MATHEMATICS

CURRICULUM OVERVIEW – YEAR 9 2023/24

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

Y9 Autumn Term

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
9	Forming and solving equations (2 weeks)	balance check (solution) coefficient equation expand form (an equation) inverse operation reverse satisfy solution solve **square root** <u>Word of the Block: Solution</u> • Etymology Discussed • Frayer Model Used	Solve one- and two-step equations and inequalities (R) Solve one- and two-step equations and inequalities with brackets (R) Inequalities with negative numbers Solve equations with unknowns on both sides Solve inequalities with unknowns on both sides Solving equations and inequalities in context Substituting into formulae and equations Rearranging formulae (one-step) Rearrange formulae (two-step) **Rearrange complex formulae including brackets and squares** (H)

Cultural Capital	Assessment	NC Reference and Links
Literacy Task – Famous Mathematicians Cardano 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: 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

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Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
9	Straight line graphs (2 weeks)	coordinate **curve (graph)** direct proportion equation function gradient **negative recipricol** parallel **perpendicular** positive (gradient) real-life (graph) rearrange <u>Word of the Block: Parallel</u> • Etymology Discussed • Frayer Model Used	Lines parallel to the axes, $y = x$ and $y = -x$ (R) Using tables of values (R) Compare gradients Compare intercepts 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 gradient and intercepts of real-life graphs **Model real-life graphs involving inverse proportion** (H) **Explore perpendicular lines** (H)

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 Sheet*** *The Think Pink contains an analysis or strengths, weaknesses, and improvements to be made.*	National Curriculum content covered includes: 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 and and the Cartesian plane interpret mathematical relationships both algebraically and graphically reduce a given linear equation in two variables to the standard form ; 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 for given values of and vice versa and to find approximate solutions of simultaneous linear equations solve problems involving direct and inverse proportion, including graphical and algebraic representations

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
9	Testing conjectures (2 weeks)	binomial common conjecture counter example demonstrate even factorise in terms of n multiple odd prime prove <u>Word of the Block: Conjecture</u> • Etymology Discussed • Frayer Model Used	Factors, Multiples and Primes (R) True or False? Always, Sometimes, Never true Show that Conjectures about number Expand a pair of binomials Conjectures with algebra Explore the 100 grid

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: 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

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
9	3D shapes (3 weeks)	area base centimetres cubed circumference commutative compound height isometric length net open/closed solid perpendicular height <u>Word of the Block: Compound</u> • Etymology Discussed • Frayer Model Used	Know names of 2-D and 3-D shapes Recognise prisms (including language of edges/vertices) Accurate nets of cuboids and other 3-D shapes Sketch and recognise 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 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)

Cultural Capital	Assessment	NC Reference and Links
Literacy Task – Engineering The Colosseum 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: use language and properties precisely to analyse numbers, algebraic expressions, 2 - D and 3 - D shapes use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3 - D derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders)

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
9	Constructions and congruency (2 weeks)	acute arc ASA bisector congruent construction lines multiplier obtuse path perpendicular point protractor <u>Word of the Block: Bisector</u> • Etymology Discussed • Frayer Model Used	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 Construct a perpendicular to a point Locus of distance from two lines Construct an angle bisector Construct triangles from given information (R) Identify congruent figures Explore congruent triangles Identify congruent triangles

Cultural Capital	Assessment	NC Reference and Links
<u>Maths Careers</u> Guided reading comprehension task Illuminating the role of an Accountant.	**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***	National Curriculum content covered includes: 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

	. 1 hour Paper	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

Year 9 Spring Term

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
9	Numbers (2 weeks)	adjust, compensate, **cube root**, denominator, difference, directed, negative, numerator, operation, positive, power, prime Word of the Block: Cube root • Etymology Discussed • Frayer Model Used	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) Solve problems with fractions Numbers in standard form (R)
Cultural Capital		**Assessment**	**NC Reference and Links**

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Literacy Task – Astronomy The Hubble Space Telescope 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: • 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 $A \times 10^n$, $1 \leq n < 10$ where n is a positive or negative integer or zero • appreciate the infinite nature of the sets of integers, real and rational numbers.

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
9	Using percentages (2 week)	bar model **index** **change** loss convert multiplier decimal original decrease percentages **depreciated** **power** <u>Word of the Block: Depreciated</u> • Etymology Discussed • Frayer Model Used	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

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.*	National Curriculum content covered includes: • 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 .

