**CURRICULUM PLAN**

|  |
| --- |
| Department: Mathematics  |
| * Vision Statement: Students:
* Have**Confidence** that comes from *remembering more*​
* Are**Curious***to know more*​
* **Collaborate** with staff and other students so that they can*do more*

Teachers will be* **Confident** to be consistent and creative in their teaching​
* **Curious**to engage with new ways of thinking​
* **Collaborative** with others by sharing good practice
 |
| Strapline: Collaboration, Curiosity, Confidence  |
| Curriculum Story: Students follow the Mastery Curriculum during Years 7, 8 and 9 where units of learning introduce them to using concrete manipulatives, pictorial methods and abstract thinking. Students spend Year 10 and Year 11 securing new skills and knowledge whilst also revisiting previous learning as part of the retrieval process. YEAR 12/13  |
| Skills developed: Students will: Develop numeracy skills which include working with proportion and all types of number Use algebra to model situations mathematically  Represent and analyse data statistically Work with shape space and measure to tackle geometrical problems  |

|  |
| --- |
| **Year 7:** Foundations. |
|  |  |  |  |  |  |  |
| **Topics** | **Why we teach this** | **Links to last topic** | **Links to future topics** | **Key skills developed** | **Cultural capital opportunities** | **Links to whole school curriculum** |
| **Autumn 1** Algebraic Thinking |
| SequencesUnderstand and use algebraic notation.Equality and equivalence. | Helps students to understand number properties without simply applying the operations. | First module.Introduces algebraic notation.Generic rules are introduced and thought about. | Directly links to problem solving activities with addition, subtraction, multiplication and division.Links to the end year 7 proof section.Forms the basis of algebraic work through to GCSE. | -Deepened understanding of four operations-Identifying patterns in maths-Use of algebra to represent models.-Collecting like terms.-Understanding equivalence.-Can identify the rule for sequences and make connections to graphical representations.-Can use and understand a function machine. | Formulae are widely used in Science, Mathematics and Engineering. Substitution is necessary in practical subjects such as DT.Climate control is modelled using algebra. | **TECHNOLOGICAL PROGRESS****PRECIOUS PLANET** |
| **Autumn 2** Place Value and Proportion. |
| Place values and ordering integers and decimals.Fraction, decimal and percentage equivalence. | Place value forms the very basics of mathematical understanding. | - Knowledge obtained in KS2 maths. | Multiplying and dividing fractionsAddition and subtraction of fractions.Understanding percentage and fractions of amount | -Ordering numbers.-Representing numbers and understanding intervals.-Range and median.-Place Value.-Fractions, decimals and percentages conversions  | Many students were educated in different countries prior to KS3 and the focus is on key words to better prepare students.Our number system is based on Arabic systems | **SOCIAL JUSTICE****CULTURAL DIVERSITY** |
| **Spring 1** : Applications of Number |
| Solving problems with addition and subtraction.Solving problems with multiplication and division.Fractions and percentages of amounts. | Helps students begin to solve problems with number, and form representations which may help them. | Builds on understanding of place values.Fractions are an extended part of number. Builds on place value (tenths, hundredths etc).Also builds on problem solving strategies introduced in Autumn 1. |  Follows on directly from Autumn term. Leads into Summer 1 and geometry problems. | Recognise number relationships, including inverse operations.•Construct tables, charts and diagrams.•Develop calculation strategies for increasing different problem-solving activities.•Substitute values into formulae.•Interpret fractions and percentages as operators. | -Rounding and estimation make calculations quick.- Architects use area and accurate drawing when designing buildings. | **ARTISTIC CREATIVITY****SOCIAL JUSTICE** |
| **Spring 2** : Directed Number and Fractional Thinking. |
| Operations and equations with directed number.Addition and Subtraction of fractions | Builds on understanding of fractions as an operator from Spring 1. Fractions are also commonly used in science, geography, DT and many aspects of real life. | -Use of conventional notation and priority for operations.-Forming and solving linear equations-Finding the range and median.Substitution into algebraic formulae. | Directly links to Percentages covered in year 8. | -Select and use appropriate calculation strategies.-Recognise and use number relationships.-Use square and square roots.-Use calculator effectively.Simplify and manipulate algebraic expressions.-Move freely between representations.-Use of inequality and equality symbols. | Climatologists measure the earth’s temperature to check on global warming. We need to keep our polar regions cold to sustain the planet’s ambient temperature. Negative numbers are used in temperatures and by oceanographers when cataloguing the seas. | **PRECIOUS PLANET** |
| **Summer 1** Lines and Angles |
| Constructing, measuring and geometric notation.Developing geometric reasoning. | Lines and Angles are used heavily in the construction and design industries. Having a good understanding of shape properties can help solve many problems.Leads into problem solving with shapes in year 8 SUM1. | * Builds on KS2 understanding of shape properties.
 | Links directly to year 8 Summer 1 topic on problem solving with lines and angles. | -Language and properties associated with 2D shapes.-Begin to reason deductively.-Draw and measure line segments and angles in geometric figures.-Describe, sketch and draw using conventional means.-Construct and interpret pie charts.-Identify and construct angles.-Derive and apply angle properties. | - Architects use accurate drawings when designing buildings and other structures.Measuring and using scales is a practical skill used in all aspects of life: baking, decorating etc.Angles used in architecture, design, building, room design. | **ARTISTIC CREATIVITY** |
| **Summer 2** Reasoning with Number |
| Developing number sense.Sets and probability.Prime numbers and proof. | Having a good understanding of number problems enables students to answer problems quickly, both in other subjects and out in the real world.Proof builds a deeper understanding of number properties and helps to solidify understanding. | * Builds on all topics during year 7. Enables students to apply their knowledge to problems.
 | Forms the basis for numerical work ongoing through the course of their academic study. | Consolidate numerical and mathematical capability from previous KS.Select appropriate strategies.Begin to reason deductively.Record, describe and analyse frequency of outcomes.Understand probability.Use integer powers and associated roots. |  – Understanding finances can prevent debt.* Calculations are required in many subjects from geography, to DT to science.
* LCM and HCF are used in production costing and optimization.
 | **SOCIAL JUSTICE** |

