Year 7 Curriculum Implementation: Mathematics

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Knowledge & Skills	**Negative Numbers and Operations** • Be able to add and subtract with negatives numbers • Be able to multiply and divide with negative numbers • Understand the order of operations • Understand equal priorities within BIDMAS **Place Value and Rounding** • Understand place value • Use inequality signs to compare numbers • Round numbers up to required decimal places • Estimate numbers in calculations	**Powers, Roots, Factors, Multiples and Primes** • Be able to list factors of integers • Be able to list multiples of integers • Know and identify square and cube numbers • Know the key square and cube roots • Understand index notation • Be able to identify prime numbers **Working with Fractions** • Convert between mixed numbers and improper fractions • Add and subtract fractions • Multiply fractions • Divide fractions **Understanding Ratio** • Understand ratio notation • Represent ratios as fractions • Understand equivalent ratios • Be able to use multiplicative relationships with ratio • Be able to divide amounts into a ratio **Algebra Induction** • Understand algebra notation • Be able to collect like terms with one variable • Be able to collect like terms with multiple variables • Know and use keywords used in expressions	**Angle Properties** • Use basic angle facts • Know and use the angle sum of a triangles • Label and describe shape notations • Describe reflective and rotational symmetry • Label and describe triangle properties **Substitution** • Substitution of integers into linear expressions • Substitution of integers into expressions involving powers • Substitutions of integers into expressions involving brackets • Substitution into simple mathematical and scientific formulae	**Measures** • Use known metric conversions in problems • Use key metric to imperial conversions (miles, lbs, feet, pints, gallons) • Use time conversions to solve problems **Basic Probability** • Use probability scale with descriptive words and simple fractions • Find probability of single events (equally likely and not) **Expanding Brackets** • Multiply and divide terms • Multiply and divide laws of indices • Expand single brackets including variables with coefficients and powers (on its own) • Factorise expressions into single brackets	**Basic Percentages** • Find fractions of amounts and link to percentage of amounts • Express a number as a fraction and percentage of another • Increase amounts by percentage • Decrease amounts by percentage **Area and Perimeter** • Find perimeter of composite shapes involving rectangles and triangles • Use rectangles, parallelograms and triangles in composite shapes to find area • Know and use the formula for the area of a trapezium **Solving Equations** • Understand how to use balance and reverse operations • Solve simple one step equations • Solve two step equations with integer answers • Solve multi-step equations including brackets	**Data Types and Averages** • Find Mean from sets of data including decimals • Find median from odd and even data sets • Find mode from lists and diagrams • Find range from lists and diagrams • Understand data types and equivalent charts **Sequences** • Find rules for number sequences (term to term) • Follow on sequences or generate based on term-to-term rule • Understand and work with Arithmetic, Triangular and Square number sequences • Fibonacci sequences in different forms **Circumference** • Name key parts of a circle • Know the relationship between diameter and radius • Find circumference of a circle (given diameter or radius) • Find diameter or radius given the circumference of a circle • Solve perimeter problems in composite shapes involving circles
Links to prior learning	**Negative Numbers and Operations** • KS2 • Use negative numbers in context, and calculate intervals across zero • Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication • Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context • Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context • Perform mental calculations, including with mixed operations and large numbers • Use their knowledge of the order of operations to carry out calculations involving the four operations • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • Solve problems involving addition, subtraction, multiplication and division **Place Value and Rounding** • KS2 • Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit • Round any whole number to a required degree of accuracy • Use negative numbers in context, and calculate intervals across zero • Use common factors to simplify fractions; use common multiples to express fractions in the same denomination • Compare and order fractions, including