3. FIVE YEAR CURRICULUM PLAN
Key Stage 3 and 4

Subject: **Mathematics**

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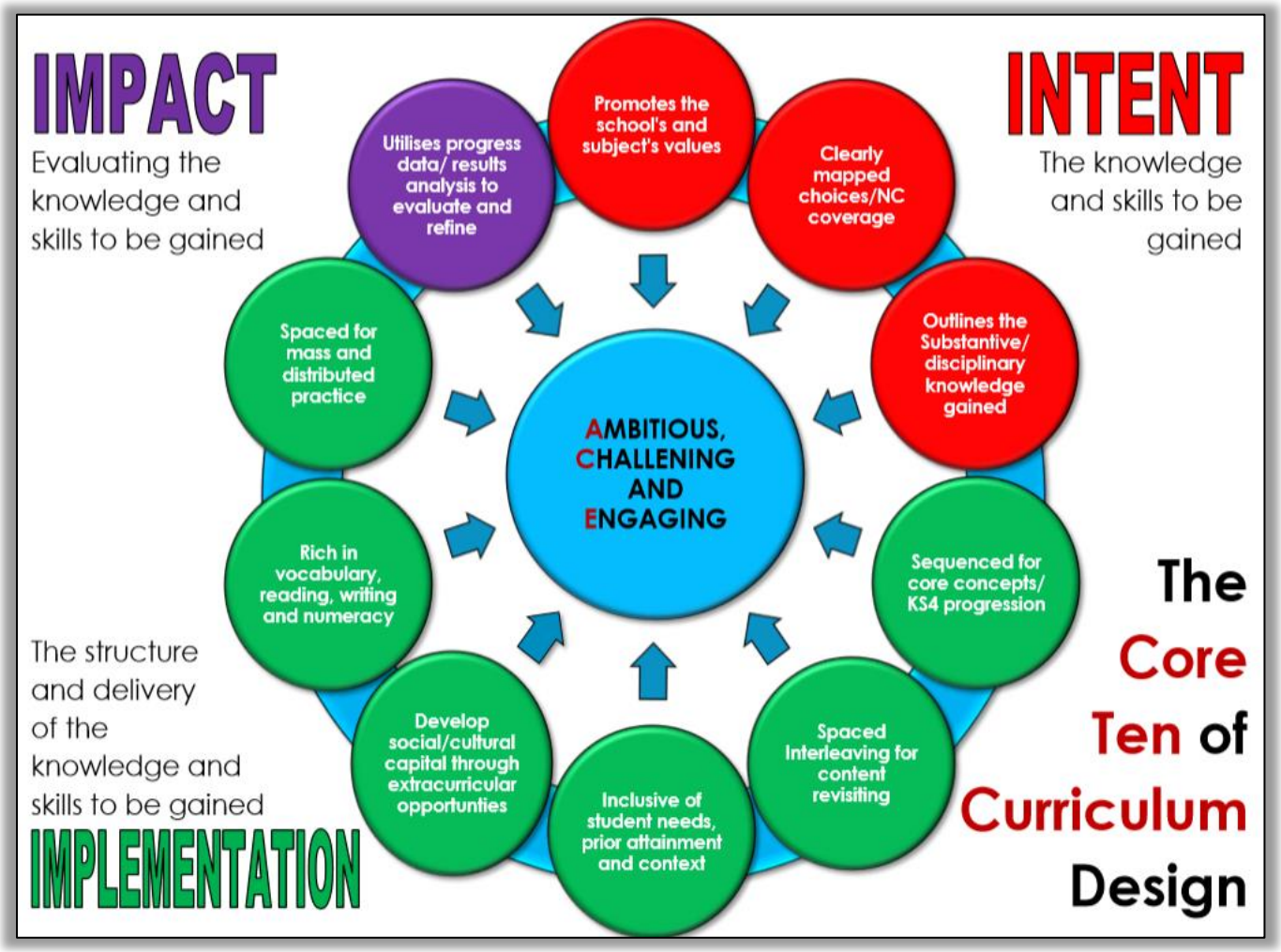

Document(s) which inform this Five Year Curriculum Plan are:

1. Curriculum Intent Overview Plan (KS3 & KS4)
2. Curriculum Implementation Overview (KS3 & KS4)

KS3 – Year 7 Year Plan

Intent

Aims:	By the time students leave in Year 11, they should: - Have a deep and broad understanding of the application of maths to a range of problems, as per the National Curriculum for KS3 and KS4. - Possess a well-rounded knowledge of number properties, calculation skills and algebraic manipulation, an appreciation of shape, space and measure, an appreciation of ratio and proportion (and its role in life) and a broad understanding of statistics and probability - Be fluent in a range of skills across the 5 key areas of mathematics (number, algebra, ratio & proportion, shape, space & measure, and statistics & probability) achieved through clear expert instruction and refined through purposeful practice, interleaving and spaced practice. - Be able to apply logic and reason to understand, unpick and solve a range of problems, including the skills of planning, conjecturing, making generalisations, developing a mathematical argument, justification, and proof - Have an appreciation of mathematics in real life contexts, and have some understanding of where the skills they have developed are used in society and other areas of specialism Have an appreciation of the language of mathematics and be able to articulate their thoughts, ideas, and conjectures in a mathematically accurate way
Academy values:	**Ambitious –** Stretch and challenge material should be available to all students in all lessons. Students are given feedback on their work and provided with personalised feedback to allow students to make the progress that is most suitable for them, encouraging them to extend their thinking further to more complex contexts where appropriate. **Brave –** Students are encouraged to take control of their own learning and can choose to access challenge work in lessons, as well as being a vehicle for their own progress by utilising the marking and feedback provided by their class teacher to move forward, regardless of ability, setting or prior attainment. Staff are asked to mark and provide feedback in a way that allows students time to reflect on the marking and provide them with a clear next step to promote progress regardless of the student's prior attainment, SES, ethnicity or SEND status **Kind –** Mathematics classrooms should build a culture of support and collaboration, where thoughts are shared freely and critiqued in a way that does not undermine or devalue the contributions students have made (both staff and students). Students are encouraged to provide positive feedback about others work during peer marking, including the use of phases such as "strengths" and "targets" for areas of improvement.

Units of Study:

Unit/Topic 1	Content:	Exploring Number	NC Content:	N4, N5
	Key Concepts:	• use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor and lowest common multiple	Powerful Knowledge:	Factoring is a useful skill in real life. Common applications include dividing something into equal pieces, exchanging money, comparing

		• use positive integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions		prices, understanding time and making calculations during travel.
Unit/Topic 2	Content:	Calculations	NC Content:	N2, N3, N4
	Key Concepts:	• understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals) • apply the four operations, including formal written methods, to integers and decimals • use conventional notation for priority of operations, including brackets recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions)	Powerful Knowledge:	Place value helps us make decisions that are used in our daily lives for example, costs, weight, distances, time etc.
Unit/Topic 3	Content:	Rounding and Estimation	NC Content:	N13, N14, N15
	Key Concepts:	• round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures) • estimate answers; check calculations using approximation and estimation, including answers obtained using technology recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions)	Powerful Knowledge:	Sometimes in life situations, it is more important to estimate your answer rather than produce an accurate result.
Unit/Topic 4	Content:	Comparing Numbers	NC Content:	N1, N2
	Key Concepts:	• order positive and negative integers, decimals and fractions use the symbols =, ≠, <, >, ≤, ≥	Powerful Knowledge:	Ordering fractions and decimals can be used within many concepts within real life, for example, when ordering measurements.
Unit/Topic 5	Content:	Constructions and conventions	NC Content:	G1
	Key Concepts:	• use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons,	Powerful Knowledge:	The triangle is the strongest to as it holds it shape and has a base which is very strong a also has a strong support. The triangle is common in all sorts of building

		regular polygons and polygons with reflection and/or rotation symmetries • use the standard conventions for labelling and referring to the sides and angles of triangles • draw diagrams from written description		supports and trusses. The overall shape of many bridges is in the shape of a catenary curve.
Unit/Topic 6	Content:	Properties of Shapes	NC Content:	G1, G4
	Key Concepts:	• *Know the connection between faces, edges and vertices in 3D shapes* • *Recognise and use nets of 3D shapes* • Know and solve problems using the properties and definitions of triangles • Know and solve problems using the properties and definitions of special types of quadrilaterals **(including diagonals)** Know and solve problems using the properties of other plane figures	Powerful Knowledge:	Whilst not an explicit objective, it is useful for students to draw and construct nets and show how they fold to make 3D solids, allowing students to make the link between 3D shapes and their nets. This will enable students to understand that there is often more than one net that can form a 3D shape.
Unit/Topic 7	Content:	Algebra Skills	NC Content:	A1, A2, A4, A7, N3
	Key Concepts:	• understand and use the concepts and vocabulary of expressions, equations, formulae and terms • use and interpret algebraic notation, including: ab in place of a × b, 3y in place of y + y + y and 3 × y, a^2 in place of a × a, a^3 in place of a × a × a, a/b in place of a ÷ b, brackets • simplify and manipulate algebraic expressions by collecting like terms and multiplying a single term over a bracket • where appropriate, interpret simple expressions as functions with inputs and outputs • substitute numerical values into formulae and expressions use conventional notation for priority of operations, including brackets	Powerful Knowledge:	

Unit/Topic 8	Content:	Fractions and Percentages	NC Content:	R3
	Key Concepts:	• Write one quantity as a fraction of another where the fraction is less than 1 • Write one quantity as a fraction of another where the fraction is greater than 1 • Write a percentage as a fraction **Write a quantity as a percentage of another**	Powerful Knowledge:	
Unit/Topic 9	Content:	Ratio	NC Content:	R4, R5
	Key Concepts:	• se ratio notation, including reduction to simplest form divide a given quantity into two parts in a given part:part or part:whole ratio	Powerful Knowledge:	Used within real life scenarios, for example recipes.
Unit/Topic 10	Content:	Sequences	NC Content:	A23
	Key Concepts:	generate terms of a sequence from a term-to-term rule	Powerful Knowledge:	
Unit/Topic 11	Content:	Measures	NC Content:	R1, G14, G15
	Key Concepts:	• use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.) • use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate • change freely between related standard units (e.g. time, length, area, volume/capacity, mass) in numerical contexts measure line segments and angles in geometric figures	Powerful Knowledge:	Real-world examples of line segments are a pencil, a baseball bat, the cord to your cell phone charger, the edge of a table, etc. Think of a real-life quadrilateral, like a chessboard; it is made of four line segments. Unlike line segments, examples of line segments in real life are endless.
Unit/Topic 12	Content:	Angles	NC Content:	G3
	Key Concepts:	apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles	Powerful Knowledge:	

Unit/Topic 13	Content:	Calculations with Fractions and Percentages	NC Content:	N2, R9
	Key Concepts:	• apply the four operations, including formal written methods, to simple fractions (proper and improper), and mixed numbers • interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively • compare two quantities using percentages solve problems involving percentage change, including percentage increase/decrease	Powerful Knowledge:	Percentage increase and decrease with relation to money. This will be beneficial within daily life as well as any careers within the financial industry.
Unit/Topic 14	Content:	Solving Equations	NC Content:	N3, A17
	Key Concepts:	• recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions) solve linear equations in one unknown algebraically	Powerful Knowledge:	Students will be introduced to questions from worded context, real life situations where there is an unknown
Unit/Topic 15	Content:	Perimeter, Area and Volume	NC Content:	R1, G14, G16, G17,
	Key Concepts:	• use standard units of measure and related concepts (length, area, volume/capacity) • calculate perimeters of 2D shapes • know and apply formulae to calculate area of triangles, parallelograms, trapezia • calculate surface area of cuboids • know and apply formulae to calculate volume of cuboids understand and use standard mathematical formulae	Powerful Knowledge:	The measurement of area and perimeter are widely used in everyday life and can be exemplified with a variety of practical situations such as measuring the size of a room by talking about its floor area, or how much fence to put around a playground.

