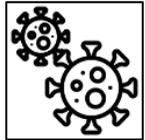




Maths Curriculum Map

<p>St. Cuthbert's Curriculum Vision</p> 	<p>The curriculum at St Cuthbert's provides ambitious educational opportunities for all members of our community. The curriculum equips our students with the knowledge, skills and personal characteristics they need to flourish as literate, articulate, global citizens, who fulfil the Catholic Mission to bring about the Common Good.</p>
<p>Maths Curriculum Vision</p> 	<p>At St Cuthbert's we believe that the first three years of mathematical learning at high school are absolutely vital. Not only are they crucial for laying down the building-blocks of key core knowledge and skills for academic success but these are the years for discovering academic interests and gaining a love for the subject of maths. To enable this to occur, our curriculum has been designed so that lessons are academically challenging and sequenced to promote interleaving and the mastery of topics. The next stage is to develop versatility in the students by applying the key core knowledge and skills they have learnt in KS3 to a wider variety of topics and situations and to equip the students for the use of maths in the real world. In building on the GCSE content through years 10 and 11, we create adaptable and resilient learners. As well as solidifying and expanding upon knowledge of previously taught topics, students will also be introduced to a number of new mathematical areas.</p>

Curriculum Icons Key

Catholic Mission	Careers (CEIAG)	COVID Catch-up	Cultural Capital	Enrichment Opportunities	Preparing for life in modern Britain	Literacy and communication	Skills for Life
							



	Maths 'at a glance'					
	AUTUMN		SPRING		SUMMER	
YEAR 7	Algebraic Thinking	Place Value & Proportion	Applications of Number	Directed Number & Fractional Thinking	Lines & Angles	Reasoning with Number
YEAR 8	Proportional Reasoning	Representations	Algebraic Techniques	Developing Number	Developing Geometry	Reasoning with Data
YEAR 9	Reasoning with Algebra	Constructing in 2D and 3D Dimensions	Reasoning with Number	Reasoning with Geometry	Reasoning with Proportion	Representations
YEAR 10	Similarity	Developing Algebra	Geometry	Proportions & Proportional Change	Delving into Data	Using Number
YEAR 11	Graphs	Algebra	Reasoning	Revision & Communication		



Y7 Maths

Year 7		AUTUMN	SPRING	SUMMER
Year 7	Theme	 Algebraic Thinking Place Value & Proportion 	 Applications of Number Directed Number Fractional Thinking 	 Lines & Angles Reasoning with Number 
	Knowledge / skills	<p><u>Sequences</u></p> <ul style="list-style-type: none"> Describe and continue both linear and non-linear sequences in diagram and number forms. <p><u>Algebraic Notation</u></p> <ul style="list-style-type: none"> Using function machines with numbers and letters. Interpret algebraic notation. Forming & substituting into expressions, including generating sequences. Represent functions graphically. <p><u>Equality & Equivalence</u></p> <ul style="list-style-type: none"> Forming & solving one and two step equations. Collecting like terms. Understanding equivalence and fact families. <p><u>Place Value and Ordering</u></p> <ul style="list-style-type: none"> Integer place value up to 1 billion. Decimal place value to hundredths 	<p><u>Addition & Subtraction</u></p> <ul style="list-style-type: none"> Use formal methods of addition/subtraction with integers and decimals. Solve problems in the context of perimeter, money and frequency trees/tables. <p><u>Multiplication & Division</u></p> <ul style="list-style-type: none"> Multiplying by powers of 10. Unit conversions Formal methods of multiplication and division. HCF and LCM Areas of triangles, rectangles and parallelograms. Finding the mean Introduction to order of operations. <p><u>Fractions and percentages of amounts</u></p> <ul style="list-style-type: none"> Find a fraction of a given amount. 	<p><u>Constructing & Measuring</u></p> <ul style="list-style-type: none"> Drawing and measuring lines and angles using rulers and protractors. Using notation for lines and angles. Parallel and perpendicular lines. Recognise types of triangles, quadrilaterals and other polygons. Drawing triangles given SSS, SAS, ASA. <p><u>Geometric Reasoning</u></p> <ul style="list-style-type: none"> Finding angles at a point, on a straight line and vertically opposite. Finding missing angles from triangles and quadrilaterals. <p><u>Number Sense</u></p> <ul style="list-style-type: none"> Mental arithmetic strategies. Using known facts to derive others, including algebraic expressions. <p><u>Probability</u></p>



Year 7		AUTUMN	SPRING	SUMMER
		<ul style="list-style-type: none"> Working out and using number lines. Comparing and ordering numbers. Range and median. Rounding to powers of 10 and 1SF <p><u>Fractions/Decimals/Percentages</u></p> <ul style="list-style-type: none"> Representing tenths and hundredths on a number line. Converting between fractions, decimals and percentages. Equivalent fractions. <p><u>Additional Higher Content</u></p> <ul style="list-style-type: none"> Exploring standard index form Exploring fractions above one 	<ul style="list-style-type: none"> Use a given fraction to find the whole and/or other fractions. Find a percentage of an amount using written methods and a calculator. <p><u>Directed Number Numbers</u></p> <ul style="list-style-type: none"> Ordering negative numbers with and without context. Four operations with negative numbers. Using a calculator with negative numbers. Order of operations. <p><u>Adding & Subtracting Fractions</u></p> <ul style="list-style-type: none"> Adding and subtracting fractions with a common denominator/ a simple different denominator/and with any denominator. Addition/subtraction of mixed formats. E.g. $\frac{3}{4} + 0.2$ <p><u>Additional Higher Content</u></p> <ul style="list-style-type: none"> Addition of standard form. Area of trapezium Algebraic area/ Algebraic HCF/LCM 	<ul style="list-style-type: none"> Understanding and using set notation. Venn Diagrams Probability of a single event. <p><u>Prime Numbers & Proof</u></p> <ul style="list-style-type: none"> Types of number, including prime factorisation. Powers and roots Using counter examples. <p><u>Additional Higher Content</u></p> <ul style="list-style-type: none"> Parallel lines rules Angles in a polygon Proof of angles rules Venn diagrams for HCF and LCM