fractions > 1 • Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction • Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places • Solve problems which require answers to be rounded to specified degrees of accuracy	**Powers, Roots, Factors, Multiples and Primes** • KS2 • Identify common factors, common multiples and prime numbers **Working with Fractions** • KS2 • Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions • Multiply simple pairs of proper fractions, writing the answer in its simplest form • Divide proper fractions by whole numbers **Understanding Ratio** • KS2 • Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts • Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples. **Algebra Introduction** • KS2 • Express missing number problems algebraically	**Angle Properties** • KS2 • Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons • Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. **Substitution** • KS2 • Use simple formulae • Express missing number problems algebraically • Interpret algebraic terms to understand the operations applied	**Measures** • KS2 • Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate • Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places • Convert between miles and kilometres **Basic Probability** • KS2 • Working with decimals – adding and subtracting from 1 • Adding fractions with a common denominator • Creating a fraction from an event • Basic FDP equivalence **Expanding Brackets** • KS2 • Understand algebra notation • Be able to collect like terms with one variable • Be able to collect like terms with multiple variables • Know and use keywords used in expressions • Multiply an algebraic term by an integer	**Basic Percentages** • KS2 • Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison • Recognise the per cent symbol (%) and understand that per cent relates to number of parts per hundred and write percentages as a fraction with denominator 100. • Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. **Area and Perimeter** • KS2 • Recognise that shapes with the same areas can have different perimeters and vice versa • Recognise when it is possible to use formulae for area and volume of shapes • Calculate the area of parallelograms and triangles **Solving Equations** • KS2 • Find pairs of numbers that satisfy an equation with two unknowns • Enumerate possibilities of combinations of two variables. • Understand algebra notation • Be able to collect like terms with one variable	**Data Types and Averages** • KS2 • Calculate and interpret the mean as an average • Construct and interpret bar charts and pictograms • Adding a series of values • Dividing one value by another **Sequences** • KS2 • Generate and describe linear number sequences • Identify if a there is positive or negative difference between two values. • Create an algebraic term from the context given **Circumference** • KS2 • Illustrate and name parts of circles, including radius, diameter and circumference • Know that the diameter is twice the radius • Interpret algebraic terms to understand the operations applied • Understand power notation

	• Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.			• Multiply an algebraic term by another algebraic term	• Interpret algebraic terms to understand the operations applied	
Assessment	**Unit Reviews** These will be completed on a regular basis after a unit of work has been completed. **End of Half Term Assessment** An assessment based on the units covered during this half term	**Unit Reviews** These will be completed on a regular basis after a unit of work has been completed. **End of Half Term Assessment** An assessment based on the units covered during this half term	**Unit Reviews** These will be completed on a regular basis after a unit of work has been completed. **End of Half Term Assessment** An assessment based on the units covered during this half term	**Unit Reviews** These will be completed on a regular basis after a unit of work has been completed. **End of Half Term Assessment** An assessment based on the units covered during this half term	**Unit Reviews** These will be completed on a regular basis after a unit of work has been completed. **End of Half Term Assessment** An assessment based on the units covered during this half term	**Unit Reviews** These will be completed on a regular basis after a unit of work has been completed.
