Year 7

Autumn Term 1A		Autumn Term 1A		Autumn Term 1B		Autumn Term 1B	
TOPIC TITLE: **Analysing and displaying data**		**TOPIC TITLE:** **Number skills**		**TOPIC TITLE:** **Expressions, functions and formulae**		**TOPIC TITLE:** **Decimals and measures**	
Topics	**Domains (Core knowledge and skills)**	**Topics**	**Domains (Core knowledge and skills)**	**Topics**	**Domains (Core knowledge and skills)**	**Topics**	**Domains (Core knowledge and skills)**
1.1 Mode, median and range 1.2 Displaying data 1.3 Grouping data 1.4 Averages and comparing data 1.5 Line graphs and more bar charts 1.6 Spreadsheets	• Find the mode of a set of data, numerical and non-numerical. • Find the median of a set of data (odd and even number of values). • Find the range of a set of data. • Read and draw pictograms, bar charts and bar-line charts. • Read and construct tally charts and frequency tables. • Find the mode and range from a chart or table. • Read and construct grouped tally charts and frequency tables. • Read and construct grouped bar charts for discrete and continuous data. • Find the modal class from a bar chart or frequency table. • Calculate the mode, median, mean and range of a set of values. • Compare two sets of data using an average and the range. • Read and draw a line graph. • Read and draw a dual bar chart. • Read and draw a compound bar chart. • Enter data into a spreadsheet program. • Use a spreadsheet to calculate the mode, median, mean and range. • Use a spreadsheet to draw bar charts, dual bar charts, compound bar charts, grouped bar charts and line graphs.	2.1 Mental maths 2.2 Addition and subtraction 2.3 Multiplication 2.4 Division 2.5 Finance: Time and money 2.6 Negative numbers 2.7 Factors, multiples and primes 2.8 Square and triangle numbers	• Know and use the priority of operations and laws of arithmetic. • Recall multiplication facts up to 10 × 10 • Multiply and divide by 10, 100, 1000 • Round whole numbers to the nearest 10, 100, 1000 • Check answers using estimation. • Add and subtract whole numbers using written methods. • Multiply whole numbers using a written method. • Divide whole numbers using a written method. • Check answers using inverse operations. • Round decimals to the nearest whole number. • Interpret a calculator display. • Solve problems involving time and money using a calculator. • Order positive and negative numbers. • Add and subtract positive and negative numbers. • Begin to multiply with negative numbers. • Identifying and understanding factors, multiples and prime numbers. • Recognise and use square numbers, square roots and triangle numbers..	3.1 Functions 3.2 Simplifying expressions 1 3.3 Simplifying expressions 2 3.4 Writing expressions 3.5 STEM: Substituting into formulae 3.6 Writing formulae	• Find outputs of simple functions written in words and using symbols. • Describe simple functions in words. • Simplify simple algebraic expressions by collecting like terms. • Use arithmetic operations with algebra. • Use brackets with numbers and letters. • Simplify more complicated expressions by collecting like terms. • Write expressions from word descriptions using addition, subtraction and multiplication. • Write expressions to represent function machines. • Substitute positive integers into simple formulae written in words. • Substitute integers into formulae written in letter symbols. • Identify variables and use letter symbols. • Write simple formulae using letter symbols. • Identify formulae and functions. • Identify the unknowns in a formula and a function..	4.1 Decimals and rounding 4.2 Length, mass and capacity 4.3 Scales and coordinates 4.4 Working with decimals mentally 4.5 Working with decimals 4.6 Perimeter 4.7 Area 4.8 STEM: More units	• Measure and draw lines to the nearest millimetre. • Write decimals in order of size. • Round decimals to the nearest whole number and to one decimal place. • Round decimals to make estimates and approximations of calculations. • Compare measurements by converting them into the same units. • Solve simple problems involving units of measurement in the context of length. • Convert between metric units of length, mass and capacity. • Read scales on a range of measuring equipment. • Interpret the display of a calculator in different contexts. • Interpret metric measures displayed on a calculator. • Plot and read coordinates in all four quadrants. • Multiply decimals mentally. • Check a result by considering whether it is of the right order of magnitude. • Understand where to position the decimal point by considering equivalent calculations. • Add and subtract decimals. • Multiply and divide decimals by single-digit whole numbers. • Work out the perimeters of shapes. • Solve perimeter problems. • Find areas by counting squares. • Calculate the areas of squares and rectangles. • Calculate the areas of shapes made from rectangles. • Solve problems involving area. • Choose suitable units to estimate length and area. • Use units of measurement to solve problems. • Use metric and imperial units.

Prior Domains:

• Find the smallest, largest and most common number of a set of positive integers.
• Find the positive difference between two numbers.
• Introduce language 'occurs most often'.
• Order numbers.
• Use ordinal numbers (3rd, 6th).
• Count on in steps of 2 and 5.
• Add, subtract, multiply and divide positive integers.
• Read a scale.
• Describe the mode in different ways, e.g. 'most common', 'most frequent', 'happened the most', 'highest frequency', 'most popular'.
• Know the values contained in a discrete class.
• Find the mode from a bar chart.
• Count and group tally marks.
• Find the mode of a set of values.
• Find the mode, median and range.
• Calculate a total.
• Label a chart.
• Find the mode from a bar chart.
• Extract information from a bar chart.
• Find the mode from a bar chart.
• Write abbreviations for months of the year.
• Find the mode, median, mean and range.
• Spreadsheet and keyboard terminology.
• Read and enter a single item of data into a spreadsheet.

Prior Domains:

• Rapid recall of addition and subtraction facts and positive integer complements to 100.
• Use number bonds in mental addition and subtraction.
• Multiply and divide using patterns.
• Tests prior knowledge of standard column addition and subtraction with two-digit numbers.
• Round to the nearest 10 in preparation for rounding to the nearest 100 and 1000.
• Use standard column procedures to add and subtract three-digit whole numbers.
• Revisit mental multiplication skills required for written methods of multiplication.
• Multiply by multiples of 10.
• Round to the nearest 100.
• Revisit mental multiplication and division.
• Mental division with a remainder.
• Mental addition and subtraction using money as a context.
• Units of time.
• Convert simple decimals to fractions.
• Express a fraction of an hour in minutes.
• Simple additive number patterns.
• Subtraction word problems.
• Use a number line to add and subtract positive numbers.
• Order positive integers.
• Subtract positive integers in the context of temperature.
• Identify odd and even numbers.
• Identify numbers divisible by 2 and 3.