Year 7		AUTUMN	SPRING	SUMMER
			<ul style="list-style-type: none"> Add and subtract simple algebraic fractions. 	
	Rationale	<p>Links to previous learning:</p> <ul style="list-style-type: none"> KS2 knowledge of place value, ordering numbers, rounding and being able to convert between fractions/decimals/percentages and recognise their equivalence. <p>Links to future learning:</p> <ul style="list-style-type: none"> Solving equations. Substitution. Equivalent expressions. <p>Why? The majority of students begin high school with a very good understanding and fluency of number, and in the past number has been chosen as the topic to begin KS3 with because of this reason. However, historically it has just been a period of weeks where the students are just being retaught skills that they can already do from KS2. By beginning our KS3 journey with Algebra, not only should it</p>	<p>Links to previous learning:</p> <ul style="list-style-type: none"> KS2 knowledge of addition/subtraction/multiplication and division. Sequences from the autumn term. KS2 knowledge of fractions. <p>Links to future learning:</p> <ul style="list-style-type: none"> Substitution of negative numbers into more difficult formula. Solving equations with negative solutions. Multiplying and dividing fractions. Area of circles and trapezia. <p>Why? As a very large part of our curriculum relies on students being able to be fluent in the four major operations of mathematics (Addition/Subtraction/Multiplication/Division), our next theme for year 7 is the application of number, which focusses on the written methods for each operation and then different contexts for their uses. By mastering these skills in year 7, many</p>	<p>Links to previous learning:</p> <ul style="list-style-type: none"> KS2 knowledge of different types of number, e.g., prime. KS3 knowledge of shape and measurement. <p>Links to future learning:</p> <ul style="list-style-type: none"> Missing angles in parallel lines. Missing angles in polygons. Loci Further set notation theory. <p>Why? After three successive themes concentrating on number, the first of the two summer themes, focuses on lines and angles; mainly the fundamental basics of lines and properties of shapes, as well as finding missing angles. These skills are very important going forward in the KS3 curriculum and a sound knowledge of them in year 7 will set them up for further</p>



Year 7	AUTUMN	SPRING	SUMMER
	<p>reach out to the students own inquisitive natures, but we will also be embarking upon new skills to teach them. Not only this, but the knowledge and skills practiced in this theme can be interleaved into several other themes and topics taught throughout year 7.</p> <ul style="list-style-type: none"> • E.g.1) Solving one and two step equations can be interleaved into solving perimeter and area problems found in the Spring term, and also interleaved into solving geometrically in the Summer term. • E.g.2) Substitution into expressions and equations can be interleaved into solving area problems using formulae and with negative numbers in the spring term. • E.g.3) Expressions and equivalence can be revisited in the Number sense theme in the Summer whereby known facts are used to derive other facts. $7n = 150$, what is the value of $21n$? <p>The second theme in the Year 7 calendar involves place value and proportion and has been put in the Autumn term to make sure that all the fundamental ideas and</p>	<p>more areas of the KS3 curriculum will become accessible to the students that wouldn't originally have been. Linked into this topic for areas of contexts are finding fractions and percentages of amounts, finding areas of 2-D shapes, finding the mean and the order of operations. By introducing these early into KS3, its gives students more time for revisiting when they arrive in other contexts and themes.</p> <p>Once the four operations and their written methods have been mastered for positive numbers, the concept of negative numbers and their uses are introduced. Again, the four operations need to be revisited with negative numbers and sequences from an earlier year 7 theme can be interleaved here for a context of ordering negative numbers. Having a good understanding of negative numbers early in year 7 will set them up for future KS3 and KS4 topics which require the substitution of negative numbers into difficult formula</p> <p>Now that students have developed a good understanding of the four operations with positive and negative integers as well as decimals, this theme introduces the</p>	<p>exploration into more difficult aspects of shape in year 8 and 9.</p> <p>The final theme in year 7 is reasoning with number. It is here that students begin to discover the different types of number, e.g. factors, multiples, primes, squares, roots, powers. However, the most important aspect of this theme is the introduction of probability. Students will have had no experience of probability from KS2, and so everything taught here will be completely new. So, the basic knowledge of the probability scale, set notation and finding probabilities becomes very important here in terms of understanding and moving forward with the probability topic throughout KS3. The year 7 curriculum has been written in a way so that students get to recap work covered from KS2 as well as introducing all the basic concepts of KS3 Algebra, number, shape and probability. Once this knowledge has been taught and all the skills practised, our year 7 students will be in the best position possible to enter the more difficult curriculum of year 8.</p>



