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: There will be one formal assessment for pupils every term which will include topics covered at any point during their maths education.						
Year	**Autumn 1**	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
7	**Sequences** ● Describe and continue sequences **Algebraic notation** ● Function machines ● Algebraic notation ● Substitution **Equality and equivalence**	**Place value and ordering** ● Place value of integers and decimals ● Order integers and decimals **Four operations** ● Adding and subtracting ● Multiplying and dividing	**Graphing data** ● Pictograms ● Bar charts ● Scatter graphs **Fractions, decimals and percentages** ● Convert between fractions, decimals and percentages	**Directed numbers** ● Order directed numbers ● Add and subtract with negative numbers ● Multiply and divide with negative numbers **Fractions and**	**Speed, distance, time** ● Calculations involving speed, distance and time using the formula ● Distance-time graphs **Properties of number** ● Factors, multiples and primes	**Add and subtract fractions** ● Equivalent fractions ● Adding and subtracting fractions **Angles and polygons** ● Measure and draw lines and angles ● Basic angle

	● Solve one step linear equations ● Collect like terms	**Averages and range** ● Calculate the mean, median, mode and range for sets of data **Rounding and estimation** ● Round numbers to varying degrees of accuracy including to powers of 10, decimal places and significant figures		**percentages of an amount** ● Find fractions and percentages of amounts ● Increase and decrease by a percentages **Perimeter and area** ● Find perimeter of shapes ● Calculate area of common 2-D shapes using a formula	● Square, triangular and cube numbers and roots	facts and related calculations ● Angles in triangles and quadrilaterals ● Angles in parallel lines
8	**Ratio and scale** ● Understand ratio and fractions ● Divide in a ratio ● Scale factors, diagrams and maps **Proportion** ● Direct and inverse proportion ● Conversion graphs ● Currency conversions ● Recipes ● Similar shapes **Multiply and divide fractions** ● Multiply and	**Linear graphs** ● Coordinates in all 4 quadrants ● Lines parallel to the axes ● Draw straight line graphs ● Understand gradient and y-intercept **Representing data** ● Scatter graphs ● Correlation ● Lines of best fit ● Frequency tables **Probability** ● Two way tables ● Sample space diagrams	**Brackets, equations and inequalities** ● Use directed number with algebra ● Expand and factorise a single bracket and simplify ● Solve 1 and 2 step equations including those with brackets **Sequences** ● Generate sequences given a rule ● Find the nth term of a sequence	**Percentages and fractions** ● Convert between fractions, decimals and percentages ● Increase and decrease by a percentage ● Percentage change **Standard index form** ● Convert numbers into, and out of, standard form ● Perform calculations with standard form	**Angles in parallel lines and polygons** ● Angles at a point, vertically opposite angles, angles on a straight line ● Angles in parallel lines ● Interior and exterior angles of polygons **Area** ● Area of rectangles, triangles, parallelograms ● Area of a trapezium ● Area and circumference	**The data handling cycle** ● Questionnaires ● Pictograms, bar charts and vertical line diagrams ● Multiple bar charts and pie charts **Averages and range** ● Mean, median, mode and range ● Mean from an ungrouped frequency

	divide fractions ● Multiply and divide mixed numbers	● Venn diagrams ● Probability	**Indices** ● Understand index notation ● Simplify expressions ● Index laws	**Number sense** ● Rounding to decimal places and significant figures ● Estimating answers ● Order of operations	of a circle ● Area of compound shapes **Line symmetry and reflection** ● Find lines of symmetry ● Reflect a shape in a line of symmetry	table
9	**Straight line graphs** ● Lines parallel to the axes ● Plot straight line graphs given the equation of the line ● Explore gradient and y-intercept **Forming and solving equations** ● Form and solve 1 and 2 step equations including those with brackets ● Represent inequalities ● Solve inequalities ● Change the subject of a formula **Conjectures** ● Explore a range	**Three dimensional shapes** ● Faces, edges and vertices ● Nets ● Plans and elevations ● Surface area ● Volume **Constructions and congruency** ● Perform constructions using protractors or a compass and ruler ● Loci ● Identify congruent shapes	**Number** ● Solve problems with integers and decimals ● Solve problems with fractions ● Rational and irrational numbers **Using percentages** ● Find percentages of an amount ● Increase and decrease by a percentage ● Reverse percentages **Maths and money** ● Simple and compound interest ● Bills, bank statements, VAT, wages and	**Deduction** ● Solve angle problems ● Solve angle problems involving algebra **Rotation and translation** ● Rotational symmetry ● Rotate a shape about a point ● Translate a shape given instructions as well as a vector **Pythagoras' theorem** ● Calculate a missing length of a right angled triangle ● Use Pythagoras' theorem to decide if a triangle is right	**Enlargement and similarity** ● Enlarge a shape using a scale factor ● Work out missing sides and angles in similar shapes **Ratio and proportion** ● Best buy problems ● Direct and inverse proportion **Rates** ● Speed, distance time calculations and graphs ● Density calculations	**Probability** ● Relative frequency ● Expected outcomes ● Independent events ● Use diagrams to work out probabilities **Algebraic representations** ● Quadratic graphs ● Reciprocal and exponential graphs

