EXCELLENCE • LEARNING • LEADERSHIP
ST JOHN'S SCHOOL

Mathematics

Year 7 – 11 Curriculum rationale

Curriculum intent: Developing resilient and curious mathematicians who see the power and beauty of Mathematics

Literacy/Reading/Oracy opportunities:

	Autumn	Spring	Summer
Year 7			

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
Autumn	Making generalisations about the number system 1						Making generalisations about the number system 2					
	Place value Y7U1	Properties of arithmetic Y7U2		Factors and multiples Y7U3		Order of operations Y7U4	Positive and negative numbers Y7U5			Expressions, equations, and inequalities Y7U6		
Spring	2-D Geometry						The Cartesian plane					
	Angles Y7U7		Classifying 2-D shapes Y7U8		Constructing triangles and quadrilaterals Y7U9		Coordinates Y7U10		Area of 2-D shapes Y7U11		Transforming 2-D figures Y7U12	
Summer	Fractions							Ratio and proportion				
	Prime factor decomposition Y7U13		Conceptualising and comparing fractions Y7U14		Manipulating and calculating with fractions Y7U15			Ratio Y7U16		Percentages Y7U17		

	Autumn	Spring	Summer
Why?	<u>Place Value</u> Students deepen their understanding of the base 10 (decimal) number system using manipulatives and place value grids.	<u>Angles</u> Students develop their understanding of the concept of angles as a measure of turn. Students have an opportunity to practise measuring and drawing angles before	<u>Prime Factorisation</u> After revisiting key ideas including factors, multiples, primes and squares, students are introduced to the Fundamental Theorem of Arithmetic: all integers greater

	Column addition and subtraction are revisited to reinforce the role of 10. <u>Properties of Arithmetic</u> Understanding of the four main operators is checked whilst building on language of arithmetic including sum, product, difference, calculation, operator and operations. Fact families reveal connections between operators. Commutativity is illustrated with arrays and used to simplify calculations. Associativity and distributivity are introduced and used for simplifying calculations. Representations are used throughout to help students to understand and to convince them of the properties. All three properties are used to equip students with a range of mental methods of multiplication. <u>Factors and Multiples</u> Students are introduced to factors and multiples in this unit and learn the divisibility rule for 3. They extend their understanding of multiples by finding common multiples of pairs of numbers using number patterns to deepen their understanding. They use bar models to support understanding of factors. Students explore factors pairs of integers and properties of prime and square numbers using arrays to support their understanding. 'Lots of' representations support connections to commutativity and associativity laying foundations for prime factor decomposition.	moving on to applying angle theorems to calculate unknown angles at a point and on a straight line. Intersecting lines and vertically opposite angles are introduced. Students begin the second week by developing their understanding of the properties of parallel lines. This is then developed through the rest of the week to introduce different angle rules involving parallel lines. <u>Classifying 2-D Shapes</u> In the first week the focus is on triangles, with students looking at properties including number of equal sides, number of equal angles, types of angles and number of lines of symmetry. Names of polygons with different numbers of sides are revisited from KS2. Students look at a range of properties of quadrilaterals including how many pairs of equal sides, equal angles and parallel sides the shape has. Rotational symmetry is introduced and connections are drawn between the number of sides/angles in a regular polygon, its order of rotational symmetry, and number of lines of symmetry. <u>Constructing Triangles and Quadrilaterals</u> This unit starts by looking at the properties of a circle and building understanding of how these properties can be used to construct shapes with equal side lengths. This is developed through the rest of the first week to introduce the approach for constructing Angle-Side-Angle triangles. The second week of this unit starts with more triangle constructions where an	than 1 are either prime or can be written as a product of prime factors in exactly one way. They learn techniques for decomposing numbers into their prime factors and use the prime factor decomposition to find square roots. In the second week, combinations of prime factors are multiplied to generate factors. Venn diagrams are introduced to help identify which prime factors to multiply to generate common factors, the highest common factor and the lowest common multiple. <u>Conceptualising and Comparing Fractions</u> In the first week of this unit pupils explore representations of fractions to understand the roles of the numerator and denominator, as well as recognising fractions as the result of a division. Pupils also use reasoned approaches to compare fractions and develop an understanding of equivalent fractions. Equivalence is built on the second week, first by thinking about mixed and improper fractions, then simplest form, and finally decimal conversions. <u>Manipulating and Calculating with Fractions</u> The first week of the unit focuses on multiplication with fractions. Pupils understand fractions as operators before using bar models and area models to underpin calculation methods for multiplying with fractions. In the final lesson pupils practise multiplying fractions in the context of developing number sense

