Year 8 Curriculum Overview

Mathematics -The Copley mathematics curriculum has 6 NC Areas and 22 strands that are woven through 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 8		HT1	HT2	HT3	HT4	HT5	HT6
Mathematics	Topic	Proportional Reasoning	Representations	Algebraic Techniques	Developing Number	Developing Geometry	Reasoning with Data
	Why this and why now?	**Ratio and Scale** For the majority of pupils, the material taught in this topic will be new material. The year 7 curriculum has given them the appropriate prior knowledge in number and algebra to be able to access this new material. Ratio is a large section of the maths curriculum as pupils move towards GCSE. They will need to be fluent with ratio in different contexts moving forward. **Multiplicative Change** Again, most of this work will be new content but the number skills taught in Year 7 will allow the pupils to access this material. The scale and proportion sections are important as the pupils can understand the graphical representation of direct proportional as well as understanding key algebraic graphs which are taught in more detail at KS4. **Multiplying and dividing fractions** Pupils will be familiar with this topic from primary and year 7 however this unit extends to include all types of fractions This unit will lead onto the pupils being fluent so as	**Working in the Cartesian Plane** Pupils will be familiar with plotting positive coordinates and using directed number in previous units. Pupils are also familiar with conversion graphs. This unit looks at the 4 quadrants and introduces gradient. Pupils will have to draw and interpret quadratics, cubics, reciprocals, exponentials and trigonometric graphs in the cartesian plane in future. **Representing Data** The majority of this will be new learning although the pupils will be familiar will line graphs and bar charts from primary school. This unit will lead into further work including frequency polygons, cumulative frequency, box plots and histograms in the future. **Tables and Probability** This will be new for most pupils although they should be used to using a listing technique previously. This unit links to further probability questions involving ratio, conditional and unconditional probability at KS4.	**Brackets, equations and inequalities** Pupils were introduced to basic algebraic notation in year 7. This unit develops their algebra by expanding brackets and factorizing. This unit is crucial for further algebraic development later in the curriculum. Solving quadratics using factorization plays a large part in the Higher GCSE course. **Sequences** Pupils will be familiar with completing patterns, this unit starts to look at how to formally describe sequences and then to use algebraic rules. Pupils will use this further as they develop iteration and quadratic sequences in key stage 4. **Indices** Pupils will be familiar with square and cube numbers from previous learning. This unit introduces the pupils to the first 4 laws of indices. Pupils will build on these rules as they develop skills for negative and fractional indices (Laws 5 and 6). Some pupils will go onto equating and solving equations by further manipulation of the base and index.	**Fractions and Percentages** There is an opportunity for pupils to consolidate prior learning in this topic as well as develop fluent skills to interchange between fractions and percentages. Pupils start to look at percentage increase and decrease with decimal multipliers being introduced. This topic further leads to work with compound interest and recurrence relation later in the curriculum. These topics are difficult to teach without this prior knowledge being embedded. **Standard Index Form** This is a new topic for pupils allowing them to write large and small numbers using a mathematical convention such as standard form. This topic is developed further within units such as speed, distance and time when pupils need to use the speed of light to work out problems. **Number Sense** Pupils will already be familiar with numerous number topics. This unit aims to get the pupils to understand number and how rounding can play an important role. The understanding of number is important in topics such as bounds and is important for pupils to have a sense of an answer when using a calculator.	**Angles in parallel lines and polygons** Pupils have developed some basic angle work in Year 7 and are familiar with triangles and quadrilaterals. This unit looks at specific angle facts with parallel lines. This unit is further developed later and expanded on when pupils complete their geometry work in angle with circle theorems later in KS4. **Area of trapezia and circles** Pupils are aware of trapeziums and circles but this topic will specifically look at finding areas and will cover parts of a circle in more detail. This is an important topic as the area of these shapes leads into volume and surface area. Pupils will also need to be fluent with the formula for a trapezium to work out areas under curves. **Line symmetry and reflection** Pupils will have reflected shapes before and drawn lines of symmetry on shapes. This unit looks at diagonally symmetry and also reflection in an equation of a line. This unit is further extended later when we look at transformations as a whole. Pupils will need to be aware of invariant points after transformations as well as understanding transformations of functions.	**The Data Handling Cycle** This unit of work revisits some common charts that pupils are familiar with. There is a greater focus however on being able to analyse the charts and choose the most appropriate chart for a given data set. This unit brings in lots of statistical language which is needed in further more complex charts. This work leads onto drawing histograms, cumulative frequency diagrams and finding all averages from grouped and data. **Measures of location** Pupils will have found averages before. This unit allows the pupils to reflect on what the average means and which average is best given different data sets. The idea of how outliers affect averages is introduced in this unit. This unit allows pupils to move onto analyse comparative data such as boxplots where the average and measure of spread need to be compared.

