MATHEMATICS CURRICULUM JOURNEY

Together we belong, develop character and achieve excellence.

Curriculum overview

Our Mathematics curriculum develops pupils' fluency, reasoning and problem-solving. It builds from secure Key Stage 2 foundations in number, calculation, fractions, decimals, percentages, ratio, geometry, measure and statistics, before moving into increasingly sophisticated algebraic, graphical, statistical and applied mathematics.

BUILDING ON KEY STAGE 2 MATHEMATICS

- Number and calculation: place value; fluent written and mental methods; factors, multiples and primes; estimation and checking.
- Fractions, decimals, percentages and ratio: equivalence, comparison, calculation, conversion, scaling and unequal sharing.
- Algebra and sequences: simple formulae, missing-number problems, linear sequences and equations with two unknowns.
- Geometry and measure: shape properties, angles, coordinates, transformations, perimeter, area, volume and unit conversion.
- Statistics and mathematical thinking: interpreting tables and graphs, calculating the mean, solving multi-step problems and explaining reasoning.

How the curriculum builds from these foundations

Key Stage 3	Key Stage 4	Key Stage 5
Pupils consolidate Key Stage 2 knowledge and extend it to signed numbers, powers and roots, algebraic manipulation, equations and graphs, proportional reasoning, geometry, probability and statistics. Fluency, reasoning and problem-solving are developed together.	Pupils deepen and connect their understanding across GCSE Mathematics. They work with quadratic and non-linear relationships, trigonometry, similarity, vectors, probability, statistics and increasingly complex multi-step problems, with content differentiated for Foundation and Higher pathways.	Pupils study pure mathematics, statistics and mechanics in greater depth. They develop formal proof, functions, calculus, trigonometry, sequences, probability distributions and mathematical modelling, applying established knowledge with greater abstraction and precision.

Each semester deliberately revisits and extends prior knowledge so that pupils make connections, address misconceptions and build secure mathematical understanding over time.

MATHEMATICS CURRICULUM JOURNEY | YEAR 7 TO YEAR 13

Year	Semester	Scheme of Learning	Powerful Knowledge / Threshold Concept links	Composites and their components	End Points	Word Revolution
7	1	**Algebra 1 Expressions and Equations** **Measures** **Shapes** **Perimeter & Area** **Coordinates** **Factors, Multiples and Primes** **Fractions** **Algebra 2 Brackets** **Angles** **Handling Data and Statistical Diagrams** **Proportion** **Fractions, Decimals and Percentages** **Probability**	**Algebra 1 Expressions and Equations:** Simplifying algebraic expressions to a more usable format, solving basic equations, substitution. **Measures:** Calculate with time and convert units of time. Estimate and measure length, mass and capacity. **Shapes:** To work with notations and line properties to understand shape properties. Pupils will be able to work with triangles, quadrilaterals and other polygons given their angles and side lengths. **Perimeter & Area:** Recall finding the perimeter of simple, rectilinear shapes and build their knowledge to compound shapes. Recall knowledge of area of shapes using grids including simple rectilinear shapes and triangles. Build their knowledge to more complex compound shapes and shapes containing triangles. **Coordinates:** To be able to read and plot coordinates and solve shape problems involving coordinates. **Factors, Multiples and Primes:** To be able to find the lowest common multiple and highest common factor. Find factors using divisibility tests. **Fractions:** To be able to recall writing and comparing fractions. Recall how to add and subtract fractions. **Algebra 2 Brackets:** To work with associated laws with expanding and factorising into brackets. **Angles:** Recap types of angles, estimate, measure and draw different types of angles. Find unknown angles around a point. **Handling Data and Statistical Diagrams:** Cover different averages, read tables and charts, collect and present data. **Proportion:** Solve proportion problems. **Fractions, Decimals and Percentages:** Recap multiplying and dividing with fractions, find fractions of amounts. Work between fractions, decimals and percentages. **Probability:** Look at theoretical probability and understand how to show likelihood of events.	**Algebra 1 Expressions and Equations:** Composite: Manipulate an algebraic expression into a simplified version. Components: Understand the meaning of the word expression. Recognise like terms. Collect like terms together to simplify the expression. Composite: Find the value of an expression when given the numerical value of a letter or letters within it. Components: Recognise the different forms terms can take and what they mean. Eg 3a means 3 x a. Substitute the given values in and calculate the resulting value of the expression Composite: To be able to solve equations. Components: Understand the meaning of the word equation. Use different pictorial representations to see equations as (for eg) a balancing scale. Perform operations to both sides of the equation to leave the unknown on its own, hence finding its value. **Measures:** Composite: Pupils to effectively work with time. Pupils to work with estimation and different measures of length, mass, time and capacity. Components: Convert units of time between whole hours to minutes, convert minutes to seconds and vice versa. Read digital and analogue clocks to tell the time and convert from a 12 hour to a 24-hour clock. Calculate with time, add and subtract hours and minutes to a given time. Be able to calculate duration from start to finish times. Use timetables and calendars to work with written dates. Estimate and measure length, mass and capacity. Convert units of length, mass and capacity. Use appropriate units of measure. **Shapes:** Composite: Pupils to recognise line properties and be able to give a written description of a shape's properties. Components: Identify parallel, perpendicular lines and equal-length line notations. Interpret line notations within a shape. Identify equilateral, scalene and isosceles triangles when given their side lengths, angles or notations. Identify types of quadrilaterals when given line and angle notations. Identify polygons as regular or irregular shapes. Symmetry – Drawing lines of symmetry and deciding whether a shape on a grid has a line of symmetry. Determine the number of lines of symmetry of shapes on grids including quadrilaterals and other polygons. **Perimeter & Area:** Composite: Pupils to work effectively with simple and complex shapes to find their perimeter and area. Components: Find the area of shapes on grids. Find the area of shapes made of two or more rectangles. Find the area of compound shapes. Find the perimeter of rectangles and simple shapes. Find the perimeter of rectangles or a trapezium given two perpendicular side lengths. Find unknown side lengths of a rectangle given the perimeter and perpendicular side lengths. Look at shapes with real-life context finding the perimeter and area of compound shapes with two unknown side lengths. **Coordinates:** Composite: Pupils to effectively read from axes and plot coordinates on a graph in all four quadrants. Components: Read coordinates of points plotted in each of the four quadrants. Identify all points which have a given y-coordinate. Read the coordinates of points when the scale on the axes is not 1. Calculate area and perimeter of a rectangle on a set of axes given some or all its points. Use three given vertices of a rectangle on a coordinate grid to calculate the coordinate of the fourth vertex. Use properties of shapes such as of a kite, square and rectangle to work out the coordinates of unknown vertices. Calculate the perimeter given the sketch	**Algebra 1 Expressions and Equations:** By the end of the module, pupils will be able to: Simplify algebraic expressions Expand and simplify expressions Substitute into an expression to find its value Solve equations in one unknown **Measures:** By the end of the unit pupils will be able to: Solve problems involving digital and analogue clocks Apply knowledge of the 12 and 24 hour clock to solve problems. Solve problems involving time differences and leap years. Solve complex fluency and reasoning problems involving scales. Solve conversion problems involving rounding, money and reading tables. **Shapes:** By the end of the unit pupils will be able to: Solve complex fluency and reasoning problems. Determine the relationships between multiple lines. Identify properties of n-sided polygons. Investigate lines of symmetry and rotational symmetry in circles and patterns. **Perimeter & Area:** End of unit pupils will be able to: Solve perimeter problems with algebraic side lengths Use shape properties to find unknown lengths Explore how perimeter changes when additional shapes are added or removed Use the area of one shape to find the area of a related shape. Solve complex fluency and reasoning problems. **Coordinates:** End of unit pupils will be able to: Read the coordinates of a point of intersection of two lines Find the missing vertex of shapes, where the sides are not parallel to an axis Solve problems involving perimeter Solve complex fluency and reasoning problems. **Factors, Multiples and Primes:** End of unit pupils will be able to: Work with Lowest common multiples in worded context. Solve complex fluency and reasoning problems Reason about factors of odd, even and square numbers Attempt to find the highest common factor of algebraic expressions Solve cross-topic questions **Fractions:** End of the unit pupils will be able to: Solving complex fluency and reasoning problems Solving cross-topic questions involving measures, time and probability Be able to order a list of improper fractions and mixed numbers. **Algebra 2 Brackets:** By the end of the unit pupils will be able to effectively – Expand and factorising with more than one variable Solve complex fluency and reasoning problems Solve cross-topic questions involving area, perimeter or collecting like terms **Angles:** By the end of the topic pupils will be able to: Use angle facts to solve complex fluency and reasoning problems. Investigate alternative methods of measuring angles. Construct triangles by drawing angles and measuring lines. Use angle facts to solve problems involving triangles. Use angle facts to solve complex fluency and reasoning. problems. Describe which angle facts are used to justify an answer. **Handling Data and Statistical Diagrams:** By the	**Algebra 1 Expressions and Equations:** Expression Equation Substitute Expand Bracket Coefficient Term **Measures:** **Shapes:** **Perimeter & Area:** **Coordinates:** **Factors, Multiples and Primes:** **Fractions:** **Algebra 2 Brackets:** **Angles:** **Handling Data and Statistical Diagrams:** **Proportion:** **Fractions, Decimals and Percentages:** **Probability:**

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				of a rectangle and two diagonally opposite points. Work out all possible vertices of a rectangle when side lengths and two vertices are given in words. **Factors, Multiples and Primes:** Composite: Pupils to effectively work with numbers to find factors, lowest common multiples and highest common factors. Components: List factors and multiples of numbers. Find the lowest common multiple of two and three numbers. Find the highest common factor when given a list of factors. Find the highest common factor where there are multiple factors. Find the highest common factors of three numbers. **Fractions:** Composite: Pupils to be able to work with fractions in different contexts of shapes, numbers and work with equivalent fractions. Components: Find fractions of regular and irregular shapes. Identify what fraction of a shape is shaded where the answer is a unit fraction. Construct fraction - Write fractions from a written description and from a description of quantities. Write down fractions that remains once n amount has been subtracted. Work with fractions in an area context where the numerator and denominator must be first calculated. Equivalent Fractions - Find the multiplier between two equivalent fractions. Find the numerator or denominator of a fraction when given an equivalent fraction. Build to finding unknowns in three equivalent fractions. Simplify fractions - where the numerator is a common factor or where there is more than one common factor. Simplify fractions with a denominator of 100. Identify when a fraction cannot be simplified and reason. Construct and simplify a fraction from a worded context. Order Fractions - with the same denominator, two different denominators, with four different fractions where the lowest denominator is present and order fractions where the lowest denominator is not present. Be able to find a fraction that lies between two fractions. Write and compare fractions – Identify mixed and improper fractions. Convert mixed numbers to into an improper fraction and convert improper fractions into a mixed number. **Algebra 2 Brackets:** Composite: To be able to expand and simplify expressions and work back to factorise into single brackets. Components: Use the distributive Law to carry out a calculation by first partitioning. Expand Single Brackets – expand in the form Expand brackets containing two variables. Expand single brackets and simplify expressions. Add and subtract constants/variables to a set of brackets. Add two set of brackets where coefficients are either positive or negative. Subtract one set of brackets from another and add two sets of brackets involving squared terms. Factorise into one bracket – factorise expressions where there are common and multiple common factors. Factorise expressions with squared terms. **Angles:** Composite: Use properties of different types of angles to estimate, measure and draw angles. Be able to work with angles inside triangles and around a point. Components: Build on knowledge of different types of angles such as acute, obtuse, reflex and right angles. Identifying the type of angle using ABC notation. Estimate the size of angles within a triangle and other polygons. Accurately use a protractor to measure and draw acute, obtuse and reflex angles. Find unknown angles on a straight line given the size of a single or two other angles at the same point. Identify vertically opposite angles. Calculate the size of unknown angles in scalene, right-angled, and isosceles triangles. **Handling Data and Statistical Diagrams:** Composite:	end of the unit pupils will effectively be able to: Find averages for a set of numbers including negatives and/or fractions. Work backwards to find missing values given an average or range. Consider the suitability of a particular average. Identify data sets which are appropriate to display on a given chart. Identifying reasons why a given chart is misleading. Solve problems involving averages or range for raw collected data and summarised data. **Proportion:** By the end of the unit pupils will effectively be able to: Solve cross-topic questions involving topics such as angles and volume. Solve proportion problems involving 3 different quantities. Solve complex fluency and reasoning problems. **Fractions, Decimals and Percentages:** By the end of the unit pupils can: Solve area questions by multiplying fractions or mixed numbers. Identify a student's mistake in dividing fractions working. Solve complex fluency and reasoning problems. Perform calculations involving a mixture of fractions and decimals. Convert percentages greater than 100%. **Probability:** By the end of the topic pupils can: Calculate probabilities and order them by likelihood Design spinners with given probabilities. Work backwards from probabilities to make deductions about events.	

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				Progress knowledge further on averages and range, tables and charts, collecting and presenting data. Components: Averages and range: Calculate the range of positive and negative values including decimals. Find the median, mode and calculate the mean value. Tables and Charts: Interpret frequency tables and two-way tables. Draw an interpret tally charts. Draw and interpret pictograms. Draw and interpret bar charts. Collecting and presenting data: Collect and record data using tables. Find averages from frequency tables. Choose suitable averages and solve problems. **Proportion:** Composite: Solve proportion worded problems. Components: Use multiplication to find an amount given the unitary proportional relationship. Use division to find an amount given the unitary proportional relationship. Interpret a recipe and use a unitary method to solve proportional problems. **Fractions, Decimals and Percentages:** Composite: Multiply and divide with fractions. Find fractions of amounts. Convert and work with fractions, decimals and percentages. Components: Multiply and divide fractions. Understand reciprocals. Multiply and divide with mixed numbers. Find fractions of amounts with and without a calculator. Work backwards from a fraction of an amount to find the total amount. Solve cross-topic questions involving time and angles. Decrease an amount by a fraction of that amount. Convert between fractions and decimals. Convert between fractions, decimals and percentages. Order fractions, decimals and percentages. Write numbers as percentages of other numbers. **Probability:** Composite: Use fractions, decimals and percentages to write probabilities. Components: Use probability phrases such as likely, unlikely and impossible. Write and use probability scales. Identify a spinner that matches a probability phrase. Identify the probability phrase for different outcomes of dice rolls. Write probabilities as fractions, decimals and percentages. Writing the chance of a single event as an x in y chance. Find the probability from a frequency table. Probabilities of mutually exclusive events. Sample space diagrams.		
7	2	**Number Sense and Calculations**	**Number Sense and Calculations:** Recap the use of the four rules of arithmetic from KS2, work with negative numbers, types of number and use the correct order of operations.	**Number Sense and Calculations:** Composite: Pupils to develop an understanding of the number system and place value. Components: Effectively use number lines to recognise place value. Round integers and decimals. Add and subtract integers and decimals with three digits, using column method with two carries. Multiply and divide numbers by 10, 100 and 1000. Multiply using place value, use a written method to multiply integers and decimals. Work with negative numbers and all four operations using number lines and written methods. Use the correct order of operations and calculate with roots and powers. Use the commutative and associative laws.	**Number Sense and Calculations:** By the end of the module pupils will be able to: Use all four operations with integers, decimals and negative numbers. Understand place value and round integers and decimals. Partition three-digit numbers Find midpoint of two values. Use the correct order of operations. Use commutative law to complete addition when given an equivalent addition. Use the associative law to complete addition and multiplication in two different ways. Recognise subtraction and division is not commutative or associative.	**Number Sense and Calculations:**
8	1	**Circles** **Area** **Coordinates** **Rounding** **Ratio and scale diagrams** **Sequences**	**Circles:** Area and circumference: Identifying parts of circles Finding the circumference of circles Finding the area of circles **Area:** Area and units Finding the area of parallelograms(M291) Finding the area of trapeziums(M705) Converting units of area **Coordinates:** Coordinates and	**Circles:** Composite: Identifying parts of circles Component: Identifying the circumference, radius and diameter Working out the radius when given the diameter and vice versa Identifying a chord and a tangent Identifying arcs, sectors and segments Identifying major and minor arcs Identifying major and minor sectors and segments Composite: Finding the circumference of circles Component: Finding the circumference of a circle when given its diameter Finding the circumference of a circle when given its radius Finding the circumference of a circle when given its radius but no diagram Finding the circumference of a circle in terms of π when given	**Circles:** **Area:** **Coordinates:** **Rounding:** **Ratio and scale diagrams:** **Sequences:**	**Circles:** **Area:** **Coordinates:** **Rounding:** **Ratio and scale diagrams:** **Sequences:**