	<u>Order of Operations</u> Students establish equal and unequal priority of the four operations and indices, and understand brackets as a tool to manipulate this order in more complex calculations. <u>Positive and Negative Numbers</u> Negative numbers are visited in contexts that students may have experienced in everyday life. Number lines are used to order, compare and add negatives. Addition of negatives is reinforced using two-sided counters. Subtraction and multiplication are explored with negative numbers. The scaling model of multiplication is used to develop the sense of numbers having both direction and magnitude, with negative scalars reversing direction. This model is continued into Week 3 when scalars between -1 and 1 are explored. Multiplication and division with negatives numbers are the continued focus, first looking more deeply at negative scale factors then looking at the inverse of multiplication: division. <u>Expressions, Equations and Inequalities</u> Students are formally introduced to some algebraic notation that they will have seen throughout the previous term. Common conventions are introduced. Key representations seen throughout the first term are revisited. Students look are expressions and relational operators (e.g. =, <, >) to introduce equations and inequalities. The maintenance of balance (or equal imbalance) is looked at by	angle and two sides are given. Quadrilateral constructions are then introduced by first giving students circles with equally spaced dots before using compasses. The unit ends with students using their understanding to construct a kite and parallelogram. <u>Coordinates</u> Time is spent at the beginning of the first week embedding the fundamental concepts of coordinates: that position is described from the origin and has a horizontal and vertical component. This is formalised when terminology and notation are introduced before deepening understanding by thinking about keeping one coordinate constant. In the second week students focus on lines drawn on grids. Coordinates of points on the graphs of $y = x$ and $y = -x$ are considered before generating coordinate and plotting graphs of lines where a relationship between the x and y-coordinate is described. Gradient is introduced and parallel and perpendicular lines are considered. <u>Area and Perimeter of 2D Shapes</u> Pupils are introduced to different forms of measure to represent perimeter and area. They calculate perimeters and areas of different 2-D shapes using reasoned approaches based on grids. They experience varying the dimensions of rectangles to preserve and change area and perimeter. The concept of perpendicular lines is central to finding the area of a parallelogram and triangle, so	of fractional scaling. The second week builds on the foundations of multiplying with fraction from week 1 to develop pupils' understanding of dividing with fractions. Bar models are used to demonstrate equivalences and inverse relationships between × and ÷ with fractions to enable pupils to understand and use efficient calculation strategies to divide by fractions. The final week of this unit focuses on addition and subtraction of fractions. Pupils explore common denominators by using pictorial representations to demonstrate the need to denominate fractions in the same way. Efficient calculation approaches are explored through lowest common denominators and adding fractions and decimals. <u>Ratio and Proportion</u> Students are introduced to ratios through a pictorial approach which allows them to share a given amount in different ways and examine different mathematical ways of describing the amounts. In the second week students spend their time connecting their understanding of scale factors and the constant of proportionality firstly to enlargements of triangles and then to line segments and part of line segments. <u>Percentages</u> This first week of the unit secures the foundations of percentages; how one whole is equivalent to one hundred percent, using number lines, converting between fractions, decimals and

	performing the same operation on both sides of the equation or inequality. Learning from the previous two weeks is consolidated through a lens of perimeter problems. The unit ends with students thinking about the generalised form, and comparing counting strategies that could be used to find the nth pattern.	pupils start the second week by examining rectilinear shapes. Pupils use square grids to support reasoning approaches for working out areas of non-rectilinear shapes. The formulae for areas of triangles and parallelograms are then generalised based on exploring how parallelograms can be arranged into rectangles, and triangles as half of parallelograms. <u>Transforming 2D Figures</u> Pupils learn how to recognise, describe and perform translations and rotations on shapes. They learn which critical features need to be included in a description of these transformations and this is supported by their understanding of angles and coordinates from earlier units. Pupils formally meet reflection and begin to combine reflections. They use the properties of corresponding points to help them reflect shapes in inclined lines of reflection before seeking equivalence between translations and double reflections in parallel lines of reflection. Enlargement is introduced in the final lesson of the unit.	percentages, before beginning to calculate percentage of amounts. Students are introduced to bearings and consider how to work out and estimate bearings using a number of different representations. Students should build a sense that a bearing and distance describe a position.
How parents / carers can support	Parents can support students in various ways with their progress in Mathematics. The main way is to be encouraging of their efforts and positive about Mathematics in general. Studies have shown that students flourish in Mathematics when parents and carers are positive about the subject themselves.	Parents can support students in various ways with their progress in Mathematics. The main way is to be encouraging of their efforts and positive about Mathematics in general. Studies have shown that students flourish in Mathematics when parents and carers are positive about the subject themselves.	Parents can support students in various ways with their progress in Mathematics. The main way is to be encouraging of their efforts and positive about Mathematics in general. Studies have shown that students flourish in Mathematics when parents and carers are positive about the subject themselves.

