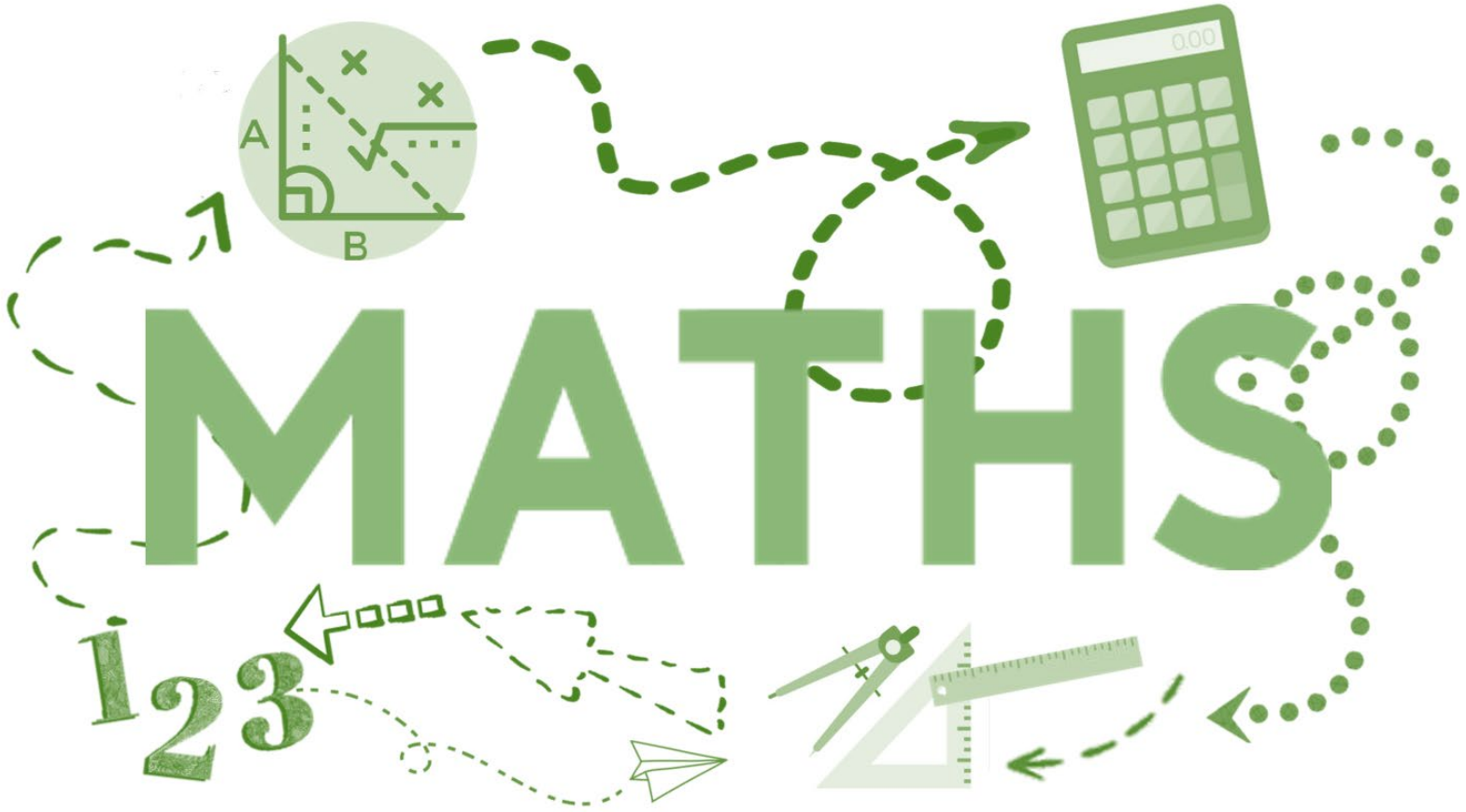

5-Year Curriculum Plan

Curriculum at a Glance

Year 7	Year 8	Year 9	Year 10	Year 11
• Number- The Four Rules, Place Value, Converting Fractions • Algebra - Sequences, understanding notation. • Shape and Space - Area of shapes, Geometric Reasoning, Construction. • Data - Probability, Statistical Diagrams.	• Number - Direct proportion, multiplication and division of fractions, indices, percentages • Algebra - Manipulation, solving equations, solving inequalities • Shape and Space - Area of circles, angles in parallel lines • Data - Probability, Interpret statistical diagrams	• Number - Standard form, approximation and estimation. • Algebra - Expressions, brackets and graphs • Shape and Space- Transformations, angles in polygons, Pythagoras • Data - MMMR	• Number- Indices, - Direct and Inverse proportion, - Standard Form, - Compund Units, - Bounds • Algebra - Expanding and Factorising, - Rearranging Formulae, - Inequalities • Shape and Space - Angles, - Similar shapes, -Volume and Surface Area, Trigonometry, - Construction • Data - Probability, - Representing data, - Graphs	• Number- Vectors • Algebra - Algebraic fractions & proof, -Trig graph & transformations, - Simultaneous equations, - Function and proof • Shape and Space - Circle theorems, - Congruence, - Angles recap & bearings •

3/5YR Curriculum Plan (Current Yr7-9)