|  |
| --- |
| **Year 8:** Widening the scope of mathematics. |
| **Topics** | **Why we teach this** | **Links to last topic** | **Links to future topics** | **Key skills developed** | **Cultural capital opportunities** | **Links to whole school curriculum** |
| **Autumn 1 – Proportional Reasoning.** |
| Ratio and Scale.Multiplicative Change.Multiplying and Dividing Fractions. | Multiplicative reasoning builds on skills developed in year 7 and KS2. And help students set up and solve problems. | It offers a chance for students to consolidate and extend their knowledge of the number system from KS2. And select appropriate strategies to solve problems. | -Probability-Scale drawings-Solving equations-Direct and Indirect proportion. | -Make connections between number relationships, algebraic and graphic representations-Scale factors, scale diagrams and maps.-Understand multiplicative relationships.-Divide into ratios. -Working in measures and formulating proportional relationships. | Map reading/creating.Architects use scale drawings.Golden ratio has been used throughout history, to create some beautiful designs.Ratio is used in money conversions and recipes. | **PRECIOUS PLANET****ARTISTIC CREATIVITY** |
| **Autumn 2 – Representations.** |
| Working in the Cartesian Plane.Representing Data.Tables and Probability. | For students to gain a conceptual understanding of representations before they are asked to solve problems.  | To help students understand the connections between algebra and representations of data and gain a conception understanding before they are asked to complete problem-solving activities.  | Students can explore gradient but the focus is using equations to draw lines, this leads into year 9.  | --Direct and inverse proportion-Understand linear and simple quadratic functions.-Substitutions into formulae and expressions.-Construct, use and interpret charts, tables, diagrams and graphs.-Describe relationships between two variables.-Record, describe and analyse the outcomes of probability experiments. | Data processing is used in science when conducting experiments to identify trends and predict behaviour.Distance-time graphsSpeed/distance/time problems.Data analysis is used by the government to ensure that the appropriate services are available for given communities. | **TECHNOLOGICAL PROGRESS****CIVIC RESPONSIBILITY** |
| **Spring 1 – Algebraic Techniques.** |
| Brackets, equations and inequalities.SequencesIndices. | Builds on understanding gained from year 7. Helps students to spot patterns and solve problems. | It builds on an understanding of algebraic notation from year 7.  | Leads into quadratic graphs and factorisation in year 9. As well as standard form calculations in SPR2 of year 8. | -Identify variables and express relationships algebraically.-Begin to model situations mathematically.-Substitute values into formulae – including scientific.-Simplify and manipulate algebraic expressions.-Generate and recognise sequences.-Interpret algebraic notation including indices | Use of scientific formulae, substitution used in geography, and science.Use of formulae in medicine. Using equations and inequalities to solve real life problems, where we are not given all variables in a problem. | **TECHNOLOGICAL PROGRESS** |
| **Spring 2 – Developing Number.** |
| Fractions and Percentages.Standard form.Number sense. | Fractions and percentages are among some of the most used maths, from recipes to interest rates. | Follows on from work on indices in previous term.Builds on understanding of fraction equivalences from year 7. | Links to interest calculations, and depreciation calculations within maths. Percentage increase and decrease in science. | -Develop mathematical knowledge to interpret and solve problems including finance.-Work interchangeably with terminating decimals and their corresponding fractions.-Define and interpret percentages.-Use integer powers and real roots.-Standard form.-Standard units of mass, length, time, money etc.-Round numbers.-Approximation. | Percentages are used in daily life, credit cards, loans, saving accounts. Standard form is used by scientists to calculate with very large and very small numbers.Rounding and estimation makes money calculations quick, and helps prevent bad money decisions. | **ETHICAL ENTERPRISE****PRECIOUS PLANET** |
| **Summer 1 – Developing Geometry**  |
| Angles in parallel lines and polygons.Area of trapezia and circles.Line symmetry and reflection. | To help students understand the world around them. | It builds on year 7 knowledge of angle sums and helps students to see the sum of angles in other polygons. | Rotations and translations covered in year 9.  | -Apply properties of angles at a point, straight line and vertically opposite angles.-Understand and use relationships between parallel lines, alternate and corresponding angles.-Derive and use sum of angles in a triangle and regular polygons.-Derive and apply formulae to calculate and solve problems.-Calculate problems with perimeters of 2d shapes.-Describe, sketch and draw using conventional terms and notations. | -Area problems are used extensively in the building industry.* Line symmetry and reflection is used in science to understand how the human eye works.