Implementation

Progression from KS2:	• Know percentage and decimal equivalents for fractions with a denominator of 2, 3, 4, 5, 8 and 10 • Know the rough equivalence between miles and kilometres • Know that vertically opposite angles are equal • Know that the area of a triangle = base × height ÷ 2 • Know that the area of a parallelogram = base × height • Know that volume is measured in cubes • Know the names of parts of a circle

	• Know that the diameter of a circle is twice the radius • Know the conventions for a 2D coordinate grid Know that mean = sum of data ÷ number of pieces of data
Progression to Year 8:	• Know the first 6 cube numbers • Know the first 12 triangular numbers • Know the symbols =, ≠, <, >, ≤, ≥ • Know the order of operations including brackets • Know basic algebraic notation • Know that area of a rectangle = l × w • Know that area of a triangle = b × h ÷ 2 • Know that area of a parallelogram = b × h • Know that area of a trapezium = ((a + b) ÷ 2) × h • Know that volume of a cuboid = l × w × h • Know the meaning of faces, edges and vertices • Know the names of special triangles and quadrilaterals • Know how to work out measures of central tendency Know how to calculate the range
Spaced Interleaving:	Units are split up throughout the year, previous topics from a unit should be recapped when beginning the next topics (usually they form pre-requisites for the next topic), see curriculum week plan below.

Student Needs:	SEND:	SEND:	SEND:	SEND:
	LPA:	LPA:	LPA:	LPA:
Extracurricular:	Numeracy opportunities whole school around religious festivals and other key events through DNAs			
Literacy/Numeracy:	Vocab (tier 2/3):	Vocab (tier 2/3):	Vocab (tier 2/3):	Vocab (tier 2/3):
	Writing:	Writing:	Writing:	Writing:
Practice:	Mass:	Mass:	Mass:	Mass:

KS3 – Year 8 Year Plan

Intent

Aims:	By the time students leave in Year 11, they should: - Have a deep and broad understanding of the application of maths to a range of problems, as per the National Curriculum for KS3 and KS4.

	- Possess a well-rounded knowledge of number properties, calculation skills and algebraic manipulation, an appreciation of shape, space and measure, an appreciation of ratio and proportion (and its role in life) and a broad understanding of statistics and probability - Be fluent in a range of skills across the 5 key areas of mathematics (number, algebra, ratio & proportion, shape, space & measure, and statistics & probability) achieved through clear expert instruction and refined through purposeful practice, interleaving and spaced practice. - Be able to apply logic and reason to understand, unpick and solve a range of problems, including the skills of planning, conjecturing, making generalisations, developing a mathematical argument, justification, and proof - Have an appreciation of mathematics in real life contexts, and have some understanding of where the skills they have developed are used in society and other areas of specialism Have an appreciation of the language of mathematics and be able to articulate their thoughts, ideas, and conjectures in a mathematically accurate way
Academy values:	**Ambitious –** Stretch and challenge material should be available to all students in all lessons. Students are given feedback on their work and provided with personalised feedback to allow students to make the progress that is most suitable for them, encouraging them to extend their thinking further to more complex contexts where appropriate. **Brave –** Students are encouraged to take control of their own learning and can choose to access challenge work in lessons, as well as being a vehicle for their own progress by utilising the marking and feedback provided by their class teacher to move forward, regardless of ability, setting or prior attainment. Staff are asked to mark and provide feedback in a way that allows students time to reflect on the marking and provide them with a clear next step to promote progress regardless of the student's prior attainment, SES, ethnicity or SEND status **Kind –** Mathematics classrooms should build a culture of support and collaboration, where thoughts are shared freely and critiqued in a way that does not undermine or devalue the contributions students have made (both staff and students). Students are encouraged to provide positive feedback about others work during peer marking, including the use of phases such as "strengths" and "targets" for areas of improvement.

Units of Study:

Unit/Topic 1	Content:	The Power of Number	NC Content:	N4, N5
	Key Concepts:	• use the concepts and vocabulary of prime numbers, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation theorem • round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures) interpret standard form $A \times 10^n$, where $1 \leq A < 10$ and n is an integer	Powerful Knowledge:	Factoring is a useful skill in real life. Common applications include dividing something into equal pieces, exchanging money, comparing prices, understanding time and making calculations during travel.

Unit/Topic 2	Content:	Calculations	NC Content:	N1, N3
	Key Concepts:	• apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative use conventional notation for priority of operations, including brackets, powers, roots and reciprocals	Powerful Knowledge:	
Unit/Topic 3	Content:	Exploring Diagrams	NC Content:	G7, G15, R2
	Key Concepts:	• measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings • identify, describe and construct similar shapes, including on coordinate axes, by considering enlargement • interpret plans and elevations of 3D shapes use scale factors, scale diagrams and maps	Powerful Knowledge:	Enlargement is useful in design and art-based subjects as it is important to keep designs and images in proportion when scaling to make larger / smaller for different products. It will also be beneficial in careers that require technical drawings such as fashion, engineering and architecture for scale drawings, accurate measurements and calculating the amount of materials needed to produce a given product.
Unit/Topic 4	Content:	Probability	NC Content:	P1, P3, P4, P7
	Key Concepts:	• relate relative expected frequencies to theoretical probability, using appropriate language and the 0 - 1 probability scale • record describe and analyse the frequency of outcomes of probability experiments using tables • construct theoretical possibility spaces for single experiments with equally likely outcomes and use these to calculate theoretical probabilities apply the property that the probabilities of an exhaustive set of outcomes sum to one	Powerful Knowledge:	
Unit/Topic 5	Content:	Algebra Skills	NC Content:	A1, A2, A4, A5

	Key Concepts:	• use and interpret algebraic notation, including: a^2b in place of $a \times a \times b$, coefficients written as fractions rather than as decimals • understand and use the concepts and vocabulary of factors • simplify and manipulate algebraic expressions by taking out common factors and simplifying expressions involving sums, products and powers, including the laws of indices • substitute numerical values into scientific formulae rearrange formulae to change the subject	Powerful Knowledge:	
Unit/Topic 6	Content:	Fractions, Decimals and Percentages	NC Content:	N10
	Key Concepts:	work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 or 3/8)	Powerful Knowledge:	
Unit/Topic 7	Content:	Ratio and Proportion	NC Content:	R6, R8, N11,
	Key Concepts:	• express the division of a quantity into two parts as a ratio; apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations) • identify and work with fractions in ratio problems • understand and use proportion as equality of ratios • express a multiplicative relationship between two quantities as a ratio or a fraction • use compound units (such as speed, rates of pay, unit pricing) • change freely between compound units (e.g. speed, rates of pay, prices) in numerical contexts relate ratios to fractions and to linear functions	Powerful Knowledge:	Apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations)
Unit/Topic 8	Content:	Sequences	NC Content:	A23, A25
	Key Concepts:	• generate terms of a sequence from either a term-to-term or a position-to-term rule deduce expressions to calculate the nth term of linear sequences	Powerful Knowledge:	Sequences can relate to many aspects of real life contexts. It can also become cross-curricula, for example

				An insect population is growing in such a way that each new generation is 1.5 times as large as the previous generation. Suppose there are 100 insects in the first generation.
Unit/Topic 9	Content:	Missing Angles	NC Content:	G3
	Key Concepts:	• understand and use alternate and corresponding angles on parallel lines derive and use the sum of angles in a triangle (e.g. to deduce and use the angle sum in any polygon, and to derive properties of regular polygons)	Powerful Knowledge:	
Unit/Topic 10	Content:	Percentage Calculations	NC Content:	N12, R9
	Key Concepts:	• interpret fractions and percentages as operators • work with percentages greater than 100% • solve problems involving percentage change, including original value problems, and simple interest including in financial mathematics calculate exactly with fractions	Powerful Knowledge:	
Unit/Topic 11	Content:	Equations	NC Content:	A17
	Key Concepts:	solve linear equations with the unknown on both sides of the equation	Powerful Knowledge:	Students will be introduced to questions from worded context, real life situations where there is an unknown.
Unit/Topic 12	Content:	Perimeter, Area and Volume	NC Content:	R12, G9, G16, G17,
	Key Concepts:	• compare lengths, areas and volumes using ratio notation • calculate perimeters of 2D shapes, including circles • identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference • know the formulae: circumference of a circle = $2\pi r = \pi d$, area of a circle = πr^2 • calculate areas of circles and composite shapes	Powerful Knowledge:	The measurement of area and perimeter are widely used in everyday life and can be exemplified with a variety of practical situations such as measuring the size of a room by talking about its floor area, or how much fence to put around a playground.

