Subject: MATHEMATICS

Subject Leader

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National Curriculum

Purpose of study

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. The intent of our mathematics curriculum is therefore to provide a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject. Our department is dedicated in making these connections between mathematical theory and the 'real-world' by applying an enriched contextual approach to every lesson.

Aims

All students follow a Mastery approach to Mathematics using a series of progressive Stages that students 'Master' before moving to the next step in their learning, teaching is in line with the National Curriculum guidelines. Key Stage Three lays the groundwork ready for Key Stage Four where most students work towards the AQA 8300 GCSE examination, either at Foundation or Higher Tier as appropriate to their ability. In addition, or alternatively, they will normally take the Pearson Edexcel Functional Skills entry-level qualifications from Y10 with an aim to sit Level 1 at the end of Y10 or Y11 where appropriate.

The expectation is that the majority of our pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress is always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly are challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material, consolidate their understanding, including through additional practice, before moving on. We have achieved this through our Mastery approach.

Information and communication technology (ICT)

We support students to develop good written and mental arithmetic proficiencies and calculators are not used as a substitute for these basic skills. However, they are introduced as a way to support contextual understanding and exploration of more complex problems when written and mental arithmetic are secure. We allow our teachers to make judgements on when the use of ICT tools are appropriate.

Spoken language

The national curriculum for mathematics reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof. Every lesson starts with a review on the key words to assist in making their thinking clear to themselves as well as others, and teachers ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions or gaps in prerequisite knowledge.

Curriculum Intent

We intend to design a curriculum, which is accessible to all and will maximise the development of every child's ability and academic achievement. Our curriculum will be rich in both skills and knowledge, allowing students to apply what they learn in mathematics to other subjects.
We aim to help students become **fluent** in the fundamentals of mathematics through varied and frequent practice of mathematical facts and concepts over time. It is important to us that students can develop strong conceptual understandings that are transferable to their culture, community and interests. Lessons start with small and accessible tasks that are designed to develop student's ability to revisit, recall and apply knowledge accurately. It is essential that students can **reason** mathematically in and out of the classroom, and so our curriculum will provide opportunities for students to follow a line of enquiry, conjecture relationships and generalisations, and develop an argument, justification or proof using mathematical language. Students who grasp concepts rapidly will be challenged by being offered rich and sophisticated **problems** before any acceleration through new content. Those who are not sufficiently fluent with earlier material will consolidate their understanding, through additional reflection practice, before moving on.

The Key Stage Three Mastery approach uses a variety of Mathematical stages and units that lays the foundation for KS4. The Units include Number and Place Value, Calculations, Fractions, Decimals, Percentages, Geometry, Ratio, Proportion, Rates of change and Statistics. In each unit, students will progress at their own rate and pace of learning, moving on only when they have mastered a skill or concept. We believe that it is vitally important to identify prerequisite knowledge in order to minimise mathematical misconceptions being carried onto later years.

Students (nationally) are expected to be at Stage 6 in all units by the start of Year Seven. At The Kingsmead School, we have split the stages in to three distinct areas to meet the range of students' needs and abilities. The first area acknowledges the abilities of students who meet or are close to the expected stage at the end of year 6 and follows units that build upon KS2 knowledge and skills to promote progress throughout KS3 and KS4. The second area acknowledges the abilities of students who do not meet expected stage at the end of year 6 but have abilities higher than is expected at KS1. These units are delivered alongside a 'bigger picture' set of units where teachers can use objectives from previous and future stages to not only promote stretch and challenge but also identify prerequisite gaps in knowledge in order to progress forward. This approach is designed to encourage more progress through closing gasp and moving forward at the same time. The final area is for students who significantly fall below standards expected at the end of year 6, particularly, fall below standards expected at KS1. These units are delivered on an individualised basis and are only assigned by the Head of Maths. Regular assessment and monitoring reviews are used in-line with a bespoke set of interventions to help maximised progress made by these students.

Across the school, various modes of delivery are implemented to create environments that promote learning while meeting a range of different educational needs. At the special school, the nurture curriculum is designed to provide a truly holistic, personalised approach to learning and enable our students to be involved in a range of opportunities and experiences in a safe and structured environment. Lessons aim to encompass a variety of activities to structure and extend learning in an engaging, non-threatening way.
Nurture enables our experienced staff to develop sequences of learning which are appropriate for the current learners and their history. Many of our learners join Kingsmead with significant gaps in education and/or social skills. It is imperative that our students are given the opportunities to learn and explore the world around them safely and appropriately, so they are ready for life beyond school.

We aim to provide a curriculum that helps to prepare our students for life beyond school and gives them the abilities to create opportunities for themselves.

Curriculum Implementation

Mastering mathematics means pupils acquiring a deep, long-term, secure and adaptable understanding of the subject. Achieving mastery means acquiring a solid enough understanding of the maths that's been taught to enable pupils to move on to more advanced material.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly will be challenged through being offered rich and sophisticated problems before moving on to new content.

Therefore, it is important to note that our schemes of learning are fluid, and that the below is based on students at the expected standard, therefore is only a rough guideline of where classes should be and when. As we progress through the scheme of learning, we reflect and adapt as necessary.

We will give students the opportunity to work on their own, in pairs and in groups where possible. We expect students to facilitate the learning of others by contributing to class discussions, group tasks and work in a productive and ambitious manner. We want to develop independent learners and build resilience in students through challenging questions. All learners will have access to quality teaching which adopts a consistent approach to lesson delivery and utilises common resources and methods. Students will be given home learning activities via satchel:one to promote supported self-study. Long term memory will be developed through retrieval practice and knowledge organisers.

