Academic Learning Plan 2023-2024

Mathematics – Year 9

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 9 Units	9.1 Straight line graphs	9.2 Forming and solving equations	9.3 Testing conjectures	9.4 Three dimensional shapes	9.5 Construction and congruency
Content (National curriculum)	Develop algebraic and graphical fluency, including understanding linear and simple quadratic functions Recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane Interpret mathematical relationships both algebraically and graphically Reduce a given linear equation in two variables to the standard form y=mx+c; calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically Use linear and quadratic graphs to estimate values of y for given values of x and vice versa and to find appropriate solutions of simultaneous linear equations Solve problems involving direct and inverse proportion, including graphical and algebraic representations	Move freely between different numerical, algebraic, graphical and diagrammatic representations [for example…equations and graphs] Use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement) Understand and use standard mathematical formulae; rearrange formulae to change the subject Model situations or procedures by translating them into algebraic expressions or formulae and by using graphs	Make and test conjectures about patterns and relationships; look for proofs or counterexamples Begin to reason deductively in geometry, number and algebra Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation Simplify and manipulate algebraic expressions to maintain equivalence by expanding products of two or more binomials	Draw and measure line segments and angles in geometric figures, including interpreting scale drawings Derive and 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); recognise and use the perpendicular distance form a point to a line as the shortest distance to the line Describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric Use the standard conventions for labelling the sides and angles of triangles ABC, and know and use the criteria for congruence of triangles	Draw and measure line segments and angles in geometric figures, including interpreting scale drawings Derive and 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); recognise and use the perpendicular distance from a point to a line as the shortest distance to the line Describe, sketch and draw using conventional terms and notations; points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric Use the standard conventions for labelling the sides and angles of triangle ABC, and know and use the criteria for congruence of triangles
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	Graphical understanding and problem solving skills	Logical thinking/problem solving skills	Logical thinking/problem solving skills	Geometrical reasoning/problem solving skills	Problem solving
Enrichment	Weekly Maths Challenges				

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	Term 3			Term 4		
Year 9 Units	9.6 Number	9.7 Using percentages	9.8 Maths and money	9.9 Deduction	9.10 Rotation and translation	9.11 Pythagoras' Theorem
Content (National curriculum)	Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property Interpret and compare numbers in standard form A x 10^{n}, $1 \leq n < 10$ where n is a positive or negative integer or zero Appreciate the infinite nature of the sets of integers, real and rational numbers	Define percentage as 'number of parts per hundred', interpret percentage changes as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100% Interpret fractions and percentages as operators Solve problems involving percentage change, including; percentage increase, decrease and original value problems and simple interest in financial mathematics	Solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics Select and use appropriate calculation strategies to solve increasingly complex problems Interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning Develop their use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics	Derive and 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); recognise and use the perpendicular distance from a point to a line as the shortest distance to the line Describe, sketch and draw using conventional terms and notations; points line, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles Understand and use the relationship between parallel lines and alternate and corresponding angles	Identify properties of, and describe the results of translations, rotations and reflections applied to given figures Describe, sketch and draw using conventional terms and notations: points, lines parallel lines, perpendicular lines, right angles. Regular polygons, and other polygons that are reflectively and rotationally symmetric Develop their mathematical knowledge, in part through solving problems and evaluating the outcome, including multi-step problems	Use Pythagoras' Theorem to solve problems involving right-angled triangles Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, including Pythagoras' Theorem, and use known results to obtain simple proofs Interpret mathematical relationships both algebraically and geometrically Begin to reason deductively in geometry, number and algebra, including using geometrical constructions Begin to model situations mathematically and express the results using a range of formal mathematical representations
Literacy	Within knowledge organisers & displayed in classrooms					
Knowledge organiser	Within exercise books					
Assessment	End of term 4 assessment – whole year group					
GCSE AO Link	Assessing all AO					
Homework	Sparx					
CEIAG	Logical thinking skills/Every day maths (4 operations)	Everyday Maths/Finance/Money	Finance/Money problem solving skills	Logical thinking/problem solving skills	Spatial awareness/problem solving skills	2D/3D Problem solving
Enrichment	Weekly Maths Challenges					

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	Term 5			Term 6		
Year 9 Units	9.12 Enlargement and similarity	9.1 Solving ratio & proportion problems	9.14 Rates	9.15 Probability	9.16 Algebraic representation	Review of work from the year
Content (National curriculum)	Construct similar shapes by enlargement, with and without coordinate grids Use scale factors, scale diagrams and maps Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction Use Pythagoras' Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles	Divide a given quantity into tow parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction Solve problems involving direct and inverse proportion, including graphical and algebraic representations Use compound units such as speed, unit pricing and density to solve problems	Use compound units such as speed, unit pricing and density to solve problems Understand that a multiplicative relationships between two quantities can be expressed as a ratio or a fraction Change freely between related standard units (for example time, length, area, volume/ capacity, mass)	Record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale Understand that the probabilities of all possible outcomes sum to 1 Enumerate sets and unions/ intersections of sets systematically, using tables, grids and Venn diagrams Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities	Recognise, sketch and produce graphs of quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane Use quadratic graphs to estimate values of y for given values of x and vice versa Find approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear, exponential and reciprocal graphs Use linear graphs to estimate values of y for given values of x and vice versa and to find approximate solutions of simultaneous linear equations Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors	Review, assess, reflect
Literacy	Within knowledge organisers & displayed in classrooms					
Knowledge organiser	Within exercise books					
Assessment	End of term 6 assessment – whole year group					
GCSE AO Link	Assessing all AO					
Homework	Sparx					
CEIAG	Spatial awareness/problem solving skills	Problem solving skills	Logical thinking/problem solving skills	Risk skills	Problem solving skills	
Enrichment	Weekly Maths Challenges					