-Help students understand the way nature works, and why certain shapes are abundant in the natural world. | **ARTISTIC CREATIVITY****PRECIOUS PLANET** |
| **Summer 2 – Reasoning with data.** |
| The data handling cycle.Measures of location. | To allows students time to gather data and information and create their own theories to be tested.Data processing and statistics are one of the most used branches of mathematics. | Charts have been used in year 7 an earlier in year 8. The focus is to compare the different representations. And to select which average to use. | Links to data processing for grouped averages which comes in year 9. | -Describe, interpret and compare distributions of single variables.-Consider spread (range and outliers) and central tendency (mean, mode and median)-Construct and interpret tables, charts and diagrams.-Describe and compare observed distributions**.** | * Data and statistics are used in business, in news, by the government, in schools.
 | **ETHICAL ENTERPRISE** |

|  |
| --- |
| **Year 9:** Modelling and predicting  |
| **Topics** | **Why we teach this** | **Links to last topic** | **Links to future topics** | **Key skills developed** | **Cultural capital opportunities** | **Links to whole school curriculum** |
| **Autumn 1** Graphs and Proportion |
| -Coordinates-Linear graphs-Proportion-Scales and standard form | Co-ordinates and graphs form the basis for the analysis of the equation of a straight line.Proportion work readies students for working with direct and inverse proportion at KS4Standard form readies students to calculate with very large and very small numbers | Forming and solving equationsBasic ratio | Graphical solutions (spr2)Similarity (Sum2) | -Use of a coordinate grid including plotting, reading and midpoints-Graphical presentation of proportion-Working in standard form | - Students are exposed to a variety of graphs, much like in newspapers.- Students learn about very small and very large measures and the real life entities they belong to. | -**TECHNOLOGICAL PROGRESS****PRECIOUS PLANET**  |
| **Autumn 2** Algebraic Expressions |
| -Linear and non linear sequences-Expanding and factorising-Changing the subject of a formula | Exploring linear and non linear sequences forms the basis for solving real life sequence problems and FibonacciExpanding and factorising skills support further work that requires algebraic manipulation (e.g for geometrical problems)Changing the subject is a necessity when calculating missing variables in a formula | Sequences work builds on previous learning of co-ordinatesExpanding and factorising builds on year 8 work of expressionsChanging the subject builds on work involving inverse operations and solving equations in year 8 | Sequences continues at KS4 with Fibonacci and quadratic sequencesThis work culminates in solving quadratic equations by factorising Changing the subject becomes more complex at KS4 with students exploring indices | Generating and finding the rule for sequencesExpanding and factorising quadratics Substitute values into formulaUse inverse operations to change the subject | Predicting trends by reflecting on sequences in data Modelling real life situations using algebra – a problem solving process that all children need | **ARTISTIC CREATIVITY** |
| **Spring 1** 2D Geometry  |
| ConstructionCongruencePythagoras TheoremAngles in polygons | Students need to be able to accurately use mathematical equipment to do accurate drawings This topic combines any previous understanding of congruence with constructionPythagoras theorem enables students to calculate missing sides of a triangle, given two other sidesStudents need to know the angle properties for polygons in order to calculate missing angles in diagrams | Builds on previous construction work (triangles and quadrilaterals) Builds on previous work with 2d shapes (area and perimeter) Builds on previous work, calculating missing angles in triangles and parallel lines | This learning leads on to Loci at KS4 and construction of angles without a protractorSolving problems (involving reasoning) with Pythagoras is prominent at KS4 and is also a lead into TrigonometryEventually this work will support circle theorems and more extensive problem solving  | Use of mathematical equipment Understanding of congruence in triangles Use of Pythagoras theoremKnowledge of angle facts for polygons and properties of shapes | Enabling students to measure and construct accurately using equipment that they may not have access to at home | **ARTISTIC CREATIVITY**  |
| **Spring 2** Equations and Inequalities  |
| Linear equations and inequalitiesGraphical Solutions | Equations and inequalities are an excellent ay of modelling real life situations and finding solutionsGraphs are another excellent way of modelling a situation  | Students will build on previous learning of solving equations and plotting linear graphs | From solving equations with unknowns on both sides, this learning leads onto solving quadratics, combing with earlier work on factorising and using formula.This learning leads to solving equations graphically, including simultaneous equations | Solving any linear equation or inequality Estimating and solving using graphs |  | **SOCIAL JUSTICE** |
| **Summer 1** handling data and probability  |
| Probability Working with dataScatter graphs | Students are becoming more skilled at identifying trends and making predictions using data Students are becoming more analytical in their work with dataStudents develop their methods of representing data and use scatter graphs to begin predicting trends  | Probability builds on previous work with decimals, fractions and percentages as well as statisticsOther statistical work builds on year 8 Summer term where students began calculating averages and creating diagrams  | This work extends later to successive probability, including probability trees and use of algebra to model probability  | Calculating probability Using measures and representations of data Plotting and analysing scatter graphs  | Students are exposed to academic vocabulary when discussing the chance of an event happening. They understand likelihood and can apply this when considering risk   | **TECHNOLOGICAL PROGRESS** |
| **Summer 2** Geometry  |
| Similarity and enlargement TransformationsTrigonometry  | Students refine their modelling skills by transforming 2D shapesStudents extend their skills to finding missing angles and sides of triangles using trigonometry  | Builds on year 7 work on symmetryBuilds on Pythagoras work from earlier this year  | This work extends to sine and cosine rule as well as 3D Pythagoras  |  |  | **TECHNOLOGICAL PROGRESS** |

