MATHEMATICS

CURRICULUM OVERVIEW - YEAR 8

Maximise our potential, to be the best we can be, every day.

Y8 Autumn Term

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
8	Ratio and Scale (2 weeks)	circumference, compare, constant, denominator, diameter, factors, parts, perimeter, Pi, proportion, ratio, scale Word of the Block: Ratio • Etymology Discussed • Frayer Model Used	Understand the meaning and representation 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 $1 : n$ (H) Compare ratios and related fractions Understand π as the ratio between diameter and circumference Understand gradient of a line as a ratio (H)

Cultural Capital	Assessment	NC Reference and Links
Literacy Task – Famous Mathematicians Hypatia Teachers ensure that resources reference a wide range of scenarios reflecting modern society.	**1 x Block Assessment** *All students to complete this assessment, then the scores are to be kept secure.* *Optional extra assessment to support lower attainers.* ***Think Pink Go Green Sheet*** *The Think Pink contains an analysis or strengths, weaknesses, and improvements to be made.*	National Curriculum content covered includes: make connections between number relationships, and their algebraic and graphical representations use scale factors, scale diagrams and maps understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction 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 solve problems involving direct and inverse proportion

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
8	Multiplicative Change (2 weeks)	axis convention conversion corresponding currency directly proportional distance not to scale object origin plan proportion rate ratio Word of the Block: Conversion • Etymology Discussed • Frayer Model Used	Solve problems involving direct proportion Explore conversion graphs Convert between currencies Explore direct proportion graphs (H) Explore relationships between similar shapes Understand scale factors as multiplicative representations Draw and interpret scale diagrams Interpret maps using scale factors and ratios

Cultural Capital	Assessment	NC Reference and Links
Black History Month	**1 x Block Assessment** *All students to complete this assessment, then the scores are to be kept secure. Optional extra assessment to support lower attainers.* ***Think Pink Go Green Feedback*** *This contains an analysis or strengths, weaknesses, and improvements to be made.*	National Curriculum content covered includes: extend and formalise their knowledge of ratio and proportion in working with measures and in formulating proportional relations algebraically interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning use scale factors, scale diagrams and maps solve problems involving direct and inverse proportion, including graphical and algebraic representations move freely between different numerical, algebraic, graphical and diagrammatic representations

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
8	Multiplying and dividing fractions (2 weeks)	commutative convert denominator(s) expression factor(s) generalise quotient reciprocal simplest form simplify (fractions) square term Word of the Block: Fact Family • Etymology Discussed • Frayer Model Used	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 Multiply and divide improper and mixed fractions (H) Multiply and divide algebraic fractions (H)

Cultural Capital	Assessment	NC Reference and Links
Real- life application of mathematical concepts	**1 x Block Assessment** *All students to complete this assessment, then the scores are to be kept secure.* *Optional extra assessment to support lower attainers.* ***Think Pink Go Green Feedback*** *This contains an analysis or strengths, weaknesses, and improvements to be made.*	National Curriculum content covered includes: consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals and fractions select and use appropriate calculation strategies to solve increasingly complex problems use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
8	Working in the Cartesian plane (3 weeks)	curve, descending, diagonal, difference, direct proportion, equidistant, gradient, graph, negative gradient, non-linear, origin, parallel, proportion, ratio, scale, segment Word of the Block: Gradient • Etymology Discussed • Frayer Model Used	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)

Cultural Capital	Assessment	NC Reference and Links
Literacy Task – Engineering Great Wall of China Teachers ensure that resources reference a wide range of scenarios reflecting modern society.	**1 x Block Assessment** *All students to complete this assessment, then the scores are to be kept secure.* *Optional extra assessment to support lower attainers.* ***Think Pink Go Green Feedback*** *This contains an analysis or strengths, weaknesses, and improvements to be made.*	National curriculum content covered: move freely between different numerical, algebraic, graphical and diagrammatic representations develop algebraic and graphical fluency, including understanding linear (and simple quadratic) functions make connections between number relationships, and their algebraic and graphical representations substitute numerical values into formulae and expressions recognise, sketch and produce graphs of linear functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
8	Representing data (2 weeks)	class boundary continuous correlation counted discrete equal estimate extrapolate outlier positive correlation qualitative quantitative range relationship strong correlation subtotal Word of the Block: Correlation • Etymology Discussed • Frayer Model Used	Draw and interpret scatter graphs Understand and describe linear correlation Draw and use line of best fit (1) & (2) 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

