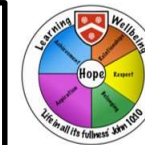Academic Learning Plan 2023-2024

Mathematics – Year 10

Intent : The Mathematics Department aims to encourage and develop the joy of problem solving. Students will leave Wadham School with essential mathematical skills for everyday life, to enable them to live their life in all its fullness. Students are actively encourage to try and sometimes fail. Mathematics is not somethings done to you but a subject that students actively engage in. Everyone is capable of being successful in Mathematics.

	Term 1		Term 2	
Year 10 Units	10.1 Congruency, similarity & enlargement	10.2 Trigonometry	10.3 Representing solutions of equations and inequalities	10.4 Simultaneous equations
Content (National curriculum)	Extend and formalise their knowledge of ratio and proportion in working with measures and geometry Compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity Interpret and use fractional {and negative} scale factors for enlargements Apply the concepts of congruence and similarity, including the relationships between lengths, {areas and volumes} in similar figures Use mathematical language and properties precisely Make and test conjectures about the generalisations that underlie patterns and relationships; look for proofs or counter-examples Develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems	Extend and formalise their knowledge of ratio and proportion, including trigonometric ratios Apply Pythagoras' Theorem and trigonometric ratios to find angles and lengths in right-angled triangles {and, where possible, general triangles} in two {and three} dimensional figures Know the exact values of $\sin\theta$, $\cos\theta$, $\tan\theta$ for required angles {know and apply the sine rule and cosine rule to find unknown lengths and angles} {know and apply to calculate the area, sides or angles of any triangle} Develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems Make and use connections between different parts of mathematics to solve problems Model situations mathematically and express the results using a range of formal mathematical representations, reflecting on how their solutions may have been affected by any modelling assumptions Select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems; interpret their solution in the context of the given problem.	Consolidate their algebraic capability from key stage 3 and extend their understanding of algebraic simplification and manipulation to include quadratic expressions Translate simple situations or procedures into algebraic expressions or formulae; derive an equation, solve the equation and interpret the solution Select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems; interpret their solution in the context of the given problem. Recognise, sketch and interpret graphs of linear functions, Factorising quadratic expressions of the form $x^2 + bx + c$ (Higher only at this stage) Solve quadratic equations algebraically by factorising (Higher only at this stage) Solve linear inequalities in one {or two} variable{s}, {and quadratic inequalities in one variable}; represent the solution set on a number line, {using set notation and on a graph}	Consolidate their algebraic capability from key stage 3 and extend their understanding of algebraic simplification and manipulation to include quadratic expressions Model situations mathematically and express the results using a range of formal mathematical representations, reflecting on how their solutions may have been affected by any modelling assumptions Translate simple situations or procedures into algebraic expressions or formulae; derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution Select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems; interpret their solution in the context of the given problem. Solve two simultaneous equations in two variables (linear/linear {or linear/quadratic}) algebraically; Recognise, sketch and interpret graphs of linear functions and quadratic functions.
Literacy	Within knowledge organisers & displayed in classrooms			
Knowledge organiser	Within exercise books			
Assessment	End of term 2 assessment – whole year group			
GCSE AO Link	Assessing all AO			
Homework	Sparx			
CEIAG	Understanding scale skills	Solving 2D and 3D problems	Spatial awareness/following instructions	Logical thinking/planning skills
Enrichment	Weekly Maths Challenges			

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	Term 3			Term 4		
Year 10 Units	10.5 Angles and bearings	10.6 Working with circles	10.7 Vectors	10.8 Ratio & fractions	10.9 Percentage & interest	10.10 Probability
Content (National curriculum)	Interpret and use bearings Compare lengths…using scale factors Apply Pythagoras' Theorem and trigonometric ratios to find angles and lengths in right-angled triangles {and, where possible, general triangles} in two dimensional figures {Know and apply the sine rule and cosine rule to find unknown lengths and angles} Use mathematical language and properties precisely Reason deductively in geometry, number and algebra, including using geometrical constructions Make and use connections between different parts of mathematics to solve problems	Identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment Calculate arc lengths, angles and areas of sectors of circles Calculate surface areas and volumes of spheres, pyramids, cones and composite solids Apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results	Describe translations as 2D vectors Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors; {use vectors to construct geometric arguments and proofs}.	Consolidating subject content from key stage 3: ➢ Use ratio notation, including reduction to simplest form. ➢ Divide a given quantity into two parts in a given $part : part$ or $part : whole$ ratio; express the division of a quantity into two parts as a ratio. ➢ Relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions. ➢ Use compound units such as speed, unit pricing and density to solve problems. Compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity. Apply the concepts of congruence and similarity, including the relationships between lengths, {areas and volumes} in similar figures.	Consolidating subject content from key stage 3: ➢ Interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100%. ➢ Solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics. Set up, solve and interpret the answers in growth and decay problems, including compound interest {and work with general iterative processes}.	Apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one. Use a probability model to predict the outcomes of future experiments; understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions. Calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams}.
Literac	Within knowledge organisers & displayed in classrooms					
Knowledge organiser	Within exercise books					
Assessment	End of unit test – whole year group					
GCSE AO Link	Assessing all AO					
Homework	Sparx					
CEIAG	Spatial awareness/following instructions	Geometrical reasoning/problem solving skills	Geometrical/scale/directional skills	Proportional problem solving skills	Finance and money problem solving skills	Risk/Quality control skills
Enrichment	Weekly Maths Challenges					

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	Term 5		Term 6		
Year 10 Units	10.14 Collecting, representing & interpreting data	10.11 - Non-calculator methods	10.12 Types of numbers & sequences	10.13 Indices and roots	Review of work from the year
Content (National curriculum)	Consolidating subject content from key stage 3: ➢ use describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data ➢ construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data ➢ describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers) Infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling Interpret and construct tables and line graphs for time series data {construct and interpret diagrams for grouped discrete data and continuous data, i.e. histograms with equal and unequal class intervals and 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} Apply statistics to describe a population Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (including modal class) and spread {including quartiles and inter-quartile range}	consolidate their numerical and mathematical capability from key stage 3 Calculate exactly with fractions, {surds} and multiples of π; {simplify surd expressions involving squares and rationalise denominators} {change recurring decimals into their corresponding fractions and vice versa} Apply and interpret limits of accuracy when rounding or truncating, {including upper and lower bounds} Develop their use of formal mathematical knowledge to interpret and solve problems, including in financial contexts Make and use connections between different parts of mathematics to solve problems	consolidating subject content from key stage 3: ➢ factors, multiples, primes, HCF and LCM ➢ describe and continue sequences Recognise and use sequences of triangular, simple arithmetic progressions, Fibonacci type sequences, quadratic sequences, and simple geometric progressions (r^n where n is an integer, and r is a positive rational number {or a surd}) {and other sequences} Deduce expressions to calculate the nth term of linear {and quadratic} sequence	Recognise and use sequences of square and cube numbers {estimate powers and roots of any given positive number} Calculate with roots, and with integer {and fractional} indices Calculate with numbers in standard form $A \times 10^n$, where $1 \leq A < 10$ and n is an integer Simplifying expressions involving sums, products and powers, including the laws of indices	Review, assess, reflect
Literac	Within knowledge organisers & displayed in classrooms				
Knowledge organiser	Within exercise books				
Assessment	End of unit test – whole year group				
GCSE AO Link	Assessing all AO				
Homework	Sparx				
CEIAG	Interpretation of graphs tables and charts	Numeracy skills	Pattern spotting	Higher level numeracy skills	
Enrichment	Weekly Maths Challenges				