		know and apply formulae to calculate volume of right prisms (including cylinders)		
Unit/Topic 13	Content:	Algebraic Graphs	NC Content:	A9, A10, A14,
	Key Concepts:	• plot graphs of equations that correspond to straight-line graphs in the coordinate plane • identify and interpret gradients and intercepts of linear functions graphically • recognise, sketch and interpret graphs of linear functions and simple quadratic functions plot and interpret graphs and graphs of non-standard (piece-wise linear) functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance and speed	Powerful Knowledge:	Fnd approximate solutions to problems such as simple kinematic problems involving distance and speed.
Unit/Topic 14	Content:	Applying Probability	NC Content:	N5, P1, P2, P6, P7,
	Key Concepts:	• apply systematic listing strategies • record describe and analyse the frequency of outcomes of probability experiments using frequency trees • enumerate sets and combinations of sets systematically, using tables, grids and Venn diagrams • construct theoretical possibility spaces for combined experiments with equally likely outcomes and use these to calculate theoretical probabilities apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments	Powerful Knowledge:	Students should be given the opportunity to justify the probability of events happening or not happening in real-life and abstract contexts. Use problems involving ratio and percentage, similar to: • A bag contains balls in the ratio 2 : 3 : 4. A ball is taken at random. Work out the probability that the ball will be … ; • In a group of students 55% are boys, 65% prefer to watch film *A*, 10% are girls who prefer to watch film *B*. One student picked at random. Find the probability that this is a boy who prefers to watch film *A* (P6).
Unit/Topic 15	Content:	Data Presentations	NC Content:	S4, S6
	Key Concepts:	• interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data	Powerful Knowledge:	Interpreting, analysing and using tables in real life context are used in many scenarios. They are also incorporated within many jobs. For example, a company may collect data based on their product or service and using the table of information,

		• use and interpret scatter graphs of bivariate data recognise correlation		compare the spread of the data collected by the company.
Unit/Topic 16	Content:	Averages	NC Content:	S4, S6
	Key Concepts:	• interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data • use and interpret scatter graphs of bivariate data recognise correlation	Powerful Knowledge:	

Implementation

Progression from Year 7:	• Know the first 6 cube numbers • Know the first 12 triangular numbers • Know the symbols =, ≠, <, >, ≤, ≥ • Know the order of operations including brackets • Know basic algebraic notation • Know that area of a rectangle = l × w • Know that area of a triangle = b × h ÷ 2 • Know that area of a parallelogram = b × h • Know that area of a trapezium = ((a + b) ÷ 2) × h • Know that volume of a cuboid = l × w × h • Know the meaning of faces, edges and vertices • Know the names of special triangles and quadrilaterals • Know how to work out measures of central tendency Know how to calculate the range
Progression to Year 9:	• Know how to write a number as a product of its prime factors • Know how to round to significant figures • Know the order of operations including powers • Know how to enter negative numbers into a calculator • Know that $a^0 = 1$ • Know percentage and decimal equivalents for fractions with a denominator of 3, 5, 8 and 10 • Know the characteristic shape of a graph of a quadratic function • Know how to measure and write bearings • Know how to identify alternate angles • Know how to identify corresponding angles

<table>
<tr><td></td><td colspan="4">• Know how to find the angle sum of any polygon
• Know that circumference = 2πr = πd
• Know that area of a circle = πr²
• Know that volume of prism = area of cross-section × length
• Know to use the midpoints of groups to estimate the mean of a set of grouped data
• Know that probability is measured on a 0-1 scale
Know that the sum of all probabilities for a single event is 1</td></tr>
<tr><td>Spaced Interleaving:</td><td colspan="4">Units are split up throughout the year, previous topics from a unit should be recapped when beginning the next topics (usually they form pre-requisites for the next topic), see curriculum week plan below.</td></tr>
<tr><td>Student Needs:</td><td>SEND:</td><td>SEN students will be provided with any concessions required and individual support where necessary.
SEND department have an intervention room to support lowest ability students to close the gap with key maths skills such as calculation methods and telling the time, etc.
One member of the maths team will be nominated as a SEN rep to engage with SEND department and share strategies and techniques for teaching and supporting SEN students
All staff to have seating plans with SEND students clearly marked as well as class teacher folder with SEND passports and support plans. All staff are expected to know the needs of their students and to be using the strategies highlighted on the passports to best support them
Lessons will be differentiated based on the needs of the students so that all students of all abilities and needs can access the main schemes of learning and outcomes. This may include scaffolding, use of signposting and set structures in lessons, labelling of resources, dual coding of key vocabulary with pictures,</td><td>Context</td><td>Based on contextual information from 2018 for Staffordshire (Appendix E)
• Increased financial stress experienced – PoS looks to explore finances in multiple topics (negative numbers, percentages, decimals) and students will be encouraged to explore these with financial sense and knowledge to better prepare them for adulthood
• Less residents from ethnic minorities – PoS and numeracy policy will develop knowledge of other cultures and religions by doing numeracy related activities to coincide with these events (eg Diwali, Ramadan)
• Nearly half of students in Tamworth do not get pass in maths & English – PoS designed for full coverage by Year 11 and support in place for students with the highest needs to attain a 4+ by the end of Year 11
• Over 10% of the local population have no qualifications – Entry Level will be offered to students with the highest needs and lowest prior attainment to be able to gain a maths equivalent qualification which is more accessible (in addition to GCSE maths)</td></tr>
</table>

		chunking of lessons, instructions provided verbally and written (with bullet points or numbered where possible), use of mnemonics, stories, cartoon strips and highlighting. Retrieval practice built into the SOLs to foster long term memory and recall. Spiral curriculum design (learning small amounts in lots of areas each year to build towards a final goal) is beneficial for SEND students to support retrieval and reduce overloading Specific fonts are used in planning to better support students with sensory needs and Autism to reduce cognitive overload (Century Gothic, Gill Sans, Arial, Cambria Math – coordinated with English)		• 3% of 16-24 year olds claim unemployment benefits – students will be encouraged to explore how maths relates to careers of all varieties and supported in developing transferable skills to boost success in obtaining a job after leaving school. Over 20% of the local population do not have private transport – students will be taught how to read timetables for local bus companies and plan their journeys using local available public transport, taking into account the costs
	LPA:	Students who join in Year 7 with below expected standard at Year 6 SATs will be supported with a foundation version of PoS which supports students to fill gaps in knowledge and skills from primary school. This is with the view that by the time they reach Year 11 they will have covered all foundation tier GCSE content and should be aiming for grades 4+ (**Progress of this group will be closely monitored throughout to ensure ambitions and outcomes are not limited.** Nature of the SOL is designed as a "spiral" progression where each area is developed in small chunks across the 5 years and it may be possible at times to use a blend of the foundation and mainstream SOLs when teaching this group to reduce the gaps in knowledge) In Year 10 this will be the Year 9 SOL and in Year 11 this will be the 11F SOL.	HPA:	Challenge tasks will be available in every lesson for all students but HPA students will be actively encouraged to engage with these
Extracurricular:	Numeracy opportunities whole school around religious festivals and other key events through DNAs			

Literacy/Numeracy:	Vocab (tier 2/3):	Students will experience direct explicit vocabulary teaching in most maths lessons. This may be through discussion, copying of definitions, knowledge recall tasks, spelling tests or the use of Frayer models (see appendix H). This will usually focus on key language for a topic (Tier 3 vocabulary) or command words (Tier 2 vocabulary). Command words are exemplified in the Teachers Guide to Exam Command Words produced by Edexcel (appendix F). All units of work include a specific list of language that is associated with that unit (Tier 3, see Appendix D) At least 1 literacy display in department (corridor) and aim to put up other literacy walls/displays in most classrooms (over half)	Reading:	Students will be given chances to read aloud and read to themselves in lessons when experiencing worded problems, investigations or activities that require students to unpick the information provided. This will be regularly modelled by the class teacher and will include work on comprehension through metacognition and unpicking problems to find out the key information and the command of the question/task.
	Writing:	All students will be required to use full sentences when writing definitions and in some cases when responding to questions or tasks (especially if they are asked to predict or make conjectures). Sometimes students will be encouraged to write in bullet points. Literacy might be "live marked" in lessons by the teacher, or highlighted for correction on their marked pieces of work. The main focus will be on key language specific to maths, but other errors may also be highlighted. Staff will be encouraged to check literacy in all lessons when circulating to support students. Incorrect spellings of key words will be clearly marked in purple pen and students will be asked to rectify this in green pen, with help if required. This	Numeracy:	Real world applications and skills will be explored where they link to the topics studied Students will take part in activities involving numeracy during lessons on National Numeracy Day and World Maths Day, as well as numeracy starters shared for religious festivals.

		should be common practice in most lessons, but may be more evident in lessons where students have written key definitions or are exploring reasoning topics / tasks.		
Practice:	Mass:	Exit ticket / topic test completed a **minimum** of a week after topic completion for all topics (see Appendix A & B). These may be completed in topic pairs to reduce teacher workload. Exit tickets will be used as formative assessment, marked by class teachers and given detailed feedback, with dedicated time for student reflection / improvement. These will not be graded as topics in maths are no longer categorised by grade but will instead be measured against the expected outcomes for a topic.	Distributed:	Topics are revisited in DNAs on a cycle. Each week there will be at least 1 DNA that takes the form of "last lesson, last week, last month" to encourage recall and revisiting of topics (see Appendix C). In addition to this, topics are often revisited when they link to new topics or when the unit is revisited for further development later in the PoS. (see Appendix D). Low stakes quizzes will be used to revisit knowledge and concepts throughout the year (see Appendix K) All year groups will have at least 3 assessment points in the year which will be cumulative of content as the year progresses.

KS3 – Year 9 Year Plan

Intent

Aims:	The mathematics curriculum is a 5 year progression and as such the KS3 and KS4 curriculum are intrinsically linked. By the time students leave in Year 11, they should: - Have a deep and broad understanding of the application of maths to a range of problems, as per the National Curriculum for KS3 and KS4. - Possess a well-rounded knowledge of number properties, calculation skills and algebraic manipulation, an appreciation of shape, space and measure, an appreciation of ratio and proportion (and its role in life) and a broad understanding of statistics and probability - Be fluent in a range of skills across the 5 key areas of mathematics (number, algebra, ratio & proportion, shape, space & measure, and statistics & probability) achieved through clear expert instruction and refined through purposeful practice, interleaving and spaced practice. - Be able to apply logic and reason to understand, unpick and solve a range of problems, including the skills of planning, conjecturing, making generalisations, developing a mathematical argument, justification, and proof - Have an appreciation of mathematics in real life contexts, and have some understanding of where the skills they have developed are used in society and other areas of specialism

	Have an appreciation of the language of mathematics and be able to articulate their thoughts, ideas, and conjectures in a mathematically accurate way
Academy values:	**Ambitious –** Stretch and challenge material should be available to all students in all lessons. Students are given feedback on their work and provided with personalised feedback to allow students to make the progress that is most suitable for them, encouraging them to extend their thinking further to more complex contexts where appropriate. **Brave –** Students are encouraged to take control of their own learning and can choose to access challenge work in lessons, as well as being a vehicle for their own progress by utilising the marking and feedback provided by their class teacher to move forward, regardless of ability, setting or prior attainment. Staff are asked to mark and provide feedback in a way that allows students time to reflect on the marking and provide them with a clear next step to promote progress regardless of the student's prior attainment, SES, ethnicity or SEND status **Kind –** Mathematics classrooms should build a culture of support and collaboration, where thoughts are shared freely and critiqued in a way that does not undermine or devalue the contributions students have made (both staff and students). Students are encouraged to provide positive feedback about others work during peer marking, including the use of phases such as "strengths" and "targets" for areas of improvement.