Prior Domains:

• Use single-step and multistep calculations to achieve an answer of 10 when starting with the number 5.
• Use the four rules with numbers in one- and two-step calculations.
• Identify the missing operation in a calculation.
• Recognise the connection between repeated addition and multiplication.
• Multiplication and division of numbers with units.
• Use the priority of operations.
• Simplify single term expressions using multiplication and division only.
• Simplify expressions with only one letter using addition, subtraction and multiplication.
• Follow instructions in words with numbers before introducing letters.
• Use the different vocabulary associated with the four rules.
• Simplify expressions by collecting like terms.
• Use addition and subtraction to complete a number pyramid.
• Practise solving problems.
• Use the priority of operations.
• Substitute numbers into a formula.
• Simplify single-letter expressions by collecting like terms.
• Simplify more complicated expressions involving more than one letter and brackets.

Prior Domains:

• Write decimal numbers in words.
• Round to the nearest whole number.
• Recall square numbers.
• Divide into 100 to reinforce factor pairs of 100.
• Multiply and divide by 10, 100 and 1000.
• Check correct identification of coordinates in the positive quadrant.
• Divide multiples of 10 by whole numbers.
• Compare two negative numbers.
• Divide by 10 or 100 to give decimal solutions.
• Multiply whole numbers mentally using partitioning.
• Use known calculation facts to divide multiples of 10 by 7.
• Add and subtract whole numbers.
• Multiply and divide whole numbers.
• Mental calculations.
• Name regular polygons.
• Calculate missing sides from compound shapes involving right-angled figures.
• Find square numbers.
• Identify square roots of square numbers.
• Simple multiplication of single-digit whole numbers.
• Find the perimeter of a square and a rectangle.
• Simplify some simple algebraic expressions.
• Find the areas of squares given a side length.
• Recall of simple relationships within metric units.
• Using < and > signs to compare different quantities within the metric system.

• Undo a mistake.	• Identify multiples. • Use of a Venn diagram to find common multiples. • Identify the missing number in calculations involving a positive whole number multiplied by itself • Priority of operations. • Find the next number in simple sequences.

Spring Term 2A		Spring Term 2A		Spring Term 2B	
TOPIC TITLE: **Fractions**		**TOPIC TITLE:** **Probability**		**TOPIC TITLE:** **Ratio and proportion**	
Topics **5.1 Comparing fractions** **5.2 Simplifying fractions** **5.3 Working with fractions** **5.4 Fractions and decimals** **5.5 Understanding percentages** **5.6 Percentages of amounts**	**Domains (Core knowledge and skills)** • Use fraction notation to describe parts of a shape. • Compare simple fractions. • Use a diagram to compare two or more simple fractions. • Change an improper fraction to a mixed number. • Identify equivalent fractions. • Simplify fractions by cancelling common factors. • Add and subtract simple fractions. • Calculate simple fractions of quantities. • Work with equivalent fractions and decimals. • Write one number as a fraction of another. • Understand percentage as 'the number of parts per 100'. • Convert a percentage to a number of hundredths or tenths. • Work with equivalent percentages, fractions and decimals. • Use different strategies to calculate with percentages. • Express one number as a percentage of another.	**Topics** **6.1 The language of probability** **6.2 Calculating probability** **6.3 More probability calculations** **6.4 Experimental probability** **6.5 FINANCE: Expected outcomes**	**Domains (Core knowledge and skills)** • Use the language of probability. • Use a probability scale with words. • Understand the probability scale from 0 to 1. • List and count outcomes. • Calculate probability based on equally likely outcomes. • Compare probabilities. • Calculate probability of A or B happening by counting outcomes. • Calculate the probability of an event not happening. • Record data from a simple experiment. • Estimate probability based on experimental data. • Make conclusions based on the results of an experiment. • Use probability to estimate the number of expected wins in a game. • Apply probabilities from experimental data in simple situations.	**Topics** **7.1 Direct proportion** **7.2 Writing ratios** **7.3 Using ratios** **7.4 Scales and measures** **7.5 Proportions and fractions** **7.6 Proportions and percentages**	**Domains (Core knowledge and skills)** • Use direct proportion in simple contexts. • Solve simple problems involving direct proportion. • Use the unitary method to solve simple word problems involving direct proportion. • Use ratio notation. • Reduce a ratio to its simplest form. • Reduce a three-part ratio to its simplest form by cancelling. • Divide a quantity into two parts in a ratio given in words. • Divide a quantity into two parts in a given ratio. • Solve word problems involving ratio. • Use ratios and measures. • Use fractions to describe and compare proportions. • Understand and use the relationship between ratio and proportion. • Use percentages to describe proportions. • Use percentages to compare simple proportions. • Understand and use the relationship between ratio and proportion.
Prior Domains: • Write positive integers in order of size. • Recognise when half of a shape is shaded. • Recognise equivalent fractions. • Work out the missing values in multiplication and division questions. • Identify the total number of fractional parts in several wholes. • Find the HCF of two numbers. • Recognise the fraction of a shape that is shaded. • Divide whole numbers. • Work out simple fractions of amounts. • Find the highest common factor of two numbers. • Divide 100 by integers less than 10. • Recognise the place value of the digits in decimal numbers. • Write fractions in their simplest form. • Identify equivalent fractions. • Multiply and divide integers and decimals by 100. • Cancel a fraction to its simplest form. • Divide whole numbers by 10. • Calculate a fraction of an amount. • Convert a fraction to a percentage.		**Prior Domains:** • Recall basic vocabulary of probability words. • Convert between decimals, fractions and percentages. • Compare probabilities written as fractions with the same denominator. • Express one number as a fraction of another. • • Describe probabilities using words. • Subtract fractions, decimals and percentages from a whole. • Express probabilities in words, decimals and percentages. • Complete a frequency table. • Describe fractions, decimals and percentages using probability words. • Find the probability of an event using equally likely outcomes. • Know that P(not winning) = 1 – P(winning). • Find the probability of an event using equally likely outcomes.		**Prior Domains:** • Divide a two-digit number by various positive integers. • Divide an amount into equal parts. • Divide and multiply with integers. • Find the HCF of two numbers. • Divide integers. • Calculate the mean. • Use a diagram to write a ratio. • Write a ratio in its simplest form. • Know the number of mm in 1 cm, g in 1 kg and cm in 1 m. • Multiply by 10, 100 and 1000. • Divide 100 and 1000 by integers. • Recognise equivalent fractions. • Order fractions. • Write one number as a fraction of another. • Complete factor pairs of 100. • Find equivalent fractions with denominator of 100. • Write one number as a percentage of another.	

