In Year Progression Plan & Curriculum Overview for Maths
YEAR 9 2024/25

	Autumn	Spring	Summer
	Unit Titles Overview		
What are students learning?	Unit 1: FDP Review Unit 2 : Probability Unit 3: Sets, Venns and sample space diagrams Unit 4 : Linear simultaneous equations - Solving algebraically Unit 5 : Linear simultaneous equations - Solving graphically	Unit 6 : Angle Review Unit 7: Constructions, congruence and loci Unit 8: Pythagoras' Theorem Unit 9: Ratio Review Unit 10 : Similarity and enlargement Unit 11: Trigonometry	Unit 12: Algebra Review Unit 13 : Quadratic expressions and equations Unit 14: Surds Unit 15: Indices Unit 16: Standard Form Unit 17: Growth and decay
Understanding:	**What will these units of work help students to understand, what does it build on and where does it lead to?**		
	Unit 1: Students revisit number work from KS2 and KS3 to refresh their understanding of the interconnection of methods of calculation for fractions, decimals and	**Unit 6:** Students revisit angle theorems to calculate missing angles using longer chains of reasoning, justifying their deductions. Opportunities exist	**Unit 12:** In the first of this two week unit, simplification is focused on, firstly by looking at multiplication and division

	percentage in preparation for work on probability in the next unit. **Unit 2:** Students are introduced to theoretical probability in a variety of contexts and with a variety of representations. Combined events are considered with the use of sample spaces, two-way tables and probability tree diagrams. Students add frequency tree diagrams and two-way tables to their repertoire of probability representations and look at non-random situations. They compare experimental to theoretical probability. **Unit 3:** Students build on their existing understanding of Venn diagrams by being introduced to set notation. The second week of this unit builds on the first by introducing probability presented in Venn diagrams and set notation. Students interpret and convert between representations to solve problems. **Unit 4:** Students work on algebraic manipulation, including some revision of solving linear equations. Students are	throughout the unit for estimating, naming, measuring and drawing angles using a protractor. **Unit 7:** Students are introduced to loci and use the properties of circles to find the locus of points that are a specific distance from a point. Students develop this to find the locus of points that are equidistant from two points and use this to construct perpendicular bisectors In week 2 of this unit, students are introduced to the conditions for congruence in triangles. This is derived from students' understanding of the different ways to construct triangles. These conditions are then used to prove when two triangles are congruent **Unit 8:** Students look at tilted squares on squared paper and represent lengths as radicals before looking at how this relates to right-angled triangles leading to a formal introduction to Pythagoras's theorem Students now start to look at different contexts in which Pythagoras' theorem can be used, such as within 2-D shapes,	algebraic conventions, then by collecting like terms and finally by expanding a single pair of brackets. Order of operations is revisited in the context of evaluating expressions using substitution, then using function machines to write and solve equations **Unit 13:** Students look specifically at quadratic expressions and equations, including those written in the standard form $ax^2+bx+c(=0)$. Students also begin looking at quadratic graphs and common visual features of them, such as the curve and turning point. Students then look at interpreting information from a quadratic graph, before looking at quadratics written in double brackets and considering equivalence with roots Students continue to work on expanding brackets, as the questions gradually increase in complexity, They eventually move onto expanding more than two brackets. **Unit 14:** Students are introduced to rational

	formally introduced to some formal algebraic manipulation methods such as equation scaling and addition and subtraction of equations within a system. Students solve simultaneous equations by adding or subtracting to remove a variable, firstly looking at cases in which this happens, and then using equivalent equations to manufacture these cases. Finally students focus on solving simultaneous equations through substitution from one equation into another. **Unit 5:** Students explore linear graphs to connect understanding of solutions to linear equations in two variables to the coordinates of points that lie on their graphs, including intersections as simultaneous equations. Venn diagrams are presented as ways of capturing experimental data. Students then calculate experimental probability from information in Venn diagrams using set notation.	3-D shapes, and the Cartesian plane. **Unit 9:** Ratio is revisited this week with a focus on understanding the difference between part : part and part : whole relationships, representing those relationships as fractions, using the constant of proportionality and scale factor to find equivalent ratios **Unit 10** Students are introduced to the idea of similarity in the context of enlargement. They use, then learn, how to find the scale factor from the unit ratio. After working with inter-shape relationships, they revisit the idea of constants of proportionality Students' attention is drawn to the similarities and differences of intra shape and inter shape relationships. They are introduced to the centre of enlargement firstly through examining enlarged shapes and their relationship to the centre **Unit 11:** Students investigate a right-angled triangle in a unit circle in quadrant 1 and use what is known about similar shapes	and irrational numbers, and surds. This unit can be thought of as "surds-lite" as students will be introduced to surds in a way that is key stage appropriate. **Unit 15:** During the first week of this unit students look at indices and roots, including looking at cases with negative indices and an index of zero. The next week focusses on the index laws, looking at multiplication, division, and raising to further powers. The final lesson asks students to apply these three laws to more complex examples **Unit 16:** Students are introduced to numbers written in standard form as tools to consider and compare very large and very small numbers. They draw connections between powers of ten and place value, compare the size of numbers by considering the power of ten. **Unit 17:** Decimal multipliers to calculate