Focus / Term	Half Term One	Half Term Two	Half Term Three	Half Term Four	Half Term Five	Half Term Six
Year 7 **Topic Covered and End Points**	**Probability** Record describe and analyse the frequency of outcomes **Addition and Subtraction** Use formal written methods applied to positive integers and decimals. Recognise and use relationships between operations including inverse operations **Sequences** Generate terms of a sequence from a term-to-term Recognize and use Fibonacci type sequences and geometric sequences	**Place Value** Understand and use place value for decimals, measures and integers of any size. Order positive and negative integers, use the number line as a model for ordering of the real numbers; use <,>, =. **Multiplication & Division** Formal written methods, applied to positive integers and decimals; Select and use appropriate calculation strategies to solve increasingly complex problems. Recognise and use relationships between operations including inverse operations; Use the concepts and vocabulary factors (or divisors), multiples, common factors, common multiples, HCF, LCM.	**Area** Identify and use formula to calculate area of shapes. **Converting & ordering FDP** Understand and use place value for decimals, measures and integers of any size. **Understanding Algebraic notation** Move freely between numerical, algebraic, graphical and diagrammatical representations. Use algebra to generalise the structure of arithmetic, including to formulate relationships.	**Shape Properties** Use three letter notations to identify angles Classify types of angles **Directed Number** Select and use appropriate calculation strategies to solve increasingly complex problems. Use the four operations, including formal written methods, applied to integers, both positive and negative. Recognise and use relationships between operations including inverse. **Fractions & Percentages of Amounts** Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions. Interpret fractions and percentages as operators.	**Construction** Draw and measure line segments including geometric figures. Use three letter notations to identify angles. Classify types of angles. **Add and Subtract Fractions** *Add and subtract fractions from an integer, with the same denominator, with different denominators* **Prime and Proof** Use concept and vocabulary of prime numbers, factors, multiples, HCF, LCM, prime factor decomposition. Look for proofs and counter examples.	**Geometric Reasoning** Apply the properties of angles at a point, on a line and in a triangle. Understand and use relationship between parallel lines and corresponding angles (H). **Statistical diagrams** Represent data in a variety of ways

NC	Data, Algebra, Number	Number.	Shape and Space, Number, Algebra	Shape and Space, Number,	Shape and Space, Number, Algebra	Shape and Space, Data
Tier 3 Words	PROBABILITY OUTCOME CERTAIN LIKELY IMPOSSIBLE	APPROXIMATE INTEGER INTERVAL MEDIAN NEGATIVE PLACE PLACE VALUE RANGE	Polygon Triangle Quadrilateral Fraction Decimal Percentage Function Input Output	Scalene Isosceles Right angled Subtract Negative Product Equivalent Whole	NUMERATOR DENOMINATOR Multiples Factors Primes	Vertically Opposite Interior Exterior
Long Term Retrieval	Students will complete an assessment in first lesson which will inform retrieval	Probability Add subtract Sequences	Probability Add subtract Sequences Place Value Multiply Divide	Probability Sequences Place Value 4 Rules (+ - x ÷) Area FDP Algebraic Notation	Probability Sequences Place Value 4 Rules (+ - x ÷) including directed number Area FDP Algebraic Notation Shape properties Fractions of amounts	Probability Sequences Place Value 4 Rules (+ - x ÷) with directed number Area FDP Algebraic Notation Shape properties Fractions of amounts Add subtract fractions Prime and Proof
Assessment Details	**Mid-point –** Probability and add and subtract fractions with common denominator. **End Point –** Probability, Add and subtract fractions and Sequences.	**Mid-point –** Place value. **End Point –** Place value, multiplication, and division.	**Mid-point –** Area and Converting FDP. **End Point –** Area, Converting FDP and algebraic notation.	**Mid-point –** Shape properties, add subtract directed numbers. **End Point –** Shape properties, directed numbers, fractions of amounts.	**Mid-point –** Construction, add and subtract fractions with common denominator. **End Point –** Construction, add and subtract fractions, prime and proof.	**Mid-point –** Geometric reasoning **End Point –** Geometric reasoning and Statistical diagrams.
Misconceptions	**Probability** it will rain is always 50/50 as it	**Place Value** A number with more digits is greater than	**Area** Once students know to divide by two for	**Directed number** Students may confuse positive and	**Construction** Measure lines from 1cm. Incorrectly	**Geometric reasoning** Any angles on a straight line are