	Term		Content/Topics	Assessment
Year 7	Autumn Term	1	**Numbers and the number system (approx. 12 lessons)** • Write and read numbers up to and including 10 000 000 • Compare and order numbers up to and including 10 000 000 • Multiply numbers by 10 • Multiply numbers by 100 • Multiply numbers by 1000 • Divide numbers by 10 • Divide numbers by 100 • Divide numbers by 1000 • Understand and use negative numbers when working in context, such as temperature • Calculate intervals across zero • Find common multiples of two numbers • Find common factors of two numbers **Checking, approximating and estimating (approx. 7 lessons)** • Round a number to the nearest 10 • Round a number to the nearest 100 • Round a number to the nearest 1000 • Round a number to the nearest whole number • Round a number to the nearest 1 decimal place • Round a number to the nearest 2 decimal places • Understand estimating as the process of finding a rough value of an answer or calculation **Calculating (Started approx. 5 lessons)** • Carry out addition calculations mentally involving numbers up to 4 digits • Carry out subtraction calculations mentally involving numbers up to 4 digits • Solve addition and subtraction multi-step problems in context • Multiply a two or three-digit numbers by a two-digit number • Multiply a four-digit number by a two-digit number using long multiplication	Start of year assessment to create a bassline for mapping in-year progress. **6M1 BAM Indicator assessment and reflection task-** Multiply and divide numbers with up to three decimal places by 10, 100, and 1000

		2	**Calculating (Continued approx. 6 lessons)** • Carry out calculations involving a mixture of multiplication and division • Carry out calculations involving mixture of addition and subtraction • Carry out calculations involving mixture of multiplication and addition/subtraction • Carry out calculations involving mixture of division and addition/subtraction • Solve multi-step problems involving addition, subtraction and/or multiplication • Check the order of magnitude of the solution to a calculation, including decimals **Calculating: division (approx. 7 lessons)** • Divide a three-digit number by a two-digit number using a formal written method of division when there is no remainder • Divide a three-digit number by a two-digit number using a formal written method of when there is a remainder • Divide a four-digit number by a two-digit number using a formal written method of division when there is no remainder • Divide a four-digit number by a two-digit number using a formal written method of division when there is a remainder • Understand how to write the remainder to a division problem as a whole number remainder or as a fraction • Understand how to interpret remainders to a division problem appropriately for the context • Solve problems involving division **Visualising and construction (approx. 8 lessons)** • Draw 2-D shapes given angles • Draw 2-D shapes given dimensions and angles • Recognise prisms • Recognise pyramids • Classify 3-D shapes including cylinders, cones and spheres • Build 3-D shapes from nets • Draw nets of 3-D shapes • Solve 3-D problems using nets including visualising the edges (vertices) that will meet when folded	**6M2 BAM Indicator assessment and reflection task-** Use long division to divide numbers up to four digits by a two-digit number. End of term assessment covering all of the topics taught. Designed to measure progress from start of year bassline assessment. Essential Knowledge:

	Spring Term	3	**Measuring space (approx. 6 lessons)** • Convert between non-adjacent metric units length from the smaller unit to the larger unit; e.g. centimetres to kilometres • Convert between non-adjacent metric units length from the larger unit to the smaller unit; e.g. kilometres and centimetres • Convert between non-adjacent metric units mass from the smaller unit to the larger unit; e.g. grams to kilograms • Convert between non-adjacent metric units mass from the larger unit to the smaller unit; e.g. kilograms to grams • Convert between non-adjacent time units; e.g. hours to seconds • Solve problems involving converting between measures **Investigating properties of shape (approx. 8 lessons)** • Classify 2D shapes using given categories; e.g. number of sides, symmetry • Find unknown angles in a triangle • Find unknown angles in an isosceles triangle when only one angle is known • Find unknown angles in a quadrilateral • Find unknown angles in regular polygons • Solve problems involving missing angles • Solve problems involving 2-D shapes • Know the names and relationships of the parts a circle **Algebraic proficiency: using formulae (approx. 4 lessons)** • Use a simple one-step formula written in words • Use a simple two-step formula written in words • Use simple formula expressed in symbols • Convert between miles and kilometres	6M3 BAM **Indicator assessment and reflection task-**Use simple formulae expressed in words

		4	**Exploring fractions, decimals and percentages (approx. 8 lessons)** • Use common factors to simplify fractions • Use common multiples to find equivalent fractions • Compare and order fractions (fractions < 1) • Compare and order fractions, including fractions > 1 • Understand a fraction is associated with division • Work out the decimal equivalents of fifths, eighths and tenths • Know simple fractions, decimals and percentages equivalences (e.g. 10%, 20%, 25%, 50%, 75%, 100%) • Find equivalences between fractions, decimals and percentages **Proportional reasoning (approx. 5 lessons)** • Solve simple problems involving ratio written in words • Solve problems involving ratio written in words • Use a scale factor to solve problems involving similar shapes • Find the scale factor of similar shapes • Solve problems involving unequal sharing or grouping problems using fractions • Solve problems involving unequal sharing or grouping problems using multiples **Pattern Sniffing (approx. 5 lessons)** • Recognise and describe a linear sequence • Find the next terms in a linear sequence • Find a missing term in a linear sequence • Generate a linear sequence from its description • Solve problems involving linear sequences	6M6 BAM **Indicator assessment and reflection task-** Write a fraction in its lowest terms by cancelling common factors 6M5 BAM **Indicator assessment and reflection task-** Use simple ratio to compare quantities 6M4 BAM **Indicator assessment and reflection task-** Generate and describe linear number sequences End of term assessment covering all of the topics taught. Designed to measure progress from start of year bassline assessment.

	Summer Term	5	**Investigating angles (approx. 4 lessons)** • Find missing angles where they meet at a point • Find missing angles where they meet on a straight line • Find missing angles where they are vertically opposite • Solve problems involving missing angles **Calculating fractions, decimals and percentages (approx. 12 lessons)** • Add fractions with different denominators • Add a mixed number and a fraction, including with different denominators • Add mixed numbers, including with different denominators • Subtract fractions with different denominators • Subtract a mixed number and a fraction, including with different denominators • Subtract mixed numbers, including with different denominators • Multiply a proper fraction by a proper fraction • Divide a proper fraction by a whole number • Multiply U.t by U • Multiply U.th by U • Calculate percentages of a quantity • Solve problems involving the use of percentages to make comparisons **Solving equations and inequalities (approx. 4 lessons)** • Express and solve missing number problems algebraically • Know the basic rules of algebraic notation • Use the basic rules of algebraic notation • Find pairs of numbers that satisfy an equation with two unknowns e.g. a + b = 15	6M10 BAM **Indicator assessment and reflection task-** Solve missing angle problems involving triangles, quadrilaterals, angles at a point and angles on a straight line 6M7 BAM **Indicator assessment and reflection task-**Add and subtract fractions and mixed numbers with different denominators 6M8 BAM **Indicator assessment and reflection task-** Multiply pairs of fractions in simple cases 6M9 BAM **Indicator assessment and reflection task-**Find percentages of quantities