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		Equations **Indices** **Money Best Buy Problems** **Percentages Percentages of amounts and percentage change**	midpoints: Calculating midpoints Mixed problems: Coordinates and midpoints **Rounding:** Significant figures: Rounding integers using significant figures Rounding decimals using significant figures Estimating calculations **Ratio and scale diagrams:** Ratio: Writing and simplifying ratios Writing ratios in the form 1:n Converting between ratios, fractions and percentages Using equivalent ratios to find unknown amounts Sharing amounts in a given ratio **Sequences:** Term-to-term rules and position-to-term rules Term-to-term rules for numerical sequences Term-to-term rules for sequences of patterns **Equations:** Solving equations: Solving equations of the form (x+a)/b=c(x+a)/b=c Solving linear equations involving brackets Solving equations with the unknown in the denominator Solving equations with the unknown on both sides Constructing and solving equations **Indices:** Index Laws: Index rules with positive indices Index rules with negative indices Simplifying expressions using index laws Simplifying algebraic fractions by cancelling common factors **Money Best Buy Problems:** Number, Ratio and Proportion – finding and using percentages, introduction to ratio and its relationships to fractions, introduction to standard form to be able to write large and small numbers. **Percentages Percentages of amounts and percentage change:** Percentages of amounts Percentage change	its diameter Finding the circumference of a circle in terms of π when given its radius Finding the diameter and the radius of a circle when given its circumference Real-life context: finding the radius of a circle when given its circumference Composite: Finding the circumference of circles Component: Finding the area of a circle when given its radius Finding the area of a circle when given its diameter Finding the area of a semicircle when given its diameter Finding the area of a circle in terms of π when given its radius Finding the area of a circle in terms of π when given its diameter but no diagram Finding the radius of a circle when given its area Finding the diameter of a circle when given its area **Area:** Composite: Finding the area of parallelograms Component: Finding the area of a parallelogram Finding the area of a parallelogram with an additional unnecessary measurement Finding the area of a parallelogram in a different orientation Working backwards to find an unknown measurement of a parallelogram from its area Composite: Finding the area of trapeziums Component: These example pairs cover the following learning points: Finding the area of a trapezium Finding the area of a trapezium where the shortest parallel side is the base Finding the area of right-angled trapezium with an additional unnecessary measurement Finding the area of a trapezium in a different orientation with an additional unnecessary measurement Working backwards to find the perpendicular height when given the area and the other side lengths Composite: Converting units of area Component: Identifying units of area Converting between and Converting between and with decimals Converting between and Finding the area of a trapezium in then converting it to Mixed problems: converting between units of area Converting between and **Coordinates:** Composite: Calculating midpoints Component: Calculating the midpoint of horizontal lines when one point is on the -axis Calculating the midpoint of vertical lines when one point is on the -axis Calculating the midpoint of horizontal and vertical lines when no points are on an axis Calculating the midpoint of a line segment with a positive gradient Calculating the midpoint of a line segment with a negative gradient Calculating the midpoint of a line segment when the points are in different quadrants Calculating the midpoint of two points when no sketch is given Composite: Mixed problems: Coordinates and midpoints Component: Calculating the area of a rectangle sketched on a grid Calculating the area of a triangle sketched on a grid Working out the coordinates of unknown vertices of a rectangle sketched on a grid Working out the coordinates of an unknown vertex of a parallelogram sketched on a grid Calculating the coordinates of the centre of a rectangle Calculating the coordinates of a vertex of a rectangle given its centre and the diagonally opposite vert **Rounding:** Composite: Rounding integers using significant figures Component: Rounding to one significant figure Rounding to two significant figures Worded context: Rounding to three significant figures Rounding the same number to different numbers of significant figures Rounding numbers that include significant zeros Rounding with carries Composite: Rounding decimals using significant figures Component: Rounding decimals to one significant figure Rounding decimals to two significant figures Rounding decimals greater than Rounding decimals with leading zeros Rounding decimals with a significant zero Rounding decimals with carries Composite: Estimating calculations Component: Estimating an addition of two 3-digit numbers Estimating a	**Equations:** **Indices:** **Money Best Buy Problems:** **Percentages Percentages of amounts and percentage change:**	**Equations:** **Indices:** **Money Best Buy Problems:** **Percentages Percentages of amounts and percentage change:**

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				multiplication of two 2-digit numbers Estimating a multiplication Estimating a division Estimating a decimal subtraction Estimating a decimal multiplication Estimating a decimal division Money context: Estimating the cost **Ratio and scale diagrams:** Composite: Writing and simplifying ratios Component: Writing a ratio from a visual representation Writing a ratio from a description Simplifying ratios Writing and simplifying a ratio Writing and simplifying a three-part ratio Writing and simplifying a three-part ratio when given two parts and the total Writing and simplifying a ratio given decimal values Composite: Writing ratios in the form 1 : n Component: Writing ratios given as a : b in the form 1 : n Writing a ratio from a description in the form 1 : n Writing a ratio in the form n : 1 where requires rounding Writing a ratio in the form 1 : m : n where m and n require rounding Ordering ratios by first writing them in the form 1 : n Composite: Converting between ratios, fractions and percentages Component: Writing a fraction and a ratio from a visual representation Writing a fraction from a ratio Writing a ratio from a fraction Writing a percentage from a ratio Writing a ratio from a percentage Writing a percentage from a three-part ratio Writing a three-part ratio when given a fraction and a percentage Composite: Using equivalent ratios to find unknown amounts Component: Finding an amount when given another amount and the ratio between them in the form Finding an amount when given another amount and the ratio between them in the form Finding the total when given one amount and a ratio Finding unknown amounts when given one amount and a three-part ratio Perimeter context: Finding the total when given a three-part ratio Composite: Sharing amounts in a given ratio Component: Money context: sharing an amount in a ratio Recipe context: sharing an amount in a ratio Recipe context: sharing an amount in a three-part ratio Solving problems involving sharing an amount in a three-part ratio **Sequences:** Composite: Term-to-term rules for numerical sequences Component: Calculating the next term of an ascending arithmetic sequence Calculating the next two terms of a descending arithmetic sequence Calculating the first term of an arithmetic sequence Finding the term-to-term rule of an ascending arithmetic sequence Finding the term-to-term rule of a descending arithmetic sequence Calculating a future term of an arithmetic sequence Calculating the next two terms of a geometric sequence Finding the term-to-term rule of a geometric sequence Calculating the next two terms of a two-step sequence Composite: Term-to-term rules for sequences of patterns Component: Drawing the next term of an arithmetic sequence of patterns Drawing the next term of an arithmetic sequence of patterns which is a combination of different objects Drawing the next term of a geometric sequence of patterns and finding the number of objects in a future pattern **Equations:** Composite: Solving equations of the form Component: Solving an equation of the form Solving an equation of the form Solving an equation of the form , where is negative Solving an equation of the form Solving an equation of the form Solving an equation of the form , where is a decimal **Indices:** Composite: Index rules with positive indices Component: Writing multiplications in index form Recognising that and Simplifying a calculation in the form Using to simplify a calculation Simplifying a calculation involving a division Using to simplify a calculation Using index rules to simplify a		

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				calculation involving multiplication and division Composite: Index rules with negative indices Component: Writing as Writing as a fraction without indices Using to simplify a calculation involving negative indices Using to simplify a calculation where is negative **Money Best Buy Problems:** Composite: Value for money Component: Calculating the cost of one unit when given the cost of multiple units Calculating a cost using proportional reasoning by multiplying up Calculating a cost using proportional reasoning by dividing down Calculating a cost using the unitary method Calculate the cost where a "buy one get one half price" offer is available **Percentages Percentages of amounts and percentage change:** Composite: Finding percentages of amounts without a calculator Components: Finding 1%, 10%, 50% and 25% of an amount Using 1% of an amount to find another percentage of that amount Using 10% of an amount to find a multiple of 10% of that amount Using 10% of an amount to find 5% of that amount Finding a percentage of an amount by combining two percentages of that amount Finding a percentage of an amount by combining two percentages of that amount where the answer is a decimal Finding a percentage of an amount Money context: finding a percentage of an amount where the answer is a decimal Composite: Finding percentages of amounts with a calculator Components: Finding a percentage of an amount Finding a percentage of an amount where the percentage is a single digit Finding a percentage of an amount where the percentage is greater than 100 Finding a percentage of an amount where the percentage is a decimal Worded context: finding a percentage of an amount Measures context: finding a percentage of an amount where the percentage is greater than 100 Money context: finding a percentage of an amount where the percentage is a decimal, and adding this to the original amount Composite: Percentage change without a calculator Components: Increasing an amount by 10% and 50% Decreasing an amount by 1% Increasing an amount by 5% Decreasing an amount by 20% Money context: decreasing amounts by a percentage Decreasing an amount by a percentage Money context: increasing amounts by a percentage Composite: Percentage change with a calculator Components: Increasing an amount by a percentage Increasing an amount by a single digit percentage Decreasing an amount by a percentage Decreasing an amount by a single digit percentage Money context: Decreasing an amount by an integer percentage Increasing and decreasing by decimal percentages Worded context: Decreasing an amount by a decimal percentage Measures context: Increasing an amount by a decimal percentage		
8	**2**	**Recurring Decimals** **Algebraic Fractions** **Brackets** **Inequalities** **Statistical Diagrams** **Angles** **Transformations** **Linear Graphs** **Surface Area & Volume**	**Recurring Decimals:** Fractions and recurring decimals. Using recurring decimal notation. Converting fractions to recurring decimals **Algebraic Fractions:** Fractions review and Algebraic fractions **Brackets:** Expanding double brackets **Inequalities:** Linear inequalities **Statistical Diagrams:** Drawing and interpreting statistical diagrams **Angles:** Finding unknown angles. Angles	**Recurring Decimals:** Composite: Using recurring decimal notation Components: Writing using dot notation Writing using dot notation Writing and using dot notation Writing out without dot notation Writing out and without dot notation Rounding to a given number of decimal places **Algebraic Fractions:** Composite: Calculating with fractions Calculating with mixed numbers Components: Adding and subtracting fractions where one denominator is a multiple of the other Adding and subtracting fractions by first finding a common denominator Adding and subtracting three fractions with different denominators Multiplying two fractions Multiplying two fractions with two simplification steps Dividing fractions by fractions Dividing fractions by fractions with simplifying Worded context: Dividing fraction by fractions	**Recurring Decimals:** By the end of the module, pupils will be able to: Use recurring decimal notation and Convert fractions to recurring decimals **Algebraic Fractions:** By the end of the module, pupils will be able to: **Brackets:** By the end of the module, pupils will be able to: Expand different variations of double brackets **Inequalities:** By the end of the module, pupils will be able to: Read and draw linear inequalities Solve single inequalities **Statistical Diagrams:**	**Recurring Decimals:** **Algebraic Fractions:** **Brackets:** **Inequalities:** **Statistical Diagrams:** **Angles:** **Transformations:** **Linear Graphs:** **Surface Area & Volume:**

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		3D Shapes **Venn Diagrams** **Standard Form**	in quadrilaterals Combining angle facts Angles on parallel lines Using quadrilateral properties to find angles Angles in polygons **Transformations:** Transforming shapes Translation Reflection **Linear Graphs:** Plotting graphs and finding equations: Plotting horizontal, vertical and diagonal lines Plotting straight line graphs Finding equations of straight line graphs **Surface Area & Volume:** Surface area: Finding the surface area from a net Finding the surface area of cubes and cuboids Finding the surface area of prisms Volume: Finding the volume of cubes and cuboids Finding the volume of prisms Converting units of volume **3D Shapes:** Nets: Properties of 3D shapes Nets of 3D shapes **Venn Diagrams:** Venn diagrams Probabilities from Venn diagrams **Standard Form:**	Composite: Simplifying algebraic fractions by factorising Adding and subtracting algebraic fractions Component: Simplifying by cancelling factors outside of brackets Simplifying by factorising the numerator then cancelling a numeric factor Simplifying by factorising the denominator then cancelling a variable Simplifying by factorising then cancelling a numeric factor and a variable Simplifying by factorising then using index laws Simplifying by factorising the numerator and denominator then cancelling a common expression **Brackets:** Composite: Expanding double brackets Component: Expanding (x + a)(x + b) Expanding (x + a)(x − b) Expanding (x + a)(b − x) Expanding (ax + b)(x + c) Expanding (ax + b)(cx + d) Expanding (ax + b)(cx + d) Expanding (ax − b)(cx − d) Expanding (x + a **Inequalities:** Composite: Reading and drawing linear inequalities on number lines Solving single inequalities Component: Using < and > correctly Writing down inequalities shown on number lines Drawing inequalities on number lines Working out which values satisfy inequalities shown on number lines **Statistical Diagrams:** Composite: Drawing pie charts Components: Completing a pie chart which is split into equal sections Drawing a pie chart where the total frequency is a factor of 360 Drawing a pie chart where the total frequency is not a factor of 360 Composite: Interpreting pie charts Components: Identifying the most and least popular categories from a pie chart Finding a proportion of a pie chart as a fraction and a percentage, where the pie chart is divided into equal sections Finding the frequency of a given category from the total frequency, where the pie chart is split into equal sections Finding the total frequency from the frequency of a given category, where the central angles of the sectors of the pie chart are given Composite: Drawing line graphs Component: Drawing a line graph by first choosing appropriate axes Drawing a line graph by first labelling the axes with suitable scales Drawing a line graph by first labelling the axes using a false origin Composite: Interpreting line graphs Component: Reading values from the x and y axis of a line graph Finding the maximum and minimum values from a line graph Finding differences on a line graph Comparing two line graphs on one set of axes Composite: Drawing stem-and-leaf diagrams Component: Drawing a stem-and-leaf diagram for integer values Drawing a stem-and-leaf diagram for decimal values (1 d.p.) Drawing a back-to-back stem-and-leaf diagram Composite: Interpreting stem-and-leaf diagrams Component: Finding the maximum value, the minimum value and the frequency of a given value Finding the total number of values Finding the number of values which are greater than or less than given values Finding the number of values in a given range Composite: Finding averages from diagrams Finding the mode from a pie chart Finding the range from a line graph Finding the mode and range from a vertical line chart Finding the mode and range from a stem-and-leaf diagram Finding the median from a stem-and-leaf diagram (even number of values) Finding the mean from a stem-and-leaf diagram Finding the mean from a bar chart **Angles:** Composite: Angles in quadrilaterals Component: Calculating the size of an unknown angle in a quadrilateral Calculating the size of an unknown angle in a quadrilateral containing a right angle Calculating the size of an unknown angle in a quadrilateral containing a reflex angle Composite:	**Angles:** By the end of the module, pupils will be able to: Use and combine their angle facts to identify missing angles Use their knowledge of quadrilaterals and polygons to find missing angles **Transformations:** **Linear Graphs:** **Surface Area & Volume:** **3D Shapes:** **Venn Diagrams:** **Standard Form:**	**3D Shapes:** **Venn Diagrams:** **Standard Form:**

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				Combining angle facts Component: Combining angle facts: Angles on a straight line and angles in a triangle angles Around a point and angles in a triangle Vertically opposite angles and angles in a triangle Angles on a straight line and angles in a quadrilateral Angles in a triangle and angles in a quadrilateral Composite: Angles on parallel lines Components: Identifying corresponding angles Identifying alternate angles Identifying alternate, corresponding and vertically opposite angles Combining vertically opposite angles and corresponding angles to solve problems with justification Combining angles on a straight line and alternate angles to solve problems with justification Combining corresponding angles and angles on a straight line to calculate a co-interior angle Composite: Using quadrilateral properties to find angles Component: Calculating an unknown angle in a parallelogram Calculating unknown angles in a trapezium Calculating unknown angles in a kite with ABC notation Composite: Angles in polygons Component: Identifying interior and exterior angles of polygons Calculating the sum of the interior angles of a polygon Calculating an interior angle in an irregular polygon Calculating the size of an interior angle in a regular polygon Calculating an exterior angle in an irregular polygon Calculating the size of an exterior angle in a regular polygon Using exterior angles to work out the number of sides in a regular polygon **Transformations:** Composite: Translation Component: Identifying which image of the shape is a translation Describing a vertical or horizontal translation in words Describing a translation on a coordinate grid in words Translating a shape on a coordinate grid given a description in words Describing the translation of a shape in words when the shape and its image overlap Plotting the original shape when given the translated shape and a description of the translation Composite: Reflection Component: Identifying which image represents a reflection Reflecting a shape in a line where no points are touching the reflection line Drawing the line of reflection between a shape and its image with no axes present Reflecting a shape in an axis Reflecting a shape in a line given by an equation Describing a reflection between a shape and its image when the reflection line is an axis Describing a reflection between a shape and its image **Linear Graphs:** Composite: Plotting horizontal, vertical and diagonal lines Component: Plotting graphs of the form and Writing the equation of graphs of the form and y=b Writing the equation of graphs of the form and Working out the point where horizontal and vertical lines cross Plotting a graph of the form and Writing the equation of a graph of the form and Composite: Finding equations of straight line graphs Component: Working out the equation of a line of the form , where is an integer Working out the equation of a line of the form where is an integer Working out the equation of a line of the form , where and are integers Working out the equation of a line of the form , where and are integers Working out the equation of a line of the form where and are integers **Surface Area & Volume:** Composite: Finding the surface area from a net Component: Calculating the surface area of a cube with a 3D image and a net given on a grid Calculating the surface area of a cuboid with a 3D image and a net Calculating the surface area of a cuboid from the net Calculating the surface area of a triangular prism with a 3D image and a net Calculating the surface area of a triangular prism from the net Calculating the surface area of an isosceles triangular prism from the net Composite: Finding the surface		

