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Year 8 Curriculum Implementation Plan

(All students in Year 8 follow this curriculum.)

Mathematics – Year 8 – Overview				
Knowledge and Skills – Students will be taught to…	Reading, Oracy, Literacy	Formative Assessment	Summative Assessment	Link to GCSE Content
Please see individual units below.	• Reading worded questions to understand the context and decide how to approach a problem • Paired discussion of problems • Writing responses to worded questions such as "Explain why…" • Expanding vocabulary of key mathematical terms • Giving verbal responses in class question-and-answer	• Questioning in class • Self-assessment • Peer-assessment • Starter and homework questions • Mini-tests • Show of hands and other forms of whole-class feedback • Review of student work during lessons • Mini-whiteboards	Whole-class assessments towards the end of each term, based on work completed during the year to date. Additional topic-based mini-assessments during the year.	Please see individual units below.

Mathematics – Autumn Term Unit 1 – Ratio and scale	
Knowledge and Skills – Students will be taught to…	Links to KS3 National Curriculum Content (green) and KS4 Content (red)
• Understand the meaning and representation of ratio • Understand and use ratio notation • Solve problems involving ratios in 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 • Compare ratios and related fractions • Understand π as the ratio between diameter and circumference Extension objectives:- • Express ratios in the form 1:n • Understand gradient of a line as a ratio.	Use ratio notation 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 Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction Calculate and solve problems involving: perimeters of 2-D shapes (including circles) Identify and work with fractions in ratio problems Interpret the gradient of a straight line graph as a rate of change
Mathematics – Autumn Term Unit 2 – Multiplicative change	
Knowledge and Skills – Students will be taught to…	Links to KS3 National Curriculum Content (green) and KS4 Content (red)
• Solve problems involving direct proportion • Explore conversion graphs • Convert between currencies • Explore relationships between similar shapes • Understand scale factors as multiplicative representations (including enlarging shapes without a centre) • Draw and interpret scale diagrams • Interpret maps using scale factors and ratios. Extension objective: • Explore direct proportion graphs	Use scale factors, scale diagrams and maps Interpret scale drawings Draw and measure angles in geometric figures, including interpreting scale drawings Solve problems involving direct proportion, including graphical and algebraic representations Recognise and interpret graphs that illustrate direct proportion
Mathematics – Autumn Term Unit 3 – Multiplying and dividing fractions	
Knowledge and Skills – Students will be taught to…	Links to KS3 National Curriculum Content (green) and KS4 Content (red)

• Represent multiplication of fractions • 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 Extension objectives:- • Multiply and divide improper and mixed fractions • Multiply and divide algebraic fractions	Use the four operations applied to proper and improper fractions, and mixed numbers, all both positive and negative
Mathematics – Autumn Term Unit 4 – Working in the Cartesian plane	
Knowledge and Skills – Students will be taught to…	Links to KS3 National Curriculum Content (green) and KS4 Content (red)
• 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 • 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 Extension objectives:- • Explore the gradient of the line y = kx • Explore non-linear graphs • Find the mid-point of a line segment	Work with coordinates in all four quadrants Recognise, sketch and produce graphs of linear functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane Interpret mathematical relationships both algebraically and graphically
Mathematics – Autumn Term Unit 5 – Representing data	
Knowledge and Skills – Students will be taught to…	Links to KS3 National Curriculum Content (green) and KS4 Content (red)