		6	**Calculating space (approx. 8 lessons)** • Recognise that shapes with the same areas can have different perimeters and vice versa • Calculate the area of a parallelogram • Calculate the area of a triangle • Estimate the volume of cubes and cuboids • Calculate the volume of cuboid, including cubes • Recognise when it is possible to use formulae to calculate area and volume • Convert between metric units of area in simple cases • Convert between metric units of volume in simple cases **Mathematical movement (approx. 4 lessons)** • Use coordinates to describe the position of a point in all four quadrants • Use coordinates to plot the position of a point in any of the four quadrants • Draw and translate simple shapes • Carry out a reflection using one of the axes as a mirror line **Presentation of data (approx. 4 lessons)** • Interpret pie charts • Construct a pie chart by measuring angles • Interpret line graphs • Construct line graphs **Measuring Data (approx. 4 lessons)** • Understand the meaning of 'average' as a typicality (or location) • Calculate the mean of a set of discrete data • Interpret the mean of a set of discrete data • Use the mean to find a missing number in a set of data	6M11 BAM **Indicator assessment and reflection task-** Calculate the volume of cubes and cuboids 6M12 BAM **Indicator assessment and reflection task-** Use coordinates in all four quadrants 6M13 BAM **Indicator assessment and reflection task-** Calculate and interpret the mean as an average of a set of discrete data End of year assessment covering all of the topics taught. Designed to measure progress from start of year bassline assessment. Essential Knowledge required: • Know percentage and decimal equivalents for fractions with a denominator of 2, 3, 4, 5, 8 and 10 • Know the rough equivalence between miles and kilometres • Know that vertically opposite angles are equal • Know that the area of a triangle = base × height ÷ 2 • Know that the area of a parallelogram = base × height • Know that volume is measured in cubes • Know the names of parts of a circle • Know that the diameter of a circle is twice the radius • Know the conventions for a 2D coordinate grid • Know that mean = sum of data ÷ number of pieces of data

	Term		Content/Topics	Assessment
Year 8	Autumn Term	1	**Numbers and the number system (approx. 12 lessons)** • Find prime numbers and test numbers to see if they are prime • Find common factors of numbers • Find the highest common factor of numbers in simple cases, including co-prime examples • Find common multiples of numbers • Recognise and solve problems involving the lowest common multiple • Use linear (arithmetic) number patterns to solve problems • Recognise and use triangular numbers • Recognise and use square and cube numbers • Read, write and evaluate powers • Define and find square roots (including using the $\sqrt{}$ symbol) • Define and find cube roots (including using the $\sqrt[3]{}$ symbol), including the use of a scientific calculator • Define and find other roots (including using the $\sqrt{}$ symbol), including the use of a scientific calculator **Calculating (Started approx. 8 lessons)** • Multiply a positive integer by a power of 10 • Multiply a decimal by a power of 10 • Divide a positive integer by a power of 10 • Divide a decimal by a power of 10 • Add numbers up to six-digits using a formal written method • Add decimals with the same, and different, number of decimal places • Subtract numbers up to six-digits using a formal written method • Subtract decimals with the same, and different, number of decimal places	Start of year assessment to create a bassline for mapping in-year progress. 7M1 BAM **Indicator assessment and reflection task-** Use positive integer powers and associated real roots

		2	**Calculating (continued approx. 8 lessons)** • Multiply a number up to four-digits by a one or two-digit number using a formal written method • Transform a multiplication involving decimals to a corresponding multiplication with integers • Multiply a large integer up to four-digits by a decimal of up to 2dp using integer multiplication • Divide a number up to four-digits by a one or two-digit number using a formal written method • Use a formal method to divide a decimal by an integer < 10 • Use a formal method to divide a decimal by an integer greater than 10 • Transform a calculation involving the division of decimals to an equivalent division involving integers • Apply the order of operations to multi-step calculations involving up to four operations and brackets **Checking, approximating and estimating (approx. 3 lessons)** • Round a number to a specified number of decimal places • Round a number to one significant figure • Estimate calculations by rounding numbers to one significant figure **Counting and comparing (approx. 9 lessons)** • Use the signs <, > and = to compare numbers • Use a compound inequality to compare three or more numbers (e.g. -1<0.5<4) • Order a set of integers • Order a set of decimals • Order a set of integers and decimals • Order fractions with the same denominator or denominators are a multiple of each other • Order fractions where the denominators are not multiples of each other • Order mixed numbers and fractions • Order a combination of integers, decimals, fractions and mixed numbers **Visualising and constructing (approx. 4 lessons)** • Identify line and rotational symmetry in polygons • Understand and use labelling notation for lengths and angles • Use ruler and protractor to construct triangles, and other shapes, from written descriptions • Use ruler and compasses to construct triangles when all three sides known	7M2 BAM **Indicator assessment and reflection task-** Apply the four operations with decimal numbers 7M6 BAM **Indicator assessment and reflection task-** Check calculations using approximation, estimation or inverse operations 7M13 BAM **Indicator assessment and reflection task-** Understand and use geometric notation for labelling angles, lengths, equal lengths and parallel lines End of term assessment covering all of the topics taught. Designed to measure progress from start of year bassline assessment.

	Spring Term	3	**Investigating the properties of shape (approx. 5 lessons)** • Know the connection between faces, edges and vertices in 3D shapes • Recognise and use nets of 3D shapes • Know and solve problems using the properties and definitions of triangles • Know and solve problems using the properties and definitions of special types of quadrilaterals (including diagonals) • Know and solve problems using the properties of other plane figures **Algebraic proficiency: tinkering (approx. 8 lessons)** • Know the meaning of expression, term, formula, equation, function • Know and use basic algebraic notation (the 'rules' of algebra) • Simplify a simple expression by collecting like terms • Simplify more complex expressions by collecting like terms • Manipulate expressions by multiplying an integer over a bracket (the distributive law) • Manipulate expressions by multiplying a single term over a bracket (the distributive law) • Substitute positive numbers into expressions and formulae • Given a function, establish outputs from given inputs and inputs from given outputs **Exploring fractions, decimals and percentages (approx. 4 lessons)** • Write one quantity as a fraction of another where the fraction is less than 1 • Write one quantity as a fraction of another where the fraction is greater than 1 • Write a percentage as a fraction • Write a quantity as a percentage of another **Proportional reasoning (approx. 4 lessons)** • Describe a comparison of measurements or objects using ratio notation a:b • Simplify a ratio by cancelling common factors • Divide a quantity in two parts in a given part:part ratio • Divide a quantity in two parts in a given part:whole ratio	7M7 BAM **Indicator assessment and reflection task-** Simplify and manipulate expressions by collecting like terms 7M8 BAM **Indicator assessment and reflection task-** Simplify and manipulate expressions by multiplying a single term over a bracket 7M9 BAM **Indicator assessment and reflection task-** Substitute numbers into formulae 7M3 BAM **Indicator assessment and reflection task-** Write a quantity as a fraction or percentage of another
		4	**Pattern sniffing (approx. 3 lessons)** • Recognise simple arithmetic progressions • Use a term-to-term rule to generate a linear sequence • Use a term-to-term rule to generate a non-linear sequence **Measuring Space (approx. 7 lessons)** • Use a ruler to accurately measure line segments to the nearest millimetre • Use a protractor to accurately measure angles to the nearest degree • Convert fluently between metric units of length • Convert fluently between metric units of mass • Convert fluently between metric units of volume / capacity • Convert fluently between units of time • Convert fluently between units of money **Investigating angles (approx. 3 lessons)** • Recognise and solve problems using vertically opposite angles • Recognise and solve problems using angles at a point • Recognise and solve problems using angles at a point on a line **Calculating fractions, decimals and percentages (Started approx. 7 lessons)** • Add proper and improper fractions • Add mixed numbers	7M4 BAM **Indicator assessment and reflection task-** Use multiplicative reasoning to interpret percentage change

