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Curriculum Plan *Maths*

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Yr 10	**Golden Threads: There are six key areas of study throughout – Number, Algebra, Ratio and Proportion, Geometry and Measure, Probability, and Statistics. Whilst these areas can appear distinct students are encouraged to see the connections across mathematical ideas. We also look to develop their fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.**		**Enrichment:** UKMT Intermediate Maths Challenge GCSE Further Maths Careers links		**Review and evaluation:** Summer 2025
	Topics and Substantive Knowledge	**Assessment**	**Misconceptions**	**Key Vocabulary**	**Knowledge tracking**
Term 1	**<u>Representing Solutions of Equations and Inequalities</u>** Students will look at the difference between equations and inequalities, they will establish the difference between and solution and a solution set, they will explore how number lines and graphs can be used to represent the solutions to an inequality. As well as solving equations, emphasis will be placed on forming equations from given information. - Solving equations and inequalities with the variable on one and both sides - Showing and interpreting the solution to an inequality on a number line - Finding solutions using linear graphs Higher – Representing solutions to single and multiple inequalities on a graph.	End of Term 1 – 45 minute in class assessment on first three blocks of learning. GCSE style questions.	- Subtracting and adding on both the variable and the constant when manipulating and equation - Confusing the direction of the inequality on a number line or graphs. Not understanding the idea that the variable is changeable.	Variable Solve Solution Equation Expression Inverse Inequality Linear	**Already Seen:** Year 9 Term 1 – Form and solve equations and inequalities with unknowns on both sides Year 9 Term 6 – Representing inequalities **To Build Towards:** Year 11 Term 2 – Form and solve quadratic equations by factorising
	<u>Quadratics</u> Students will explore quadratic functions. - Expanding double brackets - Factorising quadratics where a=1 - Solving quadratics using factorisation Higher – Some may progress to factorise when a≠1 and use this form to solve.		- Just multiplying the variables and then the constants (expanding introduced using grid method to eliminate this) - When a=1, finding values that add to the constant and multiply to the coefficient of x - Reading off the sign in the bracket to solve	Quadratic Roots Solution Factorise Expand	**Already Seen:** Year 9 Term 1 – Expand a pair of binomials **To Build Towards:** Year 11 Term 2 – Factorising quadratics, Completing the square
	<u>Simultaneous Equations</u> Students will learn to solve simultaneous equations both algebraically and graphically. The method of substitution will be dealt with, considering a known value and then an expression. For the elimination method, simple addition and subtraction examples, as well as more complex pairs where both equations will need scaling will be covered. - Determining if a value is a solution to an equation or pair of equations - Solving linear simultaneous equations by substitution - Solving linear simultaneous equations by elimination (including scaling) Higher – Solving a pair of simultaneous equations, where one of the equations is a quadratics		- Adding/subtracting incorrectly with simultaneous equations. - Not having equal coefficients in simultaneous equations. - Not adding or subtracting all term (including the constants) when manipulating expressions.	Variable Solve Scale (multiplier) Algebraically Graphically Intersection Substitute Coefficient Eliminate Lowest Common Multiple Solution Subject of the formula	**Already Seen:** Year 9 Term 1 - Form and solve equations with unknowns on both sides **To Build Towards:** Year 11 Term 2 – Form and solve quadratic equations by factorising