Year	Semester	Scheme of Learning	Powerful Knowledge / Threshold Concept links	Composites and their components	End Points	Word Revolution
				area of cubes and cuboids Component: Calculating the surface area of a cube Calculating the surface area of two opposite faces of a cuboid Calculating the surface area of a cuboid Calculating the surface area of a cuboid without an image Composite: Finding the surface area of prisms Component: Calculating the surface area of a right-angled triangular prism Calculating the surface area of an isosceles triangular prism Calculating the surface area of a prism with a regular polygon cross-section Composite: Finding the volume of cubes and cuboids Component: Calculating the volume of a cuboid with three sides given Calculating the volume of a cuboid with three sides given in a different orientation Calculating the volume of a cuboid with additional unnecessary measurements Calculating the volume of a cube Calculating the height of a cuboid given the volume, length and width Composite: Finding the volume of prisms Component: Calculating the volume given the cross-sectional area and length Calculating the volume given the cross-sectional area and additional unnecessary measurements Calculating the volume of a prism in a different orientation Calculating the volume of a triangular prism by first working out the cross-sectional area Calculating the volume of a triangular prism in a different orientation Calculating the volume of a prism where the cross section is a compound shape Calculating the volume of a prism where the cross-section is a parallelogram Calculating the volume of a prism where the cross-section is a trapezium Composite: Converting units of volume Component: Identifying units of volume Converting between and Converting between and Converting between and and between and Converting between and in a worded example Converting between and and **3D Shapes:** Composite: Properties of 3D shapes Component: Identifying cubes, cuboids, triangular prisms and pyramids Identifying cylinders, cones and spheres Identifying prisms Identifying faces, edges and vertices on a 3D shape Counting the faces, edges and vertices of a 3D shape Naming a polygonal prism and counting its edges and vertices Working out the number of faces, edges and vertices of a pyramid when an image is not provided Composite: Nets of 3D shapes Component: Identifying nets of cubes Identifying nets of cuboids Identifying cylinders, cones, triangular prisms and pyramids from their net Sketching a net of a pyramid Sketching a net of a polygonal prism Accurately drawing a net of a cuboid Accurately drawing a net of a triangular prism **Venn Diagrams:** Composite: Venn diagrams Component: Placing elements into the correct region of a Venn diagram Interpreting the region that elements belong to in a Venn diagram Counting the total number of elements in each region of a Venn diagram Interpreting a Venn diagram showing frequencies Finding the frequency of elements not in a set and the total frequency from a Venn diagram Interpreting a three-way Venn diagram Completing a Venn diagram to solve a worded set problem Composite: Probabilities from Venn diagrams Component: **Standard Form:** Finding probabilities from a Venn diagram showing the elements in each set Finding probabilities from a Venn diagram showing the frequencies in each set Finding probabilities of an element not being in a set or sets Finding probabilities when the total is not given Finding the probability of an element belonging to exactly one set out of two Finding probabilities from a three-way Venn diagram		
9	**1**	**Number 1 Fractions**	**Number 1 Fractions and Percentages:**	**Number 1 Fractions and Percentages:** Composites:	**Number 1 Fractions and Percentages:** By the end	**Number 1 Fractions and Percentages:**

Year	Semester	Scheme of Learning	Powerful Knowledge / Threshold Concept links	Composites and their components	End Points	Word Revolution
		and Percentages **Data Handlin 1 Probability** **Number 2 Standard Form** **Algebra 1 Inequalities** **Algebra 2 Quadratic Equations** **Algebra 3 Formulae** **Shape 1 Constructions** **Shape 2 Circles and Cylinders** **Number 3 Rounding** **Shape 3 3D Shapes** **Shape 4 Pythagoras** **Number 4 Ratio and Proportion**	Converting between and ordering fractions, decimals and percentages. Finding fractions of and percentages of amounts with and without a calculator. Calculating percentage change, original amounts and simple interest. **Data Handlin 1 Probability:** Calculating experimental probabilities and expected results from repeated experiments. Using frequency trees. **Number 2 Standard Form:** Adding, subtracting, multiplying and dividing with Standard Form, with or without a calculator. **Algebra 1 Inequalities:** Constructing and solving double inequalities and inequalities with unknowns on both sides. **Algebra 2 Quadratic Equations:** Factorising and solving quadratics equations and the difference of two squares. **Algebra 3 Formulae:** Changing the subject of a formula with one or more steps. **Shape 1 Constructions:** Constructing perpendicular bisector and lines, and bisecting angles. **Shape 2 Circles and Cylinders:** Finding the arc length and area of sectors and finding the surface area and volume of cylinders. **Number 3 Rounding:** Finding error intervals, truncating numbers and finding error intervals for truncated numbers. **Shape 3 3D Shapes:** Plans and elevations. **Shape 4 Pythagoras:** Using and applying Pythagoras' theorem in 2D. **Number 4 Ratio and Proportion:** Writing and simplifying ratios, sharing in a given ratio, solving direct and inverse proportion word problems and converting currency.	Converting between fractions, decimals and percentages. Finding fractions of and percentages of amounts with and without a calculator. Calculating percentage change, original amounts and simple interest. Components: Converting a decimal to a fraction. Converting a fraction to a decimal. Converting a percentage to a fraction. Using these skills to order fractions, decimals and percentages. Finding unit fraction amounts of a quantity. Finding fraction amounts of a quantity. Finding 1%, 5%, 10% etc of amounts without a calculator. Finding more difficult percentages of amounts using a calculator. Calculating a percentage change for a profit or loss, increase or decrease. Finding original amounts after an increase or decrease. Calculating simple interest and problem solving with simple interest. **Data Handlin 1 Probability:** Composites: Calculating experimental probabilities and expected results from repeated experiments. Using frequency trees. Components: Expected results from repeated experiments. Calculating experimental probabilities. Frequency trees. **Number 2 Standard Form:** Composites: Adding, subtracting, multiplying and dividing with Standard Form, with or without a calculator. Components: Multiplying and dividing numbers in standard form. Adding and subtracting numbers in standard form Standard form with a calculator. **Algebra 1 Inequalities:** Composites: Constructing and solving double inequalities and inequalities with unknowns on both sides. Components: Solving inequalities with the unknown on both sides. Solving double inequalities. Constructing and solving inequalities. **Algebra 2 Quadratic Equations:** Composites: Factorising and solving quadratics equations and the difference of two squares. Components: Factorising quadratic equations. Factorising the difference of two squares. Factorising to solve quadratic equations. **Algebra 3 Formulae:** Composites: Changing the subject of a formula with one or more steps. Components: Changing the subjects of formulae with one step. Changing the subjects of formulae with two or more steps. **Shape 1 Constructions:** Composites: Constructing perpendicular bisector and lines, and bisecting angles. Components: Constructing bisectors of angles. Constructing perpendicular bisectors and lines. **Shape 2 Circles and Cylinders:** Composites: Finding the arc length and area of sectors and finding the surface area and volume of cylinders. Components: Finding the arc length of sectors. Finding the area of sectors. Finding the surface area of cylinders. Finding the volume of cylinders. **Number 3 Rounding:** Composites: Finding error intervals, truncating numbers and finding error intervals for truncated numbers. Components: Finding error intervals. Truncating decimals. Finding error intervals for truncated numbers. **Shape 3 3D Shapes:** Composites: Drawing plans and elevations, drawing 3d shapes from plans and elevations. Components: Drawing the plan of a 3d shape. Drawing the side elevation of a 3d shape. Drawing the front elevation of a 3d shape. Drawing plans and elevations to scale. Drawing a 3d shape from plans and elevations. **Shape 4 Pythagoras:** Composites: Using and applying Pythagoras' theorem in 2D. Components: Using Pythagoras'	of the module, pupils will be able to: Convert a decimal to a fraction. Convert a fraction to a decimal. Convert a percentage to a fraction. Convert between fractions, decimals and percentages. Order fractions, decimals and percentages. Find fractions of amounts with or without a calculator. Find percentages of amounts with or without a calculator. Calculate a percentage change with or without a calculator. Find original values in percentage calculations. Find the percentage an amount has been changed by. Perform Simple interest calculations. **Data Handlin 1 Probability:** By the end of the module, pupils will be able to: Understand the expected results from repeated experiments. Calculate experimental probabilities. Complete and use Frequency trees. **Number 2 Standard Form:** By the end of the module, pupils will be able to: Multiply numbers in Standard Form without a calculator. Divide numbers in standard form without a calculator. Add numbers in standard form without a calculator. Subtract number in Standard Form without a calculator. Perform all four operations in Standard form with a calculator. **Algebra 1 Inequalities:** By the end of the module, pupils will be able to: Solve inequalities with the unknown on both sides. Solve double inequalities. Construct and solve inequalities. **Algebra 2 Quadratic Equations:** By the end of the module, pupils will be able to: Factorise quadratic equations. Factorise the difference of two squares. Factorise to solve quadratic equations. **Algebra 3 Formulae:** By the end of the module, pupils will be able to: Change the subjects of formulae using one inverse step. Changing the subjects of formulae with two or more inverse steps. **Shape 1 Constructions:** By the end of the module, pupils will be able to: Construct bisectors of angles. Construct perpendicular bisectors and lines. **Shape 2 Circles and Cylinders:** By the end of the module, pupils will be able to: Find the arc length of sectors. Find the area of sectors. Find the surface area of cylinders. Find the volume of cylinders. **Number 3 Rounding:** By the end of the module, pupils will be able to: Find error intervals. Truncate decimals. Find error intervals for truncated numbers. **Shape 3 3D Shapes:** By the end of the module, pupils will be able to: Draw the plan of a 3d shape. Draw the side elevation of a 3d shape. Draw the front elevation of a 3d shape. Draw plans and elevations to scale. Draw a 3d shape from plans and elevations. **Shape 4 Pythagoras:** By the end of the module, pupils will be able to: Use Pythagoras' theorem in 2D to find the hypotenuse or other side. Apply Pythagoras' theorem in 2D to problem solve. **Number 4 Ratio and Proportion:** By the end of the module, pupils will be able to: Write and simplify ratios. Share amounts in a given ratio. Solve direct proportion word problems. Solve inverse proportion	Numerator Denominator Convert Percentage Simple interest **Data Handlin 1 Probability:** Probability Outcomes Frequency Frequency tree Relative frequency **Number 2 Standard Form:** Standard Form Indices Powers Place Value Negative Indices **Algebra 1 Inequalities:** Construct Solve Inequality Term Unknown **Algebra 2 Quadratic Equations:** Factorise Factors Difference of two squares Solve Quadratic equation Co-efficient **Algebra 3 Formulae:** Formula Re-arrange Inverse **Shape 1 Constructions:** Construct Bisect Bisector Perpendicular **Shape 2 Circles and Cylinders:** Arc Sector Radius Diameter Face Surface Area Volume **Number 3 Rounding:** Truncate Rounding Error intervals **Shape 3 3D Shapes:** Plans Elevations Scale **Shape 4 Pythagoras:** Pythagoras Hypotenuse Square Square root **Number 4 Ratio and Proportion:** Ratio Simplify Direct Proportion Inverse Proportion Proportion Currency Exchange Rate

Year	Semester	Scheme of Learning	Powerful Knowledge / Threshold Concept links	Composites and their components	End Points	Word Revolution
				theorem in 2D to find the hypotenuse or other side. Applying Pythagoras' theorem in 2D to problem solve. **Number 4 Ratio and Proportion:** Composites: Writing and simplifying ratios, sharing in a given ratio, solving direct and inverse proportion word problems and converting currency. Components: Writing and simplifying ratios. Sharing amounts in a given ratio. Solving direct proportion word problems. Solving inverse proportion word problems. Currency conversion.	word problems. Perform currency conversions.	
9	2	**Handing Data** **Number 5 Compound Measures** **Algebra 5 Motion Time Graphs** **Algebra 6- Quadratic Graphs** **Geometry 5- Angles and Bearings** **Geometry 6- Transformations** **Geometry 7- Similarity and Congruence** **Data Handling 2- Handling Data and Statistical Diagrams** **Geometry 8- Vectors**	**Handing Data:** Sampling **Number 5 Compound Measures:** Number, Ratio and Proportion – Understand and manipulate different compound measures **Algebra 5 Motion Time Graphs:** Algebra – Understand and manipulate distance-time graphs **Algebra 6- Quadratic Graphs:** Algebra – Understand the form of a quadratic graph and be able to draw quadratic graphs **Geometry 5- Angles and Bearings:** Geometry – Understand and manipulate angle facts. Work with bearings. **Geometry 6- Transformations:** Geometry- Draw and describe all 4 transformations. **Geometry 7- Similarity and Congruence:** Geometry- Understand and use the concepts of similarity and congruence **Data Handling 2- Handling Data and Statistical Diagrams:** Data Handling: **Geometry 8- Vectors:**	**Handing Data:** Composite: Pupils should be able to understand and evaluate sampling methods and recognise bias Components: Identify the population and sample in a given context. Explain the purpose of using a sample instead of a full population. Understand the advantages of sampling, such as saving time and cost. Recognise how sample size affects the reliability of results. Identify when a sample is biased and explain how or why it leads to inaccurate conclusions. Describe how to collect a simple random sample fairly and accurately. Interpret worded problems involving sampling and evaluate the fairness or reliability of the method used **Number 5 Compound Measures:** Composite: Calculating with speed Components: Calculating speed, distance and time in different units Converting a speed from km/h to m/s Composite: Calculating with rates Components: Calculating the rate of work Calculating the time taken when given the total amount and the rate of flow (litres per second) Calculating the rate of pay when given the total pay and the time worked in hours and minutes Calculating the end time when given the start time, rate of download and total file size (MB per second) Converting a rate from ml/s to litres per hour **Algebra 5 Motion Time Graphs:** Composite: Plotting and interpreting distance-time graphs Components: Plotting distance-time graphs Reading distance time graphs Calculating speed from distance-time graphs Plotting distance-time graphs using speeds **Algebra 6- Quadratic Graphs:** Composite: Plotting and interpreting quadratic graphs Components: Plotting graphs of quadratic functions Interpreting graphs of quadratic functions Finding the y -intercept and x -intercepts (roots), line of symmetry and turning points Projectile context: Interpreting the intercepts and the turning point Solving quadratic equations graphically **Geometry 5- Angles and Bearings:** Composite: Working with angle facts Components: Combining angle facts Angles on parallel lines Using quadrilateral properties to find angles Angles in polygons Composite: Measure, draw and calculate bearings Components: Measuring and drawing bearings Calculating bearings **Geometry 6- Transformations:** Composite: Translation Components: Draw a translation Describe a translation using vectors Composite: Reflection Components: Draw a reflection Describe a reflection Composite: Rotation Components: Draw a rotation Describe a rotation Composite: Enlargement by a positive scale factor Components: Draw an enlargement Describe an enlargement Composite: Mixed transformations Components: Combine the 4 transformations together Describe multiple transformations **Geometry 7- Similarity and Congruence:** Composite: Use the concept of similarity Components: Understanding	**Handing Data:** By the end of this unit pupils will be able to: Plot a straight line graph Find the equation of a straight line graph Interpret the equation of straight lines **Number 5 Compound Measures:** By the end of this unit pupils will be able to: Calculate speed, distance and time Convert speed units Calculate rates **Algebra 5 Motion Time Graphs:** By the end of this unit pupils will be able to: Plot distance-time graphs Interpret distance-time graphs **Algebra 6- Quadratic Graphs:** By the end of this unit pupils will be able to: Plot quadratic graphs Interpret quadratic graphs Find key points on a quadratic graph **Geometry 5- Angles and Bearings:** By the end of this unit pupils will be able to: Work with angle facts Work with angles on parallel lines Work with angles in polygons Measure, draw and calculate bearings **Geometry 6- Transformations:** By the end of this unit pupils will be able to: Draw and describe a translation Draw and describe a reflection Draw and describe a rotation Draw and describe an enlargement Combine transformation together Describe more than one transformation **Geometry 7- Similarity and Congruence:** By the end of this unit pupils will be able to: Understand and use the concept of similarity to find unknown sides in similar shapes Understand use the concept of congruency to construct triangles **Data Handling 2- Handling Data and Statistical Diagrams:** By the end of this unit pupils will be able to: Draw and interpret scatter graphs Know the different types of data Compare data in variety of diagrams Choose and work out suitable averages Interpret grouped data Find averages from grouped data Draw and interpret frequency polygons **Geometry 8- Vectors:** By the end of this unit pupils will be able to: Understand column vectors Calculate with column vectors Find parallel vectors	**Handing Data:** Plot Coordinate Linear Graph Gradient Intercept Axis Equation **Number 5 Compound Measures:** Speed Distance Time Rate Flow Unit Metre Kilometre Second Mile Hour Compound Measure **Algebra 5 Motion Time Graphs:** Distance Time Speed Gradient **Algebra 6- Quadratic Graphs:** Plot Quadratic graph Y intercept Root Turning point **Geometry 5- Angles and Bearings:** Angle Parallel Opposite Alternate Corresponding Co-interior Quadrilateral Polygon Interior angle Exterior angle Bearing North **Geometry 6- Transformations:** Translation Vector Reflection Line of reflection Rotation Clockwise Anti-clockwise Centre of rotation Enlargement Scale Factor Centre of enlargement **Geometry 7- Similarity and Congruence:** Similar Congruent Construction SSS ASA SAS **Data Handling 2- Handling Data and Statistical Diagrams:** Scatter graph Line of best fit Qualitative Quantitative Discrete Continuous Primary Secondary Frequency Pictogram Bar Chart Line Graph Stem and Leaf Diagram Pie Chart Composite bar chart Mean Median Mode Outlier Mid Point Frequency polygon **Geometry 8- Vectors:** Vector Scalar Column vector Parallel