			• Subtract proper and improper fractions • Subtract mixed numbers • Multiply proper and improper fractions • Multiply mixed numbers • Divide a proper fraction by a proper fraction • Divide improper fractions	End of term assessment covering all of the topics taught. Designed to measure progress from start of year bassline assessment.
	Summer Term	5	**Calculating fractions, decimals and percentages (Continued approx. 8 lessons)** • Divide a mixed number by a proper fraction/mixed number • Identify the multiplier for a percentage increase or decrease • Use calculators to find a percentage of an amount using multiplicative methods • Use calculators to increase and decrease an amount by a percentage using multiplicative methods • Compare two quantities using percentages • Know that percentage change = actual change ÷ original amount • Calculate the percentage change in a given situation, including percentage increase / decrease **Solving equations and inequalities (approx. 5 lessons)** • Solve one-step equations when the solution is a positive integer or fraction • Solve two-step equations when the solution is a positive integer or fraction • Solve three-step equations when the solution is a positive integer or fraction • Solve multi-step equations including the use of brackets when the solution is a positive integer or fraction • Solve equations when the solution is an integer or fraction **Calculating space (approx. 5 lessons)** • Calculate perimeters of 2D shapes • Use and apply the formula to calculate the area of triangles • Use and apply the formula to calculate the area of trapezia • Use and apply the formula to calculate the volume of cuboids • Find the surface area of cuboids (including cubes)	7M5 BAM **Indicator assessment and reflection task-** Add, subtract, multiply and divide with fractions and mixed numbers 7M10 BAM **Indicator assessment and reflection task-** Solve linear equations in one unknown 7M12 BAM **Indicator assessment and reflection task-** Calculate surface area of cubes and cuboids
		6	**Mathematical movement (approx. 7 lessons)** • Solve geometrical problems on coordinate axes • Write the equation of a line parallel to the x-axis or the y-axis • Identify and draw the lines y = x and y = -x • Construct and describe reflections in horizontal, vertical and diagonal mirror lines (45° from horizontal) • Describe a translation as a 2D vector • Construct and describe rotations using a given angle, direction and centre of rotation • Solve problems involving rotations, reflections and translations **Presentation of data (approx. 6 lessons)** • Interpret and construct frequency tables • Construct and interpret bar charts and know their appropriate use • Construct and interpret comparative bar charts • Construct and interpret pie charts and know their appropriate use • Construct and interpret vertical line charts Choose appropriate graphs or charts to represent data	7M11 BAM **Indicator assessment and reflection task-** Understand and use lines parallel to the axes, y = x and y = -x

			Measuring Data (approx. 7 lessons) • Find the mode of set of data • Find the median of a set of data including when there are an even number of numbers in the data set • Calculate the mean from a frequency table • Find the mode from a frequency table • Find the median from a frequency table • Calculate and understand the range as a measure of spread (or consistency) • Analyse and compare sets of data, appreciating the limitations of different statistics (mean, median, mode, range)	End of year assessment covering all of the topics taught. Designed to measure progress from start of year bassline assessment. Essential Knowledge required: • Know the first 6 cube numbers • Know the first 12 triangular numbers • Know the symbols =, ≠, <, >, ≤, ≥ • Know the order of operations including brackets • Know basic algebraic notation • Know that area of a rectangle = l × w • Know that area of a triangle = b × h ÷ 2 • Know that area of a parallelogram = b × h • Know that area of a trapezium = ((a + b) ÷ 2) × h • Know that volume of a cuboid = l × w × h • Know the meaning of faces, edges and vertices • Know the names of special triangles and quadrilaterals • Know how to work out measures of central tendency • Know how to calculate the range

	Term		Content/Topics	Assessment
Year 9	Autumn Term	1	**Numbers and the number system (approx. 7 lessons)** • Write a number as a product of its prime factors • Use prime factorisations to find the highest common factor of two numbers • Use prime factorisations to find the lowest common multiple of two numbers • Solve problems using highest common factors or lowest common multiples • Round numbers to a given number of significant figures • Use standard form to write large numbers • Use standard form to write small numbers **Calculating (approx. 14 lessons)** • Subtract a number from a smaller number • Add a positive number to a negative number • Subtract a positive number from a negative number • Add a negative number • Subtract a negative number • Multiply a positive number by a negative number • Multiply a negative number by a negative number • Divide a positive number by a negative number • Divide a negative number by a negative number • Square and cube positive and negative numbers • Use a scientific calculator to calculate with negative numbers • Use a scientific calculator to calculate with fractions, both positive and negative • Understand how to use the order of operations including powers • Understand how to use the order of operations including roots	Start of year assessment to create a bassline for mapping in-year progress. 8M2 BAM **Indicator assessment and reflection task-** Convert numbers into standard form and vice versa 8M1 BAM **Indicator assessment and reflection task-**Apply the four operations with negative numbers
		2	**Visualising and construction (approx. 9 lessons)** • Use the centre and scale factor to carry out an enlargement with a positive integer scale factor • Find the centre of enlargement • Find the scale factor of an enlargement • Use scale diagrams, including maps • Use the concept of scaling in diagrams • Interpret plans and elevations • Understand and use bearings • Construct scale diagrams involving bearings • Solve geometrical problems using bearings **Understanding risk 1 (approx. 6 lessons)** • Know and use the vocabulary of probability • Understand the use of the 0-1 scale to measure probability • List all the outcomes for an experiment, including the use of tables • Work out theoretical probabilities for events with equally likely outcomes • Know that the sum of probabilities for all outcomes is 1 • Apply the fact that the sum of probabilities for all outcomes is 1	8M13 BAM **Indicator assessment and reflection task-** Calculate theoretical probabilities for single events