|  |
| --- |
| **Year 10:** Building on the solid foundation from KS3, Year 10 is to provide the core content of the GCSE specification. |
| **Topics** | **Why we teach this** | **Links to last topic** | **Links to future topics** | **Key skills developed** | **Cultural capital opportunities** | **Links to whole school curriculum** |
| **Autumn 1** Abstract and visual use of algebra with real world applications |
| **Unit 2 : Algebra** | Algebra is a universal language that has been used for centuries in countries all over the world. | * Negative Numbers
* Order of Operations
* Inverse Operations
* Decimals
* Laws of Indices
 | More Algebra | * Developing basic algebraic manipulation skills
 | Formulae are widely used in Science, Mathematics and Engineering.  | **PRECIOUS PLANET ETHICAL ENTERPRISE** |
| **Unit 3: Graphs, Tables and Charts** | Displaying data in a graph makes it easier to interpret. | * Plot coordinates in 1st Quadrant
* Read Scales on Graphs
 | Averages and RangeGraphs | * Produce and interpret statistical diagrams.
 | Techniques for graphical presentation are used throughout the sciences, social sciences, finance etc. Most companies produce an annual  | **TECHNOLOGICAL PROGRESS PRECIOUS PLANET** |
| * Autumn 2 Study of relationships in Maths
 |
| **Unit 5****Equations, inequalities and Sequences** | This topic explores relationships between variables (equations) and terms in a sequence. We also explore relationships that exist within inequalities.  | * Inequality signs
* Negative numbers
* Decimals
* Index Laws
* Number Lines
 | Multiplicative reasoningQuadratic equationsMore Algebra | * Solving Equations
* Solving Inequalities
* Generalising patterns with mathematics
 | Use of formulae in medicine. Using equations and inequalities to solve real life problems, where we are not given all variables in a problem | **PRECIOUS PLANET ETHICAL ENTERPRISE** |
| **Unit 7: Averages and Range** | Availability of data helps us to identify trends and look for patterns and to make comparisons  | * Midpoint of two numbers
* Statistical Diagrams
* Inequalities
 |  | * Plan an investigation
* Recognise types of data
* Collect, display and interpret data
 | In the modern world there is an ever increasing volume of data being continually collected, analysed, interpreted and stored. Statistics is the branch of mathematics that deals with the handling of data. | **6 HEALTHY LIVING** |
| **Unit 8: Perimeter, area and volume1** | Knowing how much space an object takes up in helps us understand the world around us better. | * Measure lines
* 2D Shapes
* Find areas by counting squares
* Interpret scales on measuring equipment.
 | Perimeter, area and Volume 2Congruence, similarity and vectors. | * Areas of 2D Shapes
* Changing Units
* Surface area of 3D Shapes
 | * Fencing off an **area** to plot a crop. Since fences cost money for a given **area** you would want to minimize the **perimeter**.
* Building a barn with box stalls for horses. ...
* Building a swimming pool.
 | **TECHNOLOGICAL PROGRESS** |
| **Spring 1** Visualisation of mathematics and geometry |
| **Unit 9: Graphs** | Having the mathematical tools to describe how objects move means we can better understand our world, which is in continual motion. | * Plot coordinates and real scales
* Substitute into formulae