		to find missing lengths of right-angled triangles. After being introduced to sine and cosine functions, students can find the opposite/adjacent sides Two key ideas are explored this week. Firstly, the relationship between the opposite and adjacent is looked at as the tangent of an angle is uncovered. Secondly, students look at finding unknown angles through inverse trig functions	percentage change is built on by considering repeated change, first with different percentages and then with the same percentage (compound change). Graphical representations of growth and decay are considered
Knowledge:	**What Substantive Knowledge will students gain?**		
	Unit 1: Understand the connections between methods of calculation for fractions, decimals and percentage **Unit 2:** Understand probability is a numerical measure of chance from 0 to 1 inclusive Understand a variety of representations of combined events Understand the difference between theoretical and experimental probability **Unit 3:** Understand set notation for intersections,	**Unit 6:** Understand angle theorems are used to calculate angles without the need to measure **Unit 7:** Understand that circles can be used to draw the locus of points that are a given distance from a point Understand congruency conditions for triangles **Unit 8:** Understand that radical notation can be	**Unit 12:** Understand algebraic conventions Understand a variable can take any value whilst an unknown has a fixed value (or values) **Unit 13:** Understand that quadratics are expressions and equations that include a squared variable (and no higher order power) Understand that the shape of a quadratic graph is different from a linear graph Understand that quadratic graphs can

	unions, complements and the universal set Understand probability from set notation and Venn diagrams **Unit 4:** Understand how equivalence can be maintained while scaling and rearranging equations Understand how variables and unknowns interact within a system of equations Understand that addition and subtraction of simultaneous equations can result in the elimination of a variable Understand how substitution can be used to manipulate algebra **Unit 5:** Understand coordinates as solutions to linear equations, including intersections as simultaneous solutions Understand parallel lines have no solution as they do not intersect	used to describe slanted noninteger lengths and how this relates to squares and right-angled triangles Understand that perpendicular lines are often an opportunity to use Pythagoras' theorem **Unit 9:** Understand ratios describe proportional relationships **Unit 10:** Understand angles do not change and proportions remain constant in similar shapes Understand the constant of proportionality is a relationship within a shape and the scale factor is a relationship between shapes Understand the centre of enlargement (CoE) determines the position of an enlarged shape Understand the relationship between the area of an enlarged shape and the scale factor **Unit 11:** Understand that every right-angled triangle is similar to a right angled triangle drawn within a unit circle. Understand that the relationship	be used to give us information about x and y values Understand that every x-value can be mapped to a single y-value but not the other way around Understand that quadratics can be written in a factorised form, expressed as two brackets Understand expanding brackets as a multiplication of two partitioned numbers and use models of multiplication to find quadratics and other polynomials in their standard form **Unit 14:** Understand surd notation **Unit 15:** Understand index notation and what it represents Understand how we can expand our understand on indices to integers less than 1 **Unit 16:** Understand standard form is $a\times10^b$ where $1\leq a<10$ and b is an integer **Unit 17:** Understand repeated percentage

		between the opposite and adjacent is held constant by a set angle	change results in a different amount of change each iteration

What Disciplinary knowledge and skills will students gain?

Behaviours and attitude associated with disciplinary knowledge in Maths
Thinking is highly organised. It draws on a well-connected knowledge base of facts, methods and strategies that have been used to solve problems with a similar deep structure before. Successful problem-solving is therefore not just an activity but an outcome of successful learning of the facts and methods, and their useful combinations as strategies.

Ability to;
Investigate and recognise the problem type.
Conjecture
Prove
Reason
Problem solving using a combination of facts and methods.
Understand the deep structure that the strategies are paired to.