Summer Term 3A		Summer Term 3A		Summer Term 3B	
TOPIC TITLE: **Lines and angles**		**TOPIC TITLE:** **Sequences and graphs**		**TOPIC TITLE:** **Transformations**	
Topics **8.1 Lines, angles and triangles** **8.2 Estimating, measuring and drawing angles** **8.3 Drawing triangles accurately** **8.4 STEM: Calculating angles** **8.5 Angles in a triangle** **8.6 Quadrilaterals**	• Describe and label lines, angles and triangles. • Identify angle, side and symmetry properties of triangles. • Use a protractor to measure and draw angles. • Estimate the size of angles. • Solve problems involving angles.	**Topics** **9.1 Sequences** **9.2 Pattern sequences** **9.3 Coordinates** **9.4 Extending sequences** **9.5 Straight-line graphs** **9.6 Position-to-term rules**	**Domains (Core knowledge and skills)** • . Revisit sequences including term-to-term rules. • Develop the use of mathematical language to describe sequences. • Demonstrate how sequences can be used as a mathematical model to describe patterns. • Generate sequences from practical sequences, describing how patterns grow.	**Topics** **10.1 Congruency and enlargements** **10.2 Symmetry** **10.3 Reflection** **10.4 Rotation** **10.5 Translations and combined transformations**	**Domains (Core knowledge and skills)** • Identify congruent shapes. • Use the language of enlargement. • Enlarge shapes using given scale factors. • Work out the scale factor given an object and its image. • Recognise line and rotational symmetry in 2D shapes. • Identify all the symmetries of 2D shapes. • Identify reflection symmetry in 3D shapes. • Recognise and carry out reflections in a mirror line.

• Use a ruler and protractor to draw triangles accurately. • Solve problems involving angles and triangles. • Use the rule for angles on a straight line, angles around a point and vertically opposite angles. • Solve problems involving angles. • Use the rule for the sum of angles in a triangle. • Calculate interior and exterior angles. • Solve angle problems involving triangles. • Identify and name types of quadrilaterals. • Use the rule for the sum of angles in a quadrilateral. • Solve angle problems involving quadrilaterals.	• Continue sequences arising from practical contexts and use them to answer questions. • Read, generate and plot coordinates. • Recognise geometric shapes drawn on coordinate grids and find coordinates of points using geometric information. • Find and calculate the midpoints of a line segment. • Continue and describe special sequences. • Generate sequences using more complex (two-step) term-to-term rules. • Continue sequences arising from practical contexts. • Begin to identify and use position-to-term rules. • Recognise an arithmetic sequence and find the starting number and common difference. • Recognise, name and plot straight line graphs parallel to the x- or y-axis. • Generate coordinates that satisfy a simple linear rule and plot the graph in the first quadrant. • Read values from a graph. • Recognise, name and plot the graphs of $y = x$ and $y = -x$. • Identify and use position-to-term rules. • Write the nth term of a sequence using algebra. • Recognise the relationships between term-to-term rules, position-to-term rules and nth terms.	• Reflect a shape on a coordinate grid. • Describe a reflection on a coordinate grid. • Describe and carry out rotations on a coordinate grid. • Translate 2D shapes. • Combine transformations.

Prior Domains:

- Recall angles in a full, half, quarter and three-quarter turn.
- Identifying lines of symmetry in non-triangular shapes.
- Name triangles.
- Recap of acute, obtuse and reflex angles (from measurements, not diagrams).
- Use a ruler to measure a line in millimetres.
- Recall of side length and symmetry properties of equilateral and isosceles triangles.
- Draw lines accurately to the nearest millimetre.
- Draw acute and obtuse angles using a ruler and protractor.
- Draw a line to a simple scale.
- Recall the number of degrees in a right angle.
- Simple addition and subtraction problems using 360 or 180.
- Missing number puzzles (180 and 360).
- Factors of 360.
- Mental arithmetic involving 90 and 180.
- Missing angles on a straight line.
- Recall of triangle types.
- Recall the number of sides in a quadrilateral.
- Mental arithmetic with 360 and common angle sizes.
- Lines of symmetry in quadrilaterals.
- Properties of isosceles triangles.

Prior Domains:

- Revisit addition and subtraction with negative numbers and decimals.
- Use the correct terminology; term and term-to-term rule.
- Count on in multiples.
- Relate sequences to multiples.
- Identify term-to-term rules.
- Generate terms of a sequence
- Find half of a positive integer.
- Addition involving negative integers.
- Adding negative numbers and halving.
- Revisit finding the term-to-term rule.
- Find outputs using function machines.
- Priority of operations.
- Substitute positive integers into simple algebraic formulae.
- Substitute positive integers into simple algebraic expressions.
- Find missing rules for functions.
- Find terms in a sequence.
- Use and understanding algebraic notation.

Prior Domains:

- Simple multiplication.
- Identify identical shapes.
- Simple single-digit multiplication and division.
- Symmetry of known shapes.
- Name 3D shapes.
- Identify the x-axis and y-axis.
- Read coordinates in the first quadrant.
- Plot coordinates in all four quadrants.
- Match lines of the form $x = n$, $y = n$ and $y = x$ to their equations.
- Name regular polygons.
- Identify coordinate points in all four quadrants.
- Recap the number of degrees in a full, half and quarter circle.
- Recap clockwise and anticlockwise.
- Identify left and right direction.
- Reflect an object in $y = 1$, $x = -1$.
- Draw the image of a rotation.