			Algebraic proficiency: tinkering (approx. 10 lessons) • Use and interpret algebraic notation, including: $a^2 b$ in place of $a \times a \times b$, coefficients written as fractions rather than as decimals • Simplify an expression involving terms with combinations of variables (e.g. $3a^2b + 4ab^2 + 2a^2 – a^2b$) • Factorise an algebraic expression by taking out common factors • Simplify expressions using the law of indices for multiplication • Simplify expressions using the law of indices for division • Simplify expressions using the law of indices for powers • Know and use the zero index • Substitute positive and negative numbers into formulae • Change the subject of a formula when one step is required • Change the subject of a formula when two steps are required	8M3 BAM **Indicator assessment and reflection task-**Apply the multiplication, division and power laws of indices 8M7 BAM **Indicator assessment and reflection task-** Factorise an expression by taking out common factors 8M8 BAM **Indicator assessment and reflection task-** Change the subject of a formula when two steps are required End of term assessment covering all of the topics taught. Designed to measure progress from start of year bassline assessment.
	Spring Term	3	**Exploring fractions, decimals and percentages (approx. 5 lessons)** • Identify if a fraction is terminating or recurring • Recall some decimal and fraction equivalents (e.g. tenths, fifths, eighths, thirds, quarters, etc.) • Write a terminating decimal as a fraction • Write a fraction in its lowest terms by cancelling common factors • Use a calculator to change any fraction to a decimal **Proportional reasoning (approx. 11 lessons)** • Express the division of a quantity into two parts as a ratio • Understand the connections between ratios and fractions • Find a relevant multiplier in a situation involving proportion • Solve ratio problems involving mixing • Solve ratio problems involving comparison • Solve ratio problems involving concentrations • Understand and use compound units • Convert between units of speed • Solve problems involving speed • Solve problems involving rates of pay Solve problems involving unit pricing **Pattern sniffing (approx. 4 lessons)** • Generate terms of a sequence from a position-to-term rule • Find the nth term of an ascending linear sequence • Find the nth term of an descending linear sequence • Use the nth term of a sequence to deduce if a given number is in a sequence	8M4 BAM **Indicator assessment and reflection task-**Convert between terminating decimals and fractions 8M5 BAM **Indicator assessment and reflection task-**Find a relevant multiplier when solving problems involving proportion 8M9 BAM **Indicator assessment and reflection task-** Find and use the nth term for a linear sequence

		4	**Investigating angles (approx. 7 lessons)** • Solve missing angle problems involving alternate angles • Solve missing angle problems involving corresponding angles • Use knowledge of alternate and corresponding angles to calculate missing angles in geometrical diagrams • Establish the fact that angles in a triangle must total 180° • Establish the size of an interior angle in a regular polygon • Establish the size of an exterior angle in a regular polygon • Solve missing angle problems in polygons **Calculating fractions, decimals and percentages (approx. 6 lessons)** • Identify the multiplier for a percentage increase or decrease when the percentage is greater than 100% • Use calculators to increase an amount by a percentage greater than 100% • Solve problems involving percentage change • Solve original value problems when working with percentages • Solve financial problems including simple interest • Solve problems that require exact calculation with fractions **Solving equation and inequalities (approx. 6 lessons)** • Solve linear equations with the unknown on one side when calculating with negative numbers is required • Solve linear equations with the unknown on both sides when the solution is a whole number • Solve linear equations with the unknown on both sides when the solution is a fraction • Solve linear equations with the unknown on both sides when the solution is a negative number • Solve linear equations with the unknown on both sides when the equation involves brackets • Recognise that the point of intersection of two graphs corresponds to the solution of a connected equation	8M6 BAM **Indicator assessment and reflection task**-Solve problems involving percentage change, including original value problems 8M10 BAM **Indicator assessment and reflection task**- Solve linear equations with unknowns on both sides End of term assessment covering all of the topics taught. Designed to measure progress from start of year bassline assessment.
	Summer Term	5	**Calculating Space (approx. 8 lessons)** • Know circle definitions and properties, including: centre, radius, chord, diameter, circumference • Calculate the circumference of a circle when radius or diameter is given • Calculate the perimeter of composite shapes that include sections of a circle • Calculate the area of a circle when radius or diameter is given • Calculate the area of composite shapes that include sections of a circle • Calculate the volume of a right prism • Calculate the volume of a cylinder • Compare lengths, areas and volumes using ratio notation **Algebraic proficiency: visualising (Approx. 11 lessons)** • Know that graphs of functions of the form $y = mx + c$, $x \pm y = c$ and $ax \pm by = c$ are linear • Plot graphs of functions of the form $y = mx \pm c$ • Plot graphs of functions of the form $ax \pm by = c$ • Find the gradient of a straight line on a unit grid • Find the y-intercept of a straight line • Sketch linear graphs • Distinguish between a linear and quadratic graph • Plot graphs of quadratic functions of the form $y = x^2 \pm c$ • Sketch a simple quadratic graph • Plot and interpret graphs of piece-wise linear functions in real contexts • Plot and interpret distance-time graphs (speed-time graphs) including approximate solutions to kinematic problem	8M12 BAM **Indicator assessment and reflection task-** Apply the formulae for circumference and area of a circle 8M11 BAM **Indicator assessment and reflection task-** Plot and interpret graphs of linear functions

		6	**Understanding risk 2 (approx. 8 lessons)** • List all elements in a combination of sets using a Venn diagram • List outcomes of an event systematically • Use a table to list all outcomes of an event • Use frequency trees to record outcomes of probability experiments • Construct theoretical possibility spaces for combined experiments with equally likely outcomes • Calculate probabilities using a possibility space • Use theoretical probability to calculate expected outcomes • Use experimental probability to calculate expected outcomes **Presentation of data (approx. 4 lessons)** • Construct and interpret a grouped frequency table for continuous data • Construct and interpret histograms for grouped data with equal class intervals • Plot a scatter diagram of bivariate data • Interpret a scatter diagram using understanding of correlation **Measuring data (approx. 6 lessons)** • Find the modal class of set of grouped data • Find the class containing the median of a set of data • Calculate an estimate of the mean from a grouped frequency table • Estimate the range from a grouped frequency table • Analyse and compare sets of data, appreciating the limitations of different statistics (mean, median, mode, range) • Choose appropriate statistics to describe a set of data	End of year assessment covering all of the topics taught. Designed to measure progress from start of year bassline assessment. Essential Knowledge required: • Know how to write a number as a product of its prime factors • Know how to round to significant figures • Know the order of operations including powers • Know how to enter negative numbers into a calculator • Know that $a^0 = 1$ • Know percentage and decimal equivalents for fractions with a denominator of 3, 5, 8 and 10 • Know the characteristic shape of a graph of a quadratic function • Know how to measure and write bearings • Know how to identify alternate angles • Know how to identify corresponding angles • Know how to find the angle sum of any polygon • Know that circumference = $2\pi r = \pi d$ • Know that area of a circle = πr^2 • Know that volume of prism = area of cross-section × length • Know to use the midpoints of groups to estimate the mean of a set of grouped data • Know that probability is measured on a 0-1 scale • Know that the sum of all probabilities for a single event is 1