Year 7	AUTUMN	SPRING	SUMMER
	<p>concepts of number are driven home and understood before moving on to the more difficult areas of our subject. These concepts include being fluent with place value, ordering numbers, rounding and being able to convert between fractions/decimals/percentages and recognise their equivalence. Having all this knowledge of number embedded means that we can now go into the application of number theme with confidence and high expectations.</p>	<p>addition and subtraction of fractions of which students will have differing experiences from KS2. Multiplication and division of fractions is taught separately in year 8, so that students don't get confused and mixed up with all the four operations with fractions in one unit.</p>	



Y8 Maths

YEAR 8		AUTUMN	SPRING	SUMMER
Year 8	Theme	 Proportional Reasoning Representations 	 Algebraic Techniques Developing Number 	 Developing Geometry Reasoning with Data 
	Knowledge / skills	<p><u>Ratio & Scale</u></p> <ul style="list-style-type: none"> Understand ratio and its link to multiplication. Use ratio notation. Reduce ratios to simplest form. Solve ratio problems. Use scale factors, linking to ratio, to solve simple direct proportion problems. Scale diagrams and maps. <p><u>Multiplying & Dividing Fractions</u></p> <ul style="list-style-type: none"> Multiplying and dividing a fraction by and integer and a fraction. <p><u>Straight Line Graphs</u></p> <ul style="list-style-type: none"> Plotting and drawing straight line graphs. Equations of lines parallel to the axis. Model situations by translating them into expressions, formulae and graphs. 	<p><u>Brackets, Equations, Inequalities</u></p> <ul style="list-style-type: none"> Multiplying out single brackets Forming and using expressions, formula and identities. Forming and solving equations and inequalities with and without brackets. <p><u>Sequences</u></p> <ul style="list-style-type: none"> Sequences using more complex rules e.g. with brackets and squared terms. <p><u>Indices</u></p> <ul style="list-style-type: none"> Writing expressions with powers. <p><u>Fractions & Percentages</u></p> <ul style="list-style-type: none"> Revisit FDP equivalence. One number as a percentage of another. <p><u>Standard Form</u></p> <ul style="list-style-type: none"> Conversion between numbers in ordinary and standard form. 	<p><u>Geometric Reasoning</u></p> <ul style="list-style-type: none"> Finding angles at a point, on a straight line and vertically opposite. Finding missing angles from triangles and quadrilaterals. <p><u>Parallel Lines & Polygons</u></p> <ul style="list-style-type: none"> Parallel lines and angles. Revisit geometric notation. Angles in special quadrilaterals. Angles in a polygon. <p><u>Area of Trapezia & Circles</u></p> <ul style="list-style-type: none"> Revisit Y7 area of shapes. Area of a trapezium. Area/circumference of a circle and parts of a circle. Area of compound shapes. <p><u>Symmetry & Reflection</u></p> <ul style="list-style-type: none"> Line symmetry in polygons and other shapes.

YEAR 8	AUTUMN	SPRING	SUMMER
	<p><u>Representing Data</u></p> <ul style="list-style-type: none"> Scatter graphs and correlation. Designing and using one and two way tables.  Frequency Trees. <p><u>Sets & Probability</u></p> <ul style="list-style-type: none"> Understanding and using set notation. Venn Diagrams Probability of a single event. <p><u>Probability</u></p> <ul style="list-style-type: none"> Listing outcomes. Using sample space diagrams Using tables for probability <p><u>Additional Higher Content</u></p> <ul style="list-style-type: none"> Ratio in the form 1:n Comparing ratios Multiplying and dividing mixed numbers. Finding the equation of a straight line. Finding the midpoint of a line segment. Drawing quadratic graphs. Product rule for counting. Probabilities from two way tables. 	<ul style="list-style-type: none"> Comparing numbers in standard form. <p><u>Number Sense</u></p> <ul style="list-style-type: none"> Developing mental strategies. Measures and units. Estimation, including rounding to a given number of decimal places. Revisit order of operations. <p><u>Prime Numbers & Proof</u></p> <ul style="list-style-type: none"> Types of number, including prime factorisation. Powers and roots Using counter examples. <p><u>Additional Higher Content</u></p> <ul style="list-style-type: none"> Factorising into a single bracket. Expanding binomials Solving equations with unknowns on both sides. Find the rule for the nth term of a linear sequence. Finding the original given any percentage. Calculating with standard form. Negative and simple fractional indices. Converting area units. Error interval notation. 	<ul style="list-style-type: none"> Reflections of shapes in horizontal, vertical and diagonal lines. <p><u>Data Handling Cycle</u></p> <ul style="list-style-type: none"> Collecting data. Interpreting statistical diagrams. Dual bar charts. Constructing and interpreting pie charts. Stem & Leaf diagrams. <p><u>Location & Dispersion</u></p> <ul style="list-style-type: none"> Median and mean revisited  Mean for grouped data The mode Choosing the appropriate average. Revisiting finding the range. Comparing distributions. <p><u>Additional Higher Content</u></p> <ul style="list-style-type: none"> Area and arc length of a sector. Diagonal properties of quadrilaterals. Finding unknown data values given the mean or changes in the mean.