Year 8			
Autumn Term 1A	Autumn Term 1A	Autumn Term 1B	Autumn Term 1B
TOPIC TITLE: **Number**	**TOPIC TITLE:** **Area and volume**	**TOPIC TITLE:** **Statistics, graphs and charts**	**TOPIC TITLE:** **Expressions and equations**

Topics	Domains (Core knowledge and skills)	Topics	Domains (Core knowledge and skills)	Topics	Domains (Core knowledge and skills)	Topics	Domains (Core knowledge and skills)
1.1 Calculations 1.2 Calculating with negative integers 1.3 Powers and roots 1.4 Powers, roots and brackets 1.5 Multiples and factors	• Use written methods to add and subtract with decimals. • Calculate mentally. • Calculate with money. • Estimate answers to calculations. • Add, subtract, multiply and divide positive and negative numbers. • Calculate using squares, square roots, cubes and cube roots. • Use index notation for powers of numbers. • Estimate the square root of a number. • Use mental methods to calculate combinations of powers roots and brackets.	2.1 Area of a triangle 2.2 Area of a parallelogram and trapezium 2.3 Volume of cubes and cuboids 2.4 3D shapes 2.5 Surface area of cubes and cuboids 2.6 Problems and measures	• Derive and use the formula for the area of a triangle. • Find areas of compound shapes. • Calculate areas of parallelograms and trapezia. • Calculate the volume of cubes and cuboids. • Sketch nets of 3D solids. • Calculate the surface area of cubes and cuboids. • Calculate the volume of cubes and cuboids.	3.1 Pie charts 3.2 Using tables 3.3 Stem and leaf diagrams 3.4 Comparing data 3.5 Scatter graphs 3.6 FINANCE: Misleading graphs	• Interpret simple pie charts. • Calculate angles and draw pie charts. • Drawing and interpreting two-way tables. • Calculating the mean from a simple frequency table. • Tallying data into a grouped frequency table, designing a grouped frequency table, using a ≤ x < b notation, finding modal class and estimating range. • Drawing and interpreting stem and leaf diagrams with different stem values. • Finding mode, median and range from stem and leaf diagrams, and comparing them for different data sets.	4.1 Algebraic powers 4.2 Expressions and brackets 4.3 Factorising expressions 4.4 One-step equations 4.5 Two-step equations 4.6 The balancing method	Understand and simplify algebraic powers. Substitute values into formulas involving powers. Expand brackets. Make and simplify algebraic expressions. Factorise expressions. Find the inverse of a function. Solve simple equations using function machines. Solve real life problems using equations. Solve two-step equations using function machines. Solve real life problems using equations. Solve equations using the balancing method. Solve equations with the unknown number on both sides..

• Use a calculator to check answers. • Substitute numbers into formulas involving power, roots and brackets. • Use index notation. • Write a number as a product of its prime factors. • Use prime factor decomposition to find the HCF and LCM.			• Calculate the surface area of cubes and cuboids.		• Compare data using averages and range, including mean calculated from frequency table. • Compare data using the shape of a line graph or pie chart. • Draw line graphs to compare sets of data. • Decide on the most appropriate average to use. • Draw scatter graphs. • Describe types of correlation. • Draw a line of best fit by eye on a scatter graph. • Identify graphs and charts that are misleading because of the scales used and missing axis labels, mainly in financial contexts.		

Prior Domains:	Prior Domains:	Prior Domains:	Prior Domains:
• Halve and double numbers. • Round decimals to the nearest whole number, 10 and 100. • Addition and subtraction using a written method. • Estimate by rounding. • Use negative numbers in the context of temperature. • Add and subtract positive numbers from integers using a number line. • Revise squares and square roots. • Repeated multiplication and BIDMAS. • Work out calculations involving simple squares and square roots. • Revise cubes and cube roots. • Use the correct priority of operations for more complex calculations. • Priority of operations involving cubes, cube roots, squares, square roots and brackets. • Calculate powers of 10, 100 and 1000. • Revise factors, multiples and prime numbers. • Find the HCF of two number • Identify multiples and find the LCM of two numbers.	• Find the area and perimeter of a square and rectangle. • Write an expression for the area and perimeter of a rectangle. • Describe what 'perpendicular' means. • Work out the area of a triangle by counting squares. • Work out the perimeter and area of a compound shape made from rectangles only. • Identify parallelograms and trapezia • Describe what 'congruent' means. • Work out the areas of a rectangle and a triangle. • Substitute numbers into expressions involving brackets. • Work out the answer when three numbers are multiplied together. • Work backwards to find the missing number when three numbers are multiplied together and the answer is given. • Working out cube numbers. • Substituting positive whole numbers into expressions, some involving powers. • Draw accurately a square and rectangle with the dimensions given. • Recognise and name 3D shapes. • Describe the shapes that make up the faces of some 3D shapes. • Identify which nets will fold to make a cube. • Work out the area of a square and a rectangle. • Work out the area of a square with side lengths given in different units. • Convert between metric units of measurement.	• . Number of degrees in circle • Adding and subtracting angles • Drawing a circle and radius • Drawing acute and obtuse angles • Working out simple fractions and percentages of 360 • Find the mean, median, mode and range of a set of 5 small data values. • Interpreting a simple frequency table – total frequency, mode and range. • Ordered data set of 10 values for students to find the mean (as halfway value between 5th and 6th values) • Splitting numbers into whole number and decimal parts • Deciding whether the statement 'the median in a set of 10 ordered data values is the 5th value' is true. • Interpreting range and median • Comparing two sets of data using given summary statistics (mean and range). • Calculating mean and range and using these to compare data. • Reading values from scales with different intervals. • Read and plot points in the first quadrant. Choose appropriate scales for axes. • Recognise that a bar chart needs title, axis labels and scales. • Identify what is misleading on a pictogram (doesn't use same symbols throughout) and re-draw it.	• Recall of squares and cubes. • Notation for a multiple of a letter. • Simplifying like terms. • Index notation for a product. • Priority of operations (BIDMAS). • Simplifying algebraic products. • Construct expressions from written descriptions. • Expanding brackets multiplied by numbers. • List factors of a number. • Expand brackets. • Factorise individual terms. • Find the HCF. • Related number facts for the four operations. • Find the function given the input and output of a function machine. • Check a calculation using the inverse operation. • Simplify expressions by collecting like terms. • Expand and simplify brackets. • Solve a one-step equation. • Find the output of a two-step function machine. • Find the inverse of a function • Simplify expressions by expanding brackets and collecting like terms