	Term		Content/Topics	Assessment (including formal exam options)
Year 10	Autumn Term	1	**Calculating (approx. 14 lessons)** • Calculate with positive indices • Calculate with roots • Calculate with negative indices in the context of standard form • Use a calculator to evaluate numerical expressions involving powers • Use a calculator to evaluate numerical expressions involving roots • Add numbers written in standard form • Subtract numbers written in standard form • Multiply numbers written in standard form • Divide numbers written in standard form • Use standard form on a scientific calculator including interpreting the standard form display of a scientific calculator • Understand the difference between truncating and rounding • Identify the minimum and maximum values of an amount that has been rounded (to nearest x, x d.p., x s.f.) • Use inequalities to describe the range of values for a rounded value • Solve problems involving the maximum and minimum values of an amount that has been rounded **Visualising and constructing (approx. 9 lessons)** • Use ruler and compasses to construct the perpendicular bisector of a line segment • Use ruler and compasses to bisect an angle • Use a ruler and compasses to construct a perpendicular to a line from a point and at a point • Know how to construct the locus of points a fixed distance from a point and from a line • Solve simple problems involving loci • Combine techniques to solve more complex loci problems • Choose techniques to construct 2D shapes; e.g. rhombus • Construct a shape from its plans and elevations • Construct the plan and elevations of a given shape	Start of year assessment to create a bassline for mapping in-year progress. 9M1 BAM **Indicator assessment and reflection task-**Calculate with roots and integer indices 9M8 BAM **Indicator assessment and reflection task-**Use ruler and compass methods to construct the perpendicular bisector of a line segment and to bisect an angle
		2	**Algebraic proficiency (approx.. 10 lessons)** • Understand the meaning of an identity • Multiply two linear expressions of the form $(x + a)(x + b)$ • Multiply two linear expressions of the form $(ax + b)(cx + d)$ • Expand the expression $(x + a)^2$ • Factorise a quadratic expression of the form $x^2 + bx$ • Factorise a quadratic expression of the form $x^2 + bx + c$ • Work out why two algebraic expressions are equivalent • Create a mathematical argument to show that two algebraic expressions are equivalent • Distinguish between situations that can be modelled by an expression or a formula • Create an expression or a formula to describe a situation **Proportional reasoning (approx.. 14 lessons)** • Know the difference between direct and inverse proportion • Recognise direct proportion in a situation • Recognise inverse proportion in a situation • Know the features of graphs that represent a direct or inverse proportion situation • Know the features of expressions, or formulae, that represent a direct or inverse proportion situation • Understand the connection between the multiplier, the expression and the graph • Solve problems involving direct proportion • Solve problems involving inverse proportion • Identify congruence of shapes in a range of situations	**9M2 BAM Indicator assessment and reflection task-** Manipulate algebraic expressions by expanding the product of two binomials **9M3 BAM Indicator assessment and reflection task-** Manipulate algebraic expressions by factorising a quadratic expression of the form $x^2 + bx + c$ **9M7 BAM Indicator assessment and reflection task-** Change freely between compound units

			• Finding missing lengths in similar shapes • Convert between compound units of density and pressure • Solve problems involving density • Solve problems involving pressure Solve more complex problems involving speed	End of term assessment covering all of the topics taught. Designed to measure progress from start of year bassline assessment.
	Spring Term	3	**Pattern Sniffing (approx. 7 lessons)** • Recognise and use the Fibonacci sequence • Generate Fibonacci type sequences • Solve problems involving Fibonacci type sequences • Explore growing patterns and other problems involving quadratic sequences • Generate terms of a quadratic sequence from a written rule • Find the next terms of a quadratic sequence using first and second differences • Generate terms of a quadratic sequence from its nth term **Solving equations and inequalities 1 (approx.. 8 lessons)** • Find the set of integers that are solutions to an inequality, including the use of set notation • Know how to show a range of values that solve an inequality on a number line • Solve a simple linear inequality in one variable with unknowns on one side • Solve a complex linear inequality in one variable with unknowns on one side • Solve a linear inequality in one variable with unknowns on both sides • Solve a linear inequality in one variable involving brackets • Solve a linear inequality in one variable involving negative terms • Solve problems by constructing and solving linear inequalities in one variable **Calculating space (approx. 10 lessons)** • Know circle definitions and properties, including: tangent, arc, sector and segment • Calculate the arc length of a sector, including calculating exactly with multiples of π • Calculate the area of a sector, including calculating exactly with multiples of π • Calculate the angle of a sector when the arc length and radius are known • Calculate the surface area of a right prism • Calculate the surface area of a cylinder, including calculating exactly with multiples of π • Know and use Pythagoras' theorem • Calculate the hypotenuse of a right-angled triangle using Pythagoras' theorem in two dimensional figures • Calculate one of the shorter sides in a right-angled triangle using Pythagoras' theorem in two dimensional figures • Solve problems using Pythagoras' theorem in two dimensional figures	9M10 BAM **Indicator assessment and reflection task-** Calculate exactly with multiples of π 9M11 BAM **Indicator assessment and reflection task-** Apply Pythagoras' theorem in two dimensions
		4	**Conjecturing (approx. 7 lessons)** • Apply angle facts to derive results about angles and sides • Create a geometrical proof • Know the conditions for triangles to be congruent • Use the conditions for congruent triangles • Use congruence in geometrical proofs • Solve geometrical problems involving similarity • Know the meaning of a Pythagorean triple	9M12 BAM **Indicator assessment and reflection task-** Use geometrical reasoning to construct simple proofs 9M9 BAM **Indicator assessment and reflection task-**Solve problems involving similar shapes

