Number	**To understand:** • The place value of integers • Mental methods to add and subtract positive and negative integers • Written methods to multiply/divide up to 3-digit numbers by a single-digit number • Multiply and divide whole numbers by powers of 10 • Square numbers, up to $12^2 = 144$ • Odd and even numbers, recognising their difference • The process of rounding of whole numbers to the nearest 10, 100 and 1000 • The vocabulary associated with fractions (numerator and denominator) • Use fraction notation (using the fraction symbols) • Diagram use to find equivalent fractions and to make comparisons • Conversion of simple fractions into decimals (tenths and hundredths) • Readings from scales and measures
Algebra	**To understand:** • Writing and plotting coordinates in the positive quadrant • Multiplying, dividing, adding and subtracting basic algebra (a + a, 2 x a, 3a – a)
Ratio & Proportion	**To understand:** • Conversion of fractions to a ratio (shown in the ratio 1:2) • Writing ratios in their simplest form (2:6 is the same as 1:3) • The process of solving simple problems involving direct proportion **E.g.** 2 pens cost 50p, how much does 1 pen cost?
Geometry	**To understand:** • The definition of regular and irregular polygon • The names of regular polygons up to decagon • Names of the different angles (acute, obtuse, right-angle and reflex) • The definition of parallel and perpendicular lines • How to draw/read lines of symmetry on basic shapes, giving order of rotational symmetry • The definition of congruency and draw tessellations
Statistics	**To use:** • Discrete data and record results using a frequency table/tally chart • Discrete data to draw a bar chart • A bar chart or table to find and calculate the total population • A bar chart or table to find greatest and least values • The mode and range to describe sets of data • Information and work out totals from a pictogram, and create pictograms from information
Probability	**To understand:** • Events using words such as likely, unlikely, certain and impossible • The probability scale and place events on a scale from impossible to certain • Probabilities based on equally-likely outcomes in simple contexts • And list all outcomes for single events systematically **E.g.** Flipping a coin, H,T or rolling a fair die 1,2,3,4,5,6

Number	**To understand the processes of:** • Ordering, adding and subtracting positive and negative integers within real-life contexts • Rounding of integers to the nearest ten, hundred and thousand • Written methods to multiply & divide up to three-digit numbers by a two-digit number • Decimal notation and place value • Rounding decimals to the nearest integer • Multiplying & dividing any integer or decimal by powers of 10 • Multiplying & dividing decimals with up to two decimal places by single-digit integer • Adding and subtracting decimals, including those with differing number of decimal places • Using a calculator to find square and cube roots • Listing and simplifying equivalent fractions • Expressing one number as a fraction of another, and simplify • Conversion between fractions, decimals and percentages • Finding percentages of amounts • Order of operations (BIDMAS) • Defining a prime number and listing the first 10 prime numbers • Defining multiples and factors and be able to list them • The 'less than' and 'greater than' symbols • Using inverse operations (add/subtract, multiply/divide, square/root)
Algebra	**To understand the processes of:** • Plotting coordinates in all four quadrants • Identifying expressions, terms, equations and formulae • Simplifying linear expressions by collecting like terms • Multiplying terms (including single brackets by a positive integer) • Calculating a term-to-term rule and continue a sequence • Generating sequences from patterns • Showing inequalities on a number line • Giving numbers that satisfy inequalities • Calculating the input and output of function machines (positive integers only) • Writing expressions using algebraic notation (I think of a number times it by 2 and add 5)
Ratio & Proportion	**To understand the processes of:** • Converting between metric units • Writing and interpreting a ratio given a diagram or context • Solving proportion problems using the unitary method • Comparing products to work out best value, using simple proportions • Using ratio for recipes
Geometry	**To understand the processes of:** • Identifying and calculating angles on a straight line/around a point/vertically opposite • Identify congruent shapes • Measuring and drawing angles to the nearest degree • Constructing a triangle given sides and angles with a protractor • Calculating missing angles in triangles and quadrilaterals • Identifying properties of 3D shapes • Identifying and constructing nets of common 3D shapes • Drawing plans and elevations of 3D shapes/drawing 3D shapes from the plans • Reflecting, translating and rotating a shape • Classifying quadrilaterals and triangles given their properties • Calculating the area and perimeter of rectangles/squares/triangles/trapezium and compound shapes • Identifying properties of different quadrilaterals and triangles
Statistics	**To understand the processes of:** • Drawing and completing frequency trees • Drawing and interpreting frequency diagrams for discrete and continuous data (frequency and two-way tables) • Calculating the mode, median, mean and range from sets of data • Drawing and interpreting line graphs
Probability	**To understand the processes of:** • The probability scale from 0 to 1 • Writing probabilities in words or fractions, decimals and percentages • Calculating the probability of an event happening using theoretical probability • Calculating all outcomes using dice, spinners and coins • Calculating the probability of an event happening using relative frequency