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				similarity Finding unknown sides in similar shapes Composite: Use the concept of congruence Components: Understanding congruence Congruent triangles Constructing triangles **Data Handling 2- Handling Data and Statistical Diagrams:** Composite: Scatter graphs Components: Plotting scatter graphs Interpreting scatter graphs Using lines of best fit Composite: Collecting and presenting data Components: Types of data Presenting data and making conclusions Comparing populations using diagrams Choosing suitable averages and solving problems Composite: Grouped Data Components: Interpreting frequency tables with grouped data Finding averages from grouped data Drawing and interpreting frequency polygons **Geometry 8- Vectors:** Composite: Column vectors Components: Understanding column vectors Adding and subtracting column vectors Multiplying column vectors by a scalar Identifying parallel vectors		
10	**1**	**Number 1 Percentages** **Geometry** **Algebra** **Geometry** **Geometry** **Algebra 3 Linear Graphs** **Algebra 4 Real-life graphs** **Probability 1 Set notation** **Probability 2 Tree diagrams** **Number 1 Compound measures** **Number 2 Ratio** **Algebra 5 Graphs** **Algebra 6 Sequences** **Handing Data** **Ratio and Proportion** **Ratio and Proportion** **Geometry 4 Transformations** **Number** **Number 3 Indices** **Number 4 Recurring decimals** **Algebra 7 Brackets** **Handling Data**	**Number 1 Percentages:** Use compound interest and depreciation to find the result of a repeated percentage change. **Geometry:** Find the Volume and Surface Area of more complex shapes such as spheres and cones. **Algebra:** Rearrange advanced formula. Know and understand the different methods to solve two equations simultaneously **Geometry:** Use Trigonometry to find missing angles and side lengths in right-angled triangles **Geometry:** Loci **Algebra 3 Linear Graphs:** Algebra – Drawing and interpreting graphs. **Algebra 4 Real-life graphs:** Algebra – Drawing and interpreting graphs. **Probability 1 Set notation:** Handling Data and Probability – Introduction to Set Theory to help find probabilities. **Probability 2 Tree diagrams:** Handling Data and Probability – Introduction to Venn Diagrams Tree Diagrams to help find probabilities. **Number 1 Compound measures:** Number, Ratio and Proportion –Further compound measures work to find the Density and Pressure **Number 2 Ratio:** Number, Ratio and Proportion – Ratio and Algebra. **Algebra 5 Graphs:** Algebra – Drawing and interpreting graphs to include Velocity/Time graphs, cubic, reciprocal and exponential graphs. **Algebra 6 Sequences:** Algebra – Further sequences.	**Number 1 Percentages:** Composite: To be able to calculate with compound interest Components: Calculate percentages using multipliers Calculate repeated percentage change Calculate repeated percentage change using index multipliers Calculate the original amount using reverse percentage **Geometry:** Composite: Finding the surface area of pyramids Components: Calculating the surface area of a pyramid with a square base Calculating the surface area of a pyramid with an equilateral triangle base Calculating the surface area of a pyramid with a rectangular base Composite: Finding the surface area of cones Components: Calculating the curved surface area of a cone when given the radius and slant height Calculating the surface area of a cone when given the radius and the slant height Calculating the surface area of a cone when given the diameter and the slant height Calculating the surface area of a cone in terms of when given the diameter and the slant height Calculating the slant height of a cone given the radius and the total surface area Composite Finding the surface area of spheres Components: Calculating the surface area of a sphere when given its radius Calculating the surface area of a sphere when given its diameter Calculating the surface area of a sphere in terms of Calculating the surface area of a hemisphere Calculating the radius of a sphere given its surface area Composite: Finding the surface area of frustums Components: Calculating the curved surface area of a conical frustum by subtracting given values Calculating the curved surface area of a conical frustum Calculating the surface area of a conical frustum Calculating the surface area of a pyramidal frustum Calculating the surface area of a pyramidal frustum, using subtraction to determine an unknown length Calculating the surface area of a pyramidal frustum, using similarity to determine an unknown length Calculating the surface area of a conical frustum, using similarity to determine an unknown radius Calculating the surface area of a pyramidal frustum, using similarity to determine an unknown length, with a decimal scale factor Composites: Finding the surface area of composite shapes Components: Calculating the surface area of a cuboid joined to a square-based pyramid Calculating the surface area of a cone joined to a hemisphere Calculating the surface area of a cylinder joined with two hemispheres Calculating the surface area of a cylinder with a cone removed Calculating the length of a triangular prism joined to a triangular-based pyramid when given the surface area and other measurements Composite: Finding the volume of pyramids Component	**Number 1 Percentages:** End point To be able to calculate compound interest **Geometry:** Find the Volume and Surface Area of more complex shapes such as spheres and cones. **Algebra:** **Geometry:** **Geometry:** **Algebra 3 Linear Graphs:** By the end of the module, pupils will be able to: Identify equations of parallel lines Find the equation of a straight line from its gradient and a point Find the equation of a straight line from two points on the line Identify equations of parallel and perpendicular lines* **Algebra 4 Real-life graphs:** By the end of the module, pupils will be able to: Plot linear real-life graphs Use and find equations of linear real-life graphs Sketch graphs of water flows **Probability 1 Set notation:** By the end of the module, pupils will be able to: Use Venn diagrams with set notation Use set notation **Probability 2 Tree diagrams:** By the end of the module, pupils will be able to: Draw tree diagrams for independent events Draw tree diagrams for dependent events **Number 1 Compound measures:** By the end of the module, pupils will be able to: Calculate with density Calculate with pressure **Number 2 Ratio:** By the end of the module, pupils will be able to: Combine ratios Calculate with ratios and algebra Change ratios **Algebra 5 Graphs:** By the end of the module, pupils will be able to: Calculate acceleration from velocity-time graphs Plot velocity-time graphs Plot, sketch and identify graphs of cubic functions Plot, sketch and identify graphs of reciprocal functions Plot, sketch and identify graphs of exponential functions **Algebra 6 Sequences:** By the end of the module, pupils will be able to find: Position-to-term rules for	**Number 1 Percentages:** **Geometry:** **Algebra:** **Geometry:** **Geometry:** **Algebra 3 Linear Graphs:** **Algebra 4 Real-life graphs:** **Probability 1 Set notation:** **Probability 2 Tree diagrams:** **Number 1 Compound measures:** **Number 2 Ratio:** **Algebra 5 Graphs:** **Algebra 6 Sequences:** **Handing Data:** **Ratio and Proportion:** **Ratio and Proportion:** **Geometry 4 Transformations:** **Number:** **Number 3 Indices:** **Number 4 Recurring decimals:** **Algebra 7 Brackets:** **Handling Data:**

Year	Semester	Scheme of Learning	Powerful Knowledge / Threshold Concept links	Composites and their components	End Points	Word Revolution
			Handing Data: Capture Recapture **Ratio and Proportion:** **Ratio and Proportion:** HIGHER **Geometry 4 Transformations:** Geometry – Transformations **Number:** Rounding **Number 3 Indices:** Number, Ratio and Proportion – Index Laws for Negative and Fractional Powers. **Number 4 Recurring decimals:** Number, Ratio and Proportion – Recurring decimals **Algebra 7 Brackets:** Algebra – Expanding and factorising brackets **Handling Data:** Frequency Tables	Calculating the volume of a pyramid when given the area of the base and the height Calculating the volume of a rectangular-based pyramid Calculating the volume of a square-based pyramid Calculating the volume of a triangular-based pyramid Calculating the height of a rectangular-based pyramid when given the volume and the dimensions of the base Composite: Finding the volume of cones Components: Calculating the volume of a cone when given the radius and the height Calculating the volume of a cone when given the diameter and the height Calculating the volume of a cone in terms of pi with an additional unnecessary measurement Calculating the volume of a cone without a diagram Calculating the height of a cone when given the volume and the radius Calculating the radius of a cone when given the volume and the height Composite: Pupils should be able to find the volume of frustums. Components: Understand that a frustum is a solid formed by slicing the top off a cone or pyramid. Identify the dimensions of both the full cone/pyramid and the removed cone/pyramid. Calculate the volume of the full cone or pyramid. Calculate the volume of the removed cone or pyramid. Subtract the smaller volume from the larger to find the volume of the frustum. **Algebra:** Composite Composite: Pupils should be able to change the subject of a formula with two or more steps Components: Identify the current subject and the new subject of the formula. Use inverse operations in a logical order to isolate the new subject. Rearrange terms while maintaining the balance of the equation. Expand or factorise expressions as needed to isolate the subject. Simplify the final expression where possible. Composite: Pupils should be able to change the subject of a formula when the subject appears more than once Components: Identify all instances of the subject in the formula. Be able to balance effectively to group like terms involving the subject on one side of the equation. Factorise to isolate the subject. Composite: Pupils should be able to solve simultaneous equations using elimination Components: Identify and align like terms in both equations. Understand to multiply one or both equations to create matching coefficients. Identify when to Add or subtract equations to eliminate one variable. Substitute solved values back into one of the original equations to find the second variable. Composite: Pupils should be able to solve simultaneous equations using substitution Components: Understand how to rearrange one equation to make a variable the subject. Substitute the expression into the second equation. Substitute solved values back into one of the original equations to find the second variable. Composite: Pupils should be able to solve simultaneous equations graphically Components: Rearrange equations into the form y=mx+c Accurately plot linear equations on a graph. Understand and identify the point of intersection as the solution to the system. Understand cases where lines are parallel (no solution) or coincident (infinite solutions). Composite: Pupils should be able to construct and solve simultaneous equations Components: Translate word problems or contexts into two algebraic equations. Identify the variables and define them clearly. Use substitution or elimination to solve the equations. Interpret the solution in context and check its validity. **Geometry:** Composite: Pupils should be able to understand sine, cosine, and tangent Components: Identify the opposite, adjacent, and hypotenuse in a right-angled triangle. Understand and use the definitions of sin, cos, and tan as ratios of sides. Match each ratio to the correct function based on a given angle. Composite: Pupils should be able to find	arithmetic sequences Position-to-term rules for sequences of patterns Position-to-term rules for geometric sequences Position-to-term rules for quadratic sequences Special sequences **Handing Data:** **Ratio and Proportion:** **Ratio and Proportion:** **Geometry 4 Transformations:** By the end of the module, pupils will be able to: Combine transformations Enlarge by a positive or negative scale factor **Number:** **Number 3 Indices:** By the end of the module, pupils will be able to: Use index rules with positive indices Use index rules with negative indices Simplify expressions using index laws Estimate roots and powers Use indices of the form Use indices of the form **Number 4 Recurring decimals:** By the end of the module, pupils will be able to: Convert fractions to recurring decimals Convert recurring decimals to fractions **Algebra 7 Brackets:** By the end of the module, pupils will be able to: Expand double brackets Factorise quadratic expressions of the form x2+bx+c Factorise the difference of two squares Factorise to solve quadratic equations of the form x2+bx+c=0 Expand triple brackets Complete the square Factorise quadratic expressions of the form ax2+bx+c Find the turning point of a quadratic graph by completing the square **Handling Data:**	

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				unknown sides in right-angled triangles Components: Identify the correct trigonometric ratio to use. Write and substitute values into the trigonometric formula. Rearrange the equation to isolate the unknown side. Composite: Pupils should be able to find unknown angles in right-angled triangles Components: Identify the correct trigonometric ratio to use. Write and substitute values into the trigonometric formula. Use inverse trigonometric functions to find the angle. Composite: Pupils should be able to use the exact values of trigonometric ratios Components: Recall exact values of sin, cos, and tan for 0°, 30°, 45°, 60°, and 90°. Apply exact values without using a calculator using knowledge of surds and their laws. Recognise problems where exact values are expected and not doing so may effect accuracy. Composite: Pupils should be able to solve problems involving angles of elevation and depression Components: Interpret angle of elevation as the angle measured upwards from the horizontal. Interpret angle of depression as the angle measured downwards from the horizontal. Draw accurate diagrams to represent the situation. Apply trigonometry in real-world contexts including bearings and height/distance problems **Geometry:** Composite: Pupils should be able to construct loci Components: Interpret and understand the definition of a locus as a set of points satisfying a given condition. Use a compass to draw a locus equidistant from a point (circle). Use a compass and straightedge to construct a locus equidistant from two points (perpendicular bisector). Construct a locus equidistant from two lines (angle bisector). Apply knowledge of perpendicular lines and bisectors to solve practical locus problems. Shade or identify regions that satisfy multiple locus conditions. **Algebra 3 Linear Graphs:** Equations of linear graphs Composite: Pupils should be able to recognise the relationships between parallel and perpendicular lines. Components: Recognise that parallel lines have the same gradient (slope). Compare the slopes of given linear equations to determine if they are parallel. Understand that parallel lines have different y-intercepts. Composite: Pupils should be able to construct the equation of a line when provided with sufficient information, such as gradient and a point. Components: Use . Substitute the given gradient and coordinates into the . Rearrange the equation into the form . Composite: Pupils should be able to construct the equation of a line when provided with sufficient information, such as two points. Components: Calculate the gradient from two given coordinates. Use and substitute the calculated gradient and one of the given coordinates. Rearrange the equation into the form . Composite: Pupils should be able to recognise and utilise the relationships between parallel and perpendicular lines to determine their equations. Components: Recall that parallel lines have the same gradient. Recall that perpendicular lines have gradients that are negative reciprocals of each other. Determine the gradients of given linear equations. Compare the gradients to identify parallel and perpendicular lines. Given one lines gradient, be able to calculate the gradient of a line that is perpendicular to it. **Algebra 4 Real-life graphs:** Plotting and interpreting real-life graphs Composite: Pupils should understand how to translate real-life scenarios into visual representations using linear graphs. Components: Identify the dependent and independent variables from a real-life scenario. Create a table of values based on the given information or data. Choose appropriate scales for the axes of the graph. Plot the		

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				coordinates accurately. Draw a straight line through the plotted points, if applicable. Label the axes with the correct units. Composite: Pupils should be able to extract meaningful information, including equations, from linear graphs representing real-world situations. Components: Determine the slope (rate of change) from a real-life graph. Identify the y-intercept (initial value or starting point) from a real-life graph. Write the equation of the line in the form , where m and c have real world meaning. Interpret the meaning of the slope and y-intercept in the context of the real-life situation. Use the equation to make predictions or calculations. Solve problems using the graph. Composite: Pupils should be able to create and interpret graphs that represent the change in quantities over time, such as water flow. Components: Understand the relationship between time and volume/rate of water flow. Recognise different patterns of water flow (constant, increasing, decreasing, etc.). Sketch graphs representing various water flow scenarios (e.g., filling a tank, emptying a tank, constant flow rate). Interpret the meaning of the slope of the graph in relation to the rate of water flow. Understand how changes in the rate of flow affect the shape of the graph. Be able to sketch graphs that contain different rates of flow within the same graph, for example, a tank being filled at one rate, and then a different rate. **Probability 1 Set notation:** Venn diagrams and set notation Composite: Pupils should be able to represent and interpret relationships between sets using Venn diagrams. Components: Understand the concept of a universal set and its representation in a Venn diagram. Represent individual sets as circles or other shapes within a Venn diagram. Represent the intersection of sets (elements common to both) using the symbol "∩" and the overlapping area in a Venn diagram. Represent the union of sets (all elements in either set) using the symbol "∪" and the combined area in a Venn diagram. Denoting the complement of a set A (elements not in the set A) as A’. Interpret Venn diagrams to determine the elements in specific sets or combinations of sets. Represent mutually exclusive sets within a Venn diagram. Represent subsets within a Venn diagram. Composite: Pupils should be able to use set notation to accurately describe sets and perform operations on them. Components: Understand the meaning of basic set symbols: Ξ (universal set) and { } (set). Perform set operations using the symbols: ∩ (intersection), ∪ (union), ' (complement). Determine the number of elements of a set. Use set notation to describe and solve real world problems. Understand and use the difference of two sets. **Probability 2 Tree diagrams:** Independent and dependent events Composite: Pupils should be able to use tree diagrams to represent and visualise the probabilities of different outcomes in a sequence of events. Components: Understand that independent events are events where the outcome of one event does not affect the outcome of another. Draw a tree diagram with branches representing each possible outcome of each event. Label each branch with the probability of that outcome. Multiply probabilities along branches to calculate the probability of a sequence of independent events. Understand that the probabilities of all outcomes at each set of branches must add up to one. Add probabilities of separate paths to find the probability of combined outcomes. Composite: Pupils should be able to use tree diagrams to calculate the probabilities of combined events, both independent and dependent. Components: Understand that dependent events are events where the outcome of one event affects the outcome of another. Draw a tree diagram with		

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				branches representing each possible outcome of each event. Label the first set of branches with the initial probabilities. Label subsequent branches with conditional probabilities, which are probabilities that depend on the outcomes of previous events. **Number 1 Compound measures:** Density and pressure Composite: Pupils should be able to use compound measures to solve practical problems related to density and pressure. Components: Understand the definition of density as mass per unit volume and of pressure as force per unit area. Recall and apply the formulae: Density = Mass / Volume and Pressure = Force / Area. Rearrange the formulae to find one of the other components when the other two are given or can be found. Use appropriate units for density, mass, and volume (e.g., kg/m^3, g/cm^3, kg, g, m^3, cm^3) and for pressure, force, and area (e.g., N/m^2 (Pascals), N, m^2, cm^2). Convert between different units of density, mass, and volume and of pressure, force, and area. Solve word problems involving density and pressure calculations. Understand the relationship between the three values in each formula, and how they change when one or two of the values change. **Number 2 Ratio:** Working with ratios and algebra Composite: Pupils should be able to combine and simplify ratios to represent complex relationships. Components: Understand how to find a common term between two ratios. Combine two or more ratios into a single, extended ratio. Simplify combined ratios to their lowest terms. Use combined ratios to solve problems involving proportional relationships. Understand how to work with ratios that contain more than two terms. Composite: Pupils should be able to use ratios in conjunction with algebraic techniques to solve problems Components: Represent ratios using algebraic expressions (e.g., x:y). Set up and solve equations involving ratios. Use ratios to solve problems involving proportions. Solve problems that involve dividing quantities into a given ratio. Use ratios in algebraic word problems. Composite: Pupils should understand how altering values within a ratio affects the overall relationship, and be able to calculate new ratios. Components: Understand how changing one part of a ratio affects the other parts. Calculate new ratios after changes have been made to the original values. Determine the effect of multiplying or dividing all parts of a ratio by the same factor. Solve problems that involve increasing or decreasing quantities in a given ratio. Find the new ratio after a set amount has been added to or subtracted from one or more parts of the ratio. **Algebra 5 Graphs:** Velocity-time graphs Cubic, reciprocal and exponential graphs Composite: Pupils should be able to derive information about motion (acceleration, velocity, displacement) from velocity-time graphs. Components: Understand that the gradient of a velocity-time graph represents acceleration. Calculate the gradient of a straight line segment on a velocity-time graph. Interpret the sign of the acceleration (positive, negative, zero) in terms of motion. Calculate the acceleration of a curved line by drawing tangents. Understand that a horizontal line represents constant velocity, and therefore 0 acceleration. Composite: Pupils should be able to accurately plot velocity-time graphs. Components: Identify the dependent (velocity) and independent (time) variables. Choose appropriate scales for the axes. Plot coordinates accurately. Draw a smooth curve or straight line to represent the relationship between velocity and time. Be able to label the graph, and axes correctly,		