			Algebraic proficiency: visualising (started approx. 10 lessons) • Identify and interpret gradients of linear functions algebraically • Identify and interpret intercepts of linear functions algebraically • Use the form y = mx + c to identify parallel lines • Find the equation of a line through one point with a given gradient • Find the equation of a line through two given points • Interpret the gradient of a straight line graph as a rate of change • Plot graphs of quadratic functions • Plot graphs of cubic functions • Plot graphs of reciprocal functions	9M4 BAM **Indicator assessment and reflection task-** Understand and use the gradient of a straight line to solve problems End of term assessment covering all of the topics taught. Designed to measure progress from start of year bassline assessment.
	Summer Term	5	**Algebraic proficiency: visualising (started approx. 7 lessons)** • Recognise and sketch the graphs of quadratic functions • Interpret the graphs of quadratic functions • Recognise and sketch the graphs of cubic functions • Interpret the graphs of cubic functions • Recognise and sketch the graphs of reciprocal functions • Interpret the graphs of reciprocal functions • Plot and interpret graphs of non-standard functions in real contexts • Find approximate solutions to kinematic problems involving distance, speed and acceleration **Solving equations and inequalities 2 (approx. 10 lessons)** • Understand that there are an infinite number of solutions to the equation ax + by = c ($a \neq 0$, $b \neq 0$) • Find approximate solutions to simultaneous equations using a graph • Solve two linear simultaneous equations in two variables in very simple cases (addition but no multiplication required) • Solve two linear simultaneous equations in two variables in very simple cases (subtraction but no multiplication required) • Solve two linear simultaneous equations in two variables in very simple cases (addition or subtraction but no multiplication required) • Solve two linear simultaneous equations in two variables in simple cases (multiplication of one equation only required with addition) • Solve two linear simultaneous equations in two variables in simple cases (multiplication of one equation only required with subtraction) • Solve two linear simultaneous equations in two variables in simple cases (multiplication of one equation only required with addition or subtraction) • Derive and solve two simultaneous equations • Solve problems involving two simultaneous equations and interpret the solution	9M6 BAM **Indicator assessment and reflection task-** Plot and interpret graphs of quadratic functions 9M5 BAM **Indicator assessment and reflection task-**Solve two linear simultaneous equations algebraically and graphically
		6	**Understanding risk (approx. 8 lessons)** • List outcomes of combined events using a tree diagram • Know and use the multiplication law of probability • Now and use the addition law of probability • Use a tree diagram to solve simple problems involving independent combined events • Use a tree diagram to solve complex problems involving independent combined events • Use a tree diagram to solve simple problems involving dependent combined events • Use a tree diagram to solve complex problems involving dependent combined events • Understand that relative frequency tends towards theoretical probability as sample size increases	9M13 BAM **Indicator assessment and reflection task-**Use tree diagrams to list outcomes

			Presentation of data (approx. 8 lessons) • Construct graphs of time series • Interpret graphs of time series • Construct and interpret compound bar charts • Construct and interpret frequency polygons • Construct and interpret stem and leaf diagrams • Interpret a scatter diagram using understanding of correlation • Construct a line of best fit on a scatter diagram and use the line of best fit to estimate values Understand that correlation does not indicate causation	End of year mock exam covering all of the topics taught. Designed to measure progress from start of year bassline assessment. This exam will also give clear indications for Y11 predictions. Essential Knowledge required: • Know how to interpret the display on a scientific calculator when working with standard form • Know the difference between direct and inverse proportion • Know how to represent an inequality on a number line • Know that the point of intersection of two lines represents the solution to the corresponding simultaneous equations • Know the meaning of a quadratic sequence • Know the characteristic shape of the graph of a cubic function • Know the characteristic shape of the graph of a reciprocal function • Know the definition of speed • Know the definition of density • Know the definition of pressure • Know Pythagoras' theorem • Know the definitions of arc, sector, tangent and segment • Know the conditions for congruent triangles

	Term		Content/Topics	Assessment (including formal exam options)
Year 11	Autumn Term	1	**Investigating properties of shapes (approx.. 10 lessons)** • Appreciate that the ratio of corresponding sides in similar triangles is constant • Choose an appropriate trigonometric ratio that can be used in a given situation • Understand that sine, cosine and tangent are functions of an angle • Establish the exact values of sinθ and cosθ for θ = 0°, 30°, 45°, 60° and 90° • Establish the exact value of tanθ for θ = 0°, 30°, 45° and 60° • Use a calculator to find the sine, cosine and tangent of an angle • Know the trigonometric ratios, sinθ = opp/hyp, cosθ = adj/hyp, tanθ = opp/adj • Set up and solve a trigonometric equation to find a missing side in a right-angled triangle • Set up and solve a trigonometric equation when the unknown is in the denominator of a fraction • Set up and solve a trigonometric equation to find a missing angle in a right-angled triangle • Use trigonometry to solve problems involving bearings Use trigonometry to solve problems involving an angle of depression or an angle of elevation **Calculating (approx. 2 lessons)** • Know and use the fact that $a^{-n} = 1/a^n$ • Use the functionality of a scientific calculator when calculating with roots and powers **Solving equations and inequalities 1 (approx. 6 lessons)** • Understand the concept of solving simultaneous equations by substitution • Decide whether to use elimination or substitution to solve a pair of simultaneous equations • Solve two linear simultaneous equations in two variables by substitution • Solve two linear simultaneous equations in two variables by elimination (multiplication of both equations required) • Derive and solve two simultaneous equations in complex cases • Interpret the solution to a pair of simultaneous equations **Mathematical movement (approx. 5 lessons)** • Use the centre and scale factor to carry out an enlargement of a 2D shape with a fractional scale factor • Find the scale factor and centre of an enlargement with fractional scale factor • Perform a sequence of transformations on a 2D shape • Find and describe a single transformation given two congruent 2D shapes • Solve practical problems involving lengths in similar figures	Start of year assessment to create a bassline for mapping in-year progress. 10M10 BAM **Indicator assessment and reflection task-**Apply trigonometry in two dimensions
		2	**Algebraic proficiency (approx. 4 lessons)** • Use visual representations connected to the expanding of two binomials • Identify when it is necessary to find two linear expressions to factorise a quadratic expression • Factorise an expression involving the difference of two squares • Change the subject of a formula when more than two steps are required **Proportional reasoning (approx. 6 lessons)** • Recognise and interpret graph that illustrates direct proportion • Recognise and interpret graph that illustrates inverse proportion • Understand that X is inversely proportional to Y is equivalent to X is proportional to 1/Y • Interpret equations that describe direct proportion • Interpret equations that describe inverse proportion • Solve problems which include finding the multiplier in a situation involving direct proportion • Solve problems which include finding the multiplier in a situation involving inverse proportion	