		apply to algebraic expressions and equations at KS4.					
	What is the essential knowledge that needs to be remembered?	**Ratio and Scale.** Understand the meaning and representations of ratio Understand and use ratio notation Solve problems involving ratios of the form 1 : n (or n : 1) Solve proportional problems involving the ratio m : n Divide a value into a given ratio Express ratios in their simplest integer form Express ratios in the form 1 : n Compare ratios and related fractions Understand π as the ratio between diameter and circumference Understand gradient of a line as a ratio **Multiplicative Change** Solve problems involving direct proportion Explore conversion graphs Convert between currencies Explore direct proportion graphs Explore relationships between similar shapes Understand scale factors as multiplicative representations Draw and interpret scale diagrams Interpret maps using scale factors and ratio **Multiplying and dividing fractions.** Represent multiplication of fractions	**Working in the Cartesian Plane.** Work with coordinates in all four quadrants Identify and draw lines that are parallel to the axes Recognise and use the line y =x Recognise and use lines of the form y = kx Link y = kx to direct proportion problems Explore the gradient of the line y = kx (H) Recognise and use lines of the form y = x + a Explore graphs with negative gradient (y = -kx, y = a – x, x + y = a) Link graphs to linear sequences Plot graphs of the form y = mx + c Explore non-linear graphs (H) Find the midpoint of a line segment (H) **Representing Data.** Draw and interpret scatter graphs Understand and describe linear correlation Draw and use line of best fit (Interpolation & Extrapolation) Identify non-linear relationships Identify different types of data Read and interpret ungrouped frequency tables Read and interpret grouped frequency tables Represent grouped discrete data Represent continuous data grouped into equal classes	**Brackets, equations and inequalities.** Form algebraic expressions Use directed number with algebra Multiply out a single bracket Factorise into a single bracket Expand multiple single brackets and simplify Expand a pair of binomials (H) Solve equations, including with brackets Form and solve equations with brackets Understand and solve simple inequalities Form and solve inequalities Solve equations and inequalities with unknows on both sides (H) Form and solve equations and inequalities with unknowns on both sides (H) Identify and use formulae, expressions, identities and equations **Sequences.** Generate sequences given a rule in words Generate sequences given a simple algebraic rule Generate sequences given a complex algebraic rule Find the rule for the nth term of a linear sequence (H) **Indices** Adding and subtracting expressions with indices	**Fractions and Percentages** Convert fluently between key fractions, decimals and percentages (R) Calculate key fractions, decimals and percentages of an amount without a calculator (R) Calculate key fractions, decimals and percentages of an amount using calculator methods (R) Convert between decimals and percentages greater than 100% Percentage decrease with a multiplier Calculate percentage increase and decrease using a multiplier Express one number as a fraction or a percentage of another without a calculator Express one number as a fraction or a percentage of another without a calculator Express one number as a fraction or a percentage of another using calculator methods Work with percentage change Choose appropriate methods to solve percentage problems Find the original amount given the percentage less than 100% (H) Find the original amount given the percentage greater than 100% (H) Choose appropriate methods to solve complex percentage problems (H) **Standard Index Form** Investigate positive powers of 10 Work with numbers greater than 1 in standard form Investigate negative powers of 10 Work with the numbers between 0 and 1 in standard form Compare and order numbers in standard form	**Angles in parallel lines and polygons.** Use basic angle rules and notation (R) Investigate angles between parallel lines and the transversal Identify and calculate with alternate and corresponding angles Identify and calculate with co-interior alternate and corresponding angles Solve complex problems with parallel line angles Constructions of triangles and special quadrilaterals (R) Investigate the properties of special quadrilaterals Identify and calculate with sides and angles in special quadrilaterals Understand and use the properties of diagonals of quadrilaterals (H) Understand and use the sum of exterior angles of any polygons Calculate and use the sum of the interior angles in any polygon Calculate missing interior angles in regular polygons Prove geometric facts (H) Construct angle bisector Construct a perpendicular bisector of a line segment **Area of trapezia and circles**: Area of triangles, rectangles and parallelograms (R) Area of a trapezium Area of a trapezium Calculate the perimeter and area of compound shapes (1) Investigate area of a circle Area of a circle and parts of a circle without no calc Calculate the area of a circle and parts of a circle with a calculator	**The Data Handling Cycle.** Set up a statistical enquiry Design and criticise questionnaires Draw and interpret pictograms, bar charts and vertical line charts (R) Draw and interpret multiple bar charts Draw and interpret pie charts (R) Draw and interpret line graphs Choose the most appropriate diagram foe a given set of data Represent and interpret grouped quantitative data Find and interpret the range Compare distributions using charts Identify misleading graphs **Measures of location.** Understand and use the mean, mode and median Choose the most appropriate average Find the mean from an ungrouped frequency table (H) Find the mean from grouped frequency table (H) Identify outliers Compare distributions using averages and the range