Number	**To understand the processes of:** • Adding, subtracting, multiplying and dividing positive and negative integers • Round decimals to a given number of decimal places • Round to a given number of significant figures • Multiplying and dividing integers and decimals by 0.1 and 0.01 • Multiplying and dividing decimals • Converting integers into standard form • Using positive and negative square roots, cube and cube roots • Using index notation for small positive integer powers • Writing an integer as a product of its prime factors • Conversion between improper and mixed fractions • Written division methods to convert a fraction to a decimal • Multiplying integers by fractions • Comparing/ordering fractions, including those with different denominators • Adding and subtracting fractions by converting one fraction • Ordering decimals, including those which have a different number of decimal places • Using inequality signs to show comparisons between two fractions, or decimals • Calculating percentages of amounts, using multipliers • Increasing and decreasing an amount by a given percentage • Calculating highest common factors and lowest common multiples • Solving reverse percentage problems
Algebra	**To understand the processes of:** • Expanding, factorising and simplifying a single bracket • Substituting positive and negative integers into expressions and formulae • Calculating inputs and outputs from function machines, including negatives • Generating a sequence from the nth term • Calculating the first five triangular numbers and to be able to continue the sequence • Calculating the midpoint of a line on a coordinate grid • Solving problems involving shapes on a coordinate grid • Plotting equations of line in form y = mx+c and identifying the gradient
Ratio & Proportion	**To understand the processes of:** • Conversion between imperial units and currencies when conversions are given • Sharing an amount in a given ratio and comparing scale drawings to real life • Using equivalent fractions, decimals and percentages to compare proportions • Expressing a number as a percentage of another
Geometry	**To understand the processes of:** • Calculating the volume of a prism and cuboid • Calculate the surface area of prism • Identifying and naming parts of circle • Calculating the circumference and area of a circle • Identifying and calculating angles in parallel lines e.g.: alternate/corresponding/co-interior • Calculating angles in isosceles and equilateral triangles • Drawing and finding bearings • Describing rotations, translations and reflections
Statistics	**To understand the processes of:** • Draw and interpret scatter graphs including line of best fit • Calculate the modal class from grouped data
Probability	**To understand the processes of:** • The sum of probabilities of all mutually exclusive outcomes is 1 • Listing all outcomes systematically • Drawing sample space diagrams for two events • Adding simple probabilities • Estimating the number of times an event will occur • Interpreting results of an experiment using the language of probability • Comparing estimated experimental probabilities with theoretical probabilities • Working out probabilities from Venn diagrams

