

MATHS

At James Calvert Spence College, we provide a broad and balanced, ambitious curriculum for all pupils. Our maths curriculum builds upon the knowledge and skills pupils have developed in primary school through a well-planned and sequenced curriculum. Our curriculum plans follow the national curriculum; allowing time for retrieval, practice, enquiry, mathematical reasoning and problem solving. We draw on evidence-based research to ensure our curriculum is high quality and meets the needs of our pupils. We provide regular opportunities to revisit learning, so it becomes embedded in our pupil's long-term memory. The overview of our plan is below.

Please note that students in year 7 who are working significantly below the standards expected at the end of key stage 2 will have 1 lesson per week, within their maths lessons, focussed on developing key skills. This will be planned based on the needs of the students at the time of the lesson, closely linked to the learning being covered in the year 7 curriculum. This will allow them to access the planned curriculum with greater ease. The aim of this is to close gaps in knowledge and to allow these students to catch up with their peers and to make progress alongside others in the year group.

Assessment: Assessments are provided in line with the school's assessment schedule and written feedback is calendared for pupils. In Key Stage 4 we provide fortnightly assessment pieces. In addition to this, we provide live feedback as described below.

Year	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
7	<p>Sequences</p> <ul style="list-style-type: none"> Describe and continue sequences <p>Algebraic notation</p> <ul style="list-style-type: none"> Function machines Algebraic notation Substitution 	<p>Place value and ordering</p> <ul style="list-style-type: none"> Place value of integers and decimals Order integers and decimals <p>Four operations</p> <ul style="list-style-type: none"> Adding and subtracting Multiplying and 	<p>Graphing data</p> <ul style="list-style-type: none"> Pictograms Bar charts Scatter graphs <p>Fractions, decimals and percentages</p> <ul style="list-style-type: none"> Convert between fractions, decimals and percentages 	<p>Directed numbers</p> <ul style="list-style-type: none"> Order directed numbers Add and subtract with negative numbers Multiply and divide with negative numbers 	<p>Speed, distance, time</p> <ul style="list-style-type: none"> Calculations involving speed, distance and time using the formula Distance-time graphs <p>Properties of number</p> <ul style="list-style-type: none"> Factors, 	<p>Add and subtract fractions</p> <ul style="list-style-type: none"> Equivalent fractions Adding and subtracting fractions <p>Angles and polygons</p> <ul style="list-style-type: none"> Measure and draw lines and angles

	<p>Equality and equivalence</p> <ul style="list-style-type: none"> Solve one step linear equations Collect like terms 	<p>dividing</p> <p>Averages and range</p> <ul style="list-style-type: none"> Calculate the mean, median, mode and range for sets of data <p>Rounding and estimation</p> <ul style="list-style-type: none"> Round numbers to varying degrees of accuracy including to powers of 10, decimal places and significant figures 		<p>Fractions and percentages of an amount</p> <ul style="list-style-type: none"> Find fractions and percentages of amounts Increase and decrease by a percentages <p>Perimeter and area</p> <ul style="list-style-type: none"> Find perimeter of shapes Calculate area of common 2-D shapes using a formula 	<p>multiples and primes</p> <ul style="list-style-type: none"> Square, triangular and cube numbers and roots 	<ul style="list-style-type: none"> Basic angle facts and related calculations Angles in triangles and quadrilaterals Angles in parallel lines
8	<p>Ratio and scale</p> <ul style="list-style-type: none"> Understand ratio and fractions Divide in a ratio Scale factors, diagrams and maps <p>Proportion</p> <ul style="list-style-type: none"> Direct and inverse proportion Conversion 	<p>Linear graphs</p> <ul style="list-style-type: none"> Coordinates in all 4 quadrants Lines parallel to the axes Draw straight line graphs Understand gradient and y-intercept <p>Representing data</p> <ul style="list-style-type: none"> Scatter graphs Correlation Lines of best fit 	<p>Brackets, equations and inequalities</p> <ul style="list-style-type: none"> Use directed number with algebra Expand and factorise a single bracket and simplify Solve 1 and 2 step equations including those with brackets <p>Sequences</p>	<p>Percentages and fractions</p> <ul style="list-style-type: none"> Convert between fractions, decimals and percentages Increase and decrease by a percentage Percentage change <p>Standard index form</p> <ul style="list-style-type: none"> Convert 	<p>Angles in parallel lines and polygons</p> <ul style="list-style-type: none"> Angles at a point, vertically opposite angles, angles on a straight line Angles in parallel lines Interior and exterior angles of polygons <p>Area</p>	<p>The data handling cycle</p> <ul style="list-style-type: none"> Questionnaires Pictograms, bar charts and vertical line diagrams Multiple bar charts and pie charts <p>Averages and range</p> <ul style="list-style-type: none"> Mean, median, mode and range