	On a practical note, supporting students with their homework and independent revision is extremely helpful. Online help can be found at: MathsWatch – this will have homework set for students as well as work they can access independently along with help videos	On a practical note, supporting students with their homework and independent revision is extremely helpful. Online help can be found at: MathsWatch – this will have homework set for students as well as work they can access independently along with help videos	On a practical note, supporting students with their homework and independent revision is extremely helpful. Online help can be found at: MathsWatch – this will have homework set for students as well as work they can access independently along with help videos

	Autumn	Spring	Summer
Year 8			

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
Autumn	Equations and inequalities						Graphical representations					
	Sequences Y8U1		Forming and solving equations Y8U2		Forming and solving inequalities Y8U3		Linear graphs Y8U4			Accuracy and estimation Y8U5		
Spring	Proportional reasoning						Representations and reasoning with data					
	Ratio review Y8U6	Real life graphs Y8U7		Direct and inverse proportion Y8U8			Univariate data Y8U9			Bivariate data Y8U10		
Summer	Angles						Area, volume, and surface area					
	Angles in polygons Y8U11			Bearings Y8U12			Circles Y8U13		Volume and surface area of prisms Y8U14			

Why?	<u>Sequences</u> Growing patterns are used to emphasise adding the common difference multiple times in order to develop understanding of the nth term formula. Students find the $n\ th$ term of increasing and decreasing arithmetic sequences as well as quadratic sequences (using diagrams), and using the $n\ th$ term to generate a range of sequences (arithmetic, quadratic and geometric). <u>Forming and solving equations</u>	<u>Ratio Review</u> Students will look at previously learnt ratio topics, such as equivalence and sharing a quantity in a ratio, before exploring ratio and rates of change. <u>Real-life graphs</u> Students connect prior learning of linearity and gradient to rates in real life contexts represented graphically. Students look at the example of 'rate' – speed in addition to displacement-time graphs.	<u>Angles in polygons</u> Students revisit concepts in more depth and look at formal methods for finding the sum of angles in polygon. Lessons focus on issues like 'What is a polygon?' and 'What is an interior angle?". Students continue looking at compounded triangles, and are introduced to methods for finding the sum of interior angles of a polygon. Students also look at alternate methods and again look at what is and isn't an interior angle. Students look at interior and exterior angles within regular polygons.

	Students establish the critical features of expressions, equations and identities before using pictorial representations to support the algebraic manipulation in solving simple linear equations. Students develop more versatile algebraic manipulation including solving linear equations with negative coefficients and unknowns on both sides, and applying algebraic reasoning in geometric contexts. <u>Forming and solving inequalities</u> Students develop their understanding of inequalities from Year 7 to include number line representations, understanding when inequalities are or are not satisfied, and finding solutions to simple linear inequalities. Students form and solve inequalities based on geometric properties, contexts and pictorial representations, and experience manipulations that do and do not preserve inequality relationships. <u>Linear graphs</u> Students visit and revisiting familiar linear graphs in context on the Cartesian plane, such as using coordinates, horizontal and vertical lines (from Year 7 content) and inequalities (previous unit). The focus is on connecting relationships between coordinates to the graphs of linear relationships. Gradient is introduced. The equation of a line is considered in more depth culminating in students moving between the three representations of a linear relationship (coordinates, graph and equation).	 <u>Direct and inverse proportion</u> Students explore multiplicative relationships and balance, and revisit key concepts such as scale factor and constant of proportionality. Constant of proportionality is focused on as a key concept. Students continue their work with direct proportion and learn methods for finding missing values with non-integer scale factors and constants of proportionality. Students also meet inverse proportion and compare directly and inversely proportional relationships before finding missing values and generalising. Finally, direct and inverse relationships emerge as different parts of speed × time = distance are held constant. <u>Univariate data</u> Students are introduced to the fundamentals of data collection and analysis including question writing, classifying data, collecting data using tally charts, and interpreting data in bar and pie charts. <u>Bivariate data</u> Students continue looking at data, but develop learning to bivariate data and are introduced to key representations such as bar models. Students extend their understanding of what bivariate data is, and how it can be represented. Making deductions from the	Opportunities for practice finding missing angles exist throughout the week. Formal angle notation is introduced. <u>Bearings</u> Students are introduced to bearings and consider how to work out and estimate bearings using a number of different representations. Students should build a sense that a bearing and distance describe a position. Students continue their work on bearings in new contexts. Firstly, students will formalise the relationship between A from B and B from A, then students will look at how pairs of bearings, and bearings and loci can help find exact positions. <u>Circles</u> Students build on their understanding of circles as geometric 'tools' for constructing shapes of known side lengths to include calculating circumference and arc lengths. Students extend their understanding of Pi to include being the ratio between the square of a circle's radius and diameter before calculating area and perimeter of varied sectors and compound shapes. <u>Volume and surface area of prisms</u> Students learn the vocabulary to investigate properties of solid shapes. They are challenged to develop their visualisation skills throughout the unit, this week working with 2-D representations and nets. Students are introduced to the idea of a prism. They use their knowledge of nets to