 | Quadratic equations and graphs | * Drawing graphs
* Use of conversion graphs
* Use distance-time graphs
* Real-life graphs
 | The relationship between distance, speed and acceleration in engineering, formula 1 racing, roller coasters, space exploitation.  | **TECHNOLOGICAL PROGRESS CIVIC RESPONSIBILITY** |
| **Unit 10: Transformations** | Moving shapes from one position to another. | * Basic Shapes
* Plotting coordinates
* Rotation
* Parallel lines
* Clockwise and anticlockwise
 | Congruence and similarity | * Translations
* Reflections
* Rotations
 | Graphic designers use transformations to create patterns.  | **TECHNOLOGICAL PROGRESS** |
| **Spring 2** Introducing more than one variable and how they are related. |
| **Unit 11: Ratio and Proportion** | Understanding of ratio is essential for mixing two more substances together and to understand how two variables are related. | * Arithmetic and the 4 operations
* Fractions
 | Right angles trianglesMultiplicative reasoning | * Ratios
* Measures
* Comparing ratios
* Percentages
* Direct and Inverse Proportion
 | Video screens offer up billions of colour combinations yet use just three coloured LEDs: red, green and blue.  | **HEALTHY LIVING** |
| **Unit 12: Right-angled Triangles** | Find unknown lengths and angles in triangles. | * Rearranging formulae
* Basic angle facts
* Surds
* Coordinates
 | ConstructionsBearings | * Pythagoras’ Theorem
* Finding lengths using trigonometry
* Finding angles using trigonometry
 | Measuring the heights of tall structures uses trigonometry.  | **TECHNOLOGICAL PROGRESS** |
| **Summer 1** Relationship between variables and how object move. |
| **Unit 14: Multiplicative Reasoning** | Study the relationship between variables and predict future values. | * Interpret scales on instruments
* Percentages
* Rearrange equations
* Speed/distance/time
 |  | * Percentages
* Growth and Decay
* Compound Measures
* Speed, Distance, Time
* Direct and Inverse Proportion
 | Physics uses growth and decay to study radioactivity. | **PRECIOUS PLANET**  |
| **Unit 15: Constructions, Loci and Bearings** | Accurate drawings of both 2 and 3 dimensional objects. | * Measure and draw angles and lines
 |  | * 3D Solids
* Plans and Elevations
* Accurate Drawing
 | How gear and wheels move in a machine.Where to position a new radio mast to ensure maximum phone signal coverage. | **TECHNOLOGICAL PROGRESS** |
| **Summer 2** Use of mathematics to study the properties and motion of objects. |
| **Unit 16: Quadratic Equations and Graphs** | Manipulate quadratic expressions to solve more complex problems | * Square negative numbers
* Substitute into formula
* Plot coordinates
* Expand brackets
 |  | * Expand double brackets
* Factorising quadratics
* Solving quadratic equations
 | Trajectory of a ball in flight.Satellite dish picking up signals from space | **PRECIOUS PLANET**  |
| **Unit 17: Perimeter, Area and Volume 2** | Calculating the properties of shapes that include circles.  | * Area of rectangle
* Arithmetic on a calculator
 |  | * Circumference of a circle
* Area of a Circle
* Semicircles and sectors
* Composite shapes and cylinders
* Pyramids and cones
 | Area of circular shaped jewelleryVolume of a can of popHow far forward does a wheel do in a single revolution. |  **ARTISTIC CREATIVITY** |