	will either rain or it will not. **Add/Sub** Incorrect setting out of formal method where decimal points are not aligned **Sequences** "The 4^{th} term will be double the 2^{nd} term. 100^{th} is ten times the tenth, etc.	one with less. E.g., 9.9999999999 is greater than 10. **Multiplication and Division** Multiplication/Division by 10 can be done by 'taking off a zero'	triangles, they will divide by two for rectangles **FDP** Unclear on the denominator meaning how many equal parts. **Algebraic Notation** A = 1, b = 2 or other 'codebreaker' ideas.	negative and counters; may add only negative or positive counters instead of zero pairs or make mistakes with signs when performing operations, e.g., -1 x -3 = -3. **Fractions of amounts** Because dividing by 10 gives you 10% dividing by 5 will give you 5% and dividing by 20 gives 20% etc You cannot increase by over 100% because 100% is everything.	measure angles from outer value on protractor always. **Add and Sub fractions** Ensure students know denominator is total number of parts. **Prime and Proof** LCM as HCF and vice versa.	included in angle sum to 180^0. **Statistical diagrams.** When comparing two pie charts just considering fraction covered rather than total data
Homework	• **Probability** • **Add and Subtract** • **Sequences**	• **HT1 Review** • **Place Value** • **Multiply and Divide**	• **Term 1 Review** • **Convert FDP** • **Algebraic notation**	• **HT3 Review** • **Shape properties** • **Directed number**	• **Term 2 Review** • **Construction** • **Add and Sub fractions**	• **HT5 Review** • **Geometric reasoning** • **Statistical diagrams**
Year 8 Topic Covered and End Points	**Sets and Probability** Identify and represent sets. Interpret and create Venn diagrams Know and use the vocabulary of probability Generate sample spaces for single events Calculate the probability of a single event Understand and use the probability scale	**Ratio and Scale** Understand the meaning and representation of ratio Understand and use ratio notation Solve problems involving ratios of the form 1: n (or n : 1) Solve problems involving ratios of the form m : n	**Scatter Graphs and Frequency Table** Draw and interpret scatter graphs Understand and describe linear correlation Draw and use line of best fit Identify different types of data	**Share in a Ratio** Share an amount in a ratio Calculate different parts from a given value of one part Calculate different parts from a given difference in amount **Indices** Adding and subtracting expressions with indices	**Angles in Parallel lines** Understand and use basic angle rules and notation Investigate angles between parallel lines and the transversal Identify and calculate with alternate and corresponding angles Identify and calculate with co-interior,	**Equations and Inequalities** Solve linear equations with the unknown on one side when calculating with negative numbers is required Solve linear equations with the unknown on both sides when the solution is a whole number Solve linear equations with the unknown on

	Know that the sum of probabilities for all possible outcomes is 1 Experimental probability **Algebraic Manipulation** Collect terms Brackets – expanding etc (see solve equations 2) Form algebraic expressions Use directed number with algebra Multiply out a single bracket Expand multiple single brackets and simplify Multiply binomial **Multiplicative Change** Solve problems involving direct proportion – including recipe problems Explore conversion graphs Convert between currencies Inverse proportion Understand scale factors as multiplicative representations Draw and interpret scale diagrams	Express ratios in their simplest integer form Express ratios in the form 1 : n (H) Compare ratios and fractions **Cartesian Plane** Work with coordinates in all four quadrants Find the midpoint of a line (H) Identify and draw lines that are parallel to the axes Recognise and use the line y=x Recognise and use lines of the form y = kx Recognise and use lines of the form y = x + a Link y = kx to direct proportion problems Plot graphs of the form y= mx + c **Solving Equations** Solve equations, including with brackets Form and solve equations with brackets Solve Equations with unknown on both sides	Read and interpret ungrouped frequency tables Represent grouped discrete data Read and interpret grouped frequency tables Represent continuous data grouped into equal classes **Multiply and Divide Fractions** Represent multiplication of fractions Multiply a fraction by an integer Find the product of a pair of unit fractions Find the product of a pair of any fractions Divide an integer by a fraction Divide a fraction by a unit fraction Understand and use the reciprocal Divide any pair of fractions Understand and use the reciprocal Divide any pair of fractions *Extend to mixed numbers **Sequences**	Simplifying algebraic expressions by multiplying indices Simplifying algebraic expressions by dividing indices Using the addition law for indices Using the addition and subtraction law for indices Expand brackets that use laws of indices	alternate and corresponding angles Solve complex problems with parallel line angles **Interpret Charts and Diagrams** Set up a statistical enquiry Design and criticise questionnaires Draw and interpret line graphs Choose the most appropriate diagram for given set of data Represent and interpret grouped quantitative data Find and interpret the range Compare distributions using charts Identify misleading graphs **Convert Units** Convert metric measures of lengths Convert metric units of weight and capacity	both sides when the solution is a fraction Solve linear equations with the unknown on both sides when the solution is a negative number Solve linear equations with the unknown on both sides when the equation involves brackets Represent linear inequalities on a number line Solve one sided linear inequalities. Solve two sided linear inequalities **Percentages** Identify the multiplier for a percentage increase or decrease Use calculators to increase an amount by a percentage greater than 100% Use calculators to decrease an amount by a percentage Solve problems involving percentage change Solve original value problems when working with percentages Solve financial problems including simple interest **Area, circles**

			Generate sequences given a rule in words Generate sequences given a simple algebraic rule Generate sequences given a complex algebraic rule Nth Term			Recap area of simple shapes (rectangle triangle and parallelogram) Calculate area of trapezium Calculate the circumference of a circle when radius or diameter is given Calculate the perimeter of composite shapes including sections of a circle Calculate the area of a circle when radius or diameter is given Calculate the area of composite shapes that include sections of a circle Calculate area of sectors Calculate perimeter of sectors
NC	Data Algebra Number	Data Algebra Ratio	Data Algebra Number	Number Ratio	Data Number Geometry	Algebra Number Geometry
Tier 3 Vocab	OUTCOMES PROBABILITY SET SIMPLIFY SUBSTITUTE EQUIVALENT PROPORTION VARIABLE AXES	RATIO EQUAL PARTS PROPORTION QUADRANT COORDINATE HORZIONTAL SIMPLIFY SUBSTITUTE EQUIVALENT	VARIABLE RELATIONSHIP CORRELATION NUMERATOR DENOMINATOR WHOLE SEQUENCE TERM POSITION	RATIO EQUAL PARTS PROPORTION BASE POWER EXPONENT	PARALLEL ANGLE TRANSVERSAL HYPOTHESIS SAMPLING PRIMARY DATA COMMUTATIVE ASSOCIATIVE DIVIDEND	LINEAR PARALLEL SOLVE MULTIPLER PERCENTAGE AREA CIRCUMFERENCE TRAPEZIUM CHORD RADIUS