Units of Study:

Unit/Topic 1	Content:	Calculations	NC Content:	
	Key Concepts:	• calculate with roots, and with integer indices • calculate with standard form $A \times 10^n$, where $1 \leq A < 10$ and n is an integer • use inequality notation to specify simple error intervals due to truncation or rounding • apply and interpret limits of accuracy	Powerful Knowledge:	Will form links with compound interest later on in the SOLs Links with science – explore use of standard form around planetary mass, distance from earth etc
Unit/Topic 2	Content:	Accurate Drawings	NC Content:	
	Key Concepts:	• use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle) • use these to construct given figures and solve loci problems; know that the perpendicular distance from a point to a line is the shortest distance to the line construct plans and elevations of 3D shapes	Powerful Knowledge:	• Constructions, plans and elevations and accurate drawings are key skills required for jobs and fields that require product design or scale drawings, such as architecture, graphic design, advertising

Unit/Topic 3	Content:	Algebra skills	NC Content:	
	Key Concepts:	• Manipulate expressions by collecting like terms • Know that x × x = x2 • Calculate with negative numbers • Know the grid method for multiplying two two-digit numbers • Know the difference between an expression, an equation and a formula	Powerful Knowledge:	- Negative numbers have a large significance in personal finance, especially relating to debt. Teaching students to understand and use negative numbers, and then introducing how they are applied in a monetary context will help to build financial understanding and hopefully encourage students to develop health financial critical thinking and habits in the future
Unit/Topic 4	Content:	Proportional reasoning	NC Content:	
	Key Concepts:	• solve problems involving direct and inverse proportion including graphical and algebraic representations • apply the concepts of congruence and similarity, including the relationships between lengths in similar figures • change freely between compound units (e.g. density, pressure) in numerical and algebraic contexts • use compound units such as density and pressure	Powerful Knowledge:	Proportionality will give students an appreciation of the need to keep related amounts in given values or ratios in a range of contexts, such as ingredients for cooking, baking, value for money and cost per unit (businesses). This is a skill that will likely be used in daily life such as shopping, maintaining healthy diets through home cooking as well as potentially in a future career.
Unit/Topic 5	Content:	Sequences	NC Content:	

	Key Concepts:	• *Generate a sequence from its nth term* • *Find the nth term of a linear sequence* • Recognise and use the Fibonacci sequence • Generate Fibonacci type sequences • **Solve problems involving Fibonacci type sequences** • Explore growing patterns and other problems involving quadratic sequences • Generate terms of a quadratic sequence from a written rule • **Find the next terms of a quadratic sequence using first and second differences** **Generate terms of a quadratic sequence from its nth term**	Powerful Knowledge:	
Unit/Topic 6	Content:	Inequalities	NC Content:	• Area, perimeter, volume and surface area are skills can be linked with careers such as architecture, gardening, landscaping, decorating, product design, packaging design, marketing, purchasing for businesses, property surveyance etc. As such, these skills are vital to ensure students have a deep and thorough capability with these areas to give them the best chance to pursue these careers if they so choose. This topic also underpins a range of concepts in mathematics and subjects such as graphic design, product design and textiles.
	Key Concepts:	• understand and use the concepts and vocabulary of inequalities • solve linear inequalities in one variable represent the solution set to an inequality on a number line	Powerful Knowledge:	
Unit/Topic 7	Content:	Shape and space	NC Content:	• Pythagoras' theorem is used in a range of contexts such as architecture, safety of ladder use which makes it a

				transferrable skill that has a range of applications.
	Key Concepts:	• identify and apply circle definitions and properties, including: tangent, arc, sector and segment • calculate arc lengths, angles and areas of sectors of circles • calculate surface area of right prisms (including cylinders) • calculate exactly with multiples of π know the formulae for: Pythagoras' theorem, $a^2 + b^2 = c^2$, and apply it to find lengths in right-angled triangles in two dimensional figures	Powerful Knowledge:	
Unit/Topic 8	Content:	Geometric proof	NC Content:	• Non-linear graphs are useful in modelling of situations such as pandemic outbreaks, population growth/decay so exposure to these can build an understanding of this type of data representation and builds critical thinking skills about presenting data in this way
	Key Concepts:	• use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS) apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, including Pythagoras' Theorem and the fact that the base angles of an isosceles triangle are equal, and use known results to obtain simple proofs	Powerful Knowledge:	
Unit/Topic 9	Content:	Algebraic graphs	NC Content:	
	Key Concepts:	• identify and interpret gradients and intercepts of linear functions algebraically • use the form y = mx + c to identify parallel lines	Powerful Knowledge:	• Area, perimeter, volume and surface area are skills can be linked with careers such as architecture, gardening, landscaping, decorating, product design, packaging design, marketing,

		• find the equation of the line through two given points, or through one point with a given gradient • interpret the gradient of a straight line graph as a rate of change • recognise, sketch and interpret graphs of quadratic functions • recognise, sketch and interpret graphs of simple cubic functions and the reciprocal function $y = 1/x$ with $x \neq 0$ plot and interpret graphs (including reciprocal graphs) and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration		purchasing for businesses, property surveyance etc. As such, these skills are vital to ensure students have a deep and thorough capability with these areas to give them the best chance to pursue these careers if they so choose. This topic also underpins a range of concepts in mathematics and subjects such as graphic design, product design and textiles.
Unit/Topic 10	Content:	Simultaneous equations	NC Content:	
	Key Concepts:	• solve, in simple cases, two linear simultaneous equations in two variables algebraically • derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution • find approximate solutions to simultaneous equations using a graph	Powerful Knowledge:	• Pythagoras' theorem is used in a range of contexts such as architecture, safety of ladder use which makes it a transferrable skill that has a range of applications.
Unit/Topic 11	Content:	Probability	NC Content:	
	Key Concepts:	• calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions • enumerate sets and combinations of sets systematically, using tree diagrams • understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size	Powerful Knowledge:	• Experimental probability and theoretical probability are linked to scientific modelling and can be investigated in terms of the likelihood of events happening (such as weather patterns, and predicting events based on past experience) and students will develop an appreciation for how theoretical may differ from the actual.
Unit/Topic 12	Content:	Graphs and charts	NC Content:	

	Key Concepts:	• interpret and construct tables, charts and diagrams, including tables and line graphs for time series data and know their appropriate use • draw estimated lines of best fit; make predictions • know correlation does not indicate causation; interpolate and extrapolate apparent trends whilst knowing the dangers of so doing	Powerful Knowledge:	• Graphs and charts are a transferable skill that overlap with many other subjects such as: science (patterns and trends), business (sales figures, analysing consumer habits), computing (flow charts) and history (chronology

Implementation

Progression from Year 8	• Know how to write a number as a product of its prime factors • Know how to round to significant figures • Know the order of operations including powers • Know how to enter negative numbers into a calculator • Know that $a^0 = 1$ • Know percentage and decimal equivalents for fractions with a denominator of 3, 5, 8 and 10 • Know the characteristic shape of a graph of a quadratic function • Know how to measure and write bearings • Know how to identify alternate angles • Know how to identify corresponding angles • Know how to find the angle sum of any polygon • Know that circumference = $2\pi r = \pi d$ • Know that area of a circle = πr^2 • Know that volume of prism = area of cross-section × length • Know to use the midpoints of groups to estimate the mean of a set of grouped data • Know that probability is measured on a 0-1 scale Know that the sum of all probabilities for a single event is 1
Progression to Year 10:	• Know how to interpret the display on a scientific calculator when working with standard form • Know the difference between direct and inverse proportion • Know how to represent an inequality on a number line • Know that the point of intersection of two lines represents the solution to the corresponding simultaneous equations • Know the meaning of a quadratic sequence • Know the characteristic shape of the graph of a cubic function • Know the characteristic shape of the graph of a reciprocal function • Know the definition of speed • Know the definition of density • Know the definition of pressure • Know Pythagoras' theorem • Know the definitions of arc, sector, tangent and segment

	• Know the conditions for congruent triangles			
Spaced Interleaving:	Units are split up throughout the year, previous topics from a unit should be recapped when beginning the next topics (usually they form pre-requisites for the next topic). (see Appendix D)			
Student Needs:	SEND:	SEN students will be provided with any concessions required and individual support where necessary. Where possible, KS3 catch up interventions may be offered during tutor time to support students with the highest needs to catch up and be able to access the main PoS SEND department have an intervention room to support lowest ability students to close the gap with key maths skills such as calculation methods and telling the time, etc. One member of the maths team will be nominated as a SEN rep to engage with SEND department and share strategies and techniques for teaching and supporting SEN students All staff to have seating plans with SEND students clearly marked as well as class teacher folder with SEND passports and support plans. All staff are expected to know the needs of their students and to be using the strategies highlighted on the passports to best support them Lessons will be differentiated based on the needs of the students so that all students of all abilities and needs can access the main schemes of learning and outcomes. This may include scaffolding, use of signposting and set structures in lessons, labelling of resources, dual coding of key vocabulary with pictures,	Context	Based on contextual information from 2018 for Staffordshire (Appendix E) • Increased financial stress experienced – PoS looks to explore finances in multiple topics (negative numbers, percentages, decimals) and students will be encouraged to explore these with financial sense and knowledge to better prepare them for adulthood • Less residents from ethnic minorities – PoS and numeracy policy will develop knowledge of other cultures and religions by doing numeracy related activities to coincide with these events (eg Diwali, Ramadan) • Nearly half of students in Tamworth do not get pass in maths & English – PoS designed for full coverage by Year 11 and support in place for students with the highest needs to attain a 4+ by the end of Year 11 • Over 10% of the local population have no qualifications – Entry Level will be offered to students with the highest needs and lowest prior attainment to be able to gain a maths equivalent qualification which is more accessible (in addition to GCSE maths) • 3% of 16-24 year olds claim unemployment benefits – students will be encouraged to explore how maths relates to careers of all varieties and supported in developing transferable skills to boost