• Draw and interpret scatter graphs • Understand and describe linear correlation • Draw lines of best fit • 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 • Represent data in two-way tables	Construct and interpret appropriate tables, charts, and diagrams for categorical data Construct and interpret appropriate tables, charts, and diagrams, for grouped numerical data Describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs Use and interpret scatter graphs of bivariate data Recognise correlation and know that it does not indicate causation Draw estimated lines of best fit on a scatter graph and use them to make predictions
Mathematics – Autumn Term Unit 6 – Tables and probability	
Knowledge and Skills – Students will be taught to…	Links to KS3 National Curriculum Content (green) and KS4 Content (red)
• 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 Extension objective: • Use the product rule for finding the total number of possible outcomes	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 Use the product rule for counting
Mathematics – Spring Term Unit 7 – Brackets, equations and inequalities	
Knowledge and Skills – Students will be taught to…	Links to KS3 National Curriculum Content (green) and KS4 Content (red)
• Form algebraic expressions • Use directed number with algebra • Multiply out a single bracket • Factorise into a single bracket • Expand multiple single brackets and simplify • Solve equations with brackets • Form and solve equations with brackets • Understand and solve simple inequalities • Form and solve inequalities • Identify and use formulae, expressions, identities and equations Extension objectives:- • Expand a pair of binomials	Model situations or procedures by translating them into algebraic expressions Simplify and manipulate algebraic expressions by multiplying a single term over a bracket Simplify and manipulate algebraic expressions by taking out common factors Simplify and manipulate algebraic expressions by expanding products of two or more binomials Use the symbols =, ≠, <, >, ≤, ≥ Substitute numerical values into formulae, including scientific formulae Recognise and use relationships between operations including inverse operations Use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement)

• Solve equations and inequalities with unknowns in both sides • Form and solve equations and inequalities with unknowns in both sides	Solve linear inequalities in one variable
Mathematics – Spring Term Unit 8 – Sequences	
Knowledge and Skills – Students will be taught to…	**Links to KS3 National Curriculum Content (green) and KS4 Content (red)**
• Generate sequences from rules in words • Generate sequences from algebraic rules • Generate sequences from complex algebraic rules Extension objective: • Find the algebraic rule to describe a sequence	Generate terms of a sequence from either a term-to-term or a position-to-term rule Recognise arithmetic sequences Recognise geometric sequences and appreciate other sequences that arise Find the nth term of an arithmetic sequence Deduce expressions to calculate the nth term of linear sequences
Mathematics – Spring Term Unit 9 – Indices	
Knowledge and Skills – Students will be taught to…	**Links to KS3 National Curriculum Content (green) and KS4 Content (red)**
• Adding and subtracting expressions with indices • Simplifying algebraic expressions with indices by multiplying • Simplifying algebraic expressions with indices by dividing • Using the addition law for indices • Using the addition and subtraction law for indices Extension objective: • Explore powers of powers	Use real roots associated with integer powers (square, cube and higher) Simplify expressions involving sums, products and powers, including the laws of indices Calculate with square roots, and with integer indices
Mathematics – Spring Term Unit 10 – Fractions and percentages	
Knowledge and Skills – Students will be taught to…	**Links to KS3 National Curriculum Content (green) and KS4 Content (red)**
• Convert fluently between key fraction, decimals and percentages. (use terminology terminating and recurring for decimals) • Calculate key fractions, decimals and percentages of an amount without a calculator • Calculate key fractions, decimals and percentages of an amount using calculator methods • 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 percentage of another without a calculator	Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 and 3/8) Interpret percentages as operators Work with percentages greater than 100% Express one quantity as a percentage of another Interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively Use addition, subtraction, multiplication and division applied to positive and negative decimals