						DIAMETER
Long Term Retrieval	**Year 7 Assessment**	Sets and Probability, Algebraic Manipulation, Multiplicative Change.	Sets and Probability, Algebraic Manipulation, Multiplicative Change. Ratio and Scale, cartesian Plane, Solving Equations	Sets and Probability, Algebraic Manipulation, Multiplicative Change. Ratio and Scale, cartesian Plane, Solving Equations. Scatter Graphs and Frequency Table, Multiply and divide fractions, Sequences	Sets and Probability, Algebraic Manipulation, Multiplicative Change. Ratio and Scale, cartesian Plane, Solving Equations Scatter Graphs and Frequency Table, Multiply and divide fractions, Sequences Share in a Ratio, Indices	Sets and Probability, Algebraic Manipulation, Multiplicative Change. Ratio and Scale, cartesian Plane, Solving Equations Scatter Graphs and Frequency Table, Multiply and divide fractions, Sequences Share in a Ratio, Indices Angles in Parallel lines, Interpret Charts and Diagrams Convert units
Assessment details	**Mid-point –** Sets and Probability, expand single brackets **End Point –** Sets and Probability, Algebraic Manipulation, Multiplicative Change	**Mid-point –** Ratio and Scale, recognise the equation y = x **End Point –** Ratio and Scale, cartesian Plane, Solving Equations	**Mid-point –** Scatter Graphs and Frequency Table, multiply unit fractions **End Point –** Scatter Graphs and Frequency Table, Multiply and divide fractions, Sequences	**Mid-point –** Share in a Ratio **End Point –** Share in a Ratio, Indices	**Mid-point –** Angles in Parallel lines, Design and criticise questionnaires Draw and interpret line graphs **End Point –** Angles in Parallel lines, Interpret Charts and Diagrams Convert units	**Mid-point –** Equations and Inequalities, identify the multiplier for a percentage increase or decrease **End Point –** Equations and Inequalities, Percentages, Area, circles
Misconceptions	**Sets and Probability** equivalence can be revisited in the study of probability	**Ratio and Scale** Students might use addition and subtraction rather	**Scatter Graphs and Frequency Table** Students think that the line of best fit has to go through all the	**Share in a Ratio** Some students believe ratios always compare a part to a whole, like fractions.	**Angles in Parallel lines** Students might think that any angles on a straight line are	**Equations and inequalities** Some pupils may think that you always have to manipulate

	Understand that probability is number of desired outcomes / total possible outcomes and that this is the same as parts of a whole when using fractions. **Algebraic Manipulation** Students think 2a and a^2 are equal Students think 2a + 3b = 5ab **Multiplicative Change** Pupils might use addition/subtraction instead of multiplication or division	than multiplication and division **Cartesian Plane** Students plot points or write co-ordinates to understand why y = a is parallel to the x axis **Solving Equations** Students struggle with the starting point when forming – they need to understand to start from the unknown (which can be any letter) and build up from there	points and through the origin. **Multiply and Divide Fractions** Students might think they need the reciprocal of both fractions in a divide question Students might think multiplying always makes the number larger **Sequences** Students think "the 4th term will be double the 2nd term. 100th is ten times the tenth etc…	**Indices** Students might think you multiply the indices when the base is being multiplied	included in angle sum to 180^0 so be sure to include angles on a straight line at different points to show variation **Interpret Charts and Diagrams** Students might think that the range is an average **Convert Units** Students will not always be clear when to multiply or divide	the equation to have the unknowns on the LHS of the equal sign, for example 2x – 3 = 6x + 6 **Percentages** Some students may think the multiplier for, say, a 20% decrease is 0.2 rather than 0.8 **Area of Circles and Trapezium** Some pupils may use the sloping height when finding cross-sectional areas that are parallelograms, triangles or trapezia
Year 9 Topic Covered and End Points	**Indices and Standard form** Identify types of numbers (factors , multiples and prime) Write a number as a product of its prime factors Use prime factorisations to find the HCF and LCM of two numbers Solve problems using highest common factors or lowest common multiples *Multiply and divide using index laws. (number only)*	**Sequences** ind the nth term of an ascending linear sequence Find the nth term of a descending linear sequence Generate terms of a sequence from a position-to-term rule Use the nth term of a sequence to deduce if a given number is in a sequence Recognise and use the Fibonacci sequences and geometric sequence	**Angles in Polygons** Round numbers to a given number of significant figures Estimate numerical calculations Determine whether calculation using rounding will give an underestimate or over estimate Find upper and lower bounds (and error intervals) for rounding and truncation Calculate with upper and lower bounds **Fractions**	**3D shapes** Surface area of cubes and cuboids Find volume of cubes and cuboids Find volume of cylinder Find volume of prisms Surface area of cylinder **Expressions and Brackets** Manipulate expressions by multiplying a single term over a bracket (the distributive law) Expanding two single brackets	**Representing data** Find the mean, median, mode and range of a set of data Find the range and modal class of set of grouped data and the class containing the median of a set of data Calculate an estimate of the mean from a frequency table Calculate an estimate of the mean from a grouped frequency table Construct and interpret graphs of time series	**Graphs** Know that graphs of functions of the form y = mx + c, x □ y = c and ax □ by = c are linear Plot graphs of functions of the form y = mx □ c Plot graphs of functions of the form ax □ by = c Find the gradient of a straight line on a unit grid Find the y-intercept of a straight line Sketch linear graphs