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Term 2	**Congruence, Similarity and Enlargement** This topic builds of students experience of enlargement and similarity in Year 9, students will look at enlarging by integer and fractional scale factors both with and without a centre of enlargement. They will look more formally at dealing with the conditions for congruent and similar triangles. - Enlarging by positive and fractional scale factors - Identify similar and congruent shapes - Finding missing side lengths and angles in similar shapes Higher – Enlarge shapes by a negative scale factor. Exploring the relationship between, linear, area and volume scale factor.	End of Term 2 – 45 minute in class assessment on the two Term 2 block of learning. GCSE style questions.	- Using the centre of enlargement as a point on the enlarged shape. - Enlarging the angles as well as the side lengths in similar shapes - Enlarging area and volume by the length scale factor.	Enlarge Object Image Scale factor Origin Centre of Enlargement Correspond Similar Congruent Conditions of congruency	**Already Seen:** Year 9 Term 4 – Rotational symmetry, translate shapes **To Build Towards:** Year 11 Term 4 – Plans and elevations
	Trigonometry This topic recaps the work done on Pythagoras in year 9 and then builds to introduce the 3 trigonometric ratios to finding missing measurements in right-angled triangles. Emphasis is placed on labelling right angled triangles throughout. - Finding the hypotenuse and short sides of right-angled triangles using Pythagoras. - Finding missing sides using trigonometry. - Finding missing angles using trigonometry. Higher – Pythagoras and Trigonometry in 3D. Exploring the use of trigonometry in non-right-angled triangles with the cosine rule, sine rule and sine rule for area of a triangle.		- Adding the short sides to find the hypotenuse without squaring. - Mislabelling the sides, particularly when a triangle is in a non-standard orientation. - Misplacing the bracket when using a calculator e.g. sin(30 x 9) rather than sin(30) x 9 - Using SOHCAHTOA when working with non-right angled triangles	Hypotenuse Opposite Adjacent Sine, Cosine & Tangent Formula Rearrange Ratio Inverse	**Already Seen:** Year 9 Term 4 – Use Pythagoras' Theorem **To Build Towards:** Year 11 Term 2 – Trigonometry in the context of functions
Term 3	**Angles and Bearings** This topic provides an opportunity for students to recap their knowledge of angles from KS3. Bearings is formally introduced. Students will be able to embed their understanding of Pythagoras and trigonometry through real-life examples. - Angle rules and angles in parallel lines - Representing and measuring bearings - Drawing scale diagrams using bearings - Problem solve with bearings Higher – Using the sine and cosine rule with bearings problems	Mid Term 3 – Summative GCSE style paper on all Year 10 topics to date (including expected knowledge from KS3). 2 x 45minute papers – Calculator and Non-calculator	- Confusing finding the bearing of A to B with A from B. - Using the wrong scale on a protractor (starting at 180 degrees). - Physically measuring the bearing when asked to calculate given information.	Scale Clockwise Bearing of…from.. North line East/West etc Construct Parallel Alternate Co-interior Corresponding	**Already Seen:** Year 8 Term 5 – Angles in parallel lines, Interior and exterior angles of polygons Year 9 Term 4 – Chains of reasoning to find angles **To Build Towards:** Year 11 Term 3 – Review and extend of Year 10 knowledge
	Working with Circles This topic introduces new content whilst building on prior knowledge from KS3, such as finding the circumference, area of a circle and volume of prisms. The formulae for arc length and area of a sector are built from students understanding of fraction. Students are also introduced to formulae for surface area and volume spheres and cones. - Revisit parts of a circle, area and circumference of circles - Calculating lengths of arcs and areas of sectors - Volume & surface area of cylinder		- Using the information given rather than amending to find the radius or diameter when appropriate. - Not identifying the radius and diameter still exist when only part of the circle is given	Radius Diameter Arc Tangent Sector Segment Chord	**Already Seen:** Year 8 Term 1 – Circumference of a circle Year 8 Term 5 – Area of a circle **To Build Towards:**

	- Volume & surface area of cones & spheres Higher – The first 4 circle theorems are introduced, the remaining will be introduced in Year 11.			Circumference Subtend Cyclic Cylinder Sphere Cone Frustrum Volume Surface Area	Year 11 Term 2 – Review perimeter, area and volume formulae Year 11 Term 1 – Prove and use circle theorems
Term 4	**Vectors** Students will have previously explored vectors to describe translations during KS3. This will be used as a basis for more formal work with vector; exploring the relationship between **a** and -**a**, as well as addition, subtraction and multiplication of vectors. Journeys through shapes will be explored linking the $\overrightarrow{AB}$ notation with **a**. - Understand a represent vectors and vector notation - Addition, subtraction and scalar multiplication of vectors - Explore journeys through shapes using vectors Higher – Understanding of vectors will be used to develop geometric proofs.	Towards the end of Term 4 – 45 minute in class assessment on circles, Vectors & ratio and fractions	- Using the positive vector when travelling against the arrow	rot	**Already Seen:** N/A **To Build Towards:** Year 11 – Diagrammatic and column representations of vectors
	Ratios and Fractions Students build on their prior knowledge of ratio and fractions, creating link between this and other topic areas, such as algebra and geometry. The focus for this on cross topic coherence and reasoning. - Sharing into ratios (given parts or wholes) - Use and interpret ratios in form 1:n or n:1 - Currency conversion - Best buy problems - Combining and mixed ratio problems Higher – students explore ratio in the context of area and volume of similar shapes		- Taking part of the ratio as the whole in a worded problem. - Assuming you must divide by a conversion to reduce the value (for example $ to £ you should multiply by 0.79) - Misinterpreting the values calculated in a best buys problem.	Ratio Simplest form Proportion Compare Share Gradient	**Already Seen:** Year 8 Term 1 – Divide in a ratio, use the form 1:n **To Build Towards:** Year 11 Term 1 – Gradients of curves
	Percentage and Interest Knowledge of percentages from KS3 is built upon. Students are encouraged to use calculator methods for percentage of amounts, increase, decrease and reverse problems. This develops to explore compound interest and decay problems. Financial maths is also explored, refamiliarising students with vocabulary they will be exposed to outside the classroom. - Percentage of amounts, increase and decrease. - Reverse percentages - Simple and compound interest - Repeated percentage change - Mixed problems involving percentages, ratios and fractions. Higher – students are introduced to the iterative process and the associated notation		- Dividing to complete a percentage decrease. - Using 0.7 rather than 0.07 for a calculation with 7% - Using simple interest instead of compound. Similar errors in decay and repeated percentage change problems.	Multiplier Simple Interest Compound Interest Depreciate Decay Iterate	**Already Seen:** Year 9 Term 3 – Reverse percentages, financial maths **To Build Towards:** Year 11 Term 4 – "Show that" problems with percentages
Term 5	**Probability** This topic builds upon knowledge of basic probability taught in KS3 and provides an opportunity for recap of arithmetic with fractions. Probability is seen in other contexts; tables, Venn diagrams and frequency trees.	Mid Term 5 – Summative GCSE style paper on all	- Not converting to a common denominator when adding or subtracting fractions.	Event Outcome Exact value Equally likely	**Already Seen:** Year 8 Term 2 – Use sample spaces, Use