Cultural Capital	Assessment	NC Reference and Links

Year		Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
8		Tables and Probability (1 weeks)	chance, denominator, equally likely, event, intersection, or, outcomes, product, region, sample, sample space, set, systematic, two-way table Word of the Block: Systematic • Etymology Discussed • Frayer Model Used	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

	Cultural Capital	Assessment	NC Reference and Links
	Maths Careers Guided reading comprehension task Illuminating the role of a Graphic Designer.	**1 x Block Assessment** *All students to complete this assessment, then the scores are to be kept secure.* *Optional extra assessment to support lower attainers.* ***Think Pink Go Green Feedback*** *This contains an analysis or strengths, weaknesses, and improvements to be made.* ***End of Term Assessment*** *. 1 hour Paper*	National curriculum content covered: 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 generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities use language and properties precisely to analyse probability and statistics

Year 8 Spring Term

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
8	Brackets, equations and inequalities (4 weeks)	bracket, check, coefficient, common, directed, equivalent, expand, expression, negative, positive, product, **quadratic**, satisfy, side, simplify, solution Word of the Block: Expression • Etymology Discussed • Frayer Model Used	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 unknowns on both sides** (H) **Form and solve equations and inequalities with unknowns on both sides** (H) Identify and use formulae, expressions, identities and equations

Cultural Capital	Assessment	NC Reference and Links
Literacy Task – Astronomy The Lunar Landing Teachers ensure that resources reference a wide range of scenarios reflecting modern society.	**1 x Block Assessment** *All students to complete this assessment, then the scores are to be kept secure. Optional extra assessment to support lower attainers.* ***Think Pink Go Green Feedback*** *This contains an analysis or strengths, weaknesses, and improvements to be made.*	National curriculum content covered: identify variables and express relationships between variables algebraically begin to model situations mathematically and express the results using a range of formal mathematical representations substitute numerical values into formulae and expressions, including scientific formulae understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors simplify and manipulate algebraic expressions to maintain equivalence by: collecting like terms multiplying a single term over a bracket

		taking out common factors expanding products of two or more binomials understand and use standard mathematical formulae use algebraic methods to solve linear equations in one variable

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
8	Sequences (1 week)	bracket, **coefficient**, constant, difference, expand, Fibonacci, non-linear, position, **position-to-term**, **rule**, sequence, substitute Word of the Block: Substitute • Etymology Discussed • Frayer Model Used	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 n^{th} term of a linear sequence** (H)

Cultural Capital	Assessment	NC Reference and Links
Teachers ensure that resources reference a wide range of scenarios reflecting modern society.	**1 x Block Assessment** *All students to complete this assessment, then the scores are to be kept secure.* *Optional extra assessment to support lower attainers.* ***Think Pink Go Green***	National curriculum content covered: generate terms of a sequence from either a term - to - term or a position - to - term rule $_{th}$ recognise arithmetic sequences and find the n term recognise geometric sequences and appreciate other sequences that arise

	Feedback *This contains an analysis or strengths, weaknesses, and improvements to be made.*	

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
8	Indices (1 week)	coefficient multiply denominator numerator expand power exponent product expression simplify <u>Word of the Block: Exponent</u> • Etymology Discussed • Frayer Model Used	Adding and subtracting expressions with indices 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** H

Cultural Capital	Assessment	NC Reference and Links
<u>Maths Careers</u> Guided reading comprehension task Illuminating the role of a Information security analyst.	**1 x Block Assessment** *All students to complete this assessment, then the scores are to be kept secure.* *Optional extra assessment to support lower attainers.* ***Think Pink Go Green Feedback*** *This contains an analysis or strengths, weaknesses, and improvements to be made.*	National curriculum content covered: a^3 $a\times a\times a$ use and interpret algebraic notation, including in place of ; a^2b $a\times a\times b$ in place of use language and properties precisely to analyse algebraic expressions begin to model situations mathematically and express the results using a

		range of formal mathematical representations substitute values in expressions, rearrange and simplify expressions, and solve equations