	Fractional , negative index laws (number only) *Use* standard form to write large numbers Use standard form to write small numbers Calculate with standard from **Transformations** Reflect and object in a mirror line Rotate an object around a point Translate an object Describe a rotation Describe a translation Describe a reflection Enlarge a shape with a positive and fractional scale factor Enlarge a shape with a positive scale factor from a centre Enlarge a shape with a fractional scale factor from a centre Enlarge a shape with a negative scale factor from a centre Describe an enlargement Combine transformations	Explore growing patterns and other problems involving quadratic sequences Find the next terms of a quadratic sequence using first and second differences Generate terms of a quadratic sequence from its nth term Find the nth term of a quadratic sequence **Approximation and estimation** Manipulate expressions by multiplying a single term over a bracket (the distributive law) Expanding two single brackets Multiply two linear expressions of the form (ax ± b)(cx ± d) Factorising into a single bracket Factorising quadratic (x ± b)(x ± d) Substitute into a formula Change the subject of a formula when one step is required Change the subject of a formula when a two steps are required Apply an understanding of	onvert between mixed and improper fractions Apply addition to proper fractions, improper fractions and mixed numbers Apply subtraction to proper fractions, improper fractions and mixed numbers Multiply a proper fraction by a proper fraction Multiply mixed numbers Divide a proper fraction by a whole number Divide mixed numbers Increase/decrease by a fraction of an amount Find a starting amount after an Increase/decrease by a fraction **Pythagoras** Know the meaning of a Pythagorean triple Know and use Pythagoras' theorem Calculate the hypotenuse of a right-angled triangle using Pythagoras' theorem in two dimensional figures Calculate one of the shorter sides in a right-angled triangle using Pythagoras' theorem in	Multiply two linear expressions of the form (ax ± b)(cx ± d) Factorising into a single bracket Factorising quadratic (x ± b)(x ± d) Substitute into a formula Change the subject of a formula when one step is required Change the subject of a formula when a two steps are required Apply an understanding of inverse operation to a formula in order to make a specific variable the subject	Construct and interpret frequency polygons Construct and interpret stem and leaf diagrams Analyse and compare sets of data, appreciating the limitations of different statistics (mean, median, mode, range) Interpret a scatter diagram using understanding of correlation use the line of best fit to estimate values **Trigonometry** Choose an appropriate trigonometric ratio that can be used in a given situation Understand that sine, cosine and tangent are functions of an angle Use a calculator to find the sine, cosine and tangent of an angle Know the trigonometric ratios, $\sin\theta = \text{opp/hyp}$, $\cos\theta = \text{adj/hyp}$, $\tan\theta = \text{opp/adj}$ Set up and solve a trigonometric equation to find a missing side in a right-angled triangle Set up and solve a trigonometric equation when the unknown is	Distinguish between a linear and quadratic graph Plot graphs of quadratic functions of the form $y = x^2 \square c$ Sketch a simple quadratic graph Plot and interpret graphs of piece-wise linear functions in real contexts Plot and interpret distance-time graphs (speed-time graphs) **Construction** Use ruler and compasses to construct the perpendicular bisector of a line segment Use ruler and compasses to bisect an angle Use a ruler and compasses to construct a perpendicular to a line from a point and at a point Understand a circle as the locus of a point equidistant from a fixed point Solve simple problems involving loci Combine techniques to solve more complex loci problems

		inverse operation to a formula in order to make a specific variable the subject	two dimensional figures Solve problems using Pythagoras' theorem in two dimensional figures		in the denominator of a fraction Set up and solve a trigonometric equation to find a missing angle in a right-angled triangle Use trigonometry to solve problems	
NC	**Number Geometry**	**Algebra Number Geometry**	**Number Geometry**	**Algebra Geometry**	**Data Geometry**	**Algebra Geometry**
Tier 3 Vocab	Factor Multiple Prime Translation Transformations Reflection	Linear sequence Quadratic Term Significant Figure Estimate	Improper fraction Mixed numbers Right angle Hypotenuse	Cube Cuboid Cylinder Substitute Formula Quadratic	Mean Median Mode Range Sine/Cosine/Tangent Opposite Adjacent	Bisect Parallel Perpendicular X – axis Y – axis Gradient Intercept
Long Term Retrieval	**Year 8 Assessment**	Indices and Standard form Transformations	Indices and Standard form Transformations Sequences Approximation and estimation	Indices and Standard form Transformations Sequences Approximation and estimation Angles in Polygons Fractions Pythagoras	Indices and Standard form Transformations Sequences Approximation and estimation Angles in Polygons Fractions Pythagoras 3D shapes Expressions and Brackets	Indices and Standard form Transformations Sequences Approximation and estimation Angles in Polygons Fractions Pythagoras 3D shapes Expressions and Brackets Representing data Trigonometry
Assessment Details	**Mid-point –** Indices **End Point –** Indices and Standard form Transformations	**Mid-point –** Sequences Approximation and estimation **End Point –**	**Mid-point –** Angles in Polygons Fractions	**Mid-point –** 3D shapes **End Point –** 3D shapes	**Mid-point –** Representing data **End Point –** Representing data	**Mid-point –** Graphs **End Point –** Graphs Construction