	Students explore the definition of independent and dependant events and use tree diagrams to construct probability of multiple events. - Arithmetic with fractions - Probabilities of equally likely outcomes and the property that probabilities sum to 1. - Estimating outcomes using experimental data - Finding probabilities from tables, Venn diagrams and frequency trees - Using probability tress with dependant and independent events Higher – students use the skills from this topic in the context of conditional probability	Year 10 topics to date (including expected knowledge from KS3). 1 hour Calculator paper in the hall & a 45minute Non-calculator paper in class.	- Using events are even chance because there are 2 outcomes. - Adding probabilities for combined events in a probability tree. - Only altering the numerator when dealing with conditional probability.	Complement Intersect Union Estimate Expected Value Sample space Independent events Dependant events Conditional probability	tables and Venn diagrams Year 9 Term 6 – Frequency trees **To Build Towards:** Year 11 Term 4 – Review using sample spaces and probability rules
	<u>Collecting, Representing and Interpreting Data</u> This topic builds on for work in KS3 on collecting, representing and using summary statistics on data, as well as previous study beyond maths in geography and science. Existing knowledge is consolidated, whilst extending and deepening understanding, encouraging students to evaluate and criticise methods and diagrams. Emphasis throughout this topic is on interpretation of data. - Populations, samples and types of data. - Constructing and interpreting frequency tables & polygons; two-way tables; line, bar & pie charts; stem -and-leaf diagrams and time series graphs. - Criticising charts and graphs. - Finding and interpreting averages from lists and tables. Higher – additional representation are covered; histograms, cumulative frequency graphs and box plots. The concept of quartiles is introduced in the context of box plots.	Middle of Term 6 – 45 minute in class assessment on percentages & interest, probability, data and non-calculator methods . GCSE style questions.	- Plotting frequency polygons at the edge of the range and cumulative frequency at the centre. - Stating facts rather than comparing when asked to do so. - Omitting a key in a stem-and-leaf diagram - Plotting the frequency rather than frequency density in a histogram	Sample Population Bias Random Representative Stratified Primary/ Secondary data Source Class Interval Midpoint Endpoint Frequency Misleading Spread Frequency density Class width Outlier Mean, median, mode & range Cumulative Upper/ lower quartile Interquartile range Correlation Interpolation Extrapolation Origin Line of best fit Estimate	**Already Seen:** Year 8 Term 2 – Construct and interpret frequency tables, two-way tables **To Build Towards:** Year 11 Term 2 – Construct and interpret frequency tables, two-way tables

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Term 6	**Non-Calculator Methods** This block builds on methods of calculation from KS3. Mental methods and using number sense are encouraged alongside formal methods, including using fractions, negatives and decimals. Rounding, truncation and limits of accuracy are also visited. - Mental and formal methods of arithmetic with integers, decimals and fractions. - Rounding to powers of ten, decimal places and significant figures. - Estimation - Upper and lower bounds. Higher – Surds are introduced alongside the concept of rational and irrational numbers. Students learn to calculate with surds and simplify expressions.		- Confusing rounding the decimal places and significant figures - Errors on the upper bound, not accounting for more decimal places - Doing the full calculation when asked to estimate. - Removing a constant as factor from a surd, not the square root of the constant	Mixed number Improper fraction Reciprocal Exact Rational irrational Recurring Surd Root Rationalise Estimate Significant figures Degree of Accuracy Error Interval Truncate	**Already Seen:** Year 7 Term 2 – Rounding and ordering numbers **To Build Towards:** Year 11 Term 4 – Proving equivalence, Making ordered lists
	Types of Number and Sequences Student's revisit KS3 content, such as prime factorisation, highest common factors and lowest common multiples. Creating and finding the nth term rule for linear sequence is also recapped. - Prime factorisation. - Finding HCFs and LCMs of a set of numbers. - Continuing, describing and finding the nth term of linear sequences. Higher – students will work with sequences involving surds and explore the nth term rule for quadratic sequences.	Assessed in Year 11.	- Using all numbers from the prime factorisation to find the LCM, not eliminating using a Venn diagram. - When finding the nth term, getting the negative of the constant term by inspecting change in the reverse direction. - When creating a sequence such as $2n^2$, multiplying by 2 then squaring.	Factor (HCF) Multiple (LCM) Linear Quadratic Prime Index form Intersection Union Arithmetic Geometric Nth term Coefficient	**Already Seen:** Year 7 Term 6 – HCF and LCM Year 9 Term 3 – HCF and LCM Year 8 Term 3 – nth term of a sequence **To Build Towards:** Year 11 – Review of Year 10 work