|  |
| --- |
| **Year 10:** Building on the solid foundation from KS3, Year 10 is to provide the core content of the GCSE specification. |
| **Topics** | **Why we teach this** | **Links to last topic** | **Links to future topics** | **Key skills developed** | **Cultural capital opportunities** | **Links to whole school curriculum** |
| **Autumn 1** Abstract and visual use of algebra with real world applications |
| **Unit 2: Algebra** | Algebra is a universal language that has been used for centuries in countries all over the world. | * Negative Numbers
* Order of Operations
* Inverse Operations
* Decimals
* Laws of Indices
 | More Algebra | * Developing basic algebraic manipulation skills
 | * Formulae are widely used in Science, Mathematics and Engineering.
 | **PRECIOUS PLANET ETHICAL ENTERPRISE** |
| * Autumn 2 Study of relationships in geometry
 |
| **Unit 4: Fractions, ratio and Percentages** | Proficiency and confidence dealing with parts of a whole number | * 4 operations
* Common factors
* Parts of a whole
* Percentages
* Multiplication tables
 | Fractions, Indices and Standard FormRight-angled triangles | * Working with fractions
* 4 operations with fractions
* Calculating percentages
* Growth and decay
 | * Nutritional information in food products.
* Cost of clothing in sales.
* How much tax do you have to pay?
 | **ETHICAL ENTERPRISE** |
| **Unit 5: Angles and Trigonometry** | To calculate missing angles and sides in 2D shapes | * Rearrange simple formulae
* Recall basic angle facts
* Fractions
 | Circle TheoremsMore Trigonometry | * Understand properties of polygons.
* Use Pythagoras theorem in 2D
* Able to use Sine, Cosine and Tangent
 | * Surveying building and calculating lengths and angles.
* Astronomy to calculate size of distant objects.
* How ancient Egyptians measures right angles exactly using knots in rope.
 | **TECHNOLOGICAL PROGRESS** |
| **Spring 1** Visualisation and Manipulation of mathematical relationships |
| **Unit 6: Graphs** | Having the mathematical tools to describe how objects move means we can better understand our world, which is in continual motion. | * Plot coordinates and real scales
* Substitute into formulae
 | Quadratic equations and graphs | * Drawing graphs
* Use of conversion graphs
* Use distance-time graphs
* Real-life graphs
 | The relationship between distance, speed and acceleration in engineering, formula 1 racing, roller coasters, space exploitation.  | **TECHNOLOGICAL PROGRESS** |
| **Unit 8: Transformations and Constructions** | Moving shapes from one position to another. Accurate drawings of both 2 and 3 dimensional objects | * Basic Shapes
* Plotting coordinates
* Rotation
* Parallel lines
* Clockwise and anticlockwise
* Measure and draw angles and lines
 | More trigonometry | * Translations
* Reflections
* 3D Solids
* Plans and Elevations
* Accurate Drawing Rotations
 | Graphic designers use transformations to create patterns. How gear and wheels move in a machine.Where to position a new radio mast to ensure maximum phone signal coverage. | **TECHNOLOGICAL PROGRESS** |
| **Spring 2** Use of mathematics in every day life to advance technology and to improve quality of life. |
| **Unit 9: Equations and Inequalities** | This topic explores relationships between variables (equations) and terms in a sequence. We also explore relationships that exist within inequalities. | * Inequality signs
* Negative numbers
* Factorise quadratics
* Recognise the equation of a circle
 | Equations and GraphsMore Algebra | * Complete the square
* Quadratic formula
* Solving quadratics
* Simultaneous Equations
* Solving inequalities
 | Use of formulae in medicine. Using equations and inequalities to solve real life problems, where we are not given all variables in a problem | **PRECIOUS PLANET ETHICAL ENTERPRISE** |
| **Unit 13: More Trigonometry** | Able to draw and transform graphs of trigonometric functions | * Coordinates in all 4 quadrants
* Pythagoras Theorem
* Trigonometric ratios
 | Proportion and Graphs | * Graphs of trigonometric functions
* Transformation of trigonometric graphs
 | Electronic signal processing.Domestic electricity suppliesChanging the frequency of a radio signalMeasuring the speed of a speeding car using radar | **TECHNOLOGICAL PROGRESS** |
| **Summer 1** Use of mathematic to collect, represent and interpret data so important decisions can be made. |
| **Unit 14: Further Statistics** | Use of a variety of statistical diagrams to represent data efficiently and interpretation of data | * Understanding of types of data
* Inequalities
* Multiplication of fractions
* Data handling cycle
 |  | * Cumulative frequency
* Box plots
* Histograms
* Summarising data
 | Analysing data from a variety of sources. Office for National Statistics collect data from a wide range of sources for the government can make policy decisions | **HEALTHY LIVING**  |
| **Unit 15: Equations and Graphs** | Represent a wide range of functions graphically so they can be used to solve problems | * Solve linear equations
* Solve quadratic equations
* Solve simultaneous equations
 |  | * Solving simultaneous equations graphically
* Graphs of quadratic functions
* Solving quadratics graphically
* Graphs of cubic equations
 | * Identify trends to predict future behaviour.
* Distance-time graphs
* Speed/distance/time problems
 | **TECHNOLOGICAL PROGRESS** |
| **Summer 2** Visualising mathematical relationships to find unknown properties.  |
| **Unit 16: Circle Theorems** | Use a variety of circle properties to find missing angles and lengths | * Drawing circles
* Circle terminology
* Gradient between perpendicular lines
* Equation of a straight line
 |  | * Radii and chords
* Tangents
* Angles in circles
* Applying circle theorems
 | * How do you find the centre of a circle?
* Finding missing people using last known location and time.
* Calculation of distance from rotation of a wheel
 | **TECHNOLOGICAL PROGRESS****ARTISTIC CREATIVITY** |
| **Unit 17: More Algebra** | Exact calculations using irrational numbers. Construction of strong mathematical arguments to prove solutions are correct. | * Simplify surds
* Negative numbers with all 4 operations
* BIDMAS
 |  | * Rearranging formulae
* Algebraic fractions
* Surds
* Functions
* Proof
 | * Calculation of exact lengths in right-angled triangles
* Finding the formula to solve any quadratic equation exactly
 | **TECHNOLOGICAL PROGRESS** |