YEAR 8		AUTUMN	SPRING	SUMMER
Rationale	<p>Links to previous learning:</p> <ul style="list-style-type: none"> • KS2 knowledge of ratio. • Adding and subtracting fractions. • Year 7 knowledge of probability. <p>Links to future learning:</p> <ul style="list-style-type: none"> • Interpreting straight line graphs. • Finding the equation of a straight line. • Equations of parallel lines. <p>Why? Again, as we did with our year 7 curriculum we are beginning year 8 with a new topic that the students haven't studied for over a year. Students will have had some experience of working with ratios in KS2 with some multiplicative reasoning from proportionate situations. However, they will have had little to no experience with the more difficult type of ratio questions that we see at KS3. So, we begin our year 8 curriculum by really developing students understanding of</p>	<p>Links to previous learning:</p> <ul style="list-style-type: none"> • Year 7 knowledge of algebraic thinking. • Year 7 knowledge of sequences. • Year 7 knowledge of FDP equivalence and percentages. <p>Links to future learning:</p> <ul style="list-style-type: none"> • Calculating with standard form. • Representing inequalities on number lines. • Factorising. • Negative and fractional indices. • Error interval notation. <p>Why? The first half of the spring term is devoted to algebraic techniques with the majority of time being spent on solving harder equations with the introduction of inequalities. It was decided to study this theme at this point, because not only does algebra have to be part of the curriculum every year, but it was thought that the new skills learnt in this topic, could be carried forward and be interleaved into topics covered in the summer term.</p>	<p>Links to previous learning:</p> <ul style="list-style-type: none"> • Year 7 knowledge of lines and angles. • Year 7 knowledge of areas of 2D shapes. • Year 8 knowledge of straight line graphs. <p>Links to future learning:</p> <ul style="list-style-type: none"> • Areas of sectors. • Circle Theorems. • Reverse mean. <p>Why? Continuing with our curriculum intent of revisiting and developing, we now begin to look at developing our students' knowledge and understanding of geometry. Work on angles is explored more intently (with the introduction of parallel lines), work on area is advanced (with the introduction of the trapezium and circles) and to finish the theme we take the knowledge that has been looked at during the Geometry topic, and combine it with the knowledge that was</p>	



YEAR 8	AUTUMN	SPRING	SUMMER
	<p>ratio by using diagrams and bar models to really create a picture of the maths that is being explored. This then naturally develops into scale factors and scale diagrams due to its multiplicative nature.</p> <p>Now as students will have spent a number of weeks either multiplying or dividing certain numbers depending on the context of the ratio question, it was decided at this point to run with that theme and move onto multiplying and dividing with fractions. Again, students will have some experience of this from KS2, but in the KS3 curriculum we really start developing their fluency of the topic.</p> <p>At this point, it was decided that Graphs and tables would be added to the year 8 curriculum. The majority of this theme is brand new learning for our students and introduces some new concepts that will not only develop throughout the topic but will continue to develop in the year 9 curriculum.</p> <p>The second part of this theme involving representing data in graphs and tables, (where students will be required to list</p>	<p>Our KS3 curriculum has been constructed and developed in such a way, that whatever topics have been taught to our students in one year, are not only then interleaved into future topics in that particular year, but they are also revisited and built on in future years. And so now we decided that we would develop on all the number work that was taught in our year 7 curriculum. In terms of work with percentages, we now look at writing numbers as percentages of another. In terms of types of number, we now look at standard form. And in terms of rounding, we now look at decimal places and estimation in 1SF.</p>	<p>learnt previously in the year 8 curriculum on straight line graphs by introducing the first of our four transformations, reflections.</p> <p>We now finish the year 8 curriculum with reasoning with data. Again, this will cover a mixture of revisiting previously taught concepts from our year 7 curriculum and developing these into more advanced areas of mathematics. Due to the large amounts of content that has to be taught during KS3, while also making sure that students' enter our year 9 curriculum with the required skills that they need to be able to access it, it was decided that data would be the best way to finish year 8. The year 9 curriculum is much more focussed on the problem-solving aspect of data, so it was important that in year 8 we expose our students to the knowledge of how we collect data (advantages and disadvantages) and all the different types of statistical diagrams that they need to be familiar with at KS3.</p> <p>Once the representation of data was completed, it then seemed logical to move onto the measures of location and dispersion to interpret the data. Mean,</p>



YEAR 8		AUTUMN	SPRING	SUMMER
		outcomes and represent information in two-way tables), was an excellent opportunity for us to revisit and expand on our students' knowledge of probability.		median and range are revisited and developed into averages from a frequency table for grouped data and the mode is introduced.

