

Year 9 Curriculum Overview

Mathematics -The Copley mathematics curriculum has 6 NC Areas and 22 strands that are woven through the curriculum from Year 7 to Year 11

NC Subject Content Area	Strands
Number	• Number: Understand and represent number • Number: Calculations • Number: Understand fractions and decimals • Number: Percentages
Algebra	• Algebra: Understand Notation and Substitute • Algebra: Equivalence and Proof • Algebra: Solve Equations and Inequalities • Algebra: Linear Graphs • Algebra: Non-linear Graphs • Algebra: Sequences
Ratio, proportion and rates of change	• Ratio, Proportion, Rates of Change: Multiplicative Relationships • Ratio, Proportion, Rates of Change: Ratio & Rates
Geometry and measures	• Geometry and Measures: Perimeter, Area and Volume • Geometry and Measures: Construct and Transform Geometric Figures • Geometry and Measures: Shape properties • Geometry and Measures: Angles • Geometry and Measures: Pythagoras and Trigonometry • Geometry : Geometrical Proof
Probability	• Probability
Statistics	• Statistics: Represent and Interpret Data • Statistics: Statistical Measures • Statistics: Bivariate Data

Year 9		HT1	HT2	HT3	HT4	HT5	HT6
Mathematics	Topic	Reasoning with Algebra	Constructing in 2 and 3 Dimensions	Reasoning with Number	Reasoning with Geometry	Reasoning with Proportion	Representations
	Why this and why now?	Straight Line Graphs Pupils will be familiar with horizontal and vertical lines. This unit looks at gradients and y – intercept and formalize $y = mx + c$. Students will be introduced to perpendicular and parallel line. This work is important for future learning when pupils are taught to equate lines and curves and use the properties of lines to solve problems with and without diagrams. Forming and Solving equations and Inequalities Pupils have already spent time solving linear equations and learning the basic algebraic rules. This unit looks at the similarities and differences for solving equations and inequalities. The pupils need a solid grasp of solving linear equations and inequalities. This work moves towards solving quadratic equations and inequalities at KS4. Testing Conjectures Pupils will have tested conjectures in Year 8 and 9. This unit looks to formalize this process into a proper mathematical structure. For GCSE pupils will have to prove geometrically and algebraically. Testing conjectures is an excellent introduction into this area.	Three Dimensional Shapes Pupils will be confident with working with 2D shapes and their areas. This block of work extends into 3D shapes. Pupils will work on surface areas, volumes and nets of the shapes. Pupils will in future use Pythagoras and trigonometry to further extend their work with 3D shapes. Constructions and Congruency Pupils will be familiar with using a compass, protractor and ruler when they drew accurate triangle diagrams. They will learn further how to use these mathematical instruments with a wide variety of constructions. They will also be introduced to basic congruency. These skills will be further developed when pupils have to formalize geometric proofs. They will also build their skills at applying constructions into contextualized questions.	Numbers The majority of the topics in this block have been covered earlier in KS3. This is another opportunity to secure basic numeracy skills. The number section is important for a range of topics at KS4. It is important that these skills are well embedded at KS3 so pupils can tackle more in-depth questions at KS4. Using Percentages The majority of the topics in this block have been covered earlier in KS3. This is another opportunity to secure basic numeracy skills. In this unit pupils will also look at repeated percentages. It is really important that they are confident to use a decimal multiplier when working out percentage questions. Pupils will expand their work on compound interest looking at repeating calculations with different multipliers and also reversing the calculation to find the decimal multiplier and percentage equivalent. Mathematics and Money This unit using number and percentage but puts it into a context for money life skills that the pupils will need in future. This will help pupils manage their financial arrangements in future.	Deduction This topic builds on the work on angle in Year 7 and 8. Pupils are asked to make conjectures and then check to see if they work in a variety of geometric contexts. This work is crucial as it leads into circle theorem work and eventually having to prove some of the circle theorems. Rotation and translation Pupils will have rotated shapes before. This unit formalizes the need for rotation around a point and using 4 quadrant coordinate diagrams. Pupils should start to use translations vectors for translations on 4 quadrant coordinate diagrams. The rotation works is not really built upon until A level but the translations are formalized more with vectors and transformation of functions at GCSE. Pythagoras' Theorem This is a new topic although pupils will be familiar with right angled triangles, squares and square roots. This unit enables the pupils to find the length on an unknown side of a right-angled triangle. There is scope to look at 3D shapes but this is explored in greater detail at KS4. Pupils will use the techniques learnt at KS3 to further build their skills with 2D problem solving and move onto 3D	Enlargement and similarity Pupils will be familiar with basic enlargement of shape. This unit aims to deepen this area looking at fractional and negative enlargements about a point. They will also learn how to find missing sides on shapes if shapes are similar using scale factors. The enlargement unit will be repeated at GCSE but the skills don't really increase. It will be an opportunity to further embed these skills. Similarity work will be increased when students have to prove congruence and also look at connections between scale, area and volume factors. Solving Ratio and Proportion Problems Pupils will have solved problems at primary and KS3 using proportion and the unitary method. This unit looks again at these problems but also explores what is happening graphically. Pupils build on earlier work on ratio and start to problem solve by split amounts by a ratio. This work will lead to formal methods when finding direct and inverse proportion at KS4. Pupils will also develop ratio techniques using algebraic methods, two-way tables and tree diagrams. Rates	Probability Pupils will be used to finding probabilities of single events. This unit expands on this with multiple events using two-way tables and tree diagram probability. This will lead to pupils being competent in the future with tree diagram probability to look at dependent events and algebraic probability. Algebraic Representations Pupils will be confident at plotting and understanding straight line graphs and $y = mx + c$. This unit moves onto quadratic graphs, the importance of the intersection of simultaneous equations and piece-wise graphs. Pupils will look at quadratic graphs in more detail at KS4. Work will include completing the square and turning points and solving quadratics for the intersections point with the x – axis. Pupils might even go onto look at the discriminant and its effect on a quadratic