	of statement and reason with them		taxes, exchange rates	angled		

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 Foundation	**Algebraic manipulation** ● Substitution ● Simplifying expressions ● Index Laws ● Expanding and factorising a single bracket **Equations, inequalities and formulae** ● Solve equations and inequalities ● Change the subject of a formula **Quadratic expressions and equations** ● Expand and factorise double brackets ● Solve quadratic equations	**Percentages** ● 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 **Ratio and scale** ● Equivalent ratios ● Sharing in a ratio ● Ratio and scales **Fractions** ● Fractions of an amount ● Increase and decrease by a fraction ● Fraction arithmetic	**Non calculator methods** ● Place value and ordering integers and decimals ● Four operations with integers and decimals ● Four operations with negative numbers ● Order of operations **Straight line graphs** ● Plot straight line graphs ● Calculate the gradient of a straight lines ● Understand y = mx + c ● Find the midpoint of a line segment **Probability** ● Finding a probability ● Relative frequency ● Two way tables ● Sample space	**Rounding and estimation** ● Rounding to powers of 10, decimal places and significant figures ● Error intervals **Pythagoras and Trigonometry** ● Use Pythagoras' theorem to find missing lengths in right angled triangles ● Use trigonometry to find missing sides or angles in right angled triangles ● **Perimeter, area and volume** ● Perimeter and area of rectilinear shapes	**Perimeter, area and volume** ● Perimeter and area of circles ● Volume of a prism ● Nets and surface area **Interpret and represent data** ● Mean, median, mode and range; including from tables ● Scatter graphs and lines of best fit **Non linear graphs** ● Quadratic and cubic graphs **Angles** ● Basic angle facts ● Angles in triangles and quadrilaterals ● Angles in polygons	**Angles** ● Angles in parallel lines **Graphs and diagrams** ● Pictograms and bar charts ● Pie charts ● Time series graphs **Vectors** ● Vector notation ● Translation ● Vector arithmetic **Factors, multiples and primes** ● Factors, multiples and primes ● Prime factors

			diagrams ● Frequency trees ● Probability tree diagrams			
10 Higher	**Algebraic Manipulation** ● Simplifying algebraic expressions ● Index laws ● Expand and factorise a single bracket **Equations, inequalities and formulae** ● Solve equations and inequalities ● Change the subject of a formula **Quadratic expressions and equations** ● Expand and factorise double brackets ● Solve quadratic equations ● Complete the square ● Use the quadratic formula to solve quadratic equations	**Percentages** ● Percentage calculations ● Repeated percentage change ● Reverse percentages **Ratio and scale** ● Sharing in a ratio ● Combining ratio ● Ratio and algebra **Fractions** ● Fraction arithmetic ● Algebraic fractions **Non calculator methods** ●	**Straight line graphs** ● Plotting straight line graphs ● Understanding gradient and y-intercept ● $y = mx + c$ ● Graphs of inequalities **Probability** ● Sample space diagrams ● Relative frequency ● Probability tree diagrams **Rounding and estimation** ● Error intervals and bounds	**Pythagoras and trigonometry** ● Using Pythagoras' theorem to find missing lengths in right angled triangles ● Using trigonometry to find missing sides and angles in right angled triangles Sine and cosine rule for non right angled triangles **Perimeter, area and volume** ● Arc length and area of a sector	**Perimeter, area and volume** ● Volume and surface area **Interpret and represent data** ● Mean, median, mode and range of data from lists and tables ● Sampling ● Scatter graphs **Non linear graphs** ● Properties of quadratic and cubic graphs ● Area under a graph ● Graphs of circles	**Non linear graphs** ● Equations of tangents to a circle **Graphs and diagrams** ● Pie charts ● Histograms ● Cumulative frequency diagrams ● Box plots **Vectors** ● Vector arithmetic ● Vector journeys in shapes **Factors, powers and surds** ● Prime factors ● Negative and fractional indices ● Surds
11 Foundatio	**Ratio and fractions** ● Equivalent ratios	**Collecting, representing and interpreting data**	**Expanding and factorising**	Lessons will be tailored to the needs of the class	Lessons will be tailored to the needs of the class	Lessons will be tailored to the needs

n	**Percentages** ● Finding a percentage of an amount ● Increasing and decreasing by a percentage ● Repeated percentage change ● Reverse percentages **Probability** ● Basic probability ● Sample space diagrams ● Venn diagrams ● Frequency trees ● Probability tree diagrams **Manipulating expressions** ● Simplifying expressions ● Solve equations	● Two way tables ● Pie charts ● Scatter graphs **Gradients and lines** ● Plot straight line graphs ● Gradient ● The equation of a straight line **Non linear graphs** ● Plot graphs of non-linear functions ● Finding the roots from a quadratic graphs **Using graphs** ● Conversion graphs ● Distance-time graphs ● Speed-time graphs	● Expand and factorise a single bracket ● Expand and factorise double brackets ● Solve quadratic equations **Changing the subject** ● Solve equations and inequalities ● Change the subject of a formula	based on gaps and misconceptions identified during assessments.	based on gaps and misconceptions identified during assessments.	of the class based on gaps and misconceptions identified during assessments.
11 Higher	**Percentages and interest** ● Reverse percentages ● Repeated percentage change **Probability** ● Relative	**Manipulating expressions** ● Algebraic fractions **Graphs** ● Plotting straight line and non-linear graphs	**Expanding and factorising** ● Factorise quadratics where the coefficient of x^2 is greater than 1 ● Solve quadratic equations by	**Functions** ● Function notation ● Composite and inverse functions **Graphs** ● Graphs of	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.

Ratio (Sharing in a ratio)

frequency ● Independent events ● Sample space diagrams ● Tree diagrams **Collect, represent and interpret data** ● Stratified sampling ● Pie charts ● Histograms ● Cumulative frequency diagrams ● Box plots	● The equation of a straight line ● Parallel and perpendicular lines ● Equation of a circle ● Equation of tangents	factorising ● Completing the square ● Solve quadratic equations using the quadratic formula **Change the subject** ● Change the subject of a formula ● Iteration **Proportion** ● Algebraic direct and inverse proportion	trigonometrical functions ● Graph transformations **Circle theorems** ● Circle theorems	

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