Y9 Maths

YEAR 9		AUTUMN	SPRING	SUMMER
Year 9	Theme	 Reasoning with Algebra Constructing in 2D and 3D Dimensions 	 Reasoning with Number Reasoning with Geometry 	 Reasoning with Proportion Representations 
	Knowledge / skills	<p><u>Straight Line Graphs</u></p> <ul style="list-style-type: none"> Interpreting straight line graphs. Finding the equation of a straight line. Equations of parallel lines. <p><u>Forming & Solving Equations</u></p> <ul style="list-style-type: none"> Forming and solving equations in context. E.g. Angles, probability, area etc. <p><u>Testing Conjectures</u></p> <ul style="list-style-type: none"> Conjectures about odd and even numbers, prime etc. Is a given number in a sequence? Are these lines parallel? What would happen if...? <p><u>Area of Trapezia & Circles</u></p> <ul style="list-style-type: none"> Revisit Y7 area of shapes. Area of a trapezium. Area/circumference of a circle and parts of a circle. Area of compound shapes. 	<p><u>Numbers</u></p> <ul style="list-style-type: none"> Types of number. HCF and LCM. Arithmetic of fractions. Negative Numbers Revisit standard form. <p><u>Percentages</u></p> <ul style="list-style-type: none"> Percentage increase and decrease. Percentages over 100. Finding the percentage change. Using multipliers. <p><u>Maths & Money</u></p> <ul style="list-style-type: none"> Wages and taxes. Bills and bank statements. Interest. (Simple & Compound) Best Buys.  <p><u>Deduction</u></p> <ul style="list-style-type: none"> Revisit angle rules, including within quadrilaterals and algebraic situations. 	<p><u>Enlargement & Similarity</u></p> <ul style="list-style-type: none"> Enlarge shapes by a positive scale factor, including from a given point. Calculate the lengths of missing sides in similar shapes. <p><u>Solving Ratio & Proportion</u></p> <ul style="list-style-type: none"> Direct proportion problems and graphs. Conversion graphs. Solving ratio problems given the whole or a part. <p><u>Rates</u></p> <ul style="list-style-type: none"> Speed, distance, time Density Working with compound units. <p><u>Algebraic Representation</u></p> <ul style="list-style-type: none"> Draw and interpret quadratic graphs. Interpret graphs, including reciprocal and piece-wise.



YEAR 9	AUTUMN	SPRING	SUMMER
	<p><u>3D Shapes</u></p> <ul style="list-style-type: none"> • Faces, edges and vertices. • Names of prisms and non-prisms. • Identifying 2D shapes within 3D shapes. • Volume and surface area of cuboids and cylinders. • Volume of any prism. <p><u>Constructions & Congruency</u></p> <ul style="list-style-type: none"> • Nets • Scale drawing • Constructing perpendicular bisectors. • Exploring congruency via construction. <p><u>Additional Higher Content</u></p> <ul style="list-style-type: none"> • Solving simultaneous equations graphically. • Changing the subject of the formula. • Converting between volume units. • Surface area of any prism. • Loci 	<p><u>Symmetry & Reflection</u></p> <ul style="list-style-type: none"> • Line symmetry in polygons and other shapes. • Reflections of shapes in horizontal, vertical and diagonal lines. <p><u>Rotation & Translation</u></p> <ul style="list-style-type: none"> • Identifying the order of rotational symmetry. • Rotating shapes. • Translating points and shapes. <p><u>Pythagoras' Theorem</u></p> <ul style="list-style-type: none"> • Identifying the hypotenuse of a right angled triangle. • Determining whether a triangle is right angled. • Calculating missing sides in right angled triangles. <p><u>Additional Higher Content</u></p> <ul style="list-style-type: none"> • Reverse percentages. • Repeated percentage change. • Angles proofs • Combined transformations. • Exploring proofs of Pythagoras' Theorem. 	<ul style="list-style-type: none"> • Represent inequalities. <p><u>Probability</u></p> <ul style="list-style-type: none"> • Single event probability. • Relative frequency – including convergence. • Expected outcomes. • Independent events. • Use diagrams to work out probabilities. <p><u>Data Handling Cycle</u></p> <ul style="list-style-type: none"> • Collecting data. • Interpreting statistical diagrams.  • Dual bar charts. • Constructing and interpreting pie charts. • Stem & Leaf diagrams. <p><u>Additional Higher Content</u></p> <ul style="list-style-type: none"> • Enlarge shapes by a negative scale factor. • Similar triangles. • Inverse proportion graphs. • Converting compound measures. • Conditional probability.



YEAR 9		AUTUMN	SPRING	SUMMER
			<ul style="list-style-type: none"> Using Pythagoras' theorem in 3D shapes. Simplifying Surds 	
	Rationale	<p>Links to previous learning:</p> <ul style="list-style-type: none"> Year 8 knowledge of straight line graphs. Year 8 knowledge of solving equations. Year 7/8 knowledge of 2D properties and area. <p>Links to future learning:</p> <ul style="list-style-type: none"> Solving simultaneous equations both algebraically and graphically. Surface area of harder prisms. Rearranging Formula. <p>Why? Our year 9 curriculum, just like our year 7 and 8 curriculum, begins with our students learning completely new concepts. In year 8, they will have had experience of drawing straight line graphs in the form $y = mx + c$, but now we begin to explore exactly what this means and how we can find these equations given the graph first and from two coordinates. All previous work on solving equations is now built on to include unknowns on both</p>	<p>Links to previous learning:</p> <ul style="list-style-type: none"> Year 7/8 knowledge of different types of number. Year 7/8 knowledge of percentages. Year 7/8 knowledge of angle rules. <p>Links to future learning:</p> <ul style="list-style-type: none"> Angle proofs. Combined transformations. 3D Pythagoras. Reverse percentage change. <p>Why? As with a lot of our rationale for teaching certain topics at certain times, this theme of reasoning with number is a classic example of revisiting and developing. Here we look at several concepts that have been taught in the previous 2 KS3 years and develop them further into more difficult areas of maths. For example, types of number is revisited, and then this is developed to finding the HCF and LCM from a Venn diagram.</p>	<p>Links to previous learning:</p> <ul style="list-style-type: none"> Year 8/9 knowledge of transformations. Year 8 knowledge on ratio. <p>Links to future learning:</p> <ul style="list-style-type: none"> Similar triangles. Enlarging shapes by a negative scale factor. Tree diagrams with conditional probability. <p>Why? We had one more geometrical transformation left to cover at KS3 and that was enlargement. And considering that enlargements are similar shapes, we decided that we would teach finding missing lengths from similar shapes alongside this topic. Due to the multiplicative nature of what we had already taught thus far in this theme, we decided to revisit our work previously covered on ratio and proportion and</p>