		chunking of lessons, instructions provided verbally and written (with bullet points or numbered where possible), use of mnemonics, stories, cartoon strips and highlighting. Retrieval practice built into the SOLs to foster long term memory and recall. Spiral curriculum design (learning small amounts in lots of areas each year to build towards a final goal) is beneficial for SEND students to support retrieval and reduce overloading Specific fonts are used in planning to better support students with sensory needs and Autism to reduce cognitive overload (Century Gothic, Gill Sans, Arial – coordinated with English)		success in obtaining a job after leaving school. Over 20% of the local population do not have private transport – students will be taught how to read timetables for local bus companies and plan their journeys using local available public transport, taking into account the costs
	LPA:	Students who join in Year 7 with below expected standard at Year 6 SATs will be supported with a foundation version of PoS which supports students to fill gaps in knowledge and skills from primary school. This is with the view that by the time they reach Year 11 they will have covered all foundation tier GCSE content and should be aiming for grades 4+ (Progress of this group will be closely monitored throughout to ensure ambitions and outcomes are not limited. Nature of the SOL is designed as a "spiral" progression where each area is developed in small chunks across the 5 years and it may be possible at times to use a blend of the foundation and mainstream SOLs when teaching this group to reduce the gaps in knowledge)	HPA:	PoS is designed to stretch HPA students by aiming to have the majority of students sitting the higher tier GCSE aiming for grades 6+ Challenge tasks will be available in every lesson for all students but HPA students will be actively encouraged to engage with these (see Appendix G)

<table>
<tr><td></td><td></td><td>Where possible, KS3 catch up interventions may be offered during tutor time to support students with the highest needs to catch up and be able to access the main PoS</td><td></td><td></td></tr>
<tr><td>Extracurricular:</td><td colspan="4">Year 9 girls will be invited to take part in Maths 4 Girls twice in the year. Local businesswomen will come and talk about how maths has impacted their lives and their careers and show girls that they can be successful / can take maths further than GCSEs
All Year 9 students will be invited to 2 talks from local businesspeople about their careers and lives to encourage students to believe in themselves, as well as start to identify career opportunities and pathways for themselves.</td></tr>
<tr><td rowspan="2">Literacy/Numeracy:</td><td>Vocab (tier 2/3):</td><td>Students will experience direct explicit vocabulary teaching in most maths lessons. This may be through discussion, copying of definitions, knowledge recall tasks, spelling tests or the use of Frayer models (see Appendix G). This will usually focus on key language for a topic (Tier 3 vocabulary) or command words (Tier 2 vocabulary). Command words are exemplified in the Teachers Guide to Exam Command Words produced by Edexcel (see appendix F).
All units of work include a specific list of language that is associated with that unit (Tier 3, see Appendix D)
At least 1 literacy display in department (corridor) and aim to put up other literacy walls/displays in most classrooms (over half)</td><td>Reading:</td><td>Students will be given chances to read aloud and read to themselves in lessons when experiencing worded problems, investigations or activities that require students to unpick the information provided. This will be regularly modelled by the class teacher and will include work on comprehension through metacognition and unpicking problems to find out the key information and the command of the question/task.</td></tr>
<tr><td>Writing:</td><td>All students will be required to use full sentences when writing definitions and in some cases when responding to questions or tasks (especially if they are asked to predict or make conjectures). Sometimes students will be encouraged to write in bullet points. Literacy might be “live marked” in lessons by the teacher, or</td><td>Numeracy:</td><td>Fluency with basic number skills will be practiced throughout the year, with a particular focus upon entry to Year 9 to bridge the gap from primary to secondary (loss of learning over summer period). Real world applications and skills will be explored where they link to the topics studied.</td></tr>
</table>

		highlighted for correction on their marked pieces of work. The main focus will be on key language specific to maths, but other errors may also be highlighted. Staff will be encouraged to check literacy in all lessons when circulating to support students. Incorrect spellings of key words will be clearly marked in purple pen and students will be asked to rectify this in green pen, with help if required. This should be common practice in most lessons, but may be more evident in lessons where students have written key definitions or are exploring reasoning topics / tasks.		Students will take part in activities involving numeracy during lessons on National Numeracy Day and World Maths Day, as well as numeracy starters shared for religious festivals.
Practice:	Mass:	Exit ticket / topic test completed a **minimum** of a week after topic completion for all topics (see Appendix A & B). These may be completed in topic pairs to reduce teacher workload. Exit tickets will be used as formative assessment, marked by class teachers and given detailed feedback, with dedicated time for student reflection / improvement. These will not be graded as topics in maths are no longer categorised by grade, but will instead be measured against the expected outcomes for a topic.	Distributed:	Topics are revisited in DNAs on a cycle. Each week there will be at least 1 DNA that takes the form of "last lesson, last week, last month" to encourage recall and revisiting of topics (see Appendix C). In addition to this, topics are often revisited when they link to new topics or when the unit is revisited for further development later in the PoS. (see Appendix D) All year groups will have at least 3 assessment points in the year which will be cumulative of content as the year progresses.

KS4 – Year 10 Year Plan

Intent

Aims:	By the time students leave in Year 11, they should: - Have a deep and broad understanding of the application of maths to a range of problems, as per the National Curriculum for KS3 and KS4. - Possess a well-rounded knowledge of number properties, calculation skills and algebraic manipulation, an appreciation of shape, space and measure, an appreciation of ratio and proportion (and its role in life) and a broad understanding of statistics and probability

	- Be fluent in a range of skills across the 5 key areas of mathematics (number, algebra, ratio & proportion, shape, space & measure, and statistics & probability) achieved through clear expert instruction and refined through purposeful practice, interleaving and spaced practice. - Be able to apply logic and reason to understand, unpick and solve a range of problems, including the skills of planning, conjecturing, making generalisations, developing a mathematical argument, justification, and proof - Have an appreciation of mathematics in real life contexts, and have some understanding of where the skills they have developed are used in society and other areas of specialism Have an appreciation of the language of mathematics and be able to articulate their thoughts, ideas, and conjectures in a mathematically accurate way
Academy values:	**Ambitious –** Stretch and challenge material should be available to all students in all lessons. Students are given feedback on their work and provided with personalised feedback to allow students to make the progress that is most suitable for them, encouraging them to extend their thinking further to more complex contexts where appropriate. **Brave –** Students are encouraged to take control of their own learning and can choose to access challenge work in lessons, as well as being a vehicle for their own progress by utilising the marking and feedback provided by their class teacher to move forward, regardless of ability, setting or prior attainment. Staff are asked to mark and provide feedback in a way that allows students time to reflect on the marking and provide them with a clear next step to promote progress regardless of the student's prior attainment, SES, ethnicity or SEND status **Kind –** Mathematics classrooms should build a culture of support and collaboration, where thoughts are shared freely and critiqued in a way that does not undermine or devalue the contributions students have made (both staff and students). Students are encouraged to provide positive feedback about others work during peer marking, including the use of phases such as "strengths" and "targets" for areas of improvement.

Units of Study:

Unit/Topic 1	Content:	Trigonometry	Spec Content:	G11, G10, R1
	Key Concepts:	• make links to similarity (including trigonometric ratios) and scale factors • know the exact values of sinθ and cosθ for θ = 0°, 30°, 45°, 60° and 90°; know the exact value of tanθ for θ = 0°, 30°, 45° and 60° • know the trigonometric ratios, sinθ = opposite/hypotenuse, cosθ = adjacent/hypotenuse, tanθ = opposite/adjacent • apply it to find angles and lengths in right-angled triangles in two dimensional figures	Powerful Knowledge:	Pythagoras' theorem is used in a range of contexts such as architecture, safety of ladder use which makes it a transferrable skill that has a range of applications.

Unit/Topic 2	Content:	Calculations	Spec Content:	N2, N3, N4, N8
	Key Concepts:	• estimate powers and roots of any given positive number • calculate with roots, and with integer and fractional indices • calculate exactly with surds • apply and interpret limits of accuracy, including upper and lower bounds	Powerful Knowledge:	Calculators are more prevalent now than ever before, and many students will leave school and go on to jobs that may require use of a calculator (or a programme that has similar functions) so having an appreciation for the varying functions and efficient use of one is key. Additionally, it can provide support in adulthood for calculations that people may find too difficult or time consuming to complete manually (i.e. working out the return on an investment for a given interest rate)
Unit/Topic 3	Content:	Equations	Spec Content:	A14, A15
	Key Concepts:	• find approximate solutions to equations numerically using iteration • solve two linear simultaneous equations in two variables algebraically	Powerful Knowledge:	
Unit/Topic 4	Content:	Transformations	Spec Content:	G2, G9, G14
	Key Concepts:	• identify, describe and construct similar shapes, including on coordinate axes, by considering enlargement (including fractional scale factors) • make links *between* similarity and scale factors • describe the changes and invariance achieved by combinations of rotations, reflections and translations	Powerful Knowledge:	Enlargement is useful in design and art-based subjects as it is important to keep designs and images in proportion when scaling to make larger / smaller for different products. It will also be beneficial in careers that require technical drawings such as fashion, engineering and architecture for scale drawings, accurate measurements and calculating the amount of materials needed to produce a given product.