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				including units. Composite: Pupils should be able to accurately plot and analyse the characteristic shapes of cubic functions. Components: Recognise the general shape of cubic function graphs. Identify key features of cubic graphs, such as roots and turning points. Plot cubic functions from given equations or coordinates. Be able to recognise how changes to the equation affect the shape and position of the graph. Composite: Pupils should be able to accurately plot and analyse the characteristic shapes of reciprocal functions. Components: Recognise the general shape of reciprocal function graphs. Identify asymptotes. Plot reciprocal functions from given equations or coordinates. Understand the behaviour of the graph as x approaches infinity, negative infinity, and zero. Be able to recognise how changes to the equation affect the shape and position of the graph. Composite: Pupils should be able to accurately plot and analyse the characteristic shapes exponential functions. Components: Recognise the general shape of exponential function graphs. Understand the concept of exponential growth and decay. Identify the horizontal asymptote of exponential graphs. Plot exponential functions from given equations or coordinates. Understand how changes to the base of the exponential function affect the steepness of the curve. Be able to recognise how changes to the equation effect the shape and position of the graph. **Algebra 6 Sequences:** Arithmetic, geometric and quadratic sequences Composite: Pupils should be able to derive and apply position-to-term rules to generate and analyse arithmetic sequences. Components: Understand the concept of a common difference in arithmetic sequences. Identify the first term and common difference in a given sequence. Derive and apply the position-to-term rule, nth term. Calculate any term in an arithmetic sequence using the position-to-term rule. Use arithmetic sequences to solve problems. Composite: Pupils should be able to derive and apply position-to-term rules to generate and analyse sequences of patterns. Components: Analyse patterns to identify the relationship between the position of a term and its value. Derive and express the position-to-term rule using algebraic expressions. Use the position-to-term rule to predict future terms in a pattern. Understand how to generate a sequence from a diagram. Composite: Pupils should be able to derive and apply position-to-term rules to generate and analyse geometric sequences. Components: Understand the concept of a common ratio in geometric sequences. Identify the first term and common ratio in a given sequence. Derive and apply the position-to-term rule, nth term. Calculate any term in a geometric sequence using the position-to-term rule. Use geometric sequences to solve problems. Composite: Pupils should be able to derive and apply position-to-term rules to generate and analyse quadratic sequences. Components: Recognise quadratic sequences by their second differences. Derive the position-to-term rule in the form an=an2+bn+c. Calculate the values of a, b, and c using the first few terms of the sequence. Use quadratic sequences to solve problems. Composite: Pupils should be able to identify and apply the rules for specific, commonly encountered sequences. Components: Recognise and generate Fibonacci sequences. Understand the pattern of square numbers and their position-to-term rule (n2). Understand the pattern of cube numbers and their position-to-term rule (n3). Recognise triangular numbers, and other number patterns. Recognise prime number sequences. **Handing Data:** Composite: Pupils should be able to apply the capture-recapture method to estimate populations		

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				Components: Use the capture-recapture formula to estimate the population size: Rearrange equations adequality when dealing with equivalent fractions Interpret the results in context and evaluate the assumptions behind the method (e.g., random mixing, no migration, no birth/death between samples). Recognise potential sources of error in the capture-recapture process, such as biased recapture. **Ratio and Proportion:** Composite: Pupils should be able to interpret direct proportion equations Components: Understand and use the constant of proportionality Substitute values to calculate missing variables in direct proportion relationships Interpret the context of direct proportion problems and explain relationships in words Represent direct proportion relationships using tables and graphs Composite: Pupils should be able to interpret inverse proportion equations Components: Understand and use the constant of proportionality Substitute values to calculate missing variables in inverse proportion relationships Interpret inverse proportion in context (e.g. "As one value increases, the other decreases") Identify characteristics of inverse proportion graphs (e.g. they curve, not straight lines) Composite: Pupils should be able to interpret graphs of direct and inverse proportion Components: Identify straight-line graphs passing through the origin as direct proportion Recognise curved graphs (hyperbolas) as representing inverse proportion Distinguish between direct and inverse proportion by shape and behaviour Match equations to their corresponding graphs Interpret real-world situations from proportional graphs **Ratio and Proportion:** Composite Constructing direct and inverse proportion equations Components: Recognise the form of inverse proportion equations y=kx =k/x Understand the role of the constant k and how the relationship behaves depending on if the variables are direct or inverse. Substitute values to calculate missing variables in inverse proportion relationships Use simultaneous equations to solve more advance problems **Geometry 4 Transformations:** Transforming shapes Composite: Pupils should be able to apply multiple transformations in sequence and understand the resulting overall transformation. Components: Understand the effect of applying transformations in a specific order. Perform sequences of transformations (e.g., translation followed by rotation). Describe the overall transformation resulting from a sequence of transformations. Understand how to use coordinate notation to show the effect of combined transformations. Find a single transformation that is equivalent to two successive transformations. Composite: Pupils should be able to perform and analyse enlargements with both positive and negative scale factors. Components: Understand the concept of a centre of enlargement. Perform enlargements with positive scale factors, resulting in similar figures. Perform enlargements with negative scale factors, resulting in inverted similar figures. Calculate the coordinates of image points after an enlargement. Determine the scale factor of an enlargement from given figures. Understand how the area of a shape is changed by an enlargement. Be able to calculate the length of sides on an enlarged shape. **Number:** Composite: Pupils should be able to find error intervals Components: Understand the concept of rounding and how it creates a range of possible values Identify the degree of accuracy (nearest whole number, decimal place, or significant figure) Determine the lower and upper bounds for a		

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				given rounded number Use inequality notation to write error intervals accurately Recognise when to use inclusive or exclusive bounds depending on context Composite: Pupils should be able to find error intervals for truncated numbers Components: Understand what truncating means and how it differs from rounding Identify the place value to which a number has been truncated Determine the lowest and highest possible values before truncation Write correct error intervals for truncated numbers using inequality notation Interpret and explain truncation scenarios in context **Number 3 Indices:** Index laws Composite: Pupils should be able to apply the rules of indices to simplify and manipulate expressions positive exponents. Components: Understand and apply the rule: am×an=am+n Understand and apply the rule: am÷an=am−n Understand and apply the rule: (am)n=amn Understand and apply the rule: a1=a Understand and apply the rule: a0=1 Composite: Pupils should be able to apply the rules of indices to simplify and manipulate expressions with negative exponents. Components: Understand and apply the rule: a−n= Understand how to convert expressions with negative indices to positive indices. Understand how to manipulate expressions that contain both positive and negative indices. Composite: Pupils should be able to apply the rules of indices to simplify and manipulate expressions with positive and negative exponents. Components: Apply multiple index rules to simplify complex expressions. Combine like terms involving indices. Simplify expressions with variables and indices. Be able to simplify algebraic fractions that contain indices. Composite: Pupils should be able to estimate the values of roots and powers without a calculator. Components: Estimate square roots and cube roots of numbers. Estimate powers of numbers. Use knowledge of perfect squares and cubes to approximate roots. Use estimations to check the answers of calculations. Composite: Pupils should be able to understand and apply index rules to unit fractional exponents, including roots and powers. Components: Understand that Understand that Understand that Calculate roots using fractional exponents. Composite: Pupils should be able to understand and apply index rules to fractional exponents, including roots and powers. Components: Understand that Calculate powers and roots using fractional exponents. Be able to manipulate and simplify expressions that contain fractional indices. Be able to use fractional indices to solve equations. **Number 4 Recurring decimals:** Fractions and recurring decimals Composite: Pupils should grasp the concept that recurring decimals represent rational numbers (fractions) and be able to move between these representations. Components: Perform long division of the numerator by the denominator. Identify repeating patterns in the decimal result. Use dot notation above the repeating digits to represent the recurring decimal. Understand that some fractions terminate, and some recur. Understand how to use a calculator to find the decimal equivalent of a fraction. Composite: Pupils should be able to accurately convert fractions into their recurring decimal equivalents and vice-versa. Components: Set up an algebraic equation with the recurring decimal equal to a variable (e.g., x=0.3). Multiply the equation by a power of 10 to shift the decimal point so that the repeating part aligns. Subtract the original equation from the multiplied equation to eliminate the repeating decimal. Solve the resulting algebraic equation for the variable, which represents the fraction. Simplify the fraction to its lowest terms. Understand how to use this method on decimals that have non-recurring digits before the		

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				recurring digits start. **Algebra 7 Brackets:** Expanding and factorising brackets Composite: Pupils should be able to expand algebraic expressions involving double brackets. Components: Apply the distributive property (FOIL or grid method) to multiply two binomials. Combine like terms to simplify the expanded expression. Understand how to expand brackets that contain negative terms. Composite: Pupils should be able to factorise quadratic expressions of the form x2+bx+c. Components: Find two numbers that multiply to give c and add to give b. Write the quadratic expression as the product of two binomials. Understand how to factorise when c is negative. Composite: Pupils should be able to factorise the difference of two squares expressions. Components: Recognise expressions in the form a2−b2. Factorise the expression as (a+b)(a−b). Be able to factorise expressions that require you to find a common factor first. Composite: Pupils should be able to apply factorisation to solve quadratic equations. Components: Factorise the quadratic expression. Set each factor equal to zero. Solve the resulting linear equations to find the roots. Composite: Pupils should be able to expand algebraic expressions involving triple brackets. Components: Expand two of the brackets first. Multiply the resulting expression by the third bracket. Combine like terms to simplify the expanded expression. Composite: Pupils should be able to use completing the square for a quadratic expression. Components: Rewrite a quadratic expression in the form (x+p)2+q. Understand the steps involved in completing the square. Be able to complete the square when the coefficient of the x squared term is not one. Composite: Pupils should be able to factorise quadratic expressions of the form ax2+bx+c Components: Use methods like the "ac" method or trial and error to factorise the expression. Write the quadratic expression as the product of two binomials. Understand how to factorise when a is negative. Composite: Pupils should be able to use completing the square to find the turning point of a quadratic graph. Components: Complete the square for the quadratic expression. Identify the coordinates of the turning point as (−p,q) from the completed square form (x+p)2+q. Understand that the turning point is a minimum if a is positive, and a maximum if a is negative. **Handling Data:** Composite: Pupils should be able to interpret frequency tables with grouped data Components: Read and interpret grouped frequency tables Understand class intervals and how they represent a range of values Recognise the meaning of frequency in the context of grouped data Compare and interpret distributions using grouped data Use midpoints to estimate values when necessary Interpret and extract information from two-way tables Composite: Pupils should be able to find averages from grouped data Components: Understand how to calculate the mean from grouped data using midpoints Estimate the median from grouped data using cumulative frequency Identify the modal class from grouped frequency tables Recognise that grouped data provides estimates rather than exact values Accurately interpret and apply average measures in context		
10	**2**	*No content provided in the source document.*	*No content provided in the source document.*	*No content provided in the source document.*	*No content provided in the source document.*	*No content provided in the source document.*
11	**1**	**Higher: Number 1 Surds** **Higher: Algebra 1**	**Higher: Number 1 Surds:** Calculating with surds Rationalising the denominator of a fraction	**Higher: Number 1 Surds:** Composite: Manipulating expressions involving surds using all four operations Components: Simplify expressions involving surds using and	**Higher: Number 1 Surds:** By the end of the module, pupils will be able to: Manipulate expressions involving surds including some or all of: Multiplying	**Higher: Number 1 Surds:** Rational number Irrational number Surd Radical Factor Square number Expand Simplify

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		Algebraic Fractions **Higher: Algebra 2 Equations** **Higher: Geometry 1 Pythagoras' theorem and trigonometry** **Higher: Geometry 2 Circle Geometry** **Higher: Statistics 1 Histograms** **Foundation: Number 1 Factors, Multiples & Primes** **Foundation: Number 2 Fractions & Mixed Numbers** **Foundation: Algebra 1 Simplifying Expressions** **Foundation: Algebra 2 Solving Equations** **Foundation: Geometry 1 Angles** **Foundation: Geometry 2 Right Angled Triangles** **Foundation: Geometry 3 Surface Area & Volume** **Foundation: Statistics 1 Statistical Diagrams** **Foundation: Probability 1 Theoretical and Experimental Probability** **Foundation: Algebra 3 Linear Inequalities** **Foundation: Geometry 4 Vectors** **Foundation: Number 3 Percentage Change** **Foundation: Ratio & Proportion 1 Compound Measures** **Foundation: Ratio & Proportion 2** **Foundation: Number 4 Standard Form** **Foundation: Algebra 4 Sequences** **Foundation: Algebra 5**	**Higher: Algebra 1 Algebraic Fractions:** Calculating with algebraic fractions **Higher: Algebra 2 Equations:** Solving quadratic equations Solving simultaneous equations **Higher: Geometry 1 Pythagoras' theorem and trigonometry:** Trigonometric ratios and graphs Non right-angled triangle trigonometry 3-D Pythagoras' theorem and trigonometry **Higher: Geometry 2 Circle Geometry:** Circle Theorems **Higher: Statistics 1 Histograms:** Draw and interpret histograms **Foundation: Number 1 Factors, Multiples & Primes:** Using prime factor decomposition to find HCF and LCM. **Foundation: Number 2 Fractions & Mixed Numbers:** Calculate with fractions and mixed numbers **Foundation: Algebra 1 Simplifying Expressions:** Use index Laws to simplify expressions **Foundation: Algebra 2 Solving Equations:** Solve Equations Simultaneous Equations **Foundation: Geometry 1 Angles:** Finding Unknown Angles **Foundation: Geometry 2 Right Angled Triangles:** Pythagoras Trigonometry **Foundation: Geometry 3 Surface Area & Volume:** Surface Area Volume **Foundation: Statistics 1 Statistical Diagrams:** Draw & Interpret Statistical Diagrams **Foundation: Probability 1 Theoretical and Experimental Probability:** Theoretical and Experimental Probability **Foundation: Algebra 3 Linear Inequalities:** Solve Linear Inequalities **Foundation: Geometry 4 Vectors:** Solve Vector Problems **Foundation: Number 3 Percentage Change:** Percentage Change **Foundation: Ratio & Proportion 1 Compound Measures:** Calculate Compound Measures **Foundation: Ratio & Proportion 2:** Working with Ratios and Algebra Proportion Word Problems **Foundation: Number 4 Standard Form:** Calculate with Standard Form	Simplify surds by identifying square number factors of a number under a radical and use to write numbers in the form where b is the positive square root of a perfect square Recognise that Add and subtract multiples of surds with the same number under the radical Add and subtract multiples of surds where one or more require simplifying first Expand single brackets where one or more term is a surd Expand double brackets, including squaring a binomial expression and using the difference of two squares where one or more term is a surd Composite: Rationalise denominators with a single term Rationalise denominators with a binomial expression Components: Understand that surds are irrational numbers and should not appear in the denominator of a fraction Rationalise the denominator of expressions of the form and Rationalise the denominator of expressions of the form and **Higher: Algebra 1 Algebraic Fractions:** Composite: Simplify, and use all four operations with algebraic fractions Components: Simplifying algebraic fractions by factorising into one bracket Simplifying algebraic fractions by factorising into two brackets Adding and subtracting algebraic fractions Multiplying algebraic fractions Dividing algebraic fractions **Higher: Algebra 2 Equations:** Composite: Solve any quadratic equation using appropriate or directed method Construct quadratic equations to be solved using given information Components: Factorising to solve quadratic equations of the form Solving quadratic equations by completing the square Solving quadratic equations using the quadratic formula Constructing and solving quadratic equations Solving quadratic equations graphically Composite: Solve a pair of simultaneous equations where one is quadratic, and the other is linear Components: Solving simultaneous equations involving quadratics Solving simultaneous equations involving quadratics graphically **Higher: Geometry 1 Pythagoras' theorem and trigonometry:** Composite: Draw and recognise the graphs of the three trigonometric ratios Components: Using the exact values of trigonometric ratios Using trigonometric graphs Composite: Use the sine and cosine rules for any type of triangle Components: The sine rule The cosine rule The sine rule for area of a triangle Composite: Apply all previous knowledge of Pythagoras' theorem and trigonometry in three dimensions Components: Using Pythagoras' theorem in 3D Trigonometry in 3D shapes **Higher: Geometry 2 Circle Geometry:** Composite: Know and apply circle theorems to calculate missing angles Components: Know and use to calculate missing angles that: Angle in a semi-circle is a right angle The angle at the centre is twice the angle at the circumference Angles in the same segment are equal Opposite angles in a cyclic quadrilateral add to 180 degrees Radius meets tangent at 90 degrees Two tangents that meet at a point are equal in length The alternate segment theorem **Higher: Statistics 1 Histograms:** Composite: Display continuous/grouped data using a histogram Interpret histograms Components: Drawing histograms with equal class widths Drawing histograms with unequal class widths Interpreting histograms Calculating averages from histograms **Foundation: Number 1 Factors, Multiples & Primes:** Composite: Find the LCM (lowest common multiple) and HCF (highest common factor) Components: Understand the meaning of the word multiple. Identify multiples of numbers.	and dividing surds Simplifying surds by factorising out a square number Adding and subtracting surds Expanding single or double brackets that include terms that are surds Solve mathematical problems from other areas of the curriculum such as area where at least one of the values given is a surd By the end of the module, pupils will be able to: Rationalise the denominator of any fraction giving an answer in its simplest form **Higher: Algebra 1 Algebraic Fractions:** By the end of the module, pupils will be able to: Simplify a variety of algebraic fractions Add and subtract two or more algebraic fractions Multiply and divide two or more algebraic fractions **Higher: Algebra 2 Equations:** By the end of the module, pupils will be able to: Solve a variety of quadratic equations, beginning in any format, including where they need to be derived from given information. Use by direction, or by independent choice, all methods for solving quadratic equations: Factorising where a=1 Factorising where a>1 The quadratic formula Completing the square where a=1 Completing the square where a>1 Graphically, including, where necessary, the drawing of additional lines By the end of the module, pupils will be able to: Substitute a linear expression into a quadratic equation Solve the resultant equation and use that solution to find the other Interpret the solution graphically **Higher: Geometry 1 Pythagoras' theorem and trigonometry:** By the end of the module, pupils will be able to: Know and use exact trigonometric values for 0o, 30o, 45o, 60o and 90o Draw accurately, sketch and recognise the graphs of: Know, for each function, the values where they intercept with the co-ordinate axes For sine and cosine, know the maximum and minimum values of the functions For tangent, know the equations of the asymptotes By the end of the module, pupils will be able to: Use the sine rule to calculate missing sides or angles in any triangle Use the cosine rule to calculate missing sides or angles in any triangle Use the sine rule for area of a triangle to calculate the area of a triangle Use the sine rule for area of a triangle to calculate a missing side or angle Use the sine and cosine rule in multi-step and/or problem-solving questions Use Pythagoras' theorem in cubes, cuboids, triangular prisms and pyramids to find missing sides Use right-angled triangle trigonometry in cubes, cuboids, triangular prisms and pyramids to find missing sides and angles Find the angle between an edge and a face in triangular prisms and pyramids Solve multi-step problems to find side lengths and angles found in three-dimensional shapes **Higher: Geometry 2 Circle Geometry:** By the end of the module, pupils will be able to: Identify and use the circle theorems in isolation and combined with others and with other known angle facts to calculate missing angles **Higher: Statistics 1 Histograms:** By the end of the module, pupils will be able to: Identify key features of a histogram and how they differ from a bar chart Calculate frequency density Accurately draw a	Expression Numerator Denominator Rationalise Binomial Conjugate **Higher: Algebra 1 Algebraic Fractions:** Numerator Denominator Simplify Factorise Cancel Factors **Higher: Algebra 2 Equations:** Quadratic Equation Solve Factorise Complete the square Formula Coefficient Graphically Substitute Expand Simplify **Higher: Geometry 1 Pythagoras' theorem and trigonometry:** Trigonometry Sine Cosine Tangent Angle Intersection Axes Maximum Minimum Asymptote Sketch Sine rule Cosine rule Opposite Inverse function Pythagoras' theorem Hypotenuse Opposite Adjacent Inverse function Edge Plane Face **Higher: Geometry 2 Circle Geometry:** Radius Diameter Circumference Arc Tangent Chord Sector Segment Semi-circle Cyclic Quadrilateral **Higher: Statistics 1 Histograms:** Frequency Frequency density Group width Median Quartiles Inter-quartile range Mean **Foundation: Number 1 Factors, Multiples & Primes:** Multiple Factor Prime Product HCF LCM **Foundation: Number 2 Fractions & Mixed Numbers:** Numerator Denominator Equivalent Mixed Number Improper Fraction Ascending Descending **Foundation: Algebra 1 Simplifying Expressions:** Simplify Indices Factor **Foundation: Algebra 2 Solving Equations:** Variable Simultaneous Equation Factorise Quadratic Linear **Foundation: Geometry 1 Angles:** Angle Straight Line Full Turn Vertically Opposite Triangle Quadrilateral Diagonal Parallel Perpendicular Alternate Corresponding Co-Interior Polygon Regular **Foundation: Geometry 2 Right Angled Triangles:** Pythagoras Right Angle Triangle Adjacent Opposite Hypotenuse Sine Cosine Tangent Bearing **Foundation: Geometry 3 Surface Area & Volume:** Surface Area Volume Cones Sphere Frustum Composite Pi **Foundation: Statistics 1 Statistical Diagrams:** Pie Chart Angle Scatter graph Correlation Variable Line of best fit Prediction **Foundation: Probability 1 Theoretical and Experimental Probability:** Probability Mutually exclusive Independent Sample space Venn Diagram Set notation