	 Accuracy and estimation Students use number lines to round to the nearest one, ten, hundred, thousand and to decimal places. They work backwards to see what a rounded number might have been and use rounding to estimate calculations. Students are introduced to significant figures, learning how to round to significant figures, deducing what a rounded number might have been and appreciating why there are different methods of rounding.	data, such as predict non-existent data, find averages, and assessing causality.	identify cross sections and calculate surface area of prisms and cylinders Students are introduced to the concept of volume. They connect units of measurement to dimensions and learn how to calculate the volume of a prism by multiplying cross-sectional area by length.
How parents / carers can support	Parents can support students in various ways with their progress in Mathematics. The main way is to be encouraging of their efforts and positive about Mathematics in general. Studies have shown that students flourish in Mathematics when parents and carers are positive about the subject themselves. On a practical note, supporting students with their homework and independent revision is extremely helpful. Online help can be found at: MathsWatch – this will have homework set for students as well as work they can access independently along with help videos	Parents can support students in various ways with their progress in Mathematics. The main way is to be encouraging of their efforts and positive about Mathematics in general. Studies have shown that students flourish in Mathematics when parents and carers are positive about the subject themselves. On a practical note, supporting students with their homework and independent revision is extremely helpful. Online help can be found at: MathsWatch – this will have homework set for students as well as work they can access independently along with help videos	Parents can support students in various ways with their progress in Mathematics. The main way is to be encouraging of their efforts and positive about Mathematics in general. Studies have shown that students flourish in Mathematics when parents and carers are positive about the subject themselves. On a practical note, supporting students with their homework and independent revision is extremely helpful. Online help can be found at: MathsWatch – this will have homework set for students as well as work they can access independently along with help videos

	Autumn	Spring	Summer
Year 9	<u>Foundation</u> • UNIT 1: Number, powers, decimals, HCF and LCM, roots and rounding • UNIT 2: Expressions, substituting into simple formulae, expanding and factorising • UNIT 3: Drawing and interpreting graphs, tables and charts • Statistics UNIT 1: The collection of data <u>Higher</u> • UNIT 1: Powers, decimals, HCF and LCM, positive and negative, roots, rounding, reciprocals, standard form, indices and surds • UNIT 2: Expressions, substituting into simple formulae, expanding and factorising, equations, sequences and inequalities, simple proof • UNIT 3: Averages and range, collecting data, representing data	<u>Foundation</u> • UNIT 4: Fractions and percentages • Statistics UNIT 2: Processing, representing and analysing data • UNIT 5: Equations, inequalities and sequences • UNIT 6: Angles, polygons and parallel lines <u>Higher</u> • UNIT 4: Fractions, percentages, ratio and proportion • Statistics UNIT 1: The collection of data • Statistics UNIT 2: Processing, representing and analysing data • UNIT 5: Angles, polygons, parallel lines; Right-angled triangles: Pythagoras and trigonometry	<u>Foundation</u> • UNIT 7: Statistics, sampling and the averages • Statistics UNIT 3: Summarising data: measures of central tendency and dispersion • UNIT 8: Perimeter, area and volume • UNIT 9: Real-life and algebraic linear graphs <u>Higher</u> • UNIT 6: Real-life and algebraic linear graphs, quadratic and cubic graphs, the equation of a circle, plus rates of change and area under graphs made from straight lines • Statistics UNIT 3: Summarising data: measures of central tendency and dispersion • UNIT 7: Perimeter, area and volume, plane shapes and prisms, circles, cylinders, spheres, cones; Accuracy and bounds • UNIT 8: Transformations; Constructions: triangles, nets, plan and elevation, loci, scale drawings and bearings