Unit/Topic 5	Content:	Algebraic Manipulation	Spec Content:	A1, A2
	Key Concepts:	• simplify and manipulate algebraic expressions involving algebraic fractions • manipulate algebraic expressions by expanding products of more than two binomials • simplify and manipulate algebraic expressions (including those involving surds) by expanding products of two binomials and factorising quadratic expressions of the form $x^2 + bx + c$, including the difference of two squares • manipulate algebraic expressions by factorising quadratic expressions of the form $ax^2 + bx + c$	Powerful Knowledge:	
Unit/Topic 6	Content:	Proportional reasoning	Spec Content:	R2,R3, R4
	Key Concepts:	• interpret equations that describe direct and inverse proportion • recognise and interpret graphs that illustrate direct and inverse proportion • understand that X is inversely proportional to Y is equivalent to X is proportional to 1/Y	Powerful Knowledge:	Proportionality will give students an appreciation of the need to keep related amounts in given values or ratios in a range of contexts, such as ingredients for cooking, baking, value for money and cost per unit (businesses). This is a skill that will likely be used in daily life such as shopping, maintaining healthy diets through home cooking as well as potentially in a future career.
Unit/Topic 7	Content:	Sequences	Spec Content:	A18, A19
	Key Concepts:	• deduce expressions to calculate the nth term of quadratic sequences • recognise and use simple geometric progressions (r^n where n is an integer, and r is a rational number > 0)	Powerful Knowledge:	
Unit/Topic 8	Content:	Linear inequalities	Spec Content:	A17

	Key Concepts:	• *Solve linear inequalities* • *List integer solutions to linear inequalities* • *Represent solutions to an inequality on a number line* • State the (simple) inequality represented by a shaded region on a graph • Construct and shade a graph to show a linear inequality of the form $y > ax + b$, $y < ax + b$, $y \geq ax + b$ or $y \leq ax + b$ • **Construct and shade a graph to show a linear inequality in two variables stated implicitly** • Construct and shade a graph to represent a set of linear inequalities in two variables • Find the set of integer coordinates that are solutions to a set of inequalities in two variables • **Use set notation to represent the solution set to an inequality**	Powerful Knowledge:	
Unit/Topic 9	Content:	Volume and surface area	Spec Content:	G8, G9
	Key Concepts:	• calculate surface area and volume of spheres, pyramids, cones and composite solids • apply the concepts of congruence and similarity, including the relationships between length, areas and volumes in similar figures	Powerful Knowledge:	Learning about area, volume and surface area will provide students with the knowledge and understanding they will need to complete a range of tasks (even without directly calculating) such as decorating (volume of paint required), packaging and box designs and packing items into boxes/delivery vehicles. This is just a few areas where these skills could be applied, but there will be careers that require more mathematical applications, for example interior design, architecture, landscaping, product design, and manufacturing and distribution.

Unit/Topic 10	Content:	Geometric problems	Spec Content:	G3, G4
	Key Concepts:	apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results	Powerful Knowledge:	
Unit/Topic 11	Content:	Exploring graphs	Spec Content:	A7, A10, A11, R6
	Key Concepts:	• plot and interpret graphs (including exponential graphs) and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration • calculate or estimate gradients of graphs and areas under graphs (including quadratic and other non-linear graphs), and interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts • interpret the gradient at a point on a curve as the instantaneous rate of change • identify and interpret roots, intercepts, turning points of quadratic functions graphically	Powerful Knowledge:	Compound measures include speed, pressure and density, and will overlap with science, but also have real-life applications such as the average speed of a vehicle, the time taken to travel a certain distance (assumptions will also be explored), whether being stood on by an elephants foot will exert more or less pressure than the heel of a stiletto, why some materials will sink in water but others will float.
Unit/Topic 12	Content:	FDP	Spec Content:	A6, R7
	Key Concepts:	• change recurring decimals into their corresponding fractions and vice versa • set up, solve and interpret the answers in growth and decay problems, including compound interest	Powerful Knowledge:	- Fractions and percentages are common in a range of contexts such as cooking, statistics presented on adverts and by businesses, sale items, leaving gratuities in service industries, income and tax and savings and mortgages. This will build skills such as financial sense and understanding as well as developing an understanding of the contexts in which they could be applied

Unit/Topic 13	Content:	Quadratics	Spec Content:	A13
	Key Concepts:	• solve quadratic equations algebraically by factorising • solve quadratic equations (including those that require rearrangement) algebraically by factorising • find approximate solutions to quadratic equations using a graph • deduce roots of quadratic functions algebraically	Powerful Knowledge:	
Unit/Topic 14	Content:	Probability	Spec Content:	P3, P4
	Key Concepts:	• apply systematic listing strategies including use of the product rule for counting • calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, ~~tree diagrams~~ and Venn diagrams.	Powerful Knowledge:	
Unit/Topic 15	Content:	Exploring graphs	Spec Content:	S1, S4
	Key Concepts:	• infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling • construct and interpret diagrams for grouped discrete data and continuous data, i.e. cumulative frequency graphs, and know their appropriate use • interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data, including box plots • interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency including quartiles and inter-quartile range	Powerful Knowledge:	Analysing data will be applicable to a range of careers and further study, including sociology, science, psychology, business etc. As such, students will be encouraged to compare data sets, draw conclusions, and explore the benefits and pitfalls of different averages.

Unit/Topic 16	Content:	Coordinate geometry	Spec Content:	A6, A12
	Key Concepts:	• use the form $y = mx + c$ to identify perpendicular lines • recognise and use the equation of a circle with centre at the origin • find the equation of a tangent to a circle at a given point	Powerful Knowledge:	
Unit/Topic 17	Content:	vectors	Spec Content:	G15
	Key Concepts:	apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors	Powerful Knowledge:	

Implementation

Progression from Year 9:	• Know how to interpret the display on a scientific calculator when working with standard form • Know the difference between direct and inverse proportion • Know how to represent an inequality on a number line • Know that the point of intersection of two lines represents the solution to the corresponding simultaneous equations • Know the meaning of a quadratic sequence • Know the characteristic shape of the graph of a cubic function • Know the characteristic shape of the graph of a reciprocal function • Know the definition of speed • Know the definition of density • Know the definition of pressure • Know Pythagoras' theorem • Know the definitions of arc, sector, tangent and segment • Know the conditions for congruent triangles
Progression to Year 11:	• Solve problems involving direct and inverse proportion • Solve quadratic equations by factorising • Apply trigonometry in two dimensions • Calculate volumes of spheres, cones and pyramids • Understand and use vectors
Spaced Interleaving:	Units are split up throughout the year, previous topics from a unit should be recapped when beginning the next topics (usually they form pre-requisites for the next topic), see curriculum week plan below.

Student Needs:	SEND:	SEN students will be provided with any concessions required and individual support where necessary. Where possible, KS4 catch up interventions may be offered during tutor time to support students with the highest needs to catch up and be able to access the main PoS. Students with the most complex needs, could be offered the opportunity to complete the Entry Level Certificate in Mathematics, if this is suitable based on their ability and their needs, which will be discussed with the SENCO upon entry into Year 10. SEND department have an intervention room to support lowest ability students to close the gap with key maths skills such as calculation methods and telling the time, etc. One member of the maths team will be nominated as a SEN rep to engage with SEND department and share strategies and techniques for teaching and supporting SEN students All staff to have seating plans with SEND students clearly marked as well as class teacher folder with SEND passports and support plans. All staff are expected to know the needs of their students and to be using the strategies highlighted on the passports to best support them Lessons will be differentiated based on the needs of the students so that all students of all abilities and needs can access the main schemes of learning and outcomes. This may include scaffolding, use of signposting and set structures in	Context	Based on contextual information from 2018 for Staffordshire (Appendix E) • Increased financial stress experienced – PoS looks to explore finances in multiple topics (negative numbers, percentages, decimals) and students will be encouraged to explore these with financial sense and knowledge to better prepare them for adulthood • Less residents from ethnic minorities – PoS and numeracy policy will develop knowledge of other cultures and religions by doing numeracy related activities to coincide with these events (eg Diwali, Ramadan) • Nearly half of students in Tamworth do not get pass in maths & English – PoS designed for full coverage by Year 11 and support in place for students with the highest needs to attain a 4+ by the end of Year 11 • Over 10% of the local population have no qualifications – Entry Level will be offered to students with the highest needs and lowest prior attainment to be able to gain a maths equivalent qualification which is more accessible (in addition to GCSE maths) • 3% of 16-24 year olds claim unemployment benefits – students will be encouraged to explore how maths relates to careers of all varieties and supported in developing transferable skills to boost success in obtaining a job after leaving school. Over 20% of the local population do not have private transport – students will be taught how to read timetables for local bus companies and

		lessons, labelling of resources, dual coding of key vocabulary with pictures, chunking of lessons, instructions provided verbally and written (with bullet points or numbered where possible), use of mnemonics, stories, cartoon strips and highlighting. Retrieval practice built into the SOLs to foster long term memory and recall. Spiral curriculum design (learning small amounts in lots of areas each year to build towards a final goal) is beneficial for SEND students to support retrieval and reduce overloading Specific fonts are used in planning to better support students with sensory needs and Autism to reduce cognitive overload (Century Gothic, Gill Sans, Arial, Cambria Math – coordinated with English)		plan their journeys using local available public transport, taking into account the costs
	LPA:	Students who join in Year 7 with below expected standard at Year 6 SATs will be supported with a foundation version of PoS which supports students to fill gaps in knowledge and skills from primary school. This is with the view that by the time they reach Year 11 they will have covered all foundation tier GCSE content and should be aiming for grades 4+ (**Progress of this group will be closely monitored throughout to ensure ambitions and outcomes are not limited.** Nature of the SOL is designed as a "spiral" progression where each area is developed in small chunks across the 5 years and it may be possible at times to use a blend of the foundation and mainstream SOLs when teaching this group to reduce the gaps in	HPA:	PoS is designed to stretch HPA students by aiming to have the majority of students sitting the higher tier GCSE aiming for grades 6+. HPA students will be offered the opportunity to also sit the AQA Level 2 Certificate in Further Mathematics in addition to the GCSE Mathematics paper. This is designed to support those students in stretching further and to have significant success in A Level maths, should they wish to proceed in this way. Challenge tasks will be available in every lesson for all students but HPA students will be actively encouraged to engage with these

		knowledge) In Year 10 this will be the Year 9 SOL and in Year 11 this will be the 11F SOL. Where possible, KS4 catch up interventions may be offered during tutor time to support students with the highest needs to catch up and be able to access the main PoS		
Extracurricular:	Students will be encouraged to explore how the mathematics is used in real life, and given opportunities to explore the contextual problems associated with the mathematics to build their understanding of its importance in life and society. Students will be encouraged to engage with pop culture references to mathematics and may have discussions with their class teacher about how maths has had an impact on their life experiences. In addition to this, students in Year 10 will have the opportunity to qualify to compete the in UK Maths Intermediate challenge. There will also be 4 opportunities throughout the year to engage with Maths 4 Girls or Founders 4 Schools which allows local business leaders to come in and speak about their experiences to students with the aim to inspire them to take maths beyond GCSE.			
Literacy/Numeracy:	Vocab (tier 2/3):	Students will experience direct explicit vocabulary teaching in most maths lessons. This may be through discussion, copying of definitions, knowledge recall tasks, spelling tests or the use of Frayer models (see appendix H). This will usually focus on key language for a topic (Tier 3 vocabulary) or command words (Tier 2 vocabulary). Command words are exemplified in the Teachers Guide to Exam Command Words produced by Edexcel (appendix F). All units of work include a specific list of language that is associated with that unit (Tier 3, see Appendix D) At least 1 literacy display in department (corridor) and aim to put up other literacy walls/displays in most classrooms (over half)	Reading:	Students will be given chances to read aloud and read to themselves in lessons when experiencing worded problems, investigations or activities that require students to unpick the information provided. This will be regularly modelled by the class teacher and will include work on comprehension through metacognition and unpicking problems to find out the key information and the command of the question/task.
	Writing:	All students will be required to use full sentences when writing definitions and in some cases when responding to questions	Numeracy:	Real world applications and skills will be explored where they link to the topics studied. For example, within a topic on Percentages, students might be