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		Linear Graphs	**Foundation: Algebra 4 Sequences:** Arithmetic & Geometric Sequences **Foundation: Algebra 5 Linear Graphs:** Linear Graphs	Understand the meaning of the word factor. Identify factors of numbers (may use factor pairs) Recognise prime numbers. Use a factor tree to identify prime factors. Use product of prime factors to create a Venn diagram. Use the Venn diagram to identify HCF and LCM **Foundation: Number 2 Fractions & Mixed Numbers:** Composite: Manipulate fractions and mixed numbers Components: Convert between mixed numbers and improper fractions. Identify common denominators and equivalent fractions Order fractions and mixed numbers. Add and subtract fractions and mixed numbers Multiply fractions and mixed numbers Divide fractions and mixed numbers **Foundation: Algebra 1 Simplifying Expressions:** Composite: Simplify using Index Laws Components: Recognise powers of 2,3 and 5 Know that any number to the power zero equals 1 Simplify using the index law of multiplication a2xa3 = a5 Simplify using the index law of division Simplify fractions Simplify fractions involving common factor (both numerical and algebraic) **Foundation: Algebra 2 Solving Equations:** Composite: Solve Equations Components: Solve Equations with two or more steps Solve equations with unknown on both sides. Solve equations with unknown in the denominator. Construct and solve equations. Factorise quadratics Factorising to solve quadratic equations in the form x2 + bx + c = 0 Identify key areas on a quadratic graph: roots, turning point, intercept and use to solve quadratic equations. Composite: Solve Simultaneous Equations Components: Solve using elimination Solve using substitution Solve graphically Construct simultaneous equations and solve **Foundation: Geometry 1 Angles:** Composite: Find unknown Angles Components: Recap known angle facts Find missing angles using a combination of known facts Use angle facts on Parallel lines to find unknown angles Use Properties of quadrilaterals (Parallelogram, Trapezium, Rhombus, Kite) to find unknown angles Identify polygons Calculate exterior angle, interior angle and sum of interior angles of any polygon **Foundation: Geometry 2 Right Angled Triangles:** Composite: Find missing lengths using Pythagoras Theorem Components: Use Pythagoras in 2D shapes to find any length on a right-angled triangle Use Pythagoras to determine if a triangle has a right-angle Use Pythagoras to solve problems involving Isosceles triangles and quadrilaterals Composite: Find missing lengths and Angles using Trigonometry Components: Use Trigonometry to find unknown lengths in right-angled triangles Use Trigonometry to find unknown angles in right-angled triangles Use exact Trig ratios Use Trigonometry to calculate angles of elevation and depression Use Trigonometry to calculate bearings Solve problems involving a combination of Pythagoras & Trigonometry and Bearings & Trigonometry **Foundation: Geometry 3 Surface Area & Volume:** Composite: Finding the surface area of complex shapes Components: Find the surface area of Cones and Spheres Find the surface area of a Frustum Find the surface area of composite shapes Composite: Finding the volume of complex shapes Components: Find the volume of Cones and Spheres Find the volume of a Frustum Find the volume of composite shapes **Foundation: Statistics 1 Statistical Diagrams:** Composite: Draw & Interpret Statistical diagrams Components: Draw &	histogram to represent grouped data Calculate frequency given frequency density Complete a histogram and/or frequency table from given information Use a histogram to find an estimate for the median, lower quartile and upper quartile as well as inter-quartile range (IQR) Answer interpretive questions from a histogram **Foundation: Number 1 Factors, Multiples & Primes:** By the end of the module, pupils will be able to: List multiples of numbers List Factors of numbers Identify Prime Numbers Express a number using Product of Prime Factors. Complete a Venn diagrams Use Venn Diagrams to find HCF and LCM Solve problems involving HCF and LCM **Foundation: Number 2 Fractions & Mixed Numbers:** By the end of the module, pupils will be able to: Order fractions and mixed numbers Add and Subtract fractions and mixed numbers Multiply fractions and mixed numbers Divide fractions and mixed numbers Solve problems involving fractions and mixed numbers **Foundation: Algebra 1 Simplifying Expressions:** By the end of the module, pupils will be able to: Simplify expressions involving indices using the multiplication and division laws. Simplify fractions by identifying common factors **Foundation: Algebra 2 Solving Equations:** By the end of the module, pupils will be able to: Solve linear equations involving one variable, fractions and the variable on both sides. Solve quadratic equations using factorisation Solve quadratic equations graphically Construct equations involving one or two variables Solve equations simultaneously Draw the graph(s) of linear equations. Identify simultaneous solution Solve problems involving linear or quadratic equations (area, perimeter) **Foundation: Geometry 1 Angles:** By the end of the module, pupils will be able to: Use a combination of angle facts to find unknown angles involving triangles, quadrilaterals, parallel lines and polygons. Solve problems involving angles **Foundation: Geometry 2 Right Angled Triangles:** By the end of the module, pupils will be able to: Use Pythagoras to find unknown lengths and determine the right angle in 2D shapes Solve problems involving Pythagoras on 2D shapes Use Trigonometry to find unknown lengths and angles in 2D shapes Solve problems involving Trigonometry and Bearings Solve problems involving Pythagoras and Trigonometry **Foundation: Geometry 3 Surface Area & Volume:** By the end of the module, pupils will be able to: Calculate the surface area and volume of a cone, given formula Calculate the surface area and volume of a sphere, given formula Calculate the surface area and volume of a frustum, given formula Calculate surface area and volume of composite shapes Solve problems involving volume & surface area **Foundation: Statistics 1 Statistical Diagrams:** By the end of the module, pupils will be able to: Draw & Interpret Pie Charts Plot points on a scatter graph and	Tree Diagram Conditional prbability Relative frequency Expected Frequency **Foundation: Algebra 3 Linear Inequalities:** Inequality Variable **Foundation: Geometry 4 Vectors:** Vector Column Vector Scalar Parallel **Foundation: Number 3 Percentage Change:** Percentage Increase Decrease Original Multiplier Compound Interest Profit Loss Depreciation Growth Decay **Foundation: Ratio & Proportion 1 Compound Measures:** Speed Distance Time Density Volume Mass Pressure Force Area **Foundation: Ratio & Proportion 2:** Ratio Variable Equivalent Proportion Direct Indirect Inverse Conversion **Foundation: Number 4 Standard Form:** Standard Form Indices **Foundation: Algebra 4 Sequences:** Sequence Arithmetic Nth term Geometric Fibonacci Triangular **Foundation: Algebra 5 Linear Graphs:** Linear Coordinate Gradient Y-Intercept Y=mx+c Parallel

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				Interpret Pie Charts Plot & Interpret Scatter graphs Use Lines of best fit **Foundation: Probability 1 Theoretical and Experimental Probability:** Composite: Calculate Theoretical & Experimental Probabilities Components: Calculate Probabilities from mutually exclusive events Complete sample space diagrams Calculate probabilities from sample space diagrams Calculate expected outcomes from repeated experiments Calculate relative frequencies from experimental data Complete Venn diagrams Use set notation to complete a Venn diagram and calculate probabilities from Venn diagrams Complete a probability tree diagram for independent and dependent events Calculate probabilities from a tree diagram **Foundation: Algebra 3 Linear Inequalities:** Composite: Construct & solve linear inequalities Components: Solve inequalities with unknowns on both sides Solve double inequalities Construct and solve inequalities **Foundation: Geometry 4 Vectors:** Composite: Solve Vector Problems Components: Add and subtract Column vectors Multiply column vectors by a scalar Identify parallel vectors Solve geometric problems using vectors **Foundation: Number 3 Percentage Change:** Composite: Calculate Percentages involving percentage change Components: Calculate percentage change on a calculator Find original value of percentage calculations Find the percentage an amount has been changed by Calculate with compound interest Calculate growth and decay **Foundation: Ratio & Proportion 1 Compound Measures:** Composite: Use formula and Calculate compound measures Components: Calculate Speed Use formulae for Speed to calculate distance and time Calculate Density Use the formulae for density to calculate mass and volume Calculate Pressure Use the formulae for pressure to calculate force and area Calculate with rates **Foundation: Ratio & Proportion 2:** Composite: Manipulating ratio Components: Combine Ratios Calculating with ratios and algebra Changing ratios Composite: Solve Proportion Problems Components: Solve direct proportion word problems Solve inverse proportion problems Calculate currency conversion **Foundation: Number 4 Standard Form:** Composite: Calculate with Standard Form Components: Multiply and Divide numbers in standard form Add and Subtract numbers in standard form Use a calculator to solve standard form problems **Foundation: Algebra 4 Sequences:** Composite: Arithmetic & Geometric Sequences Components: Calculate nth term rule for arithmetic sequences Calculate nth term rule for sequences of patterns Calculate nth term rule for geometric sequences Solve problems involving special sequences **Foundation: Algebra 5 Linear Graphs:** Composite: Equations of Linear Graphs Components: Plot straight-line Graphs Find equations of straight-line graphs Interpret equations of straight-line graphs Identify and calculate equations of parallel lines Find the equation of a straight-line from its gradient and a point Find the equation of a straight-line from two points on the line	describe the relationship between variables Draw a line of best fit on a scatter graph and use to predict values. **Foundation: Probability 1 Theoretical and Experimental Probability:** By the end of the module, pupils will be able to: Calculate probabilities from: Mutually exclusive events Sample space diagrams Venn Diagrams Tree Diagrams Complete from information provided: Sample space diagrams Venn Diagrams Tree Diagrams Calculate relative frequency from experimental data Calculate expected frequency from repeating experiments Solve problems involving probability **Foundation: Algebra 3 Linear Inequalities:** By the end of the module, pupils will be able to: Construct an inequality from a written description Solve inequalities with unknowns on both sides Solve a double inequality **Foundation: Geometry 4 Vectors:** By the end of the module, pupils will be able to: Add and subtract column vectors Multiply a column vector Identify parallel vectors Solve problems involving vectors **Foundation: Number 3 Percentage Change:** By the end of the module, pupils will be able to: Use a calculator to calculate: Percentage increase/decrease Original amounts The percentage an amount has changed Compound interest Solve problems involving growth and decay **Foundation: Ratio & Proportion 1 Compound Measures:** By the end of the module, pupils will be able to: Calculate Speed, Density and Pressure Rearrange formulae to calculate distance & time, mass & volume, force and area Use formula to calculate other rates of change Convert between units of compound measures (e.g. km/h to m/s) Solve problems involving compound measures **Foundation: Ratio & Proportion 2:** By the end of the module, pupils will be able to: Combine ratios where one variable is common Calculate and solve problems involving algebra in ratios Calculating the new ratio when values are added to or subtracted from some or all parts. Solve problems involving direct and inverse proportion Solve problems involving currency conversion **Foundation: Number 4 Standard Form:** By the end of the module, pupils will be able to: Multiply and Divide numbers in standard form Add and Subtract numbers in standard form Use a calculator to solve standard form problems **Foundation: Algebra 4 Sequences:** By the end of the module, pupils will be able to: Calculate nth term (position-to-term) rule for arithmetic sequences Calculate nth term (position-to-term) rule for sequences of patterns Calculate nth term (position-to-term) rule for geometric sequences Solve problems involving special sequences **Foundation: Algebra 5 Linear Graphs:** By the end of the module, pupils will be able to: Plot straight-line Graphs Find equations of straight-line graphs Interpret equations of straight-line graphs Identify and	