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
8	Fractions and percentages (3 weeks)	conversion, decimal, decrease, denominator, equivalent, estimate, interest, invest, loss, multiplier, numerator, percentage Word of the Block: Interest • Etymology Discussed • Frayer Model Used	Convert fluently between key fractions, decimals and percentages (R) Calculate key fractions, decimals and percentages of an amount without a calculator (R) Calculate 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 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)

Cultural Capital	Assessment	NC Reference and Links
Literacy Task – Sport The 2003 Rugby World Cup Teachers ensure that resources reference a wide range of scenarios reflecting modern society.	**1 x Block Assessment** *All students to complete this assessment, then the scores are to be kept secure.* *Optional extra assessment to support lower attainers.* ***Think Pink Go Green Feedback*** *This contains an analysis or strengths, weaknesses, and improvements to be made.*	National Curriculum content covered includes: • develop their use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics • work interchangeably with terminating decimals and their corresponding fractions. • define percentage as 'number of parts per hundred', interpret percentages and 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

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
8	Standard index form (2 weeks)	commutative, power, exponent, **reciprocal**, **fraction**, **root**, index/indices, standard form Word of the Block: Reciprocal • Etymology Discussed • Frayer Model Used	Investigate positive powers of 10 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 Use a calculator to work with numbers in standard form **Understand and use negative indices** H **Understand and use fractional indices** H

Cultural Capital	Assessment	NC Reference and Links
Real- life application of mathematical concepts	**1 x Block Assessment** *All students to complete this assessment, then the scores are to be kept secure.* *Optional extra assessment to support lower attainers.* ***Think Pink Go Green Feedback*** *This contains an analysis or strengths, weaknesses, and improvements to be made.* ***End of Term Assessment*** *. 1 hour Paper*	National Curriculum content covered includes: • use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations. of roots and their decimal approximations • interpret and compare numbers in standard form $A \times 10^n$, $1 \leq A < 10$, where n is a positive or negative integer or zero

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
8	Number sense (2 weeks)	balance, **bound**, change, **continuous**, credit, **cubic**, debit, metric, nearest, number line, operation, over/underestimate, power, prefix Word of the Block: Metric • Etymology Discussed • Frayer Model Used	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 Covert metric measures of length Convert metric units of weight and capacity **Convert metric units of area** (H) **Convert metric units of volume** (H) Solve problems involving time and the calendar

Cultural Capital	Assessment	NC Reference and Links
Real- life application of mathematical concepts	**1 x Block Assessment** *All students to complete this assessment, then the scores are to be kept secure.* *Optional extra assessment to support lower attainers.* ***Think Pink Go Green Feedback***	National Curriculum content covered includes: • use standard units of mass, length, time, money and other measures, including with decimal quantities • round numbers and measures to an appropriate degree of accuracy [for

	This contains an analysis or strengths, weaknesses, and improvements to be made. ***End of Term Assessment*** *. 1 hour Paper*	example, to a number of decimal places or significant figures] • use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation $a < x \leq b$ • use a calculator and other technologies to calculate results accurately and then interpret them appropriately

Y8 Summer Term

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
8	Angles in parallel lines and polygons (3 weeks)	adjacent alternate **bisect** **bisector** co-interior **compasses** corresponding **delta** **perpendicular** points polygon **proof** rectangle reflex regular rhombus <u>Word of the Block: Perpendicular</u> • Etymology Discussed • Frayer Model Used	Understand and use basic angles 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 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 polygon Calculate and use the sum of the interior angles in any polygon Calculate missing interior angles in regular polygons **Prove simple geometric facts** (H) **Construct an angle bisector** (H) **Construct a perpendicular bisector of a line segment** (H)