Number	**To understand and apply:** • Rounding decimals to any given accuracy • Equivalences and perform calculations with powers of 10 • The use of the laws of indices, **not** including fractional or negative indices • Calculation of the Lowest Common Multiple (LCM) & Highest Common Factor (HCF) using Venn diagrams • Conversion between ordinary numbers and numbers in standard form • Adding, subtracting, multiplying and dividing numbers that are written in standard form • Adding, subtracting, multiplying and dividing fractions; including different denominators • Dividing any integer by a decimal by converting to division by an integer • The term reciprocal and calculate reciprocals of any integer, decimal or fraction • Conversion of simple fractions into recurring decimals using bus-stop method • Finding the percentage increase or decrease after a percentage change • Calculation of simple interest
Algebra	**To understand and apply:** • Expanding and simplifying brackets, including with negatives • Construction and solving linear equations, including unknowns on both sides • Construction, use of and rearranging simple formulae • Plotting and solving inequalities on a number line • Solving simultaneous equations graphically • Identifying and continuing the Fibonacci sequence • Adding and subtracting simple algebraic fractions • Plotting quadratic functions with and without a calculator
Ratio & Proportion	**To understand and apply:** • Calculation of compound measures • Calculation of the linear scale factor of similar shapes • Proportional reasoning to compare proportions • Comparison of two ratios
Geometry	**To understand and apply:** • Accurate construction of triangles given SSS, ASA, SAS • Ruler and compass skills to bisect an angle • Construction of perpendicular lines • Enlargement of any shape given a positive scale factor • Describing a rotation, reflection and translation on a co-ordinate grid • Calculating the circumference and area of a semi-circle and quarter of a circle • Calculating missing lengths using Pythagoras' Theorem • Calculating interior, exterior and the sum of angles in polygons
Statistics	**To understand and apply:** • Working out the fraction of each sector on a pie chart **E.g.** a quarter, 120 out of 360 • Drawing and interpreting distance-time graphs • Calculating averages from frequency tables
Probability	**To understand and apply:** • Use of 1 – p to calculate the probability of an event not occurring • Use of tree diagrams to calculate the probabilities of two independent events • Calculating a missing probability from a list or table including algebraic terms • Use of a numerical scale from 0 to 1 to express and compare experimental and theoretical probabilities in a range of contexts. • Comparison of relative frequencies from samples of different sizes • Completion of Venn diagrams and use union and intersection notation

Number	**To confidently apply:** • Index notation, including the use of negative integer powers • Estimation of the answer to square roots & cube roots e.g.: √ 70 must lie between 8 and 9 • Calculation of the LCM and HCF of a number when given the prime factorisation of each number • Calculation of the upper and lower bounds of a number to a given degree of accuracy • Use of upper and lower bounds for addition and subtraction calculations • Estimation of answers to calculations with the use of rounding numbers • Multiplying & dividing integers and decimals by a number between 0-1 • Adding, subtracting, multiplying and dividing mixed numbers
Algebra	**To confidently apply:** • Construction and solving of linear equations that involve fractions and fractional answers • Construction and solving of linear inequalities • Expansion and factorising single and double brackets, including difference of two squares • Substitution of fractional and negative values into expressions • Rearrangement of formulae and use to solve problems • Calculation of the equation of a line in the form y=mx+c
Ratio & Proportion	**To confidently apply:** • Calculation of missing dimensions in similar shapes • Calculation of compound interest and depreciation after 2-5 years • Forming, simplifying and dividing a quantity in a given ratio in worded problems • Conversion between currencies • Interpret and solve best buy deals
Geometry	**To confidently apply:** • Calculation of the area and arc length of a sector • Calculation of the length of a line given two coordinates • Defining a geometric progression and continue a sequence • Using and applying trigonometry to right-angled triangle, including worded problems • Identifying roots and turning points on a quadratic graph • Calculation of volumes of 3D shapes and prisms • Transforming shapes by reflecting, rotating, enlarging and translating (using column vectors) • Describing fully a single transformation • Using constructions to solve loci problems
Statistics	**To confidently apply:** • Construction of and interpretation of pie charts • Construction and interpretation of composite bar charts • Construction and interpretation of real-life graphs (including speed/distance/velocity graphs)
Probability	**To confidently apply:** • Written probabilities using fractions, percentages or decimals • Understanding and using experimental and theoretical probability to calculate estimated outcomes • Working out probabilities from Venn diagrams to represent real-life situations and also 'abstract' sets of numbers/values