		or tasks (especially if they are asked to predict or make conjectures). Sometimes students will be encouraged to write in bullet points. Literacy might be "live marked" in lessons by the teacher, or highlighted for correction on their marked pieces of work. The main focus will be on key language specific to maths, but other errors may also be highlighted. Staff will be encouraged to check literacy in all lessons when circulating to support students. Incorrect spellings of key words will be clearly marked in purple pen and students will be asked to rectify this in green pen, with help if required. This should be common practice in most lessons, but may be more evident in lessons where students have written key definitions or are exploring reasoning topics / tasks.		tasked to explore whether an advertised reduction in price is accurate (Old Price, New Price, 70% off – think Sports Direct!). Another example would be working out whether something that is already reduced by 10% and then has 50% off is a good deal (compared to others) or how much this might actually cost. Students will take part in activities involving numeracy during lessons on National Numeracy Day and World Maths Day, as well as numeracy starters shared for religious festivals.
Practice:	Mass:	Exit ticket / topic test completed a **minimum** of a week after topic completion for all topics (see Appendix A & B). These may be completed in topic pairs to reduce teacher workload. Exit tickets will be used as formative assessment, marked by class teachers and given detailed feedback, with dedicated time for student reflection / improvement. These will not be graded as topics in maths are no longer categorised by grade but will instead be measured against the expected outcomes for a topic.	Distributed:	Topics are revisited in DNAs on a cycle. Each week there will be at least 1 DNA that takes the form of "last lesson, last week, last month" to encourage recall and revisiting of topics (see Appendix C). In addition to this, topics are often revisited when they link to new topics or when the unit is revisited for further development later in the PoS. (see Appendix D). Low stakes quizzes will be used to revisit knowledge and concepts throughout the year (see Appendix K) All year groups will have at least 3 assessment points in the year which will be cumulative of content as the year progresses. Engage with GCSE papers as assessments throughout the year where topics are interleaved and spaced.

Intent	
Aims:	By the time students leave in Year 11, they should: - Have a deep and broad understanding of the application of maths to a range of problems, as per the National Curriculum for KS3 and KS4. - Possess a well-rounded knowledge of number properties, calculation skills and algebraic manipulation, an appreciation of shape, space and measure, an appreciation of ratio and proportion (and its role in life) and a broad understanding of statistics and probability - Be fluent in a range of skills across the 5 key areas of mathematics (number, algebra, ratio & proportion, shape, space & measure, and statistics & probability) achieved through clear expert instruction and refined through purposeful practice, interleaving and spaced practice. - Be able to apply logic and reason to understand, unpick and solve a range of problems, including the skills of planning, conjecturing, making generalisations, developing a mathematical argument, justification, and proof - Have an appreciation of mathematics in real life contexts, and have some understanding of where the skills they have developed are used in society and other areas of specialism - Have an appreciation of the language of mathematics and be able to articulate their thoughts, ideas, and conjectures in a mathematically accurate way
Academy values:	**Ambitious –** Stretch and challenge material should be available to all students in all lessons. Students are given feedback on their work and provided with personalised feedback to allow students to make the progress that is most suitable for them, encouraging them to extend their thinking further to more complex contexts where appropriate. **Brave –** Students are encouraged to take control of their own learning and can choose to access challenge work in lessons, as well as being a vehicle for their own progress by utilising the marking and feedback provided by their class teacher to move forward, regardless of ability, setting or prior attainment. Staff are asked to mark and provide feedback in a way that allows students time to reflect on the marking and provide them with a clear next step to promote progress regardless of the student's prior attainment, SES, ethnicity or SEND status **Kind –** Mathematics classrooms should build a culture of support and collaboration, where thoughts are shared freely and critiqued in a way that does not undermine or devalue the contributions students have made (both staff and students). Students are encouraged to provide positive feedback about others work during peer marking, including the use of phases such as "strengths" and "targets" for areas of improvement.

Units of Study:

Unit/Topic 1	Content:	Trigonometry	Spec Content:	G10, G11, G12, G13
	Key Concepts:	Pythagoras' Theorem in 2D and 3D Trigonometry in 2D and 3D (including SOHCAHTOA, Sine Rule, Cosine Rule & Area of a Triangle)	Powerful Knowledge:	Pythagoras' Theorem in real life contexts Trigonometry with Bearings
Unit/Topic 2	Content:	Surds	Spec Content:	A1, N4
	Key Concepts:	Simplifying surds Expanding brackets with surds Rationalising denominators	Powerful Knowledge:	
Unit/Topic 3	Content:	Equations	Spec Content:	A7, A13, A15
	Key Concepts:	Using the quadratic formula Solving quadratic equations Completing the square Iteration formulae The discriminant	Powerful Knowledge:	
Unit/Topic 4	Content:	Transformations	Spec Content:	G1
	Key Concepts:	Enlargement with negative and fractional scale factors Recap: rotation, translation and reflection	Powerful Knowledge:	
Unit/Topic 5	Content:	Functions	Spec Content:	A5
	Key Concepts:	Function notation usage Inverse functions Composite functions Evaluating functions	Powerful Knowledge:	
Unit/Topic 6	Content:	Proportion	Spec Content:	R4
	Key Concepts:	Algebraic direct proportion Algebraic inverse proportion	Powerful Knowledge:	
Unit/Topic 7	Content:	Sequences	Spec Content:	A18
	Key Concepts:	Quadratic sequences Geometric sequences Arithmetic sequences	Powerful Knowledge:	Geometric sequences as models
Unit/Topic 8	Content:	Equations & Inequalities	Spec Content:	A14, A17
	Key Concepts:	Quadratic inequalities Graphical inequalities Quadratic simultaneous equations	Powerful Knowledge:	
Unit/Topic 9	Content:	Algebraic Graphs	Spec Content:	A6, A8, A9

	Key Concepts:	Plotting and interpreting exponential graphs Trigonometric graphs Transforming graphs and functions Gradients Rates of change	Powerful Knowledge:	Exponential graphs for modelling Critical thinking skills
Unit/Topic 10	Content:	Histograms	Spec Content:	S3
	Key Concepts:	Drawing histograms Reading and interpreting histograms	Powerful Knowledge:	
Unit/Topic 11	Content:	Vectors	Spec Content:	G15
	Key Concepts:	Drawing vectors Describing vectors Combining vectors	Powerful Knowledge:	

Implementation

Progression from Year 10:	In Year 10 students should have already covered: • Know the convention for labelling the sides in a right-angle triangle • Know the trigonometric ratios, sinθ = opposite/hypotenuse, cosθ = adjacent/hypotenuse, tanθ = opposite/adjacent • Know exact values of sinθ and cosθ for θ = 0°, 30°, 45°, 60° and 90° • Know the exact value of tanθ for θ = 0°, 30°, 45° and 60° • Know that a^1/n = n/a • Know that a^-n = 1/an • Know the information required to describe a transformation • Know the special case of the difference of two squares • Know how to set up an equation involving direct or inverse proportion • Know set notation • Know the conventions for representing inequalities graphically • Know the formulae for the volume of a sphere, a cone and a pyramid • Know the formulae for the surface area of a sphere, and the curved surface area of a cone • Know the circle theorems • Know the characteristic shape of the graph of an exponential function • Know the meaning of roots, intercepts and turning points • Know the definition of acceleration • Know how to construct a box plot • Know the conditions for perpendicular lines

<table>
<tr><td>Progression to Post-16:</td><td colspan="4">This year 11 SOW is specifically designed to develop knowledge to the highest end of GCSE content and develop key understanding of topics that feature heavily in the KS5 curriculum (based on HOD knowledge and experience of teaching KS5, such as (but not limited to):
• Geometric sequences
• Complex trigonometry
• Quadratic formula & the discriminant
• Algebraic graphs
• Functions</td></tr>
<tr><td>Spaced Interleaving:</td><td colspan="4">Units are split up throughout the year, previous topics from a unit should be recapped when beginning the next topics (usually they form pre-requisites for the next topic), see curriculum week plan below.</td></tr>
<tr><td>Student Needs:</td><td>SEND:</td><td>Exam concessions given in all assessments throughout the year
KS4 interventions offered when timetabling allows
Entry Level Certificate offered to those unable to access the main schemes and at risk of not achieving a qualification
All SEND needs marked on seating plans
Staff use SEND friendly pedagogy and teaching strategies
Retrieval practice built into the SOLs to foster long term memory and recall.
Spiral curriculum design (learning small amounts in lots of areas each year to build towards a final goal) is beneficial for SEND students to support retrieval and reduce overloading
Specific fonts are used in planning to better support students with sensory needs and Autism to reduce cognitive overload (Century Gothic, Gill Sans, Arial, Cambria Math – coordinated with English)</td><td>Context</td><td>Based on contextual information from 2018 for Staffordshire (Appendix E)
Increased financial stress experienced – SOW looks to explore finances in multiple topics (negative numbers, percentages, decimals) and students will be encouraged to explore these with financial sense and knowledge to better prepare them for adulthood
Less residents from ethnic minorities – SOW and numeracy policy will develop knowledge of other cultures and religions by doing numeracy related activities to coincide with these events (eg Diwali, Ramadan)
Nearly half of students in Tamworth do not get pass in maths & English – SOW designed for full coverage by Year 11 and support in place for students with the highest needs to attain a 4+ by the end of Year 11
Over 10% of the local population have no qualifications – Entry Level will be offered to students with the highest needs and lowest prior attainment to be able to gain a maths equivalent qualification which is more accessible (in addition to GCSE maths)
3% of 16-24 year olds claim unemployment benefits – students will be encouraged to explore</td></tr>
</table>