Why?	All mathematics learned is used to help build curious mathematicians that can solve problems related to each unit. Such as <u>Foundation</u> • Given 5 digits, what are the largest or smallest answers when subtracting a two-digit number from a three-digit number? • Use inverse operations to justify answers, e.g. $9 \times 23 = 207$ so $207 \div 9 = 23$. • Check answers by rounding to nearest 10, 100, or 1000 as appropriate, e.g. $29 \times 31 \approx 30 \times 30$ • What is the value of 2^3? • Evaluate $(2^3 \times 2^5) \div 2^4$. • Simplify $4p - 2q + 3p + 5q$. • Simplify $z^4 \times z^3$, $y^3 \div y^2$, $(a^7)^2$. • Simplify $x^{-4} \times x^2$, $w^2 \div w^{-1}$. • Expand and simplify $3(t - 1)$. • Understand $6x + 4 \neq 3(x + 2)$. • Argue mathematically that $2(x + 5) = 2x + 10$. • Evaluate the expressions for different values of x: $3x^2 + 4$ or $2x^3$. • Construct a frequency table for a continuous data set, deciding on appropriate intervals using inequalities • Plan a journey using timetables. • Decide the most appropriate chart or table given a data set.	All mathematics learned is used to help build curious mathematicians that can solve problems related to each unit. Such as <u>Foundation</u> • Express a given number as a fraction of another, including where the fraction > 1. • Simplify $\frac{120}{100}$. • $\frac{3}{5} \times 15$, $20 \times \frac{3}{4}$. • $\frac{1}{2}$ of 36 m, $\frac{1}{4}$ of £20. • Find the size of each category from a pie chart using fractions. • Calculate: $\frac{1}{2} \times \frac{6}{7}$, $\frac{3}{5} \div 3$. • Write terminating decimals (up to 3 d.p.) as fractions. • Convert between fractions, decimals and percentages, common ones such as $\frac{1}{2}$, $\frac{1}{10}$, $\frac{1}{4}$, $\frac{3}{4}$ and $\frac{n}{10}$. • Order integers, decimals and fractions. • Given a sequence, 'Which is the 1st term greater than 50?' • What is the amount of money after x months saving the same amount or the height of tree that grows 6 m per year? • What are the next terms in the following sequences? • 1, 3, 9, … 100, 50, 25, … 2, 4, 8, 16, …	All mathematics learned is used to help build curious mathematicians that can solve problems related to each unit. Such as <u>Foundation</u> • Explain why a sample may not be representative of a whole population. • Carry out a statistical investigation of their own and justify how sources of bias have been eliminated. • Show me an example of a situation in which biased data would result. • State the median, mode, mean and range from a small data set. • Extract the averages from a stem and leaf diagram. • Estimate the mean from a table. • Find the area/perimeter of a given shape, stating the correct units. • Justify whether a certain number of small boxes fit inside a larger box. • Calculate the volume of a triangular prism with correct units. • Plot and draw the graph for $y = 2x - 4$. • Which of these lines are parallel: $y = 2x + 3$, $y = 5x + 3$, $y = 2x - 9$, $2y = 4x - 8$ • Interpret a description of a journey into a distance–time or speed–time graph.

	• State the mode, smallest value or largest value from a stem and leaf diagram. <u>Higher</u> • Given 5 digits, what is the largest even number, largest odd number, or largest or smallest answers when subtracting a two-digit number from a three-digit number? • Given 2.6 × 15.8 = 41.08 what is 26 × 0.158? What is 4108 ÷ 26? • Know how to test if a number up to 120 is prime. • Understand that every number can be written as a unique product of its prime factors. • Recall prime numbers up to 100. • Understand the meaning of prime factor. • Write a number as a product of its prime factors. • Use a Venn diagram to sort information. • Write 51080 in standard form. • Write 3.74×10^{-6} as an ordinary number. • Simplify √8. • Convert a ‘near miss’, or any number, into standard form; e.g. 23×10^7. • Simplify $4p - 2q^2 + 1 - 3p + 5q^2$. • Evaluate $4x^2 - 2x$ when $x = -5$.	• Write down an expression for the nth term of the arithmetic sequence 2, 5, 8, 11, … • Is 67 a term in the sequence 4, 7, 10, 13, …? • Name all quadrilaterals that have a specific property. • Use geometric reasoning to answer problems giving detailed reasons. • Find the size of missing angles at a point or at a point on a straight line. • Convince me that a parallelogram is a rhombus. <u>Higher</u> • Convert a fraction to a decimal including where the fraction is greater than 1. • Be able to work out the price of a deposit, given the price of a sofa is £480 and the deposit is 15% of the price, without a calculator. • Find fractional percentages of amounts, with and without using a calculator. • Convince me that 0.125 is $\frac{1}{8}$. • Write/interpret a ratio to describe a situation such as 1 blue for every 2 red …, 3 adults for every 10 children … • Recognise that two paints mixed red to yellow 5 : 4 and 20 : 16 are the same colour.	<u>Higher</u> • Interpret a description of a journey into a distance–time or speed–time graph. • Calculate various measures given a graph. • Calculate an end point of a line segment given one coordinate and its midpoint. • Find the equation of the line passing through two coordinates by calculating the gradient first. • Understand that the form $y = mx + c$ or $ax + by = c$ represents a straight line. • Calculate the area and/or perimeter of shapes with different units of measurement. • Understand that answers in terms of π are more accurate. • Calculate the perimeters and/or areas of circles, semicircles and quarter-circles given the radius or diameter and vice versa. • Round 16,000 people to the nearest 1000. • Round 1100 g to 1 significant figure. • Work out the upper and lower bounds of a formula where all terms are given to 1 decimal place. • Be able to justify that measurements to the nearest whole unit may be inaccurate