		Sequences Approximation and estimation	**End Point –** Angles in Polygons Fractions Pythagoras	Expressions and Brackets	Trigonometry	
Misconceptions	<u>Standard Form</u> When converting between ordinary and standard form some pupils may incorrectly connect the power to the number of zeros; e.g. $4 \times 10^5 = 400\,000$ so $4.2 \times 10^5 = 4\,200\,000$ Similarly, when working with small numbers (negative powers of 10) some pupils may think that the power indicates how many zeros should be placed between the decimal point and the first non-zero digit <u>Transformations</u> When describing or carrying out a translation, some pupils may count the squares between the two shapes rather than the squares that describe the movement between the two shapes.	<u>Sequences</u> Some pupils will think that the nth term of the sequence 2, 5, 8, 11, … is n + 3. Some pupils may think that the (2n)th term is double the nth term of a linear sequence. Some pupils may think that sequences with nth term of the form 'ax ± b' must start with 'a'. <u>Approximation and estimation</u> Students not rounding to 1SF when estimating Students struggling when dividing by 0.5 Some pupils may think 35 934 = 36 to two significant figures	<u>Angles in Polygons</u> Some pupils may think that the sum of the interior angles of an n-sided polygon can be calculated using Sum = n × 180°. Some pupils may think that the sum of the exterior angles increases as the number of sides of the polygon increases. If the bearing of A from B is 'x', then some pupils may think that the bearing of B from A is '180 – x'. <u>Fractions</u> Some students may think that you simply can simply add/subtract the whole number part of mixed numbers and add/subtract the fractional art of mixed numbers when adding/subtracting mixed numbers, e.g. 3 - 2	<u>3D shapes</u> Some students will work out $(\pi \times r)^2$ when finding the area of a circle Some students may use the sloping height when finding cross-sectional areas that are parallelograms, triangles or trapezia Some students may confuse the concepts of surface area and volume <u>Expressions and Brackets</u> Some students may think that it is always true that a=1, b=2, c=3, etc. A common misconception is to believe that $a^2 = a \times 2 = a2$ or 2a (which it can do on rare occasions but is not the case in general) When working with an expression such as 5a, some students may	<u>Representing data</u> Some pupils may incorrectly estimate the mean by dividing the total by the numbers of groups rather than the total frequency. Some pupils may incorrectly think that there can only be one model class. Some pupils may incorrectly estimate the range of grouped data by subtracting the upper bound of the first group from the lower bound of the last group. Some students may think that a line of best fit always has to pass through the origin <u>Trigonometry</u> Some students may not appreciate the fact that adjacent and opposite labels are not fixed, and are only relevant to a particular	<u>Graphs</u> When plotting linear graphs some pupils may draw a line segment that stops at the two most extreme points plotted Students may think that a sketch is a very rough drawing. It should still identify key features. <u>Construction</u> When constructing the bisector of an angle some students may think that the intersecting arcs need to be drawn from the ends of the two lines that make the angle. When constructing a locus such as the set of points a fixed distance from the perimeter of a rectangle, some students may not interpret the corner as a point (which therefore requires an arc as part of the locus)

	When carrying out a reflection some pupils may think that the object and image should be an equal distance from the edge of the grid, rather than an equal distance form the mirror line. Some students will wrestle with the idea that a line x = a is parallel to the y-axis Some students may think that the centre of rotation is always in the centre of the shape Some pupils may think that the centre of enlargement always has to be (0,0), or that the centre of enlargement will be in the centre of the object shape.		<u>Pythagoras</u> Some students may use Pythagoras' theorem as though the missing side is always the hypotenuse	think that if a=2, then 5a = 52. Some students may think that 3(g+4) = 3g+4 The convention of not writing a coefficient of 1 (i.e. '1x' is written as 'x' may cause some confusion. In particular some students may think that 5h – h = 5	acute angle. In situations where both angles are given this can cause difficulties. Some students may not balance an equation such as sin35 = 4/x correctly, believing that the next step is (sin35)/4 = x	