YEAR 9	AUTUMN	SPRING	SUMMER
	<p>sides. Once this has been covered, the focus is on how to form equations over a variety of different contexts and then how to solve them.</p> <p>One of the major changes in the new curriculum involves students being able to reason mathematically and be able to construct an argument based on the facts in front of them. Our last topic in the theme of reasoning with algebra really focusses on this area and exposes our students to different contexts and conjectures.</p> <p>In the second part of the autumn term we have decided to teach 3-D shapes and construction, mainly to carry on the theme of teaching completely new topics at KS3. From KS2, our students will have had some experience with cubes and cuboids, but now we introduce lots of other 3-D shapes which they are not only required to know the name of, but also the properties of.</p> <p>Having revisited properties of 2-D shapes and taught properties of 3-D shapes, it was a logical step to then look at nets and constructions. Nets are a fundamental</p>	<p>In another example, percentages are revisited and then is developed into percentage change and increase/decrease using multipliers. We then thought that at this point, it would be a perfect opportunity to introduce maths and money in the real world, where students will get to experience taxes and bank statements, as well as look at further percentage units such as simple interest.</p> <p>In this theme we look to finalise the geometrical units from the national curriculum by looking at Pythagoras and two more transformations (rotations and translations). However, as we didn't want our students going a whole year of KS3 without the study of angles, we have added a unit at the beginning of this theme, whereby all the content covered in year 7 and 8 is revisited and is extended to more difficult problem-solving contexts.</p>	<p>extend it into graphical representations as well as introducing different types of rates (time and density).</p> <p>The final half of the summer term presented us with an opportunity to revisit lots of previously studied topics as we only needed to cover very few features of the KS3 national curriculum, as we had covered almost all of it in what we had taught so far over the three years of KS3. So, it was decided that this block would be used develop our knowledge and skills in the areas of probability and algebraic representation as both these areas will be built on heavily in the KS4 curriculum. New topics such as tree diagrams and representing inequalities on a number line will be taught alongside this.</p>



YEAR 9		AUTUMN	SPRING	SUMMER
		part of 3-D shapes, and the reasoning behind why each construction works, is to do with a particular property of a 2-D shape.		

Y10 Maths

YEAR 10		AUTUMN	SPRING	SUMMER
Year 10	Theme	 Similarity Developing Algebra 	 Geometry Proportions & Proportional Change 	 Delving into Data Using Number 
	Knowledge / skills	<p><u>Congruence/Similarity/Enlargement</u></p> <ul style="list-style-type: none"> Understand the difference between congruence and similarity. Enlarge a shape about a given point; understand and use similarity. Find missing sides in similar shapes including pairs of similar triangles. <p><u>Trigonometry</u></p> <ul style="list-style-type: none"> Find lengths and angles in right angled triangles. Know the exact values of key angles. <p><u>Equations & Inequalities</u></p> <ul style="list-style-type: none"> Forming and solving in a variety of contexts, eg, area, angles, probability, ratio. <p><u>Algebraic Representation</u></p>	<p><u>Angles & Bearings</u></p> <ul style="list-style-type: none"> Review of KS3 angles rules. Understanding and using bearings. <p><u>Working with Circles</u></p> <ul style="list-style-type: none"> Reviewing area and circumference. Parts of a circle – names and calculations. Area and arc length of sectors. Circle related areas and volumes – cylinder, sphere, cone etc. <p><u>Vectors</u></p> <ul style="list-style-type: none"> Understanding vector notation. Vector arithmetic. Vectors and translations. <p><u>Solving Ratio & Proportion</u></p> <ul style="list-style-type: none"> Direct proportion problems and graphs. Conversion graphs. Solving ratio problems given the whole or a part. 	<p><u>Collecting & Representing Data</u></p> <ul style="list-style-type: none"> Sampling.  Discussing limitations. Time Series Dealing with grouped data. Correlation. Lines of best fit/ extrapolation dangers. Frequency polygons. Measures of location and dispersion. Comparing distributions. <p><u>Non calculator methods</u></p> <ul style="list-style-type: none"> Four operations with FDP. With and without context. Negative number arithmetic. Percentage calculations. <p><u>Types of number/ sequences</u></p> <ul style="list-style-type: none"> Factors, multiples, primes and prime factorisation.