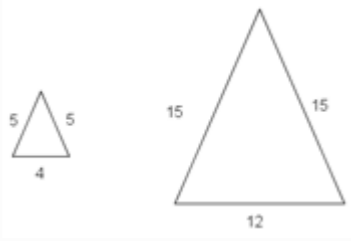| Spring Term 2A		Spring Term 2A		Spring Term 2B	
TOPIC TITLE: **Real life graphs**		**TOPIC TITLE:** **Decimals and ratio**		**TOPIC TITLE:** **Lines and angles**	
Topics	Domains (Core knowledge and skills)	Topics	Domains (Core knowledge and skills)	Topics	Domains (Core knowledge and skills)
5.1 Conversion graphs 5.2 Distance-time graphs 5.3 Line graphs 5.4 Complex line graphs 5.5 STEM: Graphs of functions 5.6 More real-life graphs	• Reading values from conversion graphs. • Plotting conversion graphs from a table of data. • Interpreting distance-time graphs. • Plotting distance-time graphs from descriptive text. • Using distance-time graphs to solve problems. • Plotting line graphs from tables of data. • Interpreting line graphs. • Reading values from real-life graphs. • Describing trends and making predictions based on information presented graphically. • Working out percentages. • Draw, use and interpret conversion graphs. • Draw, use and interpret distance-time graphs. • Draw and interpret line graphs.	6.1 Ordering decimals and rounding 6.2 Place-value calculations 6.3 Calculations with decimals 6.4 Ratio and proportion with decimals 6.5 STEM: Using ratios	• Rounding whole numbers and decimals. • Writing large numbers as a decimal number of millions. • Ordering positive and negative decimals. • Using the symbols > and < between two negative decimals. • Multiplying larger numbers. • Multiplying decimals with up to two decimal places. • Multiplying any number by 0.1 and 0.01. • Adding and subtracting decimals of any size. • Multiplying and dividing by decimals. • Dividing by 0.1 and 0.01. • Using ratios involving decimals. • Solving proportion problems involving decimals. • Solving engineering problems using ratio and proportion. • Using unit ratios. • .	7.1 Quadrilaterals 7.2 Alternate angles and proof 7.3 Geometrical problems 7.4 Exterior and interior angles 7.5 Solving geometric problems	• **Matching quadrilaterals to their descriptions.** • Using known facts about quadrilaterals to solve problems. • Using alternate angles to find unknown angles. • Using reasoning to complete mathematical proofs. • Solving geometrical problems using side and angle properties of triangles and quadrilaterals. • Identifying corresponding angles. • Solving problems using properties of angles in parallel and intersecting lines. • Calculating the sum of the interior and exterior angles of a polygon. • Calculating the interior and exterior angles of a polygon. • Finding unknown angles by forming and solving equations. • Solving geometrical problems showing reasoning. •

	• Draw, use and interpret real-life graphs. • Discuss and interpret linear and non-linear graphs. • Interpreting graphs. • Drawing and using real-life graphs. • Using graphs to solve problems and make predictions.		

Prior Domains:

- **Multiplicative reasoning using metric and imperial measures and currency.**
- Copy and complete metric unit conversions.
- Work out the value of one increment on different scales.
- Converting a distance in one hour (speed) to a distance in different fractions of an hour.
- Converting a distance in one hour (speed) to a distance in 2 hours and 1⁄2 an hour.
- Working out missing numbers in sequences.
- Reading values from a conversion graph.
- Finding the midpoint of two numbers.
- Interpreting straight line graphs.
- Substituting values into a simple formula.
- Interpreting a distance-time graph.
- Recognising that the steeper the line on a distance-time graph, the greater the speed.
- Reading information from a real-life line graph.

Prior Domains:

- Deciding which whole number a decimal is closest to
- How we decide to round up or down
- Reminder of < and >
- Rounding to nearest 100 and 1000
- Writing numbers in words
- Arranging in ascending order (including negative and decimal numbers)
- Checks understanding of place value in 0.1 and 0.01
- Checks ability to write single figure decimals as fractions
- Simple multiplication
- Multiplying by 10
- Estimation skills
- Subtracting with whole numbers
- Adding and subtracting in money context
- Simple decimal multiplications
- Simple divisions
- Finding equivalent ratios
- Simplifying ratios
- Sharing quantities in given ratios
- Divide quantities into ratios with decimal results
- Simplify decimal ratios
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Prior Domains:

- Angle sum of a quadrilateral.
- Subtraction from 180 and 360.
- Describe line and rotational symmetry of quadrilaterals.
- Angle sum on a straight line is 180°.
- Angle sum of a triangle is 180°.
- Angle sum on a straight line and around a point.
- Angle sum of a triangle and quadrilateral.
- Angles of an isosceles and equilateral triangle.
- Identify alternate and vertically opposite angles.
- Find alternate and vertically opposite angles.
- Identify types of quadrilateral.
- Find unknown angles of quadrilaterals.
- Multiples of 180
- Find the exterior angles of a triangle and quadrilateral.
- Interpreting standard notation for angles.
- Solve more complex two-step equations.
- Write a worded description using an algebraic expression.