			Pattern sniffing (approx. 2 lessons) • Recognise and describe a simple geometric progression • Find the next three terms, or any given term, in a geometric progression **Calculating space (approx. 8 lessons)** • Find the surface area of spheres • Find the volume of spheres • Use Pythagoras' theorem to find lengths in a pyramid or cone • Find the surface area of cones and pyramids • Find the volume of cones and pyramids • Identify how to find the volume of a composite solid • Identify how to find the surface area of a composite solid • Solve practical problems involving the surface area of solids • Solve practical problems involving the volume of solids **Exploring fractions decimals and percentages (approx. 5 lessons)** • Recognise when a situation involves compound interest • Set up a compound interest problem • Calculate the result of a repeated percentage change, including compound interest • Set up a growth or decay problem • Solve problems involving growth and decay	**10M11 BAM Indicator assessment and reflection task-** Calculate volumes of spheres, cones and pyramids
	Spring Term	3	**Algebraic proficiency (approx. 3 lessons)** • Identify and interpret roots of quadratic functions graphically • Identify and interpret intercepts of quadratic functions graphically • Identify and interpret turning points of quadratic functions graphically **Solving equations and inequalities 2 (approx.. 7 lessons)** • Solve a quadratic equation in factorised form • Solve a quadratic equation of the form $x^2 + bx + c$ by factorising • Make connections between graphs and quadratic equations of the form $ax^2 + bx + c = 0$ • Make connections between graphs and quadratic equations of the form $ax^2 + bx + c = d$ • Find approximate solutions to quadratic equations using a graph • Deduce roots of quadratic functions algebraically • Solve problems that involve solving a quadratic equation in context	**Mock Examinations Y11** **10M6 BAM Indicator assessment and reflection task-**Solve quadratic equations by factorising
		4	**Analysing statistics (approx. 2 lessons)** • Understand the limitations of sampling • Use a sample to infer properties of a population **Mathematical movement 2 (approx. 5 lessons)** • Understand the concept of a vector • Know and use different notations for vectors, including diagrammatic representation • Add and subtract vectors • Multiply a vector by a scalar • Solve simple geometrical problems involving vectors	**10M6 BAM Indicator assessment and reflection task-** Understand and use vectors

				End of year assessment covering all of the topics taught. Designed to measure progress from start of year bassline assessment. Essential Knowledge required: • Know the convention for labelling the sides in a right-angle triangle • Know the trigonometric ratios, sinθ = opposite/hypotenuse, cosθ = adjacent/hypotenuse, tanθ = opposite/adjacent • Know the exact values of sinθ and cosθ for θ = 0°, 30°, 45°, 60° and 90° • Know the exact value of tanθ for θ = 0°, 30°, 45° and 60° • Know the information required to describe a transformation • Know the special case of the difference of two squares • Know set notation • Know the formulae for the volume of a sphere, a cone and a pyramid • Know the formulae for the surface area of a sphere, and the curved surface area of a cone • Know the meaning of roots, intercepts and turning points
	Summer Term	5	**Revision Topics** • Know percentage and decimal equivalents for fractions with a denominator of 2, 3, 4, 5, 8 and 10 • Know the rough equivalence between miles and kilometres • Know that vertically opposite angles are equal • Know that the area of a triangle = base × height ÷ 2 • Know that the area of a parallelogram = base × height • Know that volume is measured in cubes • Know the names of parts of a circle • Know that the diameter of a circle is twice the radius • Know the conventions for a 2D coordinate grid • Know that mean = sum of data ÷ number of pieces of data • Know the first 6 cube numbers • Know the first 12 triangular numbers • Know the symbols =, ≠, <, >, ≤, ≥ • Know the order of operations including brackets • Know basic algebraic notation • Know that area of a rectangle = l × w • Know that area of a triangle = b × h ÷ 2 • Know that area of a parallelogram = b × h • Know that area of a trapezium = ((a + b) ÷ 2) × h • Know that volume of a cuboid = l × w × h • Know the meaning of faces, edges and vertices • Know the names of special triangles and quadrilaterals • Know how to work out measures of central tendency • Know how to calculate the range • Know how to write a number as a product of its prime factors • Know how to round to significant figures • Know the order of operations including powers • Know how to enter negative numbers into a calculator • Know that $a^0 = 1$	

			• Know percentage and decimal equivalents for fractions with a denominator of 3, 5, 8 and 10 • Know the characteristic shape of a graph of a quadratic function • Know how to measure and write bearings • Know how to identify alternate angles • Know how to identify corresponding angles • Know how to find the angle sum of any polygon • Know that circumference = $2\pi r = \pi d$ • Know that area of a circle = πr^2 • Know that volume of prism = area of cross-section × length • Know to use the midpoints of groups to estimate the mean of a set of grouped data • Know that probability is measured on a 0-1 scale • Know that the sum of all probabilities for a single event is 1 • Know how to interpret the display on a scientific calculator when working with standard form • Know the difference between direct and inverse proportion • Know how to represent an inequality on a number line • Know that the point of intersection of two lines represents the solution to the corresponding simultaneous equations • Know the meaning of a quadratic sequence • Know the characteristic shape of the graph of a cubic function • Know the characteristic shape of the graph of a reciprocal function • Know the definition of speed • Know the definition of density • Know the definition of pressure • Know Pythagoras' theorem • Know the definitions of arc, sector, tangent and segment • Know the conditions for congruent triangles • Know the convention for labelling the sides in a right-angle triangle • Know the trigonometric ratios, $\sin\theta$ = opposite/hypotenuse, $\cos\theta$ = adjacent/hypotenuse, $\tan\theta$ = opposite/adjacent • Know the exact values of $\sin\theta$ and $\cos\theta$ for $\theta = 0°, 30°, 45°, 60°$ and $90°$ • Know the exact value of $\tan\theta$ for $\theta = 0°, 30°, 45°$ and $60°$ • Know the information required to describe a transformation • Know the special case of the difference of two squares • Know set notation • Know the formulae for the volume of a sphere, a cone and a pyramid • Know the formulae for the surface area of a sphere, and the curved surface area of a cone • Know the meaning of roots, intercepts and turning points	**GCSE EXAMINATIONS BEGIN**
		6	**GCSE EXAMINATIONS**	