	<ul style="list-style-type: none"> graphs • Currency conversions • Recipes • Similar shapes <p>Multiply and divide fractions</p> <ul style="list-style-type: none"> • Multiply and divide fractions • Multiply and divide mixed numbers 	<ul style="list-style-type: none"> • Frequency tables <p>Probability</p> <ul style="list-style-type: none"> • Two way tables • Sample space diagrams • Venn diagrams • Probability 	<ul style="list-style-type: none"> • Generate sequences given a rule • Find the nth term of a sequence <p>Indices</p> <ul style="list-style-type: none"> • Understand index notation • Simplify expressions • Index laws 	<p>numbers into, and out of, standard form</p> <ul style="list-style-type: none"> • Perform calculations with standard form <p>Number sense</p> <ul style="list-style-type: none"> • Rounding to decimal places and significant figures • Estimating answers • Order of operations 	<ul style="list-style-type: none"> • Area of rectangles, triangles, parallelograms • Area of a trapezium • Area and circumference of a circle • Area of compound shapes <p>Line symmetry and reflection</p> <ul style="list-style-type: none"> • Find lines of symmetry • Reflect a shape in a line of symmetry 	<ul style="list-style-type: none"> • Mean from an ungrouped frequency table
9	<p>Straight line graphs</p> <ul style="list-style-type: none"> • Lines parallel to the axes • Plot straight line graphs given the equation of the line • Explore gradient and y-intercept <p>Forming and solving equations</p> <ul style="list-style-type: none"> • Form and solve 1 and 2 step equations 	<p>Three dimensional shapes</p> <ul style="list-style-type: none"> • Faces, edges and vertices • Nets • Plans and elevations • Surface area • Volume <p>Constructions and congruency</p> <ul style="list-style-type: none"> • Perform constructions using protractors or a compass 	<p>Number</p> <ul style="list-style-type: none"> • Solve problems with integers and decimals • Solve problems with fractions • Rational and irrational numbers <p>Using percentages</p> <ul style="list-style-type: none"> • Find percentages of an amount • Increase and 	<p>Deduction</p> <ul style="list-style-type: none"> • Solve angle problems • Solve angle problems involving algebra <p>Rotation and translation</p> <ul style="list-style-type: none"> • Rotational symmetry • Rotate a shape about a point • Translate a shape given 	<p>Enlargement and similarity</p> <ul style="list-style-type: none"> • Enlarge a shape using a scale factor • Work out missing sides and angles in similar shapes <p>Ratio and proportion</p> <ul style="list-style-type: none"> • Best buy problems • Direct and inverse proportion 	<p>Probability</p> <ul style="list-style-type: none"> • Relative frequency • Expected outcomes • Independent events • Use diagrams to work out probabilities <p>Algebraic representations</p> <ul style="list-style-type: none"> • Quadratic graphs • Reciprocal and exponential

	<p>including those with brackets</p> <ul style="list-style-type: none"> • Represent inequalities • Solve inequalities • Change the subject of a formula <p>Conjectures</p> <ul style="list-style-type: none"> • Explore a range of statement and reason with them 	<p>and ruler</p> <ul style="list-style-type: none"> • Loci • Identify congruent shapes 	<p>decrease by a percentage</p> <ul style="list-style-type: none"> • Reverse percentages <p>Maths and money</p> <ul style="list-style-type: none"> • Simple and compound interest • Bills, bank statements, VAT, wages and taxes, exchange rates 	<p>instructions as well as a vector</p> <p>Pythagoras' theorem</p> <ul style="list-style-type: none"> • Calculate a missing length of a right angled triangle • Use Pythagoras' theorem to decide if a triangle is right angled 	<p>Rates</p> <ul style="list-style-type: none"> • Speed, distance time calculations and graphs • Density calculations 	<p>graphs</p>
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In years 10 and 11 students study either towards a foundation tier, or a higher tier final examination. Setting is determined by student outcome at the end of year 9.