	• Simplify $z^4 \times z^3$, $y^3 \div y^2$, $(a^7)^2$, $\left(8x^6y^4\right)^{\frac{1}{3}}$. • Expand and simplify $3(t - 1) + 57$. • Factorise $15x^2y - 35x^2y^2$. • Expand and simplify $(3x + 2)(4x - 1)$. • Factorise $6x^2 - 7x + 1$. • A room is 2 m longer than it is wide. If its area is 30 m^2 what is its perimeter? • Use fractions when working in algebraic situations. • Substitute positive and negative numbers into formulae. • Be aware of common scientific formulae. • Know the meaning of the 'subject' of a formula. • Change the subject of a formula when one step is required. • Change the subject of a formula when two steps are required. • Given a sequence, 'which is the 1st term greater than 50?' • Be able to solve problems involving sequences from real-life situations, such as: ○ 1 grain of rice on first square, 2 grains on second, 4 grains on third, etc (geometric progression), or person saves £10 one week, £20 the next, £30 the next, etc;	• When a quantity is split in the ratio 3:5, what fraction does each person get? • Find amounts for three people when amount for one given. • Express the statement 'There are twice as many girls as boys' as the ratio 2 : 1 or the linear function $y = 2x$, where x is the number of boys and y is the number of girls. • Does 2, 3, 6 give a right-angled triangle? • Justify when to use Pythagoras' Theorem and when to use trigonometry.	by up to one half in either direction.

	○ What is the amount of money after x months saving the same amount, or the height of tree that grows 6 m per year; ○ Compare two pocket money options, e.g. same number of £ per week as your age from 5 until 21, or starting with £5 a week aged 5 and increasing by 15% a year until 21.		
How parents / carers can support	Parents can support students in various ways with their progress in Mathematics. The main way is to be encouraging of their efforts and positive about Mathematics in general. Studies have shown that students flourish in Mathematics when parents and carers are positive about the subject themselves. On a practical note, supporting students with their homework and independent revision is extremely helpful. Online help can be found at: MathsWatch – this will have homework set for students as well as work they can	Parents can support students in various ways with their progress in Mathematics. The main way is to be encouraging of their efforts and positive about Mathematics in general. Studies have shown that students flourish in Mathematics when parents and carers are positive about the subject themselves. On a practical note, supporting students with their homework and independent revision is extremely helpful. Online help can be found at: MathsWatch – this will have homework set for students as well as work they can	Parents can support students in various ways with their progress in Mathematics. The main way is to be encouraging of their efforts and positive about Mathematics in general. Studies have shown that students flourish in Mathematics when parents and carers are positive about the subject themselves. On a practical note, supporting students with their homework and independent revision is extremely helpful. Online help can be found at: MathsWatch – this will have homework set for students as well as work they can