|  |
| --- |
| **Year 11:** Increasing confidence in the use of mathematics in every-day life. |
| **Topics** | **Why we teach this** | **Links to last topic** | **Links to future topics** | **Key skills developed** | **Cultural capital opportunities** | **Links to whole school curriculum** |
| **Autumn 1** Technological use of mathematics in Technology and Engineering |
| **Unit 19: Congruence, Similarity and Vectors** | * Calculate properties in a larger object from the study of a smaller object.
* Learn how mathematics can be used to describe forces and motion.
 | * Column vectors
* Pythagoras’ Theorem
* Enlargements
* Area of Volume
* Measure lines and angles
 |  | * Similarity and enlargement
* Congruence
* Vectors
 | Scale model in the design process.Bearing on maps.Forces in Engineering | **TECHNOLOGICAL PROGRESS** |
| **Autumn 2** Use of mathematics in modelling real world situations. |
| **Unit 20: More Algebra** | * Draw graphs of more complex functions.
* Find sets of values that satisfy two equations at the same time.
* Form a strong argument to support mathematics concept
 | * Linear graphs
* Plot coordinates
* Sketching Functions
* Substitute into equations
* BIDMAS
* Inequalities
 |  | * Graphs of cubics and reciprocals
* Non-linear graphs
* Simultaneous equations
* Rearranging formulae
* Proof
 | * How much quicker can a job be completed if you increase the workforce?
* Speed Distance Time Calculations
* Which phone contract to take up
 | **TECHNOLOGICAL PROGRESS** |
| **Spring 1** [Insert focus of the term here – no more than one line] |
|  |  |  |  |  |  |  |
| **Spring 2** [Insert focus of the term here – no more than one line] |
|  |  |  |  |  |  |  |
| **Summer 1** [Insert focus of the term here – no more than one line] |
|  |  |  |  |  |  |  |
| **Summer 2** [Insert focus of the term here – no more than one line] |
|  |  |  |  |  |  |  |