• Express one number as a fraction or percentage of another using calculator methods. Extension objectives: • Find the original amount given the percentage less than 100% • Find the original amount given the percentage greater than 100% • Choose appropriate methods to solve complex percentage problems	
Mathematics – Spring Term Unit 11 – Standard index form	
Knowledge and Skills – Students will be taught to…	Links to KS3 National Curriculum Content (green) and KS4 Content (red)
• Investigate positive powers of 10 (including power 1 and 0) • Work with numbers greater than 1 in standard form • Investigate negative powers of 10 • Work with numbers between 0 and 1 in standard form • Compare and order numbers in standard form • Mentally calculate with numbers in standard form • Add and subtract numbers in standard form • Multiply and divide numbers in standard form Extension objectives:- • Understand and use negative indices • Understand and use fractional indices	Use integer powers (square, cube and higher) Recognise powers of 2, 3, 4, 5 Interpret and compare numbers in standard form A x 10^n $1 \leq A < 10$, where n is a positive or negative integer or zero Calculate with numbers in standard form
Mathematics – Spring Term Unit 12 – Number sense	
Knowledge and Skills – Students will be taught to…	Links to KS3 National Curriculum Content (green) and KS4 Content (red)
• Round numbers to powers of 10 and 1 significant figure • Round numbers to a given number of decimal places • Estimate the answer to a calculation • Calculate using the order or operations • Calculate with money Extension objectives:- • Understand and use error interval notation • Convert metric units of area • Convert metric units of volume	Use approximation through rounding to estimate answers Round numbers and measures to an appropriate degree of accuracy e.g. to a number of decimal places or significant figures Calculate possible resulting errors expressed using inequality notation $a < x \leq b$ Use addition and subtraction applied to decimals Apply and interpret limits of accuracy when rounding
Mathematics – Summer Term Unit 13 – Angles in parallel lines and polygons	
Knowledge and Skills – Students will be taught to…	Links to KS3 National Curriculum Content (green) and KS4 Content (red)

• Understand and use basic angles rules and notation • 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 • Construct triangles and special quadrilaterals • Investigate the properties of special quadrilaterals • Identify and calculate with sides and angles in special quadrilaterals. • Calculate and use the sum of the exterior angles of any polygon • Calculate and use the sum of the interior angles of any polygon • Calculate missing interior angles in regular polygons Extension objectives:- • Understand and use the properties of diagonals of quadrilaterals • Prove simple geometric facts • Construct an angle bisector • Construct a perpendicular bisector of a line segment.	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 Derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons Derive and use the standard ruler and compass constructions (perpendicular bisector of a line segment, bisecting a given angle) Interpret mathematical relationships geometrically
Mathematics – Summer Term Unit 14 – Area of trapezia and circles	
Knowledge and Skills – Students will be taught to…	Links to KS3 National Curriculum Content (green) and KS4 Content (red)
• Calculate the area of triangles, rectangles and parallelograms • Calculate the area of a trapezium • Calculate the perimeter and area of compound shapes • Investigate the area of a circle • Calculate the area of a circle and parts of a circle without a calculator • Calculate the area of a circle and parts of a circle with a calculator	Calculate and solve problems involving: perimeters of 2-D shapes Derive and apply formulae to calculate and solve problems involving the perimeter and area of triangles, parallelograms, and trapezia Calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes
Mathematics – Summer Term Unit 15 – Line symmetry and reflection	
Knowledge and Skills – Students will be taught to…	Links to KS3 National Curriculum Content (green) and KS4 Content (red)
• Recognise line symmetry • Reflect a shape in a horizontal or vertical line: shapes touching the line and separate from the line • Reflect a shape in a diagonal line 1 (shapes touching the line) • Reflect a shape in a diagonal line 2 (shapes not touching 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 Construct congruent triangles, with and without coordinate grids Identify properties of, and describe the results of, reflections applied to given figures

Mathematics – Summer Term Unit 16 – The data handling cycle	
Knowledge and Skills – Students will be taught to…	Links to KS3 National Curriculum Content (green) and KS4 Content (red)
• Set up a statistical enquiry • Design and criticise questionnaires • Draw and interpret pictograms, bar charts and vertical line charts (including finding probabilities) • Draw and interpret multiple bar charts • Draw and interpret pie charts (including pie charts where the total frequency isn't a factor of 360) • Draw and interpret line graphs	Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data 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
Mathematics – Summer Term Unit 17 – Measures of location	
Knowledge and Skills – Students will be taught to…	Links to KS3 National Curriculum Content (green) and KS4 Content (red)
• Understand and use the mean, median and mode • Choose the most appropriate average • Identify outliers • Compare distributions using averages and the range. Extension objectives:- • Find the mean from an ungrouped frequency table • Find the mean from a grouped frequency table.	Describe, interpret and compare observed distributions of a single variable through appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers) Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (including modal class) and spread (the range) Apply statistics to describe a population