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					calculate equations of parallel lines Find the equation of a straight-line from its gradient and a point Find the equation of a straight-line from two points on the line Solve problems involving straight line graphs	
11	2	**Higher: Statistics 2 Probability** **Higher: Algebra 3 Inequalities** **Higher: Algebra 4 Functions** **Higher: Algebra 5 Transformations** **Higher: Algebra 6 Iteration** **Higher: Algebra 7 Algebraic proof** **Higher: Geometry 3 Similarity** **Higher: Geometry 4 Geometric proof** **Higher: Algebra 8 Graphs**	**Higher: Statistics 2 Probability:** Conditional probability **Higher: Algebra 3 Inequalities:** Linear and quadratic inequalities **Higher: Algebra 4 Functions:** Substituting into functions Finding composite and inverse functions **Higher: Algebra 5 Transformations:** Transforming graphs **Higher: Algebra 6 Iteration:** Using iterative formulae **Higher: Algebra 7 Algebraic proof:** Writing algebraic proofs **Higher: Geometry 3 Similarity:** Area and volume of similar shapes **Higher: Geometry 4 Geometric proof:** Vector proofs Writing geometric proofs **Higher: Algebra 8 Graphs:** Non-linear graphs	**Higher: Statistics 2 Probability:** Composite: Calculate conditional probabilities from given information using a variety of diagrams and techniques Components: Conditional probabilities from tables Conditional probabilities from Venn diagrams Using the conditional probability formula Conditional probabilities from tree diagrams Using the product rule for counting **Higher: Algebra 3 Inequalities:** Composite: Solve linear and quadratic inequalities algebraically and graphically Components: Graphs of linear inequalities Solving quadratic inequalities **Higher: Algebra 4 Functions:** Composite: Substitute numerical values into functions Components: Substituting into functions Substituting into composite functions Composite: Find composite and inverse functions Components: Finding composite functions Finding inverse functions **Higher: Algebra 5 Transformations:** Composite: Transform, translate and reflect graphs Components: Translating graphs horizontally and/or vertically Reflecting graphs in either axis Transforming graphs by a stretch in the x and or the y direction **Higher: Algebra 6 Iteration:** Composite: Use iterative formulae to find approximate solutions to equations Components: Using recurrence relations Substitute into iterative formulae Finding approximate solutions to equations by using iteration **Higher: Algebra 7 Algebraic proof:** Composite: Prove given statements using algebraic proof Components: Use formal algebraic written communication to prove a statement is true or false **Higher: Geometry 3 Similarity:** Composite: Find missing lengths, areas and volume of similar shapes Components: Find the perimeter and area of similar shapes in two dimensions Find the surface area and volume of three-dimensional shapes **Higher: Geometry 4 Geometric proof:** Composite: Prove given geometric statements involving vectors Components: Solving geometric problems using vectors Geometric proofs with vectors Composite: Prove given geometric statements Components: Geometric proofs with angle facts Geometric proofs with congruence and similarity Proving circle theorems **Higher: Algebra 8 Graphs:** Composite: Interpreting and calculating from velocity-time graphs and other non-linear graphs Components: Estimating gradients of non-linear graphs using tangents Calculating distances from velocity-time graphs Estimating the area under non-linear graphs to estimate the distance travelled from a velocity time graph Composite: Work with the equation of a circle Components: Know and use the equation of a circle Calculate the equation of a tangent to a circle	**Higher: Statistics 2 Probability:** By the end of the module, pupils will be able to: Use two-way tables to be able to calculate probabilities Use Venn diagrams to be able to calculate probabilities Use the conditional probability formula to be able to calculate probabilities Construct and use tree diagrams to calculate conditional probabilities Calculate the number of possible outcomes in a given scenario using the product rule for counting **Higher: Algebra 3 Inequalities:** By the end of the module, pupils will be able to: Represent linear inequalities on coordinate axes Represent and solve multiple linear inequalities on coordinate axes and shade the region or list the integer coordinates that represent the solution Factorise a quadratic expression to identify the roots of the equation Solve quadratic inequalities of the form and **Higher: Algebra 4 Functions:** By the end of the module, pupils will be able to: Understand function notation including for composite functions Evaluate functions, including composite functions, by substituting a real number into them Substitute one function into another to find the equivalent composite function Rearrange the subject of a formula to find the inverse function **Higher: Algebra 5 Transformations:** By the end of the module, pupils will be able to: Translate a given graph or basic function vertically and/or horizontally including the using function notation and Reflect a given graph or basic function in the x-axis or y-axis including using the function notation and Transform a given graph or basic function by stretching vertically or horizontally including using the function notation and Transform a given graph or basic function using a combination of the individual transformations above Identify the new coordinates of key points and/or where they meet the coordinate axes **Higher: Algebra 6 Iteration:** By the end of the module, pupils will be able to: Rearrange equations to create a recurrence relation Understand iteration as a concept and iterative notation Substitute values into an iterative formula Use repeated iterations to find an approximate solution to an equation to a suitable degree of accuracy **Higher: Algebra 7 Algebraic proof:** By the end of the module, pupils will be able to: Create algebraic expressions from given information Manipulate algebraic expressions to arrive at a desired outcome Understand and conclude that an algebraic expression can be used to prove a given result **Higher: Geometry 3 Similarity:** By the end of the module, pupils will be able to: Use the fact that if lengths in similar shapes are enlarged by a given scale factor, then areas are enlarged by the square of the scale factor and volumes are enlarged by the cube of the scale factor to be able to find unknown measures	**Higher: Statistics 2 Probability:** Probability Event Outcome Independent Dependent Conditional Mutually exclusive Venn Diagram Union Intersection Universal set **Higher: Algebra 3 Inequalities:** Linear Quadratic Inequality Equation Region Coordinates Integer Factorise Root **Higher: Algebra 4 Functions:** Function Composite Substitute Evaluate Inverse Rearrange Subject of a formula **Higher: Algebra 5 Transformations:** Transform Reflect Translate Stretch Function Intersection Axes **Higher: Algebra 6 Iteration:** Iteration Formula Recurrence relation Solution **Higher: Algebra 7 Algebraic proof:** Expression Expand Factorise Simplify Prove **Higher: Geometry 3 Similarity:** Enlargement Similar Scale Factor Area Volume **Higher: Geometry 4 Geometric proof:** Vector Parallel Multiple Factorise Co-linear Prove Prove SSS = Side, Side, Side SAS = Side, Angle, Side ASA = Angle, Side, Angle RHS = Right-angle, Hypotenuse, Side Circumference Radius Diameter Tangent Arc Chord Subtend Segment **Higher: Algebra 8 Graphs:** Velocity Time Distance Tangent Gradient Area Trapezium Equal strips Perpendicular Reciprocal Intersect

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					in similar shapes **Higher: Geometry 4 Geometric proof:** By the end of the module, pupils will be able to: Use vector algebra to write composite vectors including combining vectors, multiples of vectors and the use of ratio and fraction in determining multiples of vectors Understand that vectors are parallel if they are a multiple of one another Prove given geometric statements using vectors and combinations and/or multiples of vectors including co-linearity, parallelism, and if certain line segments create a given shape Use correct notation for angles, line segments and polygons Understand notation showing right angles, parallel and perpendicular lines and line segments of equal length Use known angle facts to prove a given statement Prove that two shapes are similar Prove that two triangles are congruent using SSS, SAS, ASA or RHS Prove the learned circle theorems **Higher: Algebra 8 Graphs:** By the end of the module, pupils will be able to: Read and interpret a velocity-time graph Know that the gradient of a velocity-time graph represents the acceleration at that point Calculate an estimate for acceleration at a given point by drawing a tangent and calculating the gradient Know that the area under a velocity-time graph represents the distance travelled Calculate an estimate for distance travelled by calculating an estimate of the distance under a velocity-time by splitting it into strips of equal width comprising of trapeziums and/or triangles State whether an estimate for distance travelled is an under-estimate or an over-estimate Know that the equation represents a circle with centre (0,0) and radius r Sketch a circle given its equation Identify the centre coordinates and/or the radius of a circle from its equation Calculate the equation of the tangent to a circle at a given point Use simultaneous equations to calculate the coordinates where a circle and a line intersect	
12	1	**Algebraic Expressions (pure)** **Quadratics (pure)** **Equations and Inequalities (pure)** **Graphs and Transformations (pure)** **Straight Line Graphs (pure)** **Circles (pure)** **Algebraic methods (pure)** **The binomial expansion (pure)** **Trigonometric Ratios (pure)** **Trigonometric identities and equations (pure)**	**Algebraic Expressions (pure):** Index laws inc negative and fractional indices, expanding brackets, factorising, surds and rationalising the denominator **Quadratics (pure):** Solving quadratic equations, completing the square, functions, quadratic graphs, the discriminant, modelling with quadratics **Equations and Inequalities (pure):** Solving linear and quadratic simultaneous equations, solving linear and quadratic inequalities, inequalities on graphs **Graphs and Transformations (pure):** Sketching cubic, quartic and reciprocal graphs, finding points of intersection and graph transformations **Straight Line Graphs (pure):** , parallel and perpendicular lines, length and area, modelling with straight lines **Circles (pure):** Midpoints and	**Algebraic Expressions (pure):** Composite: To be fluent in algebraic, including indices, manipulating brackets and surds Components: Understand the meaning of expanding brackets, factorise, indices, surds and rationalise the denominator **Quadratics (pure):** Composite: To be fluent in all aspects of quadratic equations Components: Understand how to solve quadratics, complete the square, functions, quadratic graphs, using the discriminant and modelling with quadratics **Equations and Inequalities (pure):** Composite: To be fluent in solving simultaneous equations and inequalities Components: Understand how to solve linear and quadratic simultaneous equations, linear and quadratic inequalities, including graphically **Graphs and Transformations (pure):** Composite: To be fluent in sketching graphs, finding key points, intersections and how transformation effect graphs Components: Understand how to sketch cubic, quartic and reciprocal graphs, finding points of intersection and graph transformations **Straight Line Graphs (pure):** Composite: To be fluent in all aspects of Components: Understand , parallel and perpendicular lines, length and area, modelling with straight	**Algebraic Expressions (pure):** By the end of the module, pupils will be able to: Multiply and divide integer powers Expand a single term over brackets and collect like terms Expand the product of two or three expressions Factorise linear, quadratic and simple cubic expressions Simplify and use the rules of surds Rationalise denominators **Quadratics (pure):** By the end of the module, pupils will be able to: Solve quadratic equations using factorisation, the quadratic formula and completing the square Read and use notation when working with functions Sketch the graph and find the turning point of a quadratic function Find and interpret the discriminant of a quadratic expression Use and apply models that involve quadratic functions **Equations and Inequalities (pure):** By the end of the module, pupils will be able to: Solve Linear simultaneous equations Solve quadratic simultaneous equations Solve simultaneous equations graphically Solve linear inequalities Solve quadratic inequalities Solve inequalities graphically Display inequality regions	**Algebraic Expressions (pure):** Expression Expand Factorise Index Surd Rationalise Rationalise the denominator Quadratic Linear Cubic **Quadratics (pure):** Roots Solve Quadratic equations Discriminant Functions Modelling **Equations and Inequalities (pure):** Solve Roots Regions Elimination Substitution **Graphs and Transformations (pure):** Cubic Quartic Reciprocal Root **Straight Line Graphs (pure):** Gradient Parallel Perpendicular intercept **Circles (pure):** Midpoint Perpendicular bisector Tangent Chord Radius **Algebraic methods (pure):** Polynomials Contradiction Deduction Exhaustion Counter-example **The binomial expansion (pure):** Pascal’s

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		Data Collection (applied) **Measures of location and spread (applied)** **Representation of data (applied)** **Correlation (applied)** **Probability (applied)** **Statistical distributions (applied)** **Hypothesis testing (applied)**	perpendicular bisectors, equation of a circle, intersection of straight lines and circles, tangents and chords, circles and triangles **Algebraic methods (pure):** Dividing polynomials, using the factor theorem and mathematical proof **The binomial expansion (pure):** Using factorial notation and understanding how it can be used with binomial expansion **Trigonometric Ratios (pure):** Using the Cosine Rule, Sine Rule, Sine Rule for Area, the trigonometric graphs and transformations **Trigonometric identities and equations (pure):** Find angles in all for quadrants, find the exact values of trigonometric ratios, trigonometric identities, solve trigonometric equations **Data Collection (applied):** Understand sampling and different types of data **Measures of location and spread (applied):** Understanding variance and standard deviation **Representation of data (applied):** Representing data **Correlation (applied):** Understanding correlation from bivariate data **Probability (applied):** Being able to calculate probabilities in different situations **Statistical distributions (applied):** Understanding statistical distributions **Hypothesis testing (applied):** To be able to undertake a hypothesis test and understand the results	lines **Circles (pure):** Composite: To be fluent in circles and all parts of them Components: Understand midpoints and perpendicular bisectors, equation of a circle, intersection of straight lines and circles, tangents and chords, circles and triangles **Algebraic methods (pure):** Composite: To be fluent with algebra and proofs Components: Understand dividing polynomials and using the factor theorem and using mathematical proofs **The binomial expansion (pure):** Composite: To be fluent with binomial expansion Components: Understand Pascal's triangle, factorial notation and the binomial expansion **Trigonometric Ratios (pure):** Composite: To be fluent in using the Trigonometric rules and graphs from GCSE in harder questions Components: Understand the Cosine Rule, Sine Rule, Sine Rule for Area, the trigonometric graphs and transformations **Trigonometric identities and equations (pure):** Composite: To be fluent with the trigonometric identities and equations Components: Understand finding angles in all for quadrants, find the exact values of trigonometric ratios, trigonometric identities, solve trigonometric equations **Data Collection (applied):** Composite: To be fluent in sampling and understanding data Components: Understanding populations and sampling different types of data **Measures of location and spread (applied):** Composite: To be fluent in measures of location and spread Components: Understanding Use of averages Interquartile and percentiles Variance and standard deviation **Representation of data (applied):** Composite: To be fluent in representing data Components: Understanding Displaying data **Correlation (applied):** Composite: To be fluent with understanding the relationship between two variables Components: Understanding Correlation between two variables Linear regression **Probability (applied):** Composite: To be fluent calculating probabilities Components: Understanding Calculating probabilities Using Venn diagrams Mutually exclusive and independent events **Statistical distributions (applied):** Composite: To be fluent binomial distribution Components: Understanding Probability distributions The binomial distribution cumulative **Hypothesis testing (applied):** Composite: To be fluent completing a hypothesis test and reading the result Components: Understanding How to do a hypothesis test Finding critical values Performing one or teo tailed tests	**Graphs and Transformations (pure):** By the end of the module, pupils will be able to: Sketch Cubic graphs Sketch Quartic graphs Sketch Reciprocal graphs Find points of intersection Translate Graphs Stretch graphs Transform function of unfamiliar graphs **Straight Line Graphs (pure):** By the end of the module, pupils will be able to: Use Know how to work with parallel and perpendicular lines Calculate with length and area Model with straight lines **Circles (pure):** By the end of the module, pupils will be able to understand: Midpoints and perpendicular bisectors Equations of a circle Intersections of straight lines and circles Using tangents and chord properties Solving problems with circles and triangles **Algebraic methods (pure):** By the end of the module, pupils will be able to understand: Algebraic fractions Dividing polynomials The factor theorem Mathematical proof Methods of Proof **The binomial expansion (pure):** By the end of the module, pupils will be able to understand: Pascal's triangle Factorial notation The binomial expansion Solving binomial problems Binomial estimation **Trigonometric Ratios (pure):** By the end of the module, pupils will be able to understand: The Cosine Rule The Sine Rule The Sine Rule for Area Solving problems triangle problems Graph sine, cosine and tangent Apply transformations to the graphs **Trigonometric identities and equations (pure):** By the end of the module, pupils will be able to: Find angles in all four quadrants Find the exact values of trig ratios Use the trig identities Solve simple trig equations Solve harder trig equations **Data Collection (applied):** By the end of the module, pupils will be able to understand: Populations and samples Samples Non-random sampling Types of data The large data set **Measures of location and spread (applied):** By the end of the module, pupils will be able to understand: Measures of central tendency Other measures of location Measures of spread Variance and standard deviation Coding **Representation of data (applied):** By the end of the module, pupils will be able to understand: Outliers Bos plots Cumulative frequency Histograms Comparing data **Correlation (applied):** By the end of the module, pupils will be able to understand: Correlation Linear regression **Probability (applied):** By the end of the module, pupils will be able to understand: Calculating probabilities Venn diagrams Mutually exclusive and independent events Tree diagrams **Statistical distributions (applied):** By the end of the module, pupils will be able to understand: Probability distributions The binomial distribution Cumulative distributions	Triangle Factorial notation **Trigonometric Ratios (pure):** Sine Cosine Tangent **Trigonometric identities and equations (pure):** Roots Sine Cosine Tangent **Data Collection (applied):** Census Sample Stratified sampling Systematic sampling Quota sampling **Measures of location and spread (applied):** Qualitative Quantitative Interquartile Percentile Coding **Representation of data (applied):** Outliers Cumulative frequency Histogram Frequency density **Correlation (applied):** Correlation Bivariate Linear regression **Probability (applied):** Venn diagrams Mutually exclusive Independent events **Statistical distributions (applied):** Probability distribution Binomial distribution Cumulative distibution **Hypothesis testing (applied):** Hypothesis testing Critical value Critical region Actual significant level One tailed test Two tailed test