Summer Term 3A		Summer Term 3A		Summer Term 3B	
TOPIC TITLE: **Calculating with fractions**		**TOPIC TITLE:** **Straight line graphs**		**TOPIC TITLE:** **Percentages, decimals and fractions**	
Topics 8.1 Adding and subtracting fractions 8.2 Multiplying fractions 8.3 Fractions, decimals and reciprocals 8.4 Dividing fractions 8.5 Calculating with mixed numbers	**Domains (Core knowledge and skills)** Adding and subtracting fractions with any size denominator. Multiply integers and fractions by a fraction Use appropriate methods for multiplying fractions. Convert fractions to decimals. Write one amount as a fraction of another. Find the reciprocal of a number. Divide integers and fractions by a fraction. Use strategies for dividing fractions. Use the four operations with mixed numbers.	**Topics** 9.1. Direct proportion on graphs 9.2. Gradients 9.3. Equations of straight lines 9.4 STEM: Direct proportion problems	**Domains (Core knowledge and skills)** • Recognising when values are in direct proportion. • Plotting graphs and reading values to solve problems. • Plot a straight-line graph and work out its gradient. • Plot the graphs of linear functions. • Find midpoints of line segments. • Write the equations of straight line graphs in the form y = mx + c • Identify and describe practical examples of direct proportion. • Solve problems involving direct proportion with or without a graph. • .	**Topics** 10.1 Fractions and decimals 10.2 Equivalent proportions 10.3 Writing percentages 10.4 Percentages of amounts 10.5 FINANCE: Solving problems	**Domains (Core knowledge and skills)** • Recall equivalent fractions and decimals. • Recognise recurring and terminating decimals. • Order fractions by converting them to decimals or equivalent fractions. • Recall equivalent fractions, decimals and percentages. • Use different methods to find equivalent fractions, decimals and percentages. • Use the equivalence of fractions, decimals and percentages to compare proportions. • Working out one number as a percentage of another. • Working out percentage increase and decrease. • Use a multiplier to calculate percentage increase and decrease. • Use the unitary method to solve percentage problems. • Use strategies for calculating fractions and decimals of a given number. • Use mental strategies of conversion and equivalence of fractions, decimals and percentages to solve word problems mentally. •

Prior Domains:

- **Addition and subtraction of fractions where the denominators are equal**
- **Writing fractions as mixed numbers**
- **Writing simple equivalent fractions**
- **Finding the lowest common multiple (LCM) of two numbers.**
- **Simple multiplication**
- **Simple fractions of quantities**

Prior Domains:

- Convert between gallons and litres.
- Use a straight line graph and multiplication and division to solve direct proportion word problems.
- Coordinate pairs from $y = 4x$
- Multiplying with negative numbers
- Ordering time / distance graphs according to speed.

Prior Domains:

- Round to 2 decimal places.
- Convert minutes to hours.
- Use long division to divide by a single digit and obtain a decimal answer.
- Know the equivalence of simple fractions and decimals.
- Factor pairs of 1000.
- Express a proportion as a fraction.

- **Calculate fractions of quantities**
- **Simplify fractions.**
- **Match equivalent fractions and decimals**
- **Finding fractions in relation to hours and minutes**
- **Multiplying fractions**
- **Could also have a quick starter practising written method for division.**
- **Division questions worded as 'How many … in …'**
- **Finding common factors**
- **Multiplying fractions by positive and negative integers**
- **Multiplying fractions by positive and negative fractions**
- **Writing improper fractions as mixed numbers**
- **Four operations with simple fractions**
- **Using inverse operations where the answer is a fraction**

- Completing a table of values for $y = 2x + 2$ and using it to plot its graph (positive values of x).
- Adding halves involving negative values.
- Finding the midpoint of vertical, horizontal and diagonal line segments.
- Convert between kg and pounds and ounces
- Finding mass and volume of different amounts of titanium, given the mass in grams of 1 cm3.

- Know simple equivalent fractions, decimals and percentages.
- Use mental methods to find 10% and 15% of a quantity.
- Find multiples of 5% of an amount of money.
- Express a worded proportion as a percentage.
- Subtract percentages from 100%
- Increase and decrease an amount by a percentage.
- Express one number as a percentage of another using mental methods.
- Write decimals as fractions.
- Write percentages as fractions.

Year 9							
Autumn Term 1A		**Autumn Term 1A**		**Autumn Term 1B**		**Autumn Term 1B**	
TOPIC TITLE: **Indices and standard form**		TOPIC TITLE: **Expressions and formulae**		TOPIC TITLE: **Dealing with data**		TOPIC TITLE: **Multiplicative reasoning**	
Topics 1.1 Indices 1.2 Calculations and estimates 1.3 More indices 1.4 STEM: Standard form	**Domains (Core knowledge and skills)** • Calculate combinations of indices, fractions and brackets. • Use index laws to simplify expressions. • Calculate combinations of powers, roots, fractions and brackets. • Estimate answers to calculations. • Understand negative and 0 indices. • Use powers of 10 and their prefixes. • Write large and small numbers using standard form. • Enter and read standard form numbers on your calculator. • Order numbers written in standard form.	**Topics** 2.1 Substituting into expressions 2.2 Writing expressions and formulae 2.3 STEM: Using formulae 2.4 Rules of indices and brackets 2.5 Expanding double brackets	**Domains (Core knowledge and skills)** • **Change the subject of a formula.** • Simplify expressions involving brackets, use rules for indices and factorise expressions. • Multiply out double brackets and collect like terms. • Substitute into algebraic expressions involving powers. • Write expressions and formulae. • Change the subject of a formula. • Simplify expressions involving brackets, use rules for indices and factorise expressions. • Multiply out double brackets and collect like terms. • Substitute into algebraic expressions involving powers. • Write expressions and formulae. • Change the subject of a formula. • Simplify expressions involving brackets, use rules for indices and factorise expressions. • Multiply out double brackets and collect like terms. • Substitute into algebraic expressions involving powers. • Write expressions and formulae. • Change the subject of a formula. • Simplify expressions involving brackets, use rules for indices and factorise expressions. • Multiply out double brackets and collect like terms. • Substitute into algebraic expressions involving powers. • Write expressions and formulae. • Change the subject of a formula. • Simplify expressions involving brackets, use rules for indices and factorise expressions. • Multiply out double brackets and collect like terms.	**Topics** 3.1 Planning a survey 3.2 Collecting data 3.3 Calculating averages 3.4 Display and analyse data 3.5 Writing a report	**Domains (Core knowledge and skills)** • **Identify sources of primary and secondary data.** • Choose a suitable sample size and what data to collect. • Identify factors that may affect data collection and plan to reduce bias. • Design a good questionnaire. • Design and use data collection sheets and tables. • Find the modal class of a set of grouped data. • Estimate the mean form a large set of grouped data. • Construct and use a line of best fit to estimate missing values. • Identify and explain outliers in data. • Identify further lines of enquiry. • Construct and use frequency polygons. • Write a report to show results of a survey. •	**Topics** 4.1 Enlargement 4.2 Negative and fractional scale factors 4.3 FINANCE: Percentage change 4.4 Rates of change 4.5 Problem-solving	**Domains (Core knowledge and skills)** • **Enlarge 2D shapes using positive, negative and fractional scale factors.** • Find the centre of enlargement by drawing lines on a grid. • Enlarge 2D shapes using positive, negative and fractional scale factors. • Enlarge 2D shapes using a fractional scale factor. • Understand that the scale factor is the ratio of the lengths of corresponding slides. • Find an original value using inverse operations. • Calculate percentage change. • Solve problems using compound measures, percentage change and rates of change. • Solve problems using constant rates and related formulae. • Round numbers to a given number of significant figures. • Solve problems using percentage change and rates of change. • Solve problems using ratio and scale factors.
Prior Domains: • **Squares of multiples of 10, 100.** • **Rules for combining negative numbers.** • **Using BIDMAS to calculate the square of a bracket.** • **Evaluate powers of integers and decimals.** • **Cancel products in fractions.**		Prior Domains: • Substituting different values for x into $x2$. • Using correct order of operations with numbers. • Substituting positive and negative numbers into simple expressions. • Recognise the difference between an expression and a formula. • Identifying equivalent algebraic expressions and statements in words.		Prior Domains: • Finding percentages (multiples of 10%) of whole numbers. • Converting a simple fraction to a percentage. • Reading frequency tables. • Finding one number as a percentage of another. • Identifying where boundary data should go, given a selection of inequalities.		Prior Domains: • Working out the scale factor of an enlargement. • Enlarge shapes using a given scale factor. • Identify the scale factor of an enlargement. • Write ratios as unit ratios.	