Outcomes

What will students be able to do?:

Unit 1
Be able to apply the four operations to fractions, decimals and percentage

Unit 2
Be able to calculate the probability of single independent events
Be able to calculate the probability of a pair of combined events
Be able to determine whether an experiment is fair or biassed

Unit 3
Be able to identify and interpret sets described by notation and within Venn diagrams

Be able to form and interpret Venn diagrams in the context of probability

Unit 4

Be able to solve and manipulate linear equations with one or more variables
Be able to use equivalent equations – through scaling and rearranging – to solve simultaneous equations
Be able to reduce the number of variables in an equation through substitution

Unit 5

Be able to solve simultaneous linear equations graphically
Be able to identify whether a pair of simultaneous equations have a solution algebraically and graphically

Unit 6

Be able to calculate angles using multiple angle theorems

Unit 7

Be able construct perpendicular and angle bisectors
Be able to identify when two triangles are congruent

Unit 8

Be able to find any missing length of a right-angled triangle by knowing that the square of the hypotenuse is equal to the sum of the squares of the other two sides
Be able to identify opportunities to use Pythagoras's theorem in non obvious contexts

Unit 9

Be able to describe proportional relationships using ratios and fractions

Unit 10

Be able to find scale factors and constants of proportionality and use them to find missing side lengths
Be able to enlarge a shape from a given CoE and on a coordinate grid and find the CoE

Unit 11

	Be able to find the length of catheti in right-angled triangles from a given angle and the length of the hypotenuse, including through using sine and cosine functions Be able to directly find the length of the opposite from the adjacent and given angle (and vice versa) – Be able to find any angle in a right-angled triangle from two known side lengths ***Unit 12*** Be able to manipulate algebraic expressions by expanding brackets and simplifying or factorising Be able to evaluate expressions, solve single variable equations, and represent equations with 2 variables graphically **Unit 13:** Be able to evaluate quadratic expressions for a given value, and use these values to plot graphs of quadratic equations Be able to expand double brackets with x coefficients of 1 and positive constants Be able to expand double brackets including those with negatives and non-1 x coefficients **Unit 14:** Be able to identify and begin to manipulate surds **Unit 15:** Be able to write numbers in index form in decimal and fractional forms Be able to simplify expressions involving indices with the same base **Unit 16:** Be able to interpret numbers in standard form and convert between ordinary and standard forms **Unit 17:** Be able to use decimal multipliers to calculate change, forwards and backwards
Literacy Knowledge and skills:	**Vocabulary Acquisition**
	• Students will be explicitly taught new tier 2 and tier 3 vocabulary across all units.

- Students will be encouraged to incorporate newly taught vocabulary in their tasks.
- Students will be encouraged to highlight when they have used new vocabulary in written responses.
- Students will be supported to use and spell the correct terms in their written work.
- Students will self-assess the accuracy of their own spelling and grammar in their writing.
- Teachers will address common misspellings in whole class feedback and may test students if they feel it is appropriate.
- Students will revisit previously learned vocabulary and concepts through interleaved recall quizzing.

KEY VOCAB

Numerator	Unknown	Perpendicular	Trigonometry
Denominator	Eliminate	Bisector	Sine
Equivalent	Substitute	Locus	Cosine
Probability	Intersection	Equidistant	Tangent
Outcome	Corresponding angle	Congruent	Quadratic
Event	Opposite angle	Hypotenuse	Expression
Theoretical	Alternate angle	Scale factor	Coefficient
Experimental	Interior angle	Constant of proportionality	Surd
Bias	Exterior angle	Enlarge	Irrational
Intersection	Polygon	Similar	Base
Union			Index
Complement			

Oracy

- Students will be given a number of opportunities to express their opinions through discussion, debate, performance and presentations; on an individual and group basis.
- Teachers will model spoken formal Standard language and encourage students to effectively structure verbal responses.
- Poor communication and non-standard English responses will be challenged, and students will be encouraged to self-correct.

	• Students will be encouraged to practice turn taking in peer to peer conversations to aid speaking and listening skills.
	Reading for Meaning
	• Students will be encouraged to utilise reciprocal reading strategies to ensure that comprehension of the reading materials is cemented (e.g. articles, case studies, set texts etc.). • Students are expected to use the reading sources to support student responses and ideas. • Teachers are to utilise a range of DART (Directed Activities Related to Text) strategies to ensure that students are engaging with their reading e.g. use of summaries, gap fills, sequencing activities etc.); to support student responses. • Teachers will read aloud and model what effective reading sounds like (e.g. reading case studies, questions and articles).
	Literacy code - marking
	• The literacy marking code will be used to review student responses; identifying errors and expecting students to self-correct. • Particular attention on: spelling, punctuation, grammar, tense and written structure (use of paragraphing) will be highlighted. • Teachers to 'spotlight' literacy during the lesson to flag common misconceptions or spelling, punctuation or grammatical errors. • Teachers promote 'checking' phases of the lesson to encourage students to review their work for errors.
	Written Response Scaffolding
	• Within the subject; an agreed written structure for responses is shared and used. • Sentence starters are available in subject areas to support student responses. • Specific and tiered success criteria is given to before commencing extended tasks. • Live modelling of outcomes is expected. This should be constructed in the form of an 'I do, We do, You do'. 'I do' models should be curated beforehand and where possible, the model should be examples from students for authenticity.