			This unit will be revisited at KS4 to ensure that pupils leave school confident with money. The exam has limited testing on this area but we should try to ensure that young people are confident with numerical and financial calculations.	shapes. The distance formula can also be introduced at GCSE higher level.	Pupils will be used to using formula with area etc. They will now look at SDT and DMV and other rate questions. This unit will look at the connection between the variables as well as using the formulae. This work will eventually lead to working out gradients of straight lines and tangents to curves at GCSE. A pre-cursor to calculus at A level.	
What is the essential knowledge that needs to be remembered?	Straight Line Graphs Lines parallel to the axes, $y = x$ and $y = -x$ (R) Using tables of values (R) Compare gradients Compare intercept Understand and use $y = mx + c$ Write an equation in the form $y = mx + c$ (H) Find the equation of a line from a graph Interpret gradients and intercepts of real-life graphs Model real-life graphs involving inverse proportion (H) Explore perpendicular lines (H) Forming and Solving equations and Inequalities Solve one and two step equations and inequalities Solve one and two step equations and inequalities with brackets Inequalities with negative numbers Solve equations with unknowns on both sides Solve inequalities with unknowns on both sides Solve equations and inequalities in context Substituting into formulae and equations Rearrange formulae (one-step)	Three Dimensional Shapes Know the names of 2-D and 3-D shapes Recognise prisms Accurate nets of cuboids and other 3-D shapes Sketch and recognize nets of cuboids and other 3-D shapes Plans and elevations Find area of 2-D shapes (R) Surface area of cubes and cuboids Surface area of cubes and cuboid Surface area of triangular prisms Surface area of a cylinder Volume of cubes and cuboids Volume of other 3-D shapes, prisms and cylinders Explore volumes of cones, pyramids and spheres (H) Constructions and Congruency Draw and measure angles (R) Construct and interpret scale drawings (R) Locus of distance from a point Locus of distance from a straight line/shape Locus equidistant from two points Construct a perpendicular bisector Construct a perpendicular from a point	Numbers Integers, real and rational numbers Understand and use surds (H) Work with directed number (R) Solve problems with integers Solve problems with decimals HCF and LCM (R) Adding and subtracting fractions (R) Multiplying and dividing fractions (R) Solving problems with fractions Numbers in standard form (R) Using Percentages Use the equivalence of fractions, decimals and percentages (R) Calculate percentage increase and decrease (R) Express a change as a percentage (R) Solve "reverse" percentage problems Recognise and solve percentage problems (non – calculator) Recognise and solve percentage problems (calculator) (R) Solve problems with repeated percentage change (H) Mathematics and Money Solve problems with bills and bank statements	Deduction Angles in parallel lines (R) Solving angles problems (using chains of reasoning) Angles problems with algebra Conjectures with angles Conjectures with shapes Link constructions and geometrical reasoning (H) Rotation and translation Identify the order of rotational symmetry of a shape Compare and contrast rotational symmetry with line symmetry Rotate a shape about a point on a shape Rotate a shape about a point not on a shape Translate points and shapes by a given vector Compare rotation and reflection of shapes Find the result of a series of transformations (H) Pythagoras' Theorem Squares and square roots (R) Identify the hypotenuse of a right-angled triangle Determine whether a triangle is right-angled Calculate the hypotenuse of a right-angled triangle Calculate missing sides in right angled triangles	Enlargement and similarity. Recognise enlargement and similarity Enlarge a shape by a positive integer scale factor Enlarge a shape by a positive integer scale factor from a point Enlarge a shape by a positive fractional scale factor Enlarge a shape by a negative scale factor (H) Work out missing sides and angles in a pair of given similar shapes Solve problems with similar triangles (H) Explore ratios in right-angled triangles (H) Solving Ratio and Proportion Problems. Solve problems with direct proportion (R) Direct proportion and conversion graphs (R) Solve problems with inverse proportion Graphs of inverse relationships (H) Solve ratio problems given the whole or a part (R) Solve "best buy" problems Solve problems ratio and algebra (H) Rates	Probability Single event probability (R) Relative frequency – include convergence Expected outcomes Independent events Use tree diagrams (H) Use tree diagrams to solve "without replacement" problems (H) Use diagrams to work out probabilities Algebraic Representations Draw and interpret quadratic graphs Interpret graphs, including reciprocal and piece-wise Investigate graphs of simultaneous equations (H) Represent inequalities

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