		Multiply a fraction by an integer Find the product of a pair of unit fractions Find the product of a pair of any fractions Divide an integer by a fraction Divide a fraction by a unit fraction Understand and use the reciprocal Divide any pair of fractions	Represent data in two-way tables **Tables and Probability**. Construct sample spaces for 1 or more events Find probabilities from a sample space Find probabilities from two-way tables Find probabilities from Venn diagrams Use the product rule for finding the total number of possible outcomes (H)	Simplifying algebraic expressions by multiplying indices Simplifying algebraic expressions by dividing indices Using the addition law for indices Using the addition and subtraction law for indices Exploring powers of powers	Mentally calculate with numbers in standard form Add and subtract numbers in standard form Multiply and divide numbers in standard form Use a calculator to work with numbers in standard form Understand and use negative indices Understand and use fractional indices In this unit of work, we want students to know and understand **Number Sense** Round numbers to powers of 10, and 1 significant figure (R) Round numbers to a given number of decimal places Estimate the answer to a calculation Understand and use error interval notation (H) Calculate using the order of operations (R) Calculate with money Convert metric measures of length Convert metric units of weight and capacity	Calculate the perimeter and are of compound shapes (2) **<u>Line symmetry and reflection.</u>** Recognise line symmetry Reflect a shape in a horizontal or vertical line 1 (shapes touching the line) Reflect a shape in a horizontal or vertical line 1 (shapes not touching line) Reflect a shape in a diagonal line 1 (shapes touching the line) Reflect a shape in a diagonal line 1 (shapes not touching the line)	
What is the assessment intent and how will you assess?	Each block of work is assessed using the WRM assessment. During this assessment "Can you still" blocks are also assessed. This pattern can be seen at the end of this document. Teachers check the progress and areas of concern are addressed through whole class teaching with targeted Do Nows and HW. Blocks are also assessed at the end of each term to check progress and establish if long term learning has been secured.						
What should the end point look like?	Pupils need to secure their learning in the key areas listed above. Ratio and proportion questions are now a discrete unit on the national curriculum. This will enable them to progress at KS4 with formal methods of direct and increase proportion. Fractions work for the 4 operations is completed with multiplying and dividing as well as extended to algebra.	This unit explore algebraic graph work and pupils should be confident to draw and interpret graphs of the form y = mx + c. The unit also looks at statistic and pupils should become confident with analysing grouped data. Pupils will also be able to answer probability questions using 2-way tables, Venn diagrams and the product rule for permutations.	Pupils will be confident with more complex expressions and equations including expanding and factorising. Pupils will also be able to formalise their expression work with nth term rules. They will also be able to formalise the indices rules.	Pupil should be confident to use decimal multipliers with percentage questions. They will also use formal methods to express large and small numbers through standard form. They will also use rounding to get a better sense of number and be confident about the accuracy of answers.	Pupils will become more confident at finding angles in shapes. This will allow pupils a better understanding of the properties of shape. They will also develop skills to find the areas of more complex shapes. Reflection will become	Pupils will have a better understanding of which charts are more appropriate given a specific data set. They will also understand the differences in the averages that can be used and why sometimes the averages can be skewed by the data.	

		Assessment will show current performance. This will be further assessed in the future with “Can you still” questions showing learning embedded into long term learning and memory.					
	How does it cover the NC?	The NC coverage can be found on page 15-16. PowerPoint Presentation (kxcdn.com)	The NC coverage can be found on page 12-13 and 23-25. PowerPoint Presentation (kxcdn.com)	The NC coverage can be found on page 10,11 and 14 PowerPoint Presentation (kxcdn.com)	The NC coverage can be found on page 7 and 8. PowerPoint Presentation (kxcdn.com)	The NC coverage can be found on page 17 and 22. PowerPoint Presentation (kxcdn.com)	The NC coverage can be found on page 24 and 26. PowerPoint Presentation (kxcdn.com)

Year 8 Assessment Matrix