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
9	Maths & Money (2 weeks)	annual, balance, bill, compound, convert, credit, interest, multiplier, original, overtime, percentage, principal Word of the Block: Multiplier • Etymology Discussed • Frayer Model Used	Solve problems with bills and bank statements Calculate simple interest Calculate compound interest Solve problems with Value Added Tax Calculate wages and taxes Solve problems with exchange rates Solve unit pricing problems

Cultural Capital	Assessment	NC Reference and Links
Maths Careers Guided reading comprehension task Illuminating the role of a Biomedical Scientist.	**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: • 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

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
9	Deduction (2 weeks)	alternate **bisector** co-interior conjecture **construct** corresponding isosceles justify **locus** parallel parallelogram polygon Word of the Block: Corresponding • Etymology Discussed • Frayer Model Used	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)

Cultural Capital	Assessment	NC Reference and Links
Literacy Task – Sport The 2012 Olympics 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: 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 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

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
9	Rotation and translation (2 weeks)	anti-clockwise, centre, clockwise, direction, direction, horizontal, order, reflect, regular, rotate, rotational, shape Word of the Block: Clockwise • Etymology Discussed • Frayer Model Used	Identify the order of rotational symmetry of a shape Compare and contrast rotational symmetry with lines of 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
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: 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 outcomes, including multi - step problems

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
9	Pythagoras Theorem (2 weeks)	adjacent **cuboid** decimal places **diagonal** gradient hypotenuse negative opposite original quadrant significant figures square <u>Word of the Block: Hypotensuse</u> • Etymology Discussed • Frayer Model Used	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 Use Pythagoras theorem on coordinate axes Explore proofs of Pythagoras' theorem **Use Pythagoras' theorem in 3-D shapes** (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 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

Y9 Summer Term

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
9	Enlargement and similarity (2 weeks)	**adjacent** **angle** centre corresponding distance enlargement **negative** object **opposite** **orientation** position positive <u>Word of the Block: Orientation</u> • Etymology Discussed • Frayer Model Used	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)

Cultural Capital	Assessment	NC Reference and Links
Literacy Task – Art MC Escher surreal art and tessellations 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.*	Students develop their knowledge of transformations to include enlargement, learning the mathematical meaning of the word similar. You can link back to other transformations as necessary. If appropriate students can move on to negative scales factors. All students should experience finding unknown sides in similar shapes and this can be extended to formal similar triangles problems and trigonometry in the 30/60/90 triangle. General trigonometry is introduced at the start of Year 10. National Curriculum content covered includes: 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

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
9	Solving ratio and proportion problems (2 weeks)	constant direct proportion divide equal parts **equation** multiple multiplier non-linear product proportional Word of the Block: Proportional • Etymology Discussed • Frayer Model Used	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)

Cultural Capital	Assessment	NC Reference and Links
Maths Careers Guided reading comprehension task Illuminating the role of a Environmental Engineer	**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.*	National Curriculum content covered includes: 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

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

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
9	Rates (2 weeks)	accuracy average axes constant rate conversion convert minutes origin per prism rearrange rounding <u>Word of the Block: Conversion</u> • Etymology Discussed • Frayer Model Used	Solve speed, distance and time problems without a calculator Solve speed, distance and time problems with a calculator Use distance-time graphs Solve problems with density, mass and volume Solve flow problems and their graphs Rates of change and their units **Convert compound units** (H)

Cultural Capital	Assessment	NC Reference and Links
Literacy Task – Cryptography Alan Turing and WWII 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: use compound units such as speed, unit pricing and density to solve problems understand that a multiplicative relationship 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]

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

The Heys School

The Rowan Learning Trust

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
9	Probability (2 weeks)	affect biased equally likely event expected experiment outcome probability product relative frequency **replacement** sample space <u>Word of the Block: Biased</u> • Etymology Discussed • Frayer Model Used	Single event probability (R) Relative frequency Expected outcomes Independent events **Use tree diagrams** (H) **Use tree diagrams to solve 'without replacement' problems** (H) Use diagrams to work out probabilities

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: 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

Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
9	Algebraic representation (1 week)	curve, discontinuous, exponential, parabola, piece-wise, quadratic, reciprocal, **simultaneous**, symmetry, vertex Word of the Block: Vertex • Etymology Discussed • Frayer Model Used	Draw and interpret quadratic graphs Interpret other graphs, including reciprocal and piece-wise **Investigate graphs of simultaneous equations** (H) Represent inequalities

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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: recognise, sketch and produce graphs of quadratic functions of one variable with appropriate scaling, using equations in and and the Cartesian plane use quadratic graphs to estimate values of for given values of 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 for given values of 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

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Year	Topic	Key Words	Key Skills & Key Knowledge (Small Steps)
9	Revision of Ks3 curriculum (3 week)	All the words from every block from 7-9 KS3 Vocabulary	The last three weeks of the summer term are unassigned in order to allow you time to review any areas of the KS3 curriculum that you feel your students would benefit from as they prepare to transition to KS4, or to deepen their knowledge of an area if appropriate. You may wish to include: Handling Data – there is no explicit data coverage in Year 9, so you could revise the learning of Year 7 and 8, possibly through projects, and include the Y8 Higher steps around mean averages from a frequency table Sequences – there is no new sequence content in Year 9. If your class did not cover the Higher step for finding the rule for the nth term of a linear sequence, you could do this here. Error intervals – also only covered as a Higher step in Y8 Trigonometry – you could develop the brief introduction to trigonometry in Summer Block 1 to study this in more detail, but please note this is covered in depth in the first block of our Year 10 scheme of learning National Curriculum content covered depends on your choices.

Cultural Capital	Assessment
Teachers ensure that resources reference a wide range of scenarios reflecting modern society.	***End of Year Assessment***