YEAR 10	AUTUMN	SPRING	SUMMER
	<ul style="list-style-type: none"> • Draw and interpret quadratic graphs. • Interpret graphs, including reciprocal and piece-wise. • Represent inequalities. <p><u>Representing Solutions</u></p> <ul style="list-style-type: none"> • Plotting and using linear graphs. • Using number lines. <p><u>Simultaneous Equations</u></p> <ul style="list-style-type: none"> • Forming and solving linear simultaneous equations both graphically and algebraically. <p><u>Additional Higher Content</u></p> <ul style="list-style-type: none"> • Proof of congruent triangles. • Enlargement by negative SF. • 3D trigonometry. • Using the Sine and Cosine rules. • Using $\frac{1}{2}ab \sin C$ for the area of non-right angled triangles. • Using set notation for solutions. • Inequalities in two variables, identifying regions. • Solving quadratic equations and inequalities (by factorisation only). • Simplifying Algebraic Fractions 	<p><u>Ratios & Fractions</u></p> <ul style="list-style-type: none"> • Using ratios, including with mixed units. • Fractions in ratios • Fractions from ratios. <p><u>Percentages & Interest</u></p> <ul style="list-style-type: none"> • Converting FDP. • Finding percentages. • Finding as a percentage. • Simple & Compound interest. • Depreciation. • Reverse percentages. • Repeated percentage change. <p><u>Probability</u></p> <ul style="list-style-type: none"> • Single event probability. • Relative frequency – including convergence. • Expected outcomes. • Independent events. • Use diagrams to work out probabilities. <p><u>Probability</u></p> <ul style="list-style-type: none"> • Review of single event probability. 	<ul style="list-style-type: none"> • Arithmetic and geometric sequences. • Other sequences. <p><u>Indices & roots</u></p> <ul style="list-style-type: none"> • Working out powers and roots. • Standard index form. • Exact answers. <p><u>Additional Higher Content</u></p> <ul style="list-style-type: none"> • Cumulative frequency and box plots. • Histograms • Nth term of a quadratic sequence. • Fractional & negative indices. • Rational and irrational numbers. • Calculating with surds. • Expanding brackets with surds. • Rationalising the denominator. • Recurring decimals. • Limits of accuracy. • Upper and lower bounds.





YEAR 10		AUTUMN	SPRING	SUMMER
		<ul style="list-style-type: none"> Simultaneous equations with one linear and one quadratic. 	<ul style="list-style-type: none"> Independent events Tree diagrams. <i>Additional Higher Content</i> Using and proving circle theorems. Area and volume ratios. Equation of a circle. Geometric proofs with vectors. Iteration Conditional probability. 	
Rationale	<p>Links to previous learning:</p> <ul style="list-style-type: none"> Year 9 knowledge of Pythagoras. Year 9 knowledge of enlargement, similarity and congruency. KS3 knowledge of solving equations and inequalities. <p>Links to future learning:</p> <ul style="list-style-type: none"> Solving quadratic equations. Solving quadratic inequalities. Proof of similarity and congruency. <p>Why? We wanted to introduce trigonometry early in year 10 so that there is plenty of time to interleave it into as many topics as possible, so that the concepts can be revisited and reviewed constantly. However, as the trigonometry topic contains finding missing sides from similar</p>	<p>Links to previous learning:</p> <ul style="list-style-type: none"> KS3 knowledge of angle rules. Year 10 knowledge of Trigonometry. KS3 knowledge of substitution. KS3 knowledge of ratio and probability. <p>Links to future learning:</p> <ul style="list-style-type: none"> Direct proportion. Inverse Proportion. <p>Why? In the Spring term, it was decided that the theme would be Geometry, as not only would we be able to interleave the topic of trigonometry into it (angles and bearings), but there are also aspects of algebra (solving equations/substitution) that we would be able to interleave into</p>	<p>Links to previous learning:</p> <ul style="list-style-type: none"> KS3 knowledge of data. KS3 knowledge number. Year 10 knowledge of trigonometry and volume. <p>Links to future learning:</p> <ul style="list-style-type: none"> Trigonometric Graphs <p>Why? For the beginning of the Summer term it was decided that Data would be revisited and extended. There are some new diagrams and graphs that our students need to learn to draw and interpret and as we hadn't scheduled any data topics into the Year 11 curriculum, it was important</p>	



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	<p>shapes, it was decided to revisit enlargement, similarity and congruency from KS3 first, extending it to harder similar triangles involving parallel sides and two triangles in one diagram. It was decided that this was also a great opportunity to revisit and extend knowledge of Pythagoras from KS3.</p> <p>As students have just spent a lot of time solving equations in the contexts of Pythagoras and trigonometry, it was decided to begin the second half of the Autumn term by developing KS3 algebra into KS4 algebra by firstly revisiting and extending previous work covered on solving equations and inequalities, secondly revisiting work on linear graphs and then finishing with the new topic of simultaneous equations.</p>	<p>using formulae to calculate areas and surface areas/volumes of circles and circle related 3-D shapes, i.e. cylinders, cones and spheres. And while we are on the topic of geometry, this was an excellent opportunity to introduce the new KS4 topic of vectors.</p> <p>By this point in year 10, our students have now revisited and extended various parts of the algebraic and geometric topics of our curriculum, so it was decided that we would now revisit and extend the multiplicative relationships of proportions and proportional change. This would look at the fractional understanding of ratio while reviewing and extending the percentage topics already covered (Compound interest & depreciation, reverse percentages & repeated percentage change). After studying this it was decided it would be a great opportunity to review and extend our KS3 knowledge of Probability with the introduction of independent events and tree diagrams.</p>	<p>that we waited until the last term in year 10 to deliver it, so that it was fresher in the students mind for when the revision part of year 11 begins.</p> <p>The only area of the mathematic curriculum that we hadn't studied thus far in the year 10 curriculum was number. And so, we decided to use the last part of the summer term to revisit, develop and extend our current knowledge of KS3 number into elements of KS4 number (I.e. Exact answers). This gives us an excellent opportunity to interleave other areas of our year 10 curriculum such as exact trigonometric values, area and volume formulae without calculators, exact answers in terms of Pi and areas of the financial maths that was covered in year 9.</p>