				how maths relates to careers of all varieties and supported in developing transferable skills to boost success in obtaining a job after leaving school. Over 20% of the local population do not have private transport – students will be taught how to read timetables for local bus companies and plan their journeys using local available public transport, taking into account the costs
	LPA:	Foundation version of SOW available tailored to ensure students achieve Grades 4/5 on Foundation Tier Ability setting used to ensure students learn content appropriate to their skill level and at a pace that is suitable Entry Level Certificate offered to those unable to access the main schemes and at risk of not achieving a qualification Nature of the SOL is designed as a "spiral" progression where each area is developed in small chunks across the 5 years and it may be possible at times to use a blend of the foundation and mainstream SOLs when teaching this group to reduce the gaps in knowledge)	HPA:	SOW is designed to stretch HPA students by aiming to have the majority of students sitting the higher tier GCSE aiming for grades 6+. HPA students will be offered the opportunity to also sit the AQA Level 2 Certificate in Further Mathematics in addition to the GCSE Mathematics paper. This is designed to support those students in stretching further and to have significant success in A Level maths, should they wish to proceed in this way. (these topics are shown in purple and are not applicable to all students) Challenge tasks will be available in every lesson for all students but HPA students will be actively encouraged to engage with these
Extracurricular:	UK Senior Maths Challenge offered to A Set students Possibility & scope to run clubs or other extra-curriculars utilising RAC Numeracy opportunities whole school around religious festivals and other key events through DNAs			
Literacy/Numeracy:	Vocab (tier 2/3):	Students will experience direct explicit vocabulary teaching in most maths lessons. This may be through discussion, copying of definitions, knowledge recall tasks, spelling tests or the use of Frayer models. This will usually focus on key language for a topic (Tier 3 vocabulary) or command words (Tier 2 vocabulary). Command words are exemplified in the	Reading:	Students will be given chances to read aloud and read to themselves in lessons when experiencing worded problems, investigations or activities that require students to unpick the information provided. This will be regularly modelled by the class teacher and will include work on comprehension through metacognition and unpicking problems to find out the key information and the command of the question/task.

		Teachers Guide to Exam Command Words produced by Edexcel. All units of work include a specific list of language that is associated with that unit. At least 1 literacy display in department (corridor) and aim to put up other literacy walls/displays in most classrooms (over half)		
	Writing:	All students will be required to use full sentences when writing definitions and in some cases when responding to questions or tasks (especially if they are asked to predict or make conjectures). Sometimes students will be encouraged to write in bullet points. Literacy might be "live marked" in lessons by the teacher, or highlighted for correction on their marked pieces of work. The main focus will be on key language specific to maths, but other errors may also be highlighted. Staff will be encouraged to check literacy in all lessons when circulating to support students. Incorrect spellings of key words will be clearly marked in purple pen and students will be asked to rectify this in green pen, with help if required. This should be common practice in most lessons, but may be more evident in lessons where students have written key definitions or are exploring reasoning topics / tasks.	Numeracy:	Real world applications and skills will be explored where they link to the topics studied. Students will take part in activities involving numeracy during lessons on National Numeracy Day and World Maths Day, as well as numeracy starters shared for religious festivals.
Practice:	Mass:	Exit ticket / topic test completed a **minimum** of a week after topic completion for all topics (see Appendix A & B). These may be completed in topic pairs to reduce teacher workload. Exit tickets will be used as formative assessment, marked by class teachers and given detailed feedback, with dedicated time for student reflection / improvement. These will not be	Distributed:	Topics are revisited in DNAs on a cycle. Each week there will be at least 1 DNA that takes the form of "last lesson, last week, last month" to encourage recall and revisiting of topics. In addition to this, topics are often revisited when they link to new topics or when the unit is revisited for further development later in the SOW. Low stakes quizzes will be used to revisit knowledge and concepts throughout the year.

		graded as topics in maths are no longer categorised by grade but will instead be measured against the expected outcomes for a topic. Year 11 students complete exam paper practice as a minimum once a fortnight		All year groups will have at least 3 assessment points in the year which will be cumulative of content as the year progresses. Engage with GCSE papers as assessments throughout the year where topics are interleaved and spaced.

5 Year Curriculum Week Plan

KS3 - Year 7

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Autumn Term 1	Standards/Flexi	1.1 Types of Numbers	2.1 Place Value	5.1 Geometric Notation	3 Rounding & Estimating	11.1 Measuring	1.2 Factors & Multiples	10 Sequences
Autumn Term 2	2.2 Calculation Methods	6 Properties of Shape		4.1 Ordering Numbers	1.3 Powers & Roots	16.1 Coordinates & Lines	9 Ratio	
Spring Term 1	2.3 Order of Operations	15.1 Area & Perimeter	2.4 Decimal Calculations	11.2 Conversions	4.2 Ordering Fractions			
Spring Term 2	12 Missing Angles	7.1 Intro to Algebra		5.2 Constructing Triangles	17 Graphs & Charts			
Summer Term 1	15.2 Volume & Surface Area	8 Fractions & Percentages	7.2 Expanding Brackets	11.3 Time	13.1 Multiply & Divide Fractions	18.1 Averages	13.2 Percentages	
Summer Term 2	14 Equations		13.3 Add & Subtract Fractions	16.2 Transformations	13.4 Using Percentages	18.2 Averages from Tables		

KS3 - Year 8

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Autumn Term 1	Standards/Flexi	1.1 Prime Factorisation	2.2 Calculators	5.1 Index Laws	1.2 Significant Figures	3.2 Maps & Bearings	7.1 Ratio	3.1 Enlargement
Autumn Term 2	4 Probability		2.1 Negative Numbers		8 Sequences	2.3 Order of Operations	12.1 Circles	
Spring Term 1	7.2 Proportion	5.2 Algebraic Manipulation		1.3 Standard Form	3.3 Plans & Elevations	6 FDP		
Spring Term 2	9.1 Angles in Polygons	11 Equations	15 Data Presentation	13.1 Straight Line Graphs				
Summer Term 1	12.2 Volumes	10.1 Percentage Increase & Decrease	7.3 Speed	14.1 Presenting Probability	13.2 Functions & Graphs		10.2 Financial Maths	
Summer Term 2	14.2 Experimental Probability	9.2 Angles in Parallel Lines	Bletchley Park		16 Averages			

KS3 - Year 9

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Autumn Term 1	Standards/FLEXI	1.1 Powers & Roots	3.1 Quadratics		1.3 Rounding & Bounds	2.1 Constructions	4.2 Ratio	2..2 Loci
Autumn Term 2	11 Probability		5 Non-Linear Sequences		7.1 Perimeter, Area, Volume		Flexi	
Spring Term 1	4.1 Proportion	7.2 Pythagoras	1.2 Standard Form		2.3 Plans & Elevations	Flexi		
Spring Term 2	9.1 Linear Graphs		12 Graphs & Charts		Flexi			
Summer Term 1	6 Linear Inequalities		4.3 Compound Measures		9.2 Non-Linear Graphs		Flexi	
Summer Term 2	3.2 Argument & Proof	8 Geometric Proof		10 Simultaneous Equations				

KS4 - Year 10

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Autumn Term 1	Standards/Flexi	2.1 Estimating Roots (3) 5.1 Expanding Brackets (3)	2.3 Bounds	1.1 SOHCAHTOA		6.1 Proportional Problems	5.2 Factorising	4.1 Transformations
Autumn Term 2	2.2 Index Laws & Surds	14.1 Venn Diagrams	8 Graphical Inequalities	12.1 Recurring Decimals	7 Non-linear Sequences	15.1 Sampling	9.1 Cones, Spheres & Pyramids	
Spring Term 1	5.4 Rearranging	6.2 Compound Measures	11.1 Non-linear Graphs	1.2 Bearings	3.2 Simultaneous Equations	12.2 Compound Interest		
Spring Term 2	11.3 Graphs in Context	14.2 Probability Problems	10.1 Circle Theorems		13.1 Solving Quadratics			
Summer Term 1	4.2 Similar Triangles	15.2 Box Plots	5.3 Algebraic Fractions	9.2 Length, Area, Volume SFs	16.1 Perpendicular Lines	15.3 Cumulative Frequency	13.2 Quadratic Graphs	
Summer Term 2	10.2 Geometric Proof	11.2 Gradients & Rates of Change	17 Vectors	16.2 Circles & Tangents	3.1 Iteration	Flexi		

KS4 - Year 11

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Autumn Term 1	Standards/Flexi	2 Surds	10 Histograms	1.1 Right Angled Triangles in 2D		3.1 Completing the Square	6 Proportion	4 Transformations
Autumn Term 2	5 Functions	11 Vectors	3.2 Quadratic Formula	1.2 Sine & Cosine Rules	7 Geometric Progressions	1.3 Triangle Problems	8.1 Quadratic Inequalities	
Spring Term 1	3.3 Iteration	9.1 Non-Linear Graphs	8.2 Simultaneous Equations	9.2 Rates of Change	**F4 Further Trigonometry**	**F1.1 Binomial Expansion**		
Spring Term 2	**9.3 Further Straight Line Graphs**	**F1.2 Complex Factorising**	**9.4 Circle Equations**	**F1.3 Algebraic Fractions**	**1.4 Polynomials**			
Summer Term 1	**F2 Calculus**		**F3 Matrices**	Revision	Revision	Revision	GCSE Paper 1	
Summer Term 2								

How does the Five Year Curriculum Plan meet the ACE curriculum design?	
Ambitious	Aims to finish Year 11 teaching before February Half Term to allow lots of time for exam technique practice and revision in lessons Aims for students to follow SOW each year to enable most students to sit the Higher tier paper and aim for 6+ Supports LPA students to aim for 4+ at GCSE by providing support in filling in knowledge gaps through spiral curriculum design Includes additional elements on top of SOW objectives in all lessons in all year groups Aims to enable all A set students to be entered for the Further Maths qualification in Year 11 as an additional qualification
Challenging	Students challenged to study in a way that leads to Higher tier entry at GCSE Challenge work will be provided in all lessons Problem solving and abstract applications will be used where possible HPA students have access to UK Maths Challenge competitions (aimed at highest achievers in Maths nationally) HPA students have option to sit Further Maths qualification
Engaging	Real life links included where possible Additional opportunities are planned to coincide with national and local events A range of activities used to consolidate, revisit and assess Enrichment activities built into SOW

What are the current strengths of the Five Year Curriculum Plan?

The curriculum is ambitious in its design by aiming for higher GCSE entries for the majority (although these will be considered on a case by case basis in Year 11, and suitability of the curriculum for each teaching group will be reviewed at least twice yearly).
It has taken into account research around developing a curriculum to support memory by utilising interleaving and spaced learning.

What specific actions have to be taken in response to the above? Please consider:

- Unit sequence changes;
- Content changes at KS3 and KS4;
- Modifications to ensure an ACE curriculum design;
- CPD for teachers in your subject area;
- Additional research you have to consider as part of this review.