10 Foundati on	<p>Algebraic manipulation</p> <ul style="list-style-type: none"> • Substitution • Simplifying expressions • Index Laws • Expanding and factorising a single bracket <p>Equations, inequalities and formulae</p> <ul style="list-style-type: none"> • Solve equations and inequalities • Change the subject of a 	<p>Percentages</p> <ul style="list-style-type: none"> • Finding a percentage of an amount • Increase and decrease by a percentage • Percentage profit and loss • Writing and amount as a percentage • Simple and compound interest <p>Ratio and scale</p> <ul style="list-style-type: none"> • Equivalent 	<p>Non calculator methods</p> <ul style="list-style-type: none"> • Place value and ordering integers and decimals • Four operations with integers and decimals • Four operations with negative numbers • Order of operations <p>Straight line graphs</p>	<p>Rounding and estimation</p> <ul style="list-style-type: none"> • Rounding to powers of 10, decimal places and significant figures • Error intervals <p>Perimeter, area and volume</p> <ul style="list-style-type: none"> • Perimeter and area of rectilinear shapes • Perimeter and area of circles • Volume of a 	<p>Angles</p> <ul style="list-style-type: none"> • Basic angle facts • Angles in triangles and quadrilaterals • Angles in polygons • Angles in parallel lines <p>Pythagoras and trigonometry</p> <ul style="list-style-type: none"> • Use Pythagoras' theorem to find missing lengths in right 	<p>Vectors</p> <ul style="list-style-type: none"> • Vector notation • Translation • Vector arithmetic <p>Simultaneous equations</p> <ul style="list-style-type: none"> • Solve simultaneous equations <p>Factors, multiples and primes</p> <ul style="list-style-type: none"> • Factors, multiples and primes • Prime factors
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	<p>formula</p> <p>Quadratic expressions and equations</p> <ul style="list-style-type: none"> Expand and factorise double brackets Solve quadratic equations 	<p>ratios</p> <ul style="list-style-type: none"> Sharing in a ratio Ratio and scales <p>Fractions</p> <ul style="list-style-type: none"> Fractions of an amount Increase and decrease by a fraction Fraction arithmetic 	<ul style="list-style-type: none"> Plot straight line graphs Calculate the gradient of a straight lines Understand $y = mx + c$ Find the midpoint of a line segment <p>Probability</p> <ul style="list-style-type: none"> Finding a probability Relative frequency Two way tables Sample space diagrams Frequency trees Probability tree diagrams 	<p>prism</p> <ul style="list-style-type: none"> Nets and surface area <p>Interpret and represent data</p> <ul style="list-style-type: none"> Mean, median, mode and range; including from tables Scatter graphs and lines of best fit <p>Non linear graphs</p> <ul style="list-style-type: none"> Quadratic and cubic graphs 	<p>angled triangles</p> <ul style="list-style-type: none"> Use trigonometry to find missing sides or angles in right angled triangles <p>Graphs and diagrams</p> <ul style="list-style-type: none"> Pictograms and bar charts Pie charts Time series graphs 	
10 Higher	<p>Algebraic Manipulation</p> <ul style="list-style-type: none"> Simplifying algebraic expressions Index laws Expand and factorise a single bracket <p>Equations, inequalities and</p>	<p>Percentages</p> <ul style="list-style-type: none"> Percentage calculations Repeated percentage change Reverse percentages <p>Ratio and scale</p> <ul style="list-style-type: none"> Sharing in a ratio 	<p>Straight line graphs</p> <ul style="list-style-type: none"> Plotting straight line graphs Understanding gradient and y-intercept $y = mx + c$ Graphs of inequalities <p>Probability</p>	<p>Perimeter, area and volume</p> <ul style="list-style-type: none"> Arc length and area of a sector Volume and surface area <p>Interpret and represent data</p> <ul style="list-style-type: none"> Mean, median, mode and 	<p>Non linear graphs</p> <ul style="list-style-type: none"> Equations of tangents to a circle <p>Graphs and diagrams</p> <ul style="list-style-type: none"> Pie charts Histograms Cumulative frequency diagrams Box plots 	<p>Factors, powers and surds</p> <ul style="list-style-type: none"> Prime factors Negative and fractional indices Surds <p>Pythagoras and trigonometry</p> <ul style="list-style-type: none"> Using Pythagoras'