YEAR 10-11

Focus / Term	Half Term One	Half Term Two	Half Term Three	Half Term Four	Half Term Five	Half Term Six
Year 10 Topic Covered and End Points	**Trigonometry** Choose an appropriate trigonometric ratio that can be used in a given situation Understand that sine, cosine and tangent are functions of an angle Use a calculator to find the sine, cosine and tangent of an angle **Indices** Know and use the fact that $a^{-n} = 1/a^n$ Know and use the fact that $a^{1/n} = \sqrt[n]{a}$ Writing a number as a power of another Solving equations involving powers **Probability** List outcomes of an event systematically Use frequency trees to record outcomes of probability experiments Use 2way tables to record outcomes of probability experiments List all elements in a combination of sets using a Venn diagram Use theoretical probability to calculate expected outcomes	**Formula** Solve two linear simultaneous equations in two variables in very simple cases (addition & subtraction but no multiplication required) Solve two linear simultaneous equations in two variables in simple cases (multiplication of one equation only required) Solve two linear simultaneous equations in two variables in simple cases (multiplication of both equations required **Representing data** Calculate an estimate of the mean from a frequency table Calculate an estimate of the mean from a grouped frequency table Construct and interpret graphs of time series Construct and interpret frequency polygons	**Graphs (H)** Identify and interpret gradients of linear functions graphically Identify and interpret intercepts of linear functions algebraically Find the equation of a line through one point with a given gradient Find the equation of a line through two given points. **Similar Shapes** Identify similarity of shapes in a range of situations Finding missing lengths in similar shapes Solve problems with area/volume of similar shapes Convert between units of length, area & volume. **Quadratics** Solve a quadratic equation of the form $x^2 + bx + c = 0$ by factorising Solve a quadratic equation by rearranging and factorising Find approximate solutions to quadratic equations using a graph (including higher question Solve by formula	**Quadratics** Solve a quadratic equation of the form $x^2 + bx + c = 0$ by factorising Solve a quadratic equation by rearranging and factorising Find approximate solutions to quadratic equations using a graph (including higher question **Direct & inverse Proportion** Know and recognise the difference between direct and inverse proportion Know the features of graphs that represent a direct or inverse proportion situation Solve problems involving direct proportion using the constant of proportionality y=kx **Volume and Surface area** Calculate volume and surface area of pyramids, cones and spheres Solve problems involving pyramids, cones and spheres Solving frustum questions using similar shapes	**Inequalities (HIGHER)** Construct and shade a graph to show a linear inequality of the form $y > ax + b$, $y < ax + b$, $y \geq ax + b$ or $y \leq ax + b$ Construct and shade a graph to show a linear inequality in two variables stated implicitly Construct and shade a graph to represent a set of linear inequalities in two variables. **Surds** Solve problems involving the simplification of surds Addition & subtraction of surds Multiply two binomials involving surds Rationalise the denominator of a surd expression **Compound units** Convert between compound units of density and pressure Solve problems involving density Solve problems involving pressure	**Trigonometry +** Use Pythagoras' theorem in 3D. Use trigonometry in 3D. Solve bearings problems using trigonometry. Find the area of a triangle and a segment of a circle **Construction** Use ruler and protractor to construct triangles, and other shapes, from written descriptions Use ruler and compasses to construct triangles when all three sides known Use ruler and compasses to construct the perpendicular bisector of a line segment Use ruler and compasses to bisect an angle Use a ruler and compasses to construct a perpendicular **Bounds** Know and understand limits of accuracy. Find Upper and Lower bounds Calculate with Upper and Lower bounds

	Use experimental probability to calculate expected outcomes		Solve by completed square			
NC	Data, Shape Number	Algebra. Data	Shape and Space, Algebra.	Number. Shape and Space,	Number. Algebra.	Number. Shape and Space,
Tier 3 Words	Function Sine Cosine Tangent Adjacent Outcome Event	Linear Equation Estimate Mean Frequency	Quadratic Similar Convert Area Volume	Area Volume Surface Area	Compound Density Surd Inequality Variable	Loci Perpendicular Parallel Segment Arc
Long Term Retrieval	Students will complete a bench mark assessment	Trigonometry Indices Probability	Trigonometry Indices Probability Formula Representing data	Trigonometry Indices Probability Formula Representing data Graphs Similar Shapes	Trigonometry Indices Probability Formula Representing data Graphs Similar Shapes Direct & inverse Proportion Volume and Surface area	Trigonometry Indices Probability Formula Representing data Graphs Similar Shapes Direct & inverse Proportion Volume and Surface area Inequalities (HIGHER Surds Compound units
Assessment Details	**Mid-point –** Trigonometry Indices Probability **End Point –** Summative of all 3	**Mid-point –** Formula Representing data **End Point –** Summative of all 2 + HT1	**Mid-point –** Graphs Similar Shapes **End Point –** Summative of all 2 + T1	**Mid-point –** Quadratics, Direct & inverse Proportion Volume and Surface area **End Point –** Summative of all and previous	**Mid-point –.** Inequalities (HIGHER Surds Compound units **End Point –** Summative of all 3 and previous topics	**Mid-point –** Trigonometry + Construction Bounds **End Point –** Summative of all 3 and previous .
Misconceptions	Ensure that all students are aware of the importance of their	Pupils should build on the experiences of using the grid method to expand	**Common approaches** *Pupils are taught to use positive numbers wherever possible to reduce potential*	**Common approaches** *All students are taught to use the grid method to*	**Common approaches** *All Students are taught to manipulate algebraically rather than be taught*	**Common approaches** *The **appropriate** mnemon ic 'used to help students*