Y11 Maths

YEAR 11		AUTUMN	SPRING	SUMMER
Year 11	Theme	 Graphs Algebra 	 Reasoning Revision & Communication 	Revision Exams
	Knowledge / skills	<p><u>Gradients & Lines</u></p> <ul style="list-style-type: none"> Finding and using equations of lines. <p><u>Non Linear Graphs</u></p> <ul style="list-style-type: none"> Plotting quadratic curves. Understanding roots. Cubic and reciprocal graphs. Real life graphs. <p><u>Using Graphs</u></p> <ul style="list-style-type: none"> Reflecting in a line. Speed, distance, time graphs. <p><u>Expanding & Factorising</u></p> <ul style="list-style-type: none"> Expanding a single bracket and binomials. Factorise into a single bracket. Factorise quadratics with a single coefficient of x squared. Solving quadratics equations. <p><u>Changing the Subject</u></p> <ul style="list-style-type: none"> Review of solving equations. 	<p><u>Multiplicative Reasoning</u></p> <ul style="list-style-type: none"> Review of scale and enlargement. Direct and inverse proportion. Pressure and density. <p><u>Geometric Reasoning</u></p> <ul style="list-style-type: none"> Review of angle facts, focusing on language of reasons. Review of Pythagoras and trigonometry. <p><u>Algebraic Reasoning</u></p> <ul style="list-style-type: none"> Complex indices. Review of simplifying complex expressions, finding the nth term rule. Justification e.g. why a number is/isn't in a given sequence. <p><u>Transformations & Constructions</u></p> <ul style="list-style-type: none"> Revisit transformations. Constructions using ruler and protractor. 	



		<ul style="list-style-type: none"> Changing the subject of a formula where the subject appears once. <p><u>Functions</u></p> <ul style="list-style-type: none"> Inputs and outputs. Equations and identities. Using kinematic equations. <p><u>Additional Higher Content</u></p> <ul style="list-style-type: none"> Exponential graphs. Factorising Quadratics when the coefficient of x squared is greater than 1. Simplifying Harder Algebraic Fractions. Completing the square and using the quadratic formula. Equations of perpendicular lines. Equations of a tangent to a curve. Area under a curve. Changing the subject of a formula where the subject appears more than once. Composite and inverse functions. 	<ul style="list-style-type: none"> Constructions using ruler and compasses. Plans and elevations. <p><u>Listing & Describing</u></p> <ul style="list-style-type: none"> Organised lists. Using Venn diagrams. <p><u>Show that...</u></p> <ul style="list-style-type: none"> Illustrating equivalence. Justifying answers. Language of angle rules. Conditions for congruent triangles. <p><u>Additional Higher Content</u></p> <ul style="list-style-type: none"> Proportion with powers. Algebraic Proof. Trigonometrical graphs. Graph transformations. 	
	<p>Rationale</p>	<p>Links to previous learning:</p> <ul style="list-style-type: none"> KS3 knowledge of straight line graphs. Year 9 knowledge of rates. 	<p>Links to previous learning:</p> <ul style="list-style-type: none"> Year 10 knowledge of scale and enlargement. Year 10 knowledge of Pythagoras and Trigonometry. KS3/4 knowledge of algebra. 	<p>Why?</p> <p>By this point, our students will only have one half term left. From using our 5 year curriculum, the foundation students will have been taught everything to allow them to achieve a grade 4/5 on their</p>



		<ul style="list-style-type: none"> Year 10 knowledge of solving equations (including factorising quadratics) <p>Why? The beginning of the Autumn term in our year 11 curriculum starts with the theme of graphs. This theme has been put here because our students haven't studied any types of graph since KS3 and we didn't want to leave it any longer until it was revised and developed. In this unit they will revisit and extend finding and using equations of lines, plotting different types of graphs and then they will look at new types of graph i.e. speed distance time graphs.</p> <p>Having just spent the first half of the Autumn term either working with equations to draw straight lines, rearranging $y = mx + c$ to either find equations or find parallel equations or plotting graphs of several different formats (quadratic, cubic, reciprocal), it seemed logical to start the second half of the autumn term with Algebra. Here students will rediscover how to factorise and expand both single and double brackets while learning new concepts such as factorising and solving quadratic</p>	<p>Why? Going into the Spring term of our year 11 curriculum and we have almost covered every topic needed for our students to access a grade 4/5 in their summer exam. As a result of this we decided to put in a Reasoning theme at this point to really test the understanding and mastery of the topics that have been already covered both at KS3 and KS4. This involves reasoning from across multiplicative relationships, geometric and algebraic topics. Here students will be tested on not only their ability to answer a question on a particular topic, but whether they can problem solve or put forward mathematical reasons as to why a particular statement is false or whether a particular method of solution is correct.</p> <p>In the final section of our year 11 curriculum, the only new topic left to teach to our main cohort of students is plans and elevations. As this involves drawing and constructing, it was decided that at this point we would use this time to revisit all our previous work on transformations and constructions, which would then lead onto plans and</p>	<p>exam. The higher strand will have been taught everything to allow them to achieve up to a grade 9. Teachers will now cater to the needs of their own class through the use of QLA from weekly exam papers.</p>
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		equations. They will also learn how to rearrange formula to change the subject and will finish on the topic of functions.	elevations. With time left it was important that our students had some directed revision in the field of probability.	
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