	<p>formulae</p> <ul style="list-style-type: none"> Solve equations and inequalities Change the subject of a formula <p>Quadratic expressions and equations</p> <ul style="list-style-type: none"> Expand and factorise double brackets Solve quadratic equations Complete the square Use the quadratic formula to solve quadratic equations 	<ul style="list-style-type: none"> Combining ratio Ratio and algebra <p>Fractions</p> <ul style="list-style-type: none"> Fraction arithmetic Algebraic fractions <p>Non calculator methods</p> <ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Sample space diagrams Relative frequency Probability tree diagrams <p>Rounding and estimation</p> <ul style="list-style-type: none"> Error intervals and bounds 	<p>range of data from lists and tables</p> <ul style="list-style-type: none"> Sampling Scatter graphs <p>Non linear graphs</p> <ul style="list-style-type: none"> Properties of quadratic and cubic graphs Area under a graph Graphs of circles 	<p>Vectors</p> <ul style="list-style-type: none"> Vector arithmetic Vector journeys in shapes 	<p>theorem to find missing lengths in right angled triangles</p> <ul style="list-style-type: none"> Using trigonometry to find missing sides and angles in right angled triangles Sine and cosine rule for non right angled triangles <p>Simultaneous equations</p> <ul style="list-style-type: none"> Solving linear simultaneous equations Solving simultaneous equations where one is not linear
11 Foundati on	<p>Ratio and fractions</p> <ul style="list-style-type: none"> Equivalent ratios Sharing in a ratio <p>Percentages</p> <ul style="list-style-type: none"> Finding a percentage of 	<p>Collecting, representing and interpreting data</p> <ul style="list-style-type: none"> Two way tables Pie charts Scatter graphs <p>Gradients and lines</p>	<p>Expanding and factorising</p> <ul style="list-style-type: none"> Expand and factorise a single bracket Expand and factorise double brackets 	<p>Lessons will be tailored to the needs of the class based on gaps and misconceptions identified during assessments.</p>	<p>Lessons will be tailored to the needs of the class based on gaps and misconceptions identified during assessments.</p>	<p>Lessons will be tailored to the needs of the class based on gaps and misconceptions identified during assessments.</p>

	<ul style="list-style-type: none"> an amount Increasing and decreasing by a percentage Repeated percentage change Reverse percentages <p>Probability</p> <ul style="list-style-type: none"> Basic probability Sample space diagrams Venn diagrams Frequency trees Probability tree diagrams <p>Manipulating expressions</p> <ul style="list-style-type: none"> Simplifying expressions Solve equations 	<ul style="list-style-type: none"> Plot straight line graphs Gradient The equation of a straight line <p>Non linear graphs</p> <ul style="list-style-type: none"> Plot graphs of non-linear functions Finding the roots from a quadratic graphs <p>Using graphs</p> <ul style="list-style-type: none"> Conversion graphs Distance-time graphs Speed-time graphs 	<ul style="list-style-type: none"> Solve quadratic equations <p>Changing the subject</p> <ul style="list-style-type: none"> Solve equations and inequalities Change the subject of a formula 			
11 Higher	<p>Percentages and interest</p> <ul style="list-style-type: none"> Reverse percentages Repeated percentage change <p>Probability</p> <ul style="list-style-type: none"> Relative 	<p>Manipulating expressions</p> <ul style="list-style-type: none"> Algebraic fractions <p>Graphs</p> <ul style="list-style-type: none"> Plotting straight line and non-linear graphs 	<p>Expanding and factorising</p> <ul style="list-style-type: none"> Factorise quadratics where the coefficient of x^2 is greater than 1 Solve quadratic 	<p>Functions</p> <ul style="list-style-type: none"> Function notation Composite and inverse functions <p>Graphs</p> <ul style="list-style-type: none"> Graphs of trigonometrical 	Lessons will be tailored to the needs of the class based on gaps and misconceptions identified during assessments.	Lessons will be tailored to the needs of the class based on gaps and misconceptions identified during assessments.

	<p>frequency</p> <ul style="list-style-type: none"> • Independent events • Sample space diagrams • Tree diagrams <p>Collect, represent and interpret data</p> <ul style="list-style-type: none"> • Stratified sampling • Pie charts • Histograms • Cumulative frequency diagrams • Box plots 	<ul style="list-style-type: none"> • The equation of a straight line • Parallel and perpendicular lines • Equation of a circle • Equation of tangents 	<p>equations by factorising</p> <ul style="list-style-type: none"> • Completing the square • Solve quadratic equations using the quadratic formula <p>Change the subject</p> <ul style="list-style-type: none"> • Change the subject of a formula • Iteration <p>Proportion</p> <ul style="list-style-type: none"> • Algebraic direct and inverse proportion 	<p>functions</p> <ul style="list-style-type: none"> • Graph transformations <p>Circle theorems</p> <ul style="list-style-type: none"> • Circle theorems 		
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Additional Information

The curriculum above is the broad overview of structure and sequencing. In some instances, this will be adapted slightly to ensure the best progress for pupils - for example by running parallel units of work with different specialist staff. Where this happens, careful planning ensures that all pupils receive the same content in the same depth across the year and that, as always, assessment is carefully planned to ensure that no group is ever disadvantaged.

Examples of on-going assessment and feedback in lessons

- Verbal feedback by the teacher to the whole class which students act on in the lesson
- Pupils self-assess or peer-assess work with a clear framework guiding them through this.
- Teachers circulate to give 'LIVE' and immediate feedback as pupils are working independently
- Pupils may complete mini quizzes or retrieval activities that revisit prior learning and receive verbal feedback
- Use of tailored questioning by the teacher
- End of unit 'exit tickets' as well as termly assessments are marked by the teacher and feedback is given