Number	**To confidently apply:** • Consolidation of index laws and embedding fractional powers • The definition of a surd and perform calculations involving roots e.g.: √16 × √4 = 8 Simplify surds e.g.: √12 = 2√3 • Conversion of a fraction to a recurring decimal and vice versa • Solving problems involving standard form
Algebra	**To confidently apply:** • Iterative processes to generate sequences • Iterative methods to calculate solutions • Multiplication of three binomials e.g.(y+5)(y+2)(y-3) • Identification of linear, quadratic, cubic, reciprocal and exponential graphs • Solving quadratics graphically and by factorising • Solving and simplifying algebraic fractions • Constructing and solving simultaneous linear equations • Calculating the equation of a linear function given two coordinates
Ratio & Proportion	**To confidently apply:** • Calculation of reverse and repeated percentage change • Construction of and solving equations involving direct and inverse proportion • Use of kinematics formulae to calculate speed and acceleration from worded and graphical situations
Geometry	**To confidently apply:** • Enlargement of a shape given a negative integer scale factor • Describing combinations of transformations • Calculation of and solving vector problems involving ratio • Calculation of the number of sides on a regular polygon given the interior and exterior angles • Understanding and use of the formulae for 'sum of angles in a polygon' and 'exterior angle' • Recalling and use of the formulae for volume and surface area for pyramids, frustums and cones • Calculation of the dimensions given the volume or surface area
Statistics	**To confidently apply:** • Plotting and interpreting cumulative frequency graphs • Plotting and interpreting boxplots • Plotting time-series graphs • Construction and interpretation of tables and calculate averages from continuous data
Probability	**To confidently apply:** • Calculation of the outcomes of two or more events by using the product rule • Use of tree diagrams to calculate the probabilities of two dependent events • Calculation of a missing probability from a list or two-way table, including algebraic terms • Use of a two-way table to calculate conditional probability • Comparison of relative frequency and theoretical probabilities including from different sample sizes

Number	**To confidently and independently:** • Solve complex problems involving index laws • Evaluate numbers with positive, fractional and negative indices • Rationalise simple fractions with a surd as the denominator e.g $\frac{\sqrt{3}}{3}$ • Write the denominator in terms of its prime factors, determine whether a fraction can be expressed as a recurring or terminating decimal • Calculate limits using upper and lower bounds
Algebra	**To confidently and independently:** • Rearrange formulae with same variable on both sides • Solve Quadratics using the formula, factorising and including completing the square • Recognise the difference of two squares • Algebraic proof – to show algebraic expressions are equivalent, and use algebra to support and construct arguments and proofs e.g.: explain why (n+1)(n+20) is an even number • Plot and find the equation of a circle • Calculate the equation of a line given two points and the equations of a perpendicular line • Solve inequalities algebraically and graphically
Ratio & Proportion	**To confidently and independently:** • Solve problems involving inverse and direct proportion including squares, square roots • Plot and interpret exponential functions ($y = k^x$) for positive values of k • Use similarity in length, area and volume to calculate scale factors and vice versa
Geometry	**To confidently and independently:** • Identify trigonometric graphs • Use and apply Pythagoras in 3D situations e.g.: diagonal lengths in cuboid and lengths of lines given 3D coordinates • Calculate the area of any given triangle using $\frac{1}{2}abSinC$ • Use and apply both sine and cosine rule to triangles and apply to bearing questions • Enlarge a shape given a negative fractional scale factor • Use and apply **all** circle theorems • Use graphs to solve problems involving distance, speed and acceleration
Statistics	**To confidently and independently:** • Construct and interpret histograms • Understand the structure of a stratified sample and calculate the proportion
Probability	**To confidently and independently:** • Use a tree diagram to calculate conditional probability

Number	**To confidently and independently:** • Solve and calculate the value of complex indices including surds • Rationalise more complex denominators e.g. $\frac{1}{2+\sqrt{3}}$ • Understand and use rational and irrational numbers
Algebra	**To confidently and independently:** • Calculate the nth term of a quadratic and geometric sequences • Solve simultaneous equations with one linear and one quadratic function • Use the equation of a circle to find points of intersection with a line or a tangent to a given point • Calculate the equation of a circle given the centre and a point on the circumference • Estimate area under a quadratic or other graph by dividing it into trapezia • Calculate or estimate gradients of graphs including quadratic and other non-linear graphs • Calculate the acceleration and distance from velocity-time graphs • Simplify and solve algebraic fractions • Calculate the inverse function and construct and use composite functions
Ratio & Proportion	**To confidently and independently:** • Set up, solve and interpret the answers in growth and decay problems
Geometry	**To confidently and independently:** • Transform both trigonometric and other functions. e.g.: Show $y = -f(x)$, $y = f(-x)$, $y=f(x+a)$, $y=f(x)+a$ • Sketch quadratic functions; identifying y and x-axis intercepts and turning points • Use trigonometry including the sine and cosine rule in 3D dimensions • Prove all circle theorems algebraically • Use and apply vectors to prove lines are collinear (lie on the same straight line) or parallel
Probability	**To confidently and independently:** • Use a Venn diagram to calculate conditional probability