	scientific calculator being in degrees mode. Ensure that students do not round until the end of a multi-step calculation This unit of trigonometry should focus only on right-angled triangles in two dimensions. **Common approaches** *The **appropriate** mnemonic 'used to help students remember the trigonometric ratios* **Misconceptions** Some students may not appreciate the fact that adjacent and opposite labels are not fixed, and are only relevant to a particular acute angle. In situations where both angles are given this can cause difficulties. Some students may not balance an equation such as sin35 = 4/x correctly, believing that the next step is (sin35)/4 = x Some students may think that $\sin^{-1}\theta = 1 \div \sin\theta$ Some students may think that sinθ means sin × θ **Common approaches** *Pattern sniffing is encouraged to establish the result $a^0 = 1$, $a^{-n} = 1/a^n$, i.e.* *$2^3 = 2 \times 2 \times 2 = 8$, $2^2 = 2 \times 2 = 4$, $2^1 = 2$, $2^0 = 1$, $2^{-1} =$*	products of more than two binomials. Eg $(x + 2)(x + 3)(x – 4) = (x^2 + 5x + 6)(x – 4) = x^3 + x^2 – 14x – 24$ Teachers also need to help pupils 'see' the difference of two squares by using pictorial representation **Common approaches** *Students manipulate algebra tiles to explore factoring quadratics* *The difference of two squares is explained using visual representation* **Misconceptions** Some pupils may incorrectly estimate the mean by dividing the total by the numbers of groups rather than the total frequency. Some pupils may incorrectly think that there can only be one model class.	*difficulties with substitution of negative numbers .Students plot points with a 'x' and not '⍰dot.Students draw graphs in pencil* **Misconceptions** When plotting linear graphs some pupils may draw a line segment that stops at the two most extreme points plotted Students may think that a sketch is a very rough drawing. It should still identify key features. Some students do not rearrange the equation of a straight line to find the gradient of a straight line. For example, they think that the line $y – 2x = 6$ has a gradient of -2. **Misconceptions** Many students will want to identify an additive relationship between two quantities that are in proportion and apply this to solve problems The word 'similar' means something much more precise in this context than in other contexts students encounter. This can cause confusion.	*multiply two linear expressions.* All students are taught to use the sum and product method to factorise quadrtics. **Misconceptions** Once students know how to factorise a quadratic expression of the form $x^2 + bx + c$ they might overcomplicate the simpler case of factorising an expression such as $x^2 + 2x$ (≡ (x + 0)(x + 2)) Many students may think that $(x + a)^2 \equiv x^2 + a^2$ **Common approaches** *All students are taught to set up a 'proportion table' and use it to find the multiplier in situations involving direct proportion* **Misconceptions** Many students will want to identify an additive relationship between two quantities that are in proportion and apply this to solve problems Some students may think that a multiplier always has to be greater than 1 Students will need to be reminded of the key formula, in particular the importance of the perpendicular height	*'tricks'. For example, in the case of -2x > 8, students should not be taught to flip the inequality when dividing by -2. They should be taught to add 2x to both sides.* **Misconceptions** Some pupils may think that it is possible to multiply or divide both sides of an inequality by a negative number with no impact on the inequality (e.g. if -2x > 12 then x > -6) Some pupils may think that strict inequalities, such as y < 2x + 3, are represented by a solid, rather than dashed, line on a graph Some pupils may shade the incorrect region **Common approaches** *Pattern sniffing is encouraged to establish the result $a^0 = 1$, $a^{-n} = 1/a^n$, i.e.* *$2^3 = 2 \times 2 \times 2 = 8$, $2^2 = 2 \times 2 = 4$, $2^1 = 2$, $2^0 = 1$, $2^{-1} =$* Use Grid method when multiplying surds **Misconceptions** Some students may think that negative indices change the sign of a number, for example $2^{-1} = -2$ rather than $2^{-1} =$	*remember the trigonometric ratios* **Misconceptions** Some students may label opposite and adjacent in a non-right-angled triangle Some students may not balance an equation such as 5 = 4/sinθ correctly, believing that the next step is sinθ = 5/4 Some students may think that $\cos^{-1}\theta = 1 \div \cos\theta$ **Misconceptions** When constructing the bisector of an angle some students may think that the intersecting arcs need to be drawn from the ends of the two lines that make the angle. When constructing a locus such as the set of points a fixed distance from the perimeter of a rectangle, some students may not interpret the corner as a point (which therefore requires an arc as part of the locus) The north elevation is the view of a shape from the north (the north face of the shape), not the view of the shape while facing north. **Misconceptions** Students think to get the highest value you use the highest bound not allowing for

	Use Grid method when multiplying surds **Misconceptions** Some students may think that negative indices change the sign of a number, for example 2^{-1}= -2 rather than 2^{-1}= **Common approaches** *Students are taught not to simply fractions when finding probabilities of combined events using a tree diagram (so that a simple check can be made that the probabilities sum to 1)* **Misconceptions** Some students may think that there are only three outcomes when two coins are flipped, or that there are only six outcomes when three coins are flipped Some students may think that there are 12 unique outcomes when two dice are rolled			when calculating areas and the correct use of πr^2. Note: some students may only find the area of the three 'distinct' faces when finding surface area. **Common approaches** *Students visualise and write down the shapes of all the faces of a prism before calculating the surface area.* **Misconceptions** Some students will work out $(\pi \times r)^2$ when finding the area of a circle Some students may use the sloping height when finding cross-sectional areas that are parallelograms, triangles or trapezia Some students may confuse the concepts of surface area and volum	Some students may think = Some students may think that Some students may write $\sqrt{4 \times 3}$ when they should write (or $\sqrt{(4 \times 3)}$) **Common approaches** *All students are taught to set up a 'proportion table' and use it to find the multiplier in situations involving direct proportion* **Misconceptions** Many students will want to identify an additive relationship between two quantities that are in proportion and apply this to solve problems Some students may think that a multiplier always has to be greater than 1	division like wise for finding the lower value