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	Autumn	Spring	Summer
Year 10	Foundation • Statistics UNIT 4: Scatter diagrams and correlation • UNIT 10: Transformations • UNIT 11: Ratio and Proportion • UNIT 12: Right-angled triangles: Pythagoras and trigonometry Higher • Statistics UNIT 4: Scatter diagrams and correlation • UNIT 9: Algebra: Solving quadratic equations and inequalities, solving simultaneous equations algebraically • UNIT 10: Probability	Foundation • UNIT 13: Probability • Statistics UNIT 6: Probability • UNIT 14: Multiplicative reasoning: more percentages, rates of change, compound measures • Statistics UNIT 7: Index numbers Higher • UNIT 11: Multiplicative reasoning: direct and inverse proportion, relating to graph form for direct, compound measures, repeated proportional change • UNIT 12: Similarity and congruence in 2D and 3D • UNIT 13: Sine and cosine rules, $ab \sin C$, trigonometry and Pythagoras' Theorem in 3D, trigonometric graphs, and accuracy and bounds	• UNIT 15: Constructions: triangles, nets, plan and elevation, loci, scale drawings and bearings • UNIT 16: Algebra: quadratic equations and graphs • UNIT 17: Perimeter, area and volume 2: circles, cylinders, cones and spheres Higher • Statistics UNIT 5: Time series analysis • UNIT 14: Statistics and sampling, cumulative frequency and histograms • UNIT 15: Quadratics, expanding more than two brackets, sketching graphs, graphs of circles, cubes and quadratics • UNIT 16: Circle theorems and circle geometry • Statistics UNIT 7: Index numbers
Why?	All mathematics learned is used to help build curious mathematicians that can solve problems related to each unit. Such as Foundation • Understand that translations are specified by a distance and direction (using a vector).	All mathematics learned is used to help build curious mathematicians that can solve problems related to each unit. Such as Foundation • Mark events on a probability scale and use the language of probability.	All mathematics learned is used to help build curious mathematicians that can solve problems related to each unit. Such as Foundation • Solve $3x^2 + 4 = 100$. • Expand $(x + 2)(x + 6)$. • Factorise $x^2 + 7x + 10$.

	• Describe and transform a given shape by either a rotation or a translation. • Describe and transform a given shape by a reflection. • Convince me the scale factor is, for example, 2.5. • Write a ratio to describe a situation such as 1 blue for every 2 red, or 3 adults for every 10 children. • Recognise that two paints mixed red to yellow 5 : 4 and 20 : 16 are the same colour. • Express the statement 'There are twice as many girls as boys' as the ratio 2 : 1 or the linear function $y = 2x$, where x is the number of boys and y is the number of girls. • Does 2, 3, 6 give a right angled triangle? • Justify when to use Pythagoras' Theorem and when to use trigonometry. Higher • Recognise similar shapes because they have equal corresponding angles and/or sides scaled up in same ratio. • Understand that translations are specified by a distance and direction (using a vector). • Recognise that enlargements preserve angle but not length. • Understand that distances and angles are preserved under rotations, reflections and translations so that any shape is congruent to its image.	• If the probability of outcomes are x, $2x$, $4x$, $3x$ calculate x. • Calculate the probability of an event from a two-way table or frequency table. • Decide if a coin, spinner or game is fair. • Understand the use of the 0–1 scale to measure probability. • List all the outcomes for an experiment. • Know and apply the fact that the sum of probabilities for all outcomes is 1. • Draw a Venn diagram of students studying French, German or both, and then calculate the probability that a student studies French given that they also study German • Know that measurements using real numbers depend upon the choice of unit, with speedometers and rates of change. • Change m/s to km/h. • Understand direct proportion as: as x increase, y increases. • Understand inverse proportion as: as x increases, y decreases. Higher • Change g/cm^3 to kg/m^3, kg/m^2 to g/cm^2, m/s to km/h. • Solve word problems involving direct and inverse proportion. • Understand direct proportion as: as x increases, y increases. • Understand inverse proportion as: as x increases, y decreases.	• Solve $x^2 + 7x + 10 = 0$. • Solve $(x - 3)(x + 4) = 0$. • Recognise a quadratic graph from its shape. • Recall terms related to a circle. • Understand that answers in terms of pi are more accurate. Higher • Explain why a sample may not be representative of a whole population. • Carry out their own statistical investigation and justify how sources of bias have been eliminated. • Construct cumulative frequency graphs, box plots and histograms from frequency tables. • Compare two data sets and justify their comparisons based on measures extracted from their diagrams where appropriate in terms of the context of the data. • Expand $x(x - 1)(x + 2)$. • Expand $(x - 1)^3$. • Expand $(x + 1)(x + 2)(x - 1)$. • Sketch $y = (x + 1)^2(x - 2)$. • Interpret a pair of simultaneous equations as a pair of straight lines and their solution as the point of intersection.