Spring Term 2A		Spring Term 2A		Spring Term 2B	
TOPIC TITLE: Constructions		**TOPIC TITLE:** Equations, inequalities and proportionality		**TOPIC TITLE:** Circles, Pythagoras and prisms	
Topics 5.1 Using scales 5.2 Basic constructions 5.3 Constructing triangles 5.4 Loci	**Domains (Core knowledge and skills)** • Use scales on maps and diagrams. • Draw diagrams to scale. • Make accurate constructions using drawing equipment. • Construct accurate triangles. • Construct accurate nets of solids involving triangles. • Draw loci for the paths of points.	**Topics** 6.1 Solving equations 6.2 Using equations 6.3 Trial and improvement 6.4 Using and solving inequalities 6.5 STEM: Proportion 6.6 Simultaneous equations	**Domains (Core knowledge and skills)** • Construct and solve equations with the unknown on both sides. • Construct and solve equations including brackets, powers and fractions. • Convert a recurring decimal to a fraction. • Know the difference between equations and identities. • Use trial and improvement methods to find solutions to equations. • Solve linear equalities. • Represent solutions to inequalities on a number line. • Set up equations to show direct proportion. • Recognise data sets that are proportional. • Use algebra to solve problems involving proportion. • Solve a pair of simultaneous equations. • .	**Topics** 7.1 Circumference of a circle 7.2 Area of a circle 7.3 Pythagoras' theorem 7.4 Prisms and cylinders 7.5 STEM: Errors and bounds	**Domains (Core knowledge and skills)** • Calculate the circumference of a circle. • Estimate calculations involving p. • Solve problems involving the circumference of a circle. • Calculate the area of a circle. • Solve problems involving the area of a circle. • Find the length of an unknown side of a right-angled triangle. • Solve problems involving right-angled triangles. • Calculate the volume and surface area of a right prism. • Calculate the volume and surface area of a cylinder. • Find the lower and upper bounds for a measurement. • Calculate percentage error intervals. • .

Prior Domains:

- **What is the scale factor of enlargement from the small triangle to the large one?**

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- **Find a length from a scale drawing.**
- **Simplify ratios.**
- **What does 'perpendicular' mean?**
- **Can you see examples of perpendicular lines in the classroom?**
- **Draw accurate lines to within 1 mm.**
- **Construct accurate circles of known radius with compasses.**
- **What is special about an isosceles triangle?**
- **Describe an equilateral triangle.**
- **Sketch a net for a 3D shape.**
- **Construct a perpendicular bisector for a line of a known length.**
- **The scale of a drawing is 2 cm to 1 m. What distance is represented by 5 cm on the drawing?**
- **How long on the drawing would a real-life distance of 30 cm be?**
- **Draw a circle with a known radius.**
- **Construct an angle bisector for a given angle.**
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Prior Domains:

- $x\,2 = 16$. Give two possible values of x.
- $x2 = 121$. Give two possible values of x
- Solve simple equations with the unknown on one side.
- Multiply expressions by 2.
- What do these mean?
- 0.6
- 0.48
- Solve
- $5x = 4$
- $3y = 2$
- $100x = 77$
- $99x = 63$
- Write an example of a formula, an expression and an equation in the context of shapes.
- Which two numbers do these roots lie between?
- $48\text{---}\sqrt{}$
- $339\text{---}\sqrt{}$
- Substitution practice, including use of $x2$.
- What is an integer?
- An integer is < 5. What could it be?
- An integer is ≥ 2. What could it be?
- Solve simple equations.
- Find integer values to satisfy an inequality.
- How many seconds are there in 5 minutes?
- Apples are £1.25 per kilogram. How much will 3 kg cost?
- 80 km = 50 miles. How far in miles is 20 km?
- Identify quantities that change in direct proportion.
- Identify the graph of quantities that change in proportion.