|  |
| --- |
| **Year 11:** Increasing confidence in the use of mathematics in every-day life. |
| **Topics** | **Why we teach this** | **Links to last topic** | **Links to future topics** | **Key skills developed** | **Cultural capital opportunities** | **Links to whole school curriculum** |
| **Autumn 1** Use of mathematics in Science and Engineering which improve our quality of life. |
| **Unit 18: Vectors and Proof** | Vectors give us a powerful tool in dealing with forces, velocities etc. acting in multiple directions | * Properties of triangles and quadrilaterals
* Pythagoras Theorem
 |  | * Vectors and vector notation
* Vector arithmetic
* Parallel vectors and colinear points
* Geometric problems
 | * Forces in three dimensions
* Proof of circle theorems
* Speed, velocity, acceleration problems
 | **TECHNOLOGICAL PROGRESS** |
| **Unit 19: Proportion and Graphs** | Ability to use and manipulate a variety of functions to represent real life situations. | * Draw linear and quadratic graphs
* Gradient between 2points
* Transformations of trigonometric graphs
* Direct Proportion
 |  | * Exponential Functions
* Non-linear graphs
* Translating functions
 | * Population growth
* Epidemiology
* Effectiveness of medicine
* Charge building up on a capacitor
 | **TECHNOLOGICAL PROGRESS** |
| **Autumn 2**  |
|  |  |  |  |  |  |  |
| **Spring 1** [Insert focus of the term here – no more than one line] |
|  |  |  |  |  |  |  |
| **Spring 2** [Insert focus of the term here – no more than one line] |
|  |  |  |  |  |  |  |
| **Summer 1** [Insert focus of the term here – no more than one line] |
|  |  |  |  |  |  |  |
| **Summer 2** [Insert focus of the term here – no more than one line] |
|  |  |  |  |  |  |  |

**Appendix A: Whole-school Curriculum Vision**

**OUR CURRICULUM VISION**

Colton Hills Community School is an inner-city school with a diverse cohort that draws from a wide range of cultures, nationalities and identities. A significant majority of our students come from working class backgrounds, and many from households where resources can be scarce and access to cultural capital is limited. Our school proudly holds the status of a School of Sanctuary, where students from across the local area – and across the globe, too – can come together to learn harmoniously regardless of their background and upbringing. We are aware of the challenges of our students’ lives, but do not use them as an excuse.

Therefore, the intention of our curriculum is that we will offer our students the access to a broad and varied curriculum that seeks to equip them for modern life. We intend it to be knowledge-rich, deep in its explorations of topics, challenging in its delivery and with a distinctive, outward-looking, international feel. We recognised the importance of grounding our curriculum in its wider contexts to enable us to fill gaps in our students’ knowledge that they may have when compared to students from more affluent backgrounds, and we are unapologetic in ensuring that our students have every opportunity to engage with as much powerful knowledge as those more fortunate than they are.

With these school contexts in mind, at Colton Hills we have built our curriculum around a series of thematically based Curricular Concepts that students will see in various subjects, enabling them to draw links and supporting them in making connections that might not always be apparent to them.

The intention of our curriculum at all stages is that we will teach all children at the school that:

|  |
| --- |
| **1 – Humanity is on an optimistic, positive journey of developing tolerance, enfranchisement and rights for all peoples, and we must all play our part in this (SOCIAL JUSTICE)****2 – Diversity is a gift to be valued, one that enriches our school, and that the shared histories of all cultures are worthy of respect and understanding (CULTURAL DIVERSITY)****3 – Respect for the law, democracy and its institutions are vital, but that existing power structures should always be respectfully questioned (CIVIC RESPONSIBILITY)****4 – Technological development is full of great human achievement, but is not without its challenges and drawbacks of which we must always be aware (TECHNOLOGICAL PROGRESS)****5 – The natural world is a place of wonder, mystery and beauty that should be respected, revered and protected, particularly in the face of climate change (PRECIOUS PLANET)****6 – Our health – mentally, physically and spiritually – is of primary importance and must be preserved as it contributes immensely to a happy and productive life (HEALTHY LIVING)****7 – Being enterprising and financially independent is crucial, but making money should always be weighed against the moral decisions about who it might affect (ETHICAL ENTERPRISE)****8 – An appreciation of the vast array of creative arts and their power to entertain and educate is vital in an enriched, meaningful and fulfilled life (ARTISTIC CREATIVITY)** |

Students who leave school with wider awareness of the world around them, with self-respect and with a personal morality will be best able to take advantage of all that life offers, and find their place in the world as a citizen of all of their communities.