledge of kinematics with forces and equilibrium.</p> <p>Students will also begin applying their integration and differentiation in mechanics within variable acceleration.</p>	<p>Students begin applying the mathematics learned so far into further differentiation, integration and trigonometry which is used as a transition into year 2 of the course.</p> <p>They will see areas of maths such as the binomial expansion appear within small angle estimations in the radians topics and with sufficient practice and time to learn them, will expand their knowledge of trigonometric identities.</p>

Year 13

	Autumn	Spring	Summer
Unit/Topics	Area Between Two Curves Numerical Methods - Iteration Newton-Raphson Points of Inflection Proof by Contradiction Chain Rule Integration as a Limit of a Sum Modulus Function Partial Fractions Product & Quotient Rule Trigonometry Identities Normal Distribution Hypothesis Testing with Normal Distributions Conditional Probability Vectors with Kinematics Forces in Equilibrium Resolving Forces Projectiles	Integration by Substitution Integration by Parts 3D Vectors Exponential Calculus Functions & Modelling Further Integration Trigonometrical Calculus Regression & Correlation Resultant Forces in Motion Moments	Parametric Equations Differential Equations
Key Assessment	November Pre-Public Examination	Spring Pre-Public Examination	A level Exams

<p>Why is it studied?</p>	<p>The Year 13 curriculum begins by consolidating the knowledge of the previous year before moving on to more advanced mathematics.</p> <p>Students will learn more methods of differentiation and integration building on their past skills and knowledge. They will also progress to look at inclined planes and projectiles in mechanics which aims to use and develop year 12 knowledge.</p> <p>In statistics, students will progress from the binomial distribution to normal distribution and will learn to test hypotheses with these more advanced distributions.</p>	<p>As the year progresses, year 13 will continue to develop their trigonometry, calculus, vectors and functions knowledge. They will use their knowledge and skills from earlier in the year and from year 12 to tackle some of the most advanced parts of mathematics on the course.</p> <p>Students will also combine their mechanics skills to study moments which uses almost all parts of mechanics previously learned within it.</p>	<p>During the summer term, students are taught their last pieces of content which builds upon trigonometric and calculus knowledge from last term.</p> <p>Students then practice their skills through targeted revision lessons that aim to provide students the best chance to get the best possible outcomes.</p>
----------------------------------	---	--	---