Prior Domains:

- Rounding to significant figures, decimal places, nearest unit.
- Solve equations involving multiplication and division.
- Substitute values into a formula.
- Round measurements to significant figures.
- Finding the square of whole numbers and decimals.
- Finding the square root of whole numbers.
- Knowing that the diameter is twice the radius.
- Finding the sum and difference of two square whole numbers.
- Use a calculator to work out the sum and difference of two squares.
- Use a calculator to work out the square root of the sum and difference of two squares.
- Find the positive solution of an equation involving x $x2$.
- Calculate the volume and surface area of a cuboid.
- Calculate the area of a circle.
- Convert between cubic metric units.
- Find the area of flat shapes.
- Calculate the volume and surface area of a prism.
- Round quantities to the nearest unit or multiple.
- Calculate a simple percentage of a quantity.
- Increase and decrease a quantity by a simple percentage.
- Find the circumference and area of a circle.
- Describe the possible values of a measurement rounded to the nearest unit using a diagram and inequality.
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Work out:
• 4 – 6
• 7 – 11
• −7 + 5
• −6 + 11
• Form equations with two variables.

Summer Term 3A		Summer Term 3A		Summer Term 3B	
TOPIC TITLE: **Sequences and graphs**		**TOPIC TITLE:** **Probability**		**TOPIC TITLE:** **Comparing shapes**	
Topics 8.1 nth term of arithmetic sequences 8.2 Non-linear sequences 8.3 Graphing rates of change 8.4 Using y = mx + c 8.5 More straight-line graphs 8.6 More simultaneous equations 8.7 Graphs of quadratic functions 8.8 Non-linear graphs	**Domains (Core knowledge and skills)** • use the nth term to generate a sequence. • find the nth term of a sequence. • recognise and continue geometric sequences. • recognise and continue quadratic sequences. • use distance-time graphs to solve problems. • recognise graphs showing constant rates of change. • interpret graphs showing rates of change. • draw a graph from its equation, without working out points. • write the equation of a line parallel to another line. • compare graph lines using their equations. • plot graphs with equations like ax + by = c. • rearrange equations of graphs into y = mx + c. • find inverse functions and plot their graphs. • solve simultaneous equations by drawing graphs. • find the equation of a line through two points. • draw graphs with quadratic equations like y = x2. • interpret graphs of quadratic functions. • draw graphs of cubic equations like y = x3. • interpret non-linear graphs. • .	**Topics** 9.1 Calculating probabilities 9.2 Experimental probability 9.3 Probability diagrams 9.4 Independent events	**Domains (Core knowledge and skills)** • calculate probabilities from tables. • compare probabilities. • calculate estimates of probability from experiments or survey results. • use experimental probabilities to predict outcomes. • list all the possible outcomes of one or two events in Venn diagrams, tables and sample space diagrams. • compare experimental and theoretical probabilities. • You will decide if a game is fair. • calculate the probability of two independent events. • use tree diagrams. •	**Topics** 10.1 Congruent and similar shapes 10.2 Ratios in triangles 10.3 The tangent ratio 10.4 The sine ratio 10.5 The cosine ratio	**Domains (Core knowledge and skills)** • **Use congruent shapes to solve problems about triangles and quadrilaterals.** • Work out whether shapes are similar, congruent or neither. • Solve problems involving similar triangles. • Use conventions for naming sides of a right-angled triangle. • Work out the tangent of any angle. • Use the tangent to work out an unknown side of a triangle. • Work out the sine ratio of any angle. • Use sine to work out the opposite side in a right-angled triangle. • Work out the cosine ratio of any angle. • Use the cosine ratio to work out the adjacent side in a right-angled triangle. •
Prior domans: **Identify arithmetic sequences (i.e. those with common difference).** **Find common difference** **Find multiples of positive and negative numbers.** **Substitute into linear expressions.** **Find position-to-term rule for sequences with one step rules (n + 2, 8n).** **Find the next term in a non-linear sequence where the rule is ×2, ×3 or ÷2. Students met this type of sequence in year 7.** **Interpret multiplying by a fraction as a division calculation.** **Generate terms of a sequence from the nth term.** **Substitute into quadratic expressions.** **Understand the term 'constant speed'.** **Calculate how fast a car travels in different time periods at 50 km/h.** **Read and interpret simple distance-time graph, calculate speed of 120 km in 2 hours as 60 km/h (not using formula).** **Identify positive and negative gradient, and read y-intercepts from graphs, to ensure students remember these key words.** **Finding gradient and y-intercept, hence writing equation of line.** **Draw line of given gradient on squared paper.** **Relate steepness of graph to coefficient of x in $y = mx + c$** **Substitute x = 0 into equations of lines to find the corresponding y value.** **Identify inverse operations for all four rules.** **Draw a graph from $y = mx + c$, using intercept and gradient.** **Solve two step equations.** **Change the subject of one step formulae.** **Understand the equation of a straight line and what m and c represent.** **Find point of intersection of two graphs.** **Substitute x and y coordinates into the equation of a line to see if points lie on the line.** **Solve simultaneous equations algebraically, to compare with the graphical solutions in Q4.** **Students know what a quadratic expression is.** **Square positive and negative numbers.**		**Prior Domains:** Compare fractions with different denominators. Calculate theoretical probability of different outcomes on a spinner Calculate expected values. Read a two-way table Recognise that a greater number of trials produces a more reliable estimate of probability. Calculate probability from a two-way table. Estimate probability of a dice score from experimental data. Use estimates of probability to calculate expected numbers of successes. List possible outcomes for single events. Calculate probability of picking different cards from a pack and getting different scores on a dice. Multiply decimals, add and multiply fractions. Complete a sample space diagram for flipping two coins and calculating probabilities from it. Write down probabilities for a spinner, including P(A or B), and explain why P(A or B) = P(A) + P(B), with reference to the diagram.		**Prior Domains:** Recognising congruence. Simple enlargement. Vertically opposite angles and angles on a straight line. Recognising congruent rectangles. Equivalent ratios. Recognising similarity. Finding the scale factor of an enlargement. Identifying the hypotenuse. Converting fractions to decimals. Rearranging formulae involving fractions. Rearranging formulae Identifying the hypotenuse, and opposite and adjacent sides of a triangle. Finding the tangent and sine ratio of angles.	

Evaluate 3x^2 for positive and negative values of x. **Solve simple quadratic equations of the form $ax^2 = n$.** **Cube positive and negative numbers.** **Calculate the volume of a cylinder (practice for Q6).** **Calculate x^3 for values of x from −3 to + 3.**		