	• Understand that similar shapes are enlargements of each other and angles are preserved. • Able to read and construct scale drawings. • When given the bearing of a point A from point B, can work out the bearing of B from A. • Know that scale diagrams, including bearings and maps, are 'similar' to the real-life examples. • Able to sketch the locus of point on a vertex of a rotating shape as it moves along a line, of a point on the circumference and at the centre of a wheel. • Solve $3x^2 + 4 = 100$. • Know that the quadratic formula can be used to solve all quadratic equations, and often provides a more efficient method than factorising or completing the square. • Have an understanding of solutions that can be written in surd form. • Use inequality symbols to compare numbers. • Given a list of numbers, represent them on a number line using the correct notation. • Solve equations involving inequalities. • If the probability of outcomes are x, $2x$, $4x$, $3x$, calculate x. • Draw a Venn diagram of students studying French, German or both, and then calculate the probability that a	• Recognise that all corresponding angles in similar shapes are equal in size when the corresponding lengths of sides are not. • Understand that enlargement does not have the same effect on area and volume. • Understand, from the experience of constructing them, that triangles satisfying SSS, SAS, ASA and RHS are unique, but SSA triangles are not. • Match the characteristic shape of the graphs to their functions and transformations. • Find the area of a segment of a circle given the radius and length of the chord. • Justify when to use the cosine rule, sine rule, Pythagoras' Theorem or normal trigonometric ratios to solve problems.	• Be able to state the solution set of $x^2 - 3x - 10 < 0$ as $\{x: x < -3\} \cup \{x: x > 5\}$. • Justify clearly missing angles on diagrams using the various circle theorems. • Justify if a straight-line graph would pass through a circle drawn on a coordinate grid.

	student studies French given that they also study German.		
How parents / carers can support	Parents can support students in various ways with their progress in Mathematics. The main way is to be encouraging of their efforts and positive about Mathematics in general. Studies have shown that students flourish in Mathematics when parents and carers are positive about the subject themselves. On a practical note, supporting students with their homework and independent revision is extremely helpful. Online help can be found at: MathsWatch – this will have homework set for students as well as work they can access independently along with help videos Corbettmaths – Videos, worksheets, 5-a-day and much more This has past exam questions sorted by topic as well as past papers and help videos by topic	Parents can support students in various ways with their progress in Mathematics. The main way is to be encouraging of their efforts and positive about Mathematics in general. Studies have shown that students flourish in Mathematics when parents and carers are positive about the subject themselves. On a practical note, supporting students with their homework and independent revision is extremely helpful. Online help can be found at: MathsWatch – this will have homework set for students as well as work they can access independently along with help videos Corbettmaths – Videos, worksheets, 5-a-day and much more This has past exam questions sorted by topic as well as past papers and help videos by topic	Parents can support students in various ways with their progress in Mathematics. The main way is to be encouraging of their efforts and positive about Mathematics in general. Studies have shown that students flourish in Mathematics when parents and carers are positive about the subject themselves. On a practical note, supporting students with their homework and independent revision is extremely helpful. Online help can be found at: MathsWatch – this will have homework set for students as well as work they can access independently along with help videos Corbettmaths – Videos, worksheets, 5-a-day and much more This has past exam questions sorted by topic as well as past papers and help videos by topic

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	Autumn	Spring	Summer
Year 11	<u>Foundation</u> • UNIT 18: More fractions, reciprocals, standard form, zero and negative indices • UNIT 19: Congruence, similarity and vectors • UNIT 20: Rearranging equations, graphs of cubic and reciprocal functions and simultaneous equations <u>Higher</u> • UNIT 17: Changing the subject of formulae (more complex), algebraic fractions, solving equations arising from algebraic fractions, rationalising surds, proof • Statistics UNIT 6: Probability • UNIT 18: Vectors and geometric proof • UNIT 19: Direct and indirect proportion: using statements of proportionality, reciprocal and exponential graphs, rates of change in graphs, functions, transformations of graphs • Probability UNIT 8: Probability distributions	From the spring term in year 11 all students will be preparing for their GCSE examinations by revising in lessons using bespoke lesson sequences.	
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	<u>Foundation</u> • What is the reciprocal of 4, $\frac{1}{2}$, -2, $-\frac{1}{2}$? • Write 51 080 in standard form. • Write 3.74×10^{-6} as an ordinary number. • What is 9^0? • Understand similarity as one shape being an enlargement of the other. • Recognise that all corresponding angles in similar shapes are equal in size when the corresponding lengths of sides are not equal in size. • Use *AB* notation for describing lengths and $\angle ABC$ notation for describing angles. • Solve two simultaneous equations in two variables (linear/linear) algebraically and find approximate solutions using a graph. • Identify expressions, equations, formulae and identities from a list. <u>Higher</u> • Add and subtract vectors algebraically and use column vectors. • Solve geometric problems and produce proofs.		

	• Explain why you cannot find the area under a reciprocal or tan graph. • Understand that when two quantities are in direct proportion, the ratio between them remains constant. • Know the symbol for 'is proportional to'. • Rationalise: $\frac{1}{\sqrt{3}-1}$, $\frac{1}{\sqrt{3}}$, $(\sqrt{18} + 10) + \sqrt{2}$. • Explain the difference between rational and irrational numbers. • Given a function, evaluate f(2). • When $g(x) = 3 - 2x$, find $g^{-1}(x)$.		
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