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					Hypothesis testing (applied): By the end of the module, pupils will be able to understand: Hypothesis testing Finding critical values One-tailed tests Two-tailed tests	
12	**2**	**Vectors (pure)** **Differentiation (pure)** **Integration (pure)** **Exponentials and logarithms (pure)** **Modelling in mechanics (applied)** **Constant acceleration (applied)** **Forces and motion (applied)** **Variable Acceleration (applied)**	**Vectors (pure):** Representing vectors, including magnitude and direction and solving geometric problems **Differentiation (pure):** Differentiating functions, finding the gradients, tangents and normal, increasing and decreasing functions, second order derivatives, stationary points, sketching gradient functions, modelling with differentiation **Integration (pure):** Indefinite integrals, definite functions, area under the curve, area between a curve and a line **Exponentials and logarithms (pure):** Be able to work with exponentials and logarithms to solve problems. **Modelling in mechanics (applied):** Being able to construct a mechanical model **Constant acceleration (applied):** Using displacement-time / velocity-time graphs and constant acceleration formula **Forces and motion (applied):** Using Newtons 1st, 2nd and 3rd law to solve problems **Variable Acceleration (applied):** Velocity is the rate of change of displacements and acceleration is the rate of change of velocity	**Vectors (pure):** Composite: To be fluent in using and understanding vectors and vector problems Components: Understand representing vectors, finding magnitude and direction, position vectors and modelling with vectors **Differentiation (pure):** Composite: To be fluent with differentiating Components: Understand differentiating functions, finding the gradients, tangents and normal, increasing and decreasing functions, second order derivatives, stationary points, sketching gradient functions, modelling with differentiation **Integration (pure):** Composite: To be fluent integrating functions Components: Understand indefinite integrals, definite integrals, finding the area under a curve, including when below the x-axis, areas between curves and lines **Exponentials and logarithms (pure):** Composite: To be fluent with exponentials and logarithms Components: Understand how to use exponential functions, modelling with exponentials, laws of logarithms, solving equations using logarithms, working with natural logarithms and logarithms and non linear data **Modelling in mechanics (applied):** Composite: To be fluent creating models in mechanics Components: Understand the assumptions needed to create mechanical models **Constant acceleration (applied):** Composite: To be fluent using the constant acceleration formula Components: Understand displacement and velocity time graphs, constant acceleration formula **Forces and motion (applied):** Composite: To be fluent in forces and motion Components: Understand force diagrams and using them to solve problems with acceleration and with pulleys **Variable Acceleration (applied):** Composite: To be fluent using differentiation or integration to solve problems with displacement, velocity and acceleration Components: Understanding velocity is the rate of change of displacements and acceleration is the rate of change of velocity	**Vectors (pure):** By the end of the module, pupils will be able to understand: Representing vectors Magnitude and direction Position vectors Solving geometric problems Modelling with vectors **Differentiation (pure):** By the end of the module, pupils will be able to: Differentiate functions Find the gradient, tangent and normal, Increasing and decreasing functions, Second order derivatives Stationary points Sketching gradients Modelling with differentiation **Integration (pure):** By the end of the module, pupils will be able to understand: Indefinite integral Definite integral Find the area under a curve (including when below the x-axis) Find the area between a curve and a line **Exponentials and logarithms (pure):** By the end of the module, pupils will be able to understand: Exponential functions Exponential modelling Logarithms Laws of logarithms Solving equations using logarithms Working with natural logarithms Logarithms and non-linear data **Modelling in mechanics (applied):** By the end of the module, pupils will be able to understand: Constructing a model Modelling assumptions Quantities and units Working with vectors **Constant acceleration (applied):** By the end of the module, pupils will be able to understand: Displacement time graphs Velocity time graphs Constant acceleration formula Using constant acceleration under gravity **Forces and motion (applied):** By the end of the module, pupils will be able to understand: Force diagrams Forces as vectors Forces and acceleration Motion in 2 dimensions Connected particles Pulleys **Variable Acceleration (applied):** By the end of the module, pupils will be able to understand: Functions of time Using differentiation Maxima and minima problems Using integration Constant acceleration problems	**Vectors (pure):** Magnitude Direction Scaler Parallel Perpendicular Bisect Prove **Differentiation (pure):** Gradient Tangent Normal Derivative Stationary points **Integration (pure):** Indefinite Integral Definite integral **Exponentials and logarithms (pure):** Exponential Logarithms Natural logarithm **Modelling in mechanics (applied):** Assumptions Force diagrams SI units **Constant acceleration (applied):** Displacement Velocity Acceleration Gravity **Forces and motion (applied):** Resultant forces Rough/smooth horizontal plane Weight Mass Connected particles Pulleys **Variable Acceleration (applied):** Instantaneously at rest
13	**1**	**Pure Maths Algebraic Methods** **Pure Maths Functions** **Pure Maths Sequences and Series** **Pure Maths Binomial Expansions** **Pure Maths Parametric Equations** **Statistics - Probability** **Statistics – Regression and Correlation**	**Pure Maths Algebraic Methods:** Manipulate and use algebraic expressions, proof using algebra. **Pure Maths Functions:** Recognise and use the properties of functions. **Pure Maths Sequences and Series:** Recognise and manipulate both arithmetic and geometric sequences and series. **Pure Maths Binomial Expansions:** Expand Single Brackets with a rational power. **Pure Maths Parametric Equations:**	**Pure Maths Algebraic Methods:** Composite Split a fraction involving more than one bracket in the denominator into partial fractions. Components Split up the fraction into 2 or more separate fractions Find the values of the numerators by substitution or equating coefficients. Recognise when there are repeated factors. Manipulate the fraction before splitting when the order of the numerator is the same or higher than the denominator. Composite Use proof by contradiction to prove that a statement must be true. Component Recognise that a contradiction is a disagreement between two statements. **Pure Maths Functions:** Composite Recognise and use the Modulus Function Components Know the properties of the modulus function and the modulus of any function Sketch graphs involving the modulus of any function Composite	**Pure Maths Algebraic Methods:** By the end of the module, pupils will be able to: Prove a statement is true by using proof by contradiction Split any fraction (improper or otherwise) involving more than 1 bracket in the denominator into separate fractions **Pure Maths Functions:** By the end of the module, pupils will be able to: Draw the modulus of any function Recognise and use the properties of the modulus of any function Find the domain and range of a function Find the composite of two or more functions Find and use the inverse of any function Transform a curve following a combination of two or more transformations. **Pure Maths Sequences and Series:** By the end of	**Pure Maths Algebraic Methods:** Partial Improper Divisor Substitution Expression Numerator Denominator **Pure Maths Functions:** Modulus Domain Range Composite Inverse Transformation **Pure Maths Sequences and Series:** Arithmetic Geometric Sequence Series Converge Infinity Recurrence Suffix Sigma **Pure Maths Binomial Expansions:** Binomial Expansion Fractional Negative Term Expression Power Rational Irrational **Pure Maths Parametric Equations:** Parametric Parameter Variable Cartesian

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		Mechanics- Moments **Mechanics- Forces and Friction** **Mechanics- Projectiles**	Recognise, use and manipulate equations given in a third parameter. **Statistics - Probability:** Conditional probability and diagrams. **Statistics – Regression and Correlation:** Use regression and correlation to see if there is a relationship in bi-variate data. **Mechanics- Moments:** Calculate and use the turning effect of a force. **Mechanics- Forces and Friction:** Understand the effect friction has on an object that is moving. **Mechanics- Projectiles:** Describe the motion of an object thrown horizontally or at an angle to the horizontal.	Recognise the properties of functions Component Use mappings, domain and range, composite functions and inverse functions. Composite Use transformations of functions Component Apply a combination of two or more transformations to a curve, including the modulus function **Pure Maths Sequences and Series:** Composite Recognise and use Arithmetic Sequences and Series. Components Find the nth term of an arithmetic sequence Prove and use the formula for the sum of the first n terms of an arithmetic sequence Composite Recognise and use Geometric Sequences and Series. Components Find the nth term of a geometric sequence Prove and use the formulae for the sum of the first n terms and the sum to infinity of a geometric sequence. Composite Generate terms from a recurrence relationship. Components Use the suffix notation for recurrence relationships. Use sigma notation to describe the series. **Pure Maths Binomial Expansions:** Composite Expand brackets of the form (a + bx)n where n is a rational number. Recognise when this is valid. Components Expand (1 + x)n where n is a negative integer Expand (1 + x)n where n is a fraction. Expand (a + bx)n where n is a rational number Composite Expand Fractional Expressions of any type Components Split a fractional expression into partial fractions and then find the Binomial Expansion of each term. **Pure Maths Parametric Equations:** Composite Convert between parametric and Cartesian equations. Components Use substitution to convert. Use Trigonometric Identities to convert where the parametric equation is given in terms of an angle parameter. Composite Understand and use parametric equations. Components Sketch curves of equations given parametrically. Solve co-ordinate geometry problems using parametric equations. Use parametric equations in modelling in a variety of contexts. **Statistics - Probability:** Composite Understand and use conditional probability and the associated diagrams. Components Understand set notation in probability. Solve conditional probability using tree diagrams, two-way tables and Venn diagrams. Use probability formulae to solve problems. **Statistics – Regression and Correlation:** Composite Use exponential models along with logarithms to find a linear relationship and vice- versa. Components Understand exponential models in bi-variate data. Use a change of variable to estimate coefficients in an exponential model. Composite Use correlation and hypothesis testing to see if there is a relationship between two variables. Components Understand and calculate the product moment correlation coefficient. Carry out a hypothesis test for zero correlation. **Mechanics- Moments:** Composite Calculate and use the turning effect of a force. Components Calculate the resultant moment of a set of forces acting on a rigid body. Solve problems involving uniform and non-uniform rods in equilibrium. Solve problems involving rods on the point of titling. **Mechanics- Forces and Friction:** Composite Calculate the maximum value of friction and use this to solve problems involving objects on a horizontal or inclined rough plane. Components Resolve forces into components. Use the triangle law to find a resultant force. Solve problems involving smooth or rough inclined planes. Understand and use friction and the	the module, pupils will be able to: Recognise the difference between a sequence and series. Recognise the difference between arithmetic and geometric sequences. Find the nth term and sum of the first n terms for both sequences. Prove the formulae relating to these. Recognise when a geometric series converges and use and prove the formula for the sum to infinity. Use sigma and suffix notation to describe recurrence relationships. Model real-life situations using sequences and series. **Pure Maths Binomial Expansions:** By the end of the module, pupils will be able to: Expand any given expression to the required number of terms. State the values for which each expansion is valid. Use partial fractions to find the Binomial Expansion of any Fractional Expression. **Pure Maths Parametric Equations:** By the end of the module, pupils will be able to: Understand the reasons curves may be given using a third parameter. Convert between parametric and Cartesian equations. Use parametric equations to model real life situations. Solve a variety of problems using them – linking later to differentiation and integration. **Statistics - Probability:** By the end of the module, pupils will be able to: Solve a variety of conditional probability problems using a range of techniques and diagrams. **Statistics – Regression and Correlation:** By the end of the module, pupils will be able to: Use logarithms to link together linear and exponential relationships. Calculate the PMCC Use the PMCC along with statistical tables to ascertain whether a relationship between two variables exists. **Mechanics- Moments:** By the end of the module, pupils will be able to: Use moments along with other forces to solve a variety of problems involving uniform and non-uniform rods. **Mechanics- Forces and Friction:** By the end of the module, pupils will be able to: Solve a variety of problems using friction and the coefficient of friction. Understand the effect friction has on how an object is likely to move. **Mechanics- Projectiles:** By the end of the module, pupils will be able to: Describe the path that an object will take when thrown. Find the maximum height, horizontal distance and time of flight. Solve a variety of problems involving projectiles.	Identity Expression Equation **Statistics - Probability:** Conditional Probability Set Notation Venn Intersection Union Given **Statistics – Regression and Correlation:** Product Moment Correlation Coefficient Bi-variate Relationship Hypothesis Positive Negative **Mechanics- Moments:** Moment Force Tilt Uniform **Mechanics- Forces and Friction:** Force Friction Inclined Rough Coefficient **Mechanics- Projectiles:** Projectile Motion Horizontal Vertical Gravity

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				coefficient of friction. **Mechanics- Projectiles:** Composite Predict the motion of an object being thrown. Components Model motion under gravity for an object projected horizontally. Resolve velocity into components. Solve problems involving particles projected at an angle. Derive the formulae for time of flight, range and greatest height, and the equation of the path of a projectile.	
13	**2**	**Pure Maths Trigonometry** **Pure Maths Differentiation** **Pure Maths Integration** **Pure Maths Vectors** **Pure Maths Numerical Methods** **Statistics – The Normal Distribution** **Mechanics- Applications of Forces** **Mechanics- Further Kinematics**	**Pure Maths Trigonometry:** Solve and use trigonometric equations and expressions (in both radians and degrees). **Pure Maths Differentiation:** Differentiate expressions of all types – use this to find gradients of curves. **Pure Maths Integration:** Integrate expressions of all types – use this to find the area under the curve and to solve differential equations. **Pure Maths Vectors:** Solve geometric problems using vectors in 3 dimensions. **Pure Maths Numerical Methods:** Solve equations using a numerical method. **Statistics – The Normal Distribution:** Use the Normal Distributions to calculate probabilities and carry out tests on the sample mean. **Mechanics- Applications of Forces:** Use and describe forces acting on a particle. **Mechanics- Further Kinematics:** Use vectors in mechanics to describe motion. Use variable acceleration and calculus with more complex functions.	**Pure Maths Trigonometry:** Composite Recognise and use radians as an alternative angle measure. Components Convert between radians and degrees (Eg 360o = 2πc) Apply this knowledge to graphs and their transformations. Find arc length and areas of sectors using radians. Solve trig equations in radians. Use approximate trig values when the angle is very small. Composite Know and use trigonometric functions and identities. Components Recognise and use the reciprocal trigonometric functions of secant, cosecant and cotangent and their graphs. Simplify expressions, prove identities and solve equations using the reciprocal trigonometric functions. Understand and use inverse trigonometric functions and their domains and ranges. Composite Know and use further trigonometric formulae and model with trigonometry. Components Prove and understand the addition formulae. Understand and use double angle formulae. Solve trig equations and prove trig identities using addition and double angle formulae. Write expressions of the form asinx ± bcosx in the form Rcos(∂±α) or Rsin(∂±α). Use trigonometric functions to model real-life situations. **Pure Maths Differentiation:** Composite Differentiate functions using a variety of methods. Components Differentiate trigonometric functions. Differentiate exponentials and logarithms. Differentiate functions using the chain, product and quotient rules. Differentiate functions defined implicitly. Differentiate parametric equations. Use the differentiated function to find gradients of tangents and normals. Use the second derivative to explain the nature of a function and its turning points. Solve problems involving connected rates of change **Pure Maths Integration:** Composite Integrate functions using a variety of methods. Components Integrate trigonometric (also using trig identities) and exponential functions. Integrate functions of the form f(ax+b) using the reverse chain rule method. Integrate more complex functions using substitution. Integrate a product of functions using integration by parts. Integrate a quotient by first splitting it into partial fractions. Composite Find the area under curves. Components Use integration to find the area under a curve, or a combination of curves. Use the trapezium rule to find approximate areas under curves. Composite Solve differential equations Components Use all of the above methods of integration to set up and solve differential equations using the "separation of variables" method. **Pure Maths Vectors:** Composite Understand and use co-ordinates and vectors in 3 dimensions. solve geometric problems using vectors in 3 dimensions. Components Understand 3D cartesian co-ordinates Use vectors in 3-dimensions to solve geometric problems. Model 3D motion in mechanics using vectors **Pure Maths Numerical Methods:** Composite Show that a solution to an equation lies between two points. Components Substitute given values into the equation and use the "change	**Pure Maths Trigonometry:** By the end of the module, pupils will be able to: Know and use the Radians angle measure. Use Trigonometry in a variety of real-life situations. Prove and use trig identities using double angle, addition formulae, inverse and reciprocal trig functions, and the Rcos method. Solve a variety of trig equations involving each of the above. **Pure Maths Differentiation:** By the end of the module, pupils will be able to: Differentiate all types of expression and function. Use the first and second derivative to find gradients and to describe the nature of a curve. Link differentiation to previous work in year 12 on Integration. Solve optimisation problems. **Pure Maths Integration:** By the end of the module, pupils will be able to: Integrate a variety of styles of function. Integrate by substitution. Integrate by parts. Find the areas under curves by integrating. Find approximate areas of more complex functions using the trapezium rule. Set up an solve differential equations. **Pure Maths Vectors:** By the end of the module, pupils will be able to: Find position vectors and link these to co-ordinates of their points in 3D Solve a range of geometrical problems including shapes using vectors. Make links to the applied section of the course by modelling in mechanics. **Pure Maths Numerical Methods:** By the end of the module, pupils will be able to: Show that a solution to an equation lies between two values using the "change of sign" method. Use iteration or the "Newton-Raphson" method to solve complex equations and show how iteration works using cobweb or step diagrams. **Statistics – The Normal Distribution:** By the end of the module, pupils will be able to: Calculate probabilities from the Normal Distribution. Find the mean and/or variance if probabilities are known. Understand how the Standard Normal Distribution works. Approximate a Binomial to a Normal. Perform a Hypothesis Test on a sample mean. **Mechanics- Applications of Forces:** By the end of the module, pupils will be able to: Solve a variety of problems that involve forces acting on a particle or connected particles. **Mechanics- Further Kinematics:** By the end of the module, pupils will be able to: Recognise and use vectors to describe displacement, velocity and acceleration. Calculate either displacement, velocity or acceleration with variable acceleration on more complex functions.	**Pure Maths Trigonometry:** Trigonometry Radians Transformations Equation Identity Reciprocal Inverse Model **Pure Maths Differentiation:** Differentiation Integration Parametric Trigonometric Exponential Logarithm Implicit Tangent Normal Stationary Increasing Decreasing **Pure Maths Integration:** Integrate Substitution Parts Trigonometric Partial Trapezium Approximate Differential **Pure Maths Vectors:** Vector Co-ordinate Geometric **Pure Maths Numerical Methods:** Iteration Numerical Root Solution Approximation By the end of the module, pupils will be able to: **Statistics – The Normal Distribution:** Normal Continuous Binomial Discrete Mean Standard Deviation Variance Continuity Correction Sample Mean **Mechanics- Applications of Forces:** Smooth Rough Plane Equilibrium Pulleys Weight Tension Connected **Mechanics- Further Kinematics:** Displacement Velocity Acceleration Variable Calculus Differentiate Integrate

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				of sign” method to show that at least one solution lies between the two. Composite Solve more complex equations by using a “numerical method”. Components Show that an equation can be arranged into the form x = f(x) which potentially creates an iteration formula. Use the iteration formula to obtain roots of the equation. Use the “Newton-Raphson” method to find successive approximations to the roots of equations. Use these methods to solve modelling problems in real-life situations. **Statistics – The Normal Distribution:** Composite Understand the Normal Distribution as a Continuous Distribution along with its probability related properties. Components Understand the characteristics of the Normal Distribution. Calculate probabilities given the mean and standard deviation. Calculate the mean and/or standard deviation given areas under the curve, linking to the Standard Normal Distribution. Composite Understand the links between the Binomial and Normal Distributions. Components Approximate a Binomial to a Normal Distribution and estimate associated probabilities using the continuity correction. Composite Test whether a sample mean given indicates a change in the overall mean of the distribution. Components Carry out a hypothesis test based on a given mean, using the value of the sample mean. Recognise that the variance of the sample means is different to the original distribution linked to the sample size. **Mechanics- Applications of Forces:** Composite Use and describe forces acting on a particle which is either moving or in equilibrium. Components Find an unknown force when is a system is in equilibrium. Solve statics problems involving weight, tension and pulleys. Understand and solve problems involving limiting equilibrium. Solve problems involving motion on rough or smooth inclined planes. Solve problems involving connected particles. **Mechanics- Further Kinematics:** Composite Use vectors to describe motion. Component Work with vectors for displacement, velocity and acceleration when using the vector equations of motion. Composite Solve problems involving variable acceleration. Components Use calculus with harder function of time involving variable acceleration. Differentiate and Integrate vectors with respect to time.		