Cultural Capital	Assessment	NC Reference and Links
Literacy Task – Art Vitruvian Man by Leonardo Da Vinci Teachers ensure that resources reference a wide range of scenarios reflecting modern society.	**1 x Block Assessment** *All students to complete this assessment, then the scores are to be kept secure.* *Optional extra assessment to support lower attainers.* ***Think Pink Go Green Feedback***	National Curriculum content covered includes: • 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

	This contains an analysis or strengths, weaknesses, and improvements to be made.	sum in any polygon, and to derive properties of regular polygons • use the standard conventions for labelling the sides and angles of triangle ABC • derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures [for example, equal lengths and angles] using appropriate language and technologies • derive and use the standard ruler and compass constructions (H only)

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
8	Area of trapezia and circles (2 weeks)	area calculate compound decimal point diameter estimate formula perpendicular height radius rhombus sector square substitute trapezia Word of the Block: Diameter • Etymology Discussed • Frayer Model Used	Calculate the area of triangles, rectangles and parallelograms (R) Calculate the area of a trapezium Calculate the perimeter and area of compound shapes (1) 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 the perimeter and area of compound shapes (2)

Cultural Capital	Assessment	NC Reference and Links
Maths Careers Guided reading comprehension task Illuminating the role of a Business Analyst	**1 x Block Assessment** *All students to complete this assessment, then the scores are to be kept secure.* *Optional extra assessment to support lower attainers.* ***Think Pink Go Green***	National Curriculum content covered includes: • derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia • calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes

	Feedback *This contains an analysis or strengths, weaknesses, and improvements to be made.*	

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
8	Line symmetry & reflection (1 week)	equilateral, horizontal, image, isosceles, line symmetry, polygon, reflect, regular, rhombus, vertex Word of the Block: Vertex • Etymology Discussed • Frayer Model Used	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 2 (shapes not touching 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)

Cultural Capital	Assessment	NC Reference and Links
Literacy Task – Cryptography Mary Queen of Scots and Queen Elizabeth Teachers ensure that resources reference a wide range of scenarios reflecting modern society.	**1 x Block Assessment** *All students to complete this assessment, then the scores are to be kept secure.* *Optional extra assessment to support lower attainers.* ***Think Pink Go Green Feedback*** *This contains an analysis or strengths, weaknesses, and improvements to be made.*	National Curriculum content covered includes: • 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 • identify properties of, and describe the results of reflections applied to given figures

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
8	The data handling cycle (4 weeks)	bar chart, biased, bivariate, change, compare, comparison, consistent, continuous, investigation, line chart, mislead, pictogram, pie chart, primary data, proportion, questionnaire Word of the Block: Continuous • Etymology Discussed • Frayer Model Used	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 for given set of data Represent and interpret grouped quantitative data Find and interpret the range Compare distributions using charts Identify misleading graphs

Cultural Capital	Assessment	NC Reference and Links
Real- life application of mathematical concepts	**1 x Block Assessment** *All students to complete this assessment, then the scores are to be kept secure. Optional extra assessment to support lower attainers.* ***Think Pink Go Green Feedback*** *This contains an analysis or strengths, weaknesses, and improvements to be made.*	National Curriculum content covered includes: • 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) • 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

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
8	Measures of location (2 weeks)	consistent, estimate, frequency, mean, median, mode, outlier, range, represent, subtotal Word of the Block: Frequency • Etymology Discussed • Frayer Model Used	Understand and use the mean, median and mode Choose the most appropriate average **Find the mean from an ungrouped frequency table** (H) **Find the mean from an grouped frequency table** (H) Identify outliers Compare distributions using averages and the range

Cultural Capital	Assessment	NC Reference and Links
Teachers ensure that resources reference a wide range of scenarios reflecting modern society.	**1 x Block Assessment** *All students to complete this assessment, then the scores are to be kept secure.* *Optional extra assessment to support lower attainers.* ***Think Pink Go Green Feedback*** *This contains an analysis or strengths, weaknesses, and improvements to be made.* ***End of Term Assessment*** *. 1 hour Paper*	National Curriculum content covered includes: • 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)