Home learning	**Multiplication/Division Techniques** • Column Multiplication • Grid Multiplication • Short Division • Dividing by Multi-Digit Numbers • Multiplication and Division: Worded Questions **Decimals** • Decimal Place Value • Adding Decimals • Multiplying Decimals • Dividing Decimals • Multiplying Decimals: Worded Questions • Dividing Decimals by Decimals **Place Value (x10, x100, x1000, Rounding to 10, 100, 1000)** • Ordering Decimals • Multiplying by Powers of 10 • Rounding to the nearest 10, 100, 1000 • Dividing by Powers of Ten • Testing for Divisibility **BIDMAS** • BIDMAS • Manipulating Decimal Calculations with Multiplication • Manipulating Decimal Calculations with Division **Multiples/ Factors** • Multiples • Factors **Revision for Assessment** Pupils will have a set of topics to revise and can produce a revision sheet for the assessment.	**Negative Numbers** • Adding Negatives • Subtracting Negatives • Multiplying Negatives • Dividing Negatives • Negatives and Positives • Multiplying and Dividing with Negatives **Equivalent Fractions** • Expressing as a Fraction • Ordering Fractions • Equivalent Fractions • Simplifying Fractions • Mixed and Improper Fractions **Rounding/Estimation** • Rounding to the Nearest Whole Number • Rounding to 1 Decimal Place • Rounding to 2 Decimal Places • Estimation **Powers/Roots/Primes** • Primes • Squares • Powers • Squaring and Cubing Negatives • Roots of Squares and Cubes **HCF/LCM** • Lowest Common Multiple - Listing Technique • Highest Common Factor - Listing Technique • Powers of 0 and 1 **Algebra Introduction** • Zero Pairs • Algebraic Terminology • Function Machines **Types of Angles** • Identifying Angles • Types of Angles • Parallel and Perpendicular Lines • Types of Triangles **Revision for Assessment** Pupils will have a set of topics to revise and can produce a revision sheet for the assessment.	**Algebra Basics** • Forming Algebraic Expressions • Collecting Like Terms • Collecting Like Terms In Context (Perimeter) **Fractions (Adding and Subtracting)** • Mixed and Improper Fractions • Adding and Subtracting Fractions • Adding and Subtracting Improper Fractions • Adding and Subtracting Mixed Numbers • Adding and Subtracting Improper Fractions and Mixed Numbers **Ratio** • Simplifying Ratios • Sharing with a Given Ratio • Converting Ratios into Fractions • Converting Fractions into Ratios • Part of a Ratio to the Whole **Basic Angles** • Straight Line Angles • Angles Around a Point • Vertically Opposite Angles • Angles in a Triangle **Units and Measure** • Metric Units • Estimating with Metric Units • Reading Scales • Metric and Imperial Length • Converting Time **Revision for Assessment** Pupils will have a set of topics to revise and can produce a revision sheet for the assessment.	**Fractions, Decimals, Percentages** • Fractions to Percentage • Decimals to Percentage • Percentage to Decimals • Percentage to Fractions • Decimals to Fractions • Ordering Fractions, Decimals and Percentages **Angle properties** • Combined angle properties • Angles in a Triangle : Isosceles Triangles • Angles in Quadrilaterals **Substitution** • Substituting into Expressions • Function Machines **Fractions (Multiplying and Dividing)** • Multiplying Fractions 1 • Dividing Fractions • Multiplying and Dividing Mixed Numbers • Multiplying with Whole Numbers and Fractions • Dividing with Whole Numbers and Fractions **Multiplying and dividing algebra** • Simplifying Expressions : Multiplication • Simplifying Expressions : Division **Revision for Assessment** Pupils will have a set of topics to revise and can produce a revision sheet for the assessment.	**Measures** • Converting Metric Length • Converting Metric Mass • Converting Metric Capacity • Metric and Imperial Length **Fractions and decimals** • Fraction of Amounts • Multiplying Decimals **Basic Area and Perimeter** • Area of Squares and Rectangles • Estimating Area • Perimeter of Regular Shapes **Basic Probability** • Probability Scale in Words • Probability Scale in Numbers • Calculating Probability • Mutually Exclusive Events **Expanding Single Brackets** • Expanding Single Brackets • Expanding and Simplifying **Revision** Pupils will have a set of topics to revise and can produce a revision sheet for the assessment.	**Area and Perimeter** • Area of Squares, Rectangles and Parallelograms • Area of Right-Angled Triangles • Area of Triangles • Area of Composite Shapes • Area of Trapeziums • Area Problem Solving **Percentages** • Finding 10% • Finding 5% • Finding 1% • Finding Percentages of Amounts **Factorising into Single Brackets** • Factorising into a Single Bracket **Averages** • Mode • Median • Mean • Range **Solving Equations** • Solving Equations: One Step • Solving Equations: Two Steps **Circles** • Circumference: From Radius • Circumference: From Diameter • Using the Circumference to find the Radius or Diameter • Perimeter of Part Circles • Perimeter of Composite Shapes with Part Circles
Cultural Capital and extra-curricular opportunities	**Artful Maths Club** Where geometry meets creativity. Pupils can learn to fold their way into the wonders of maths with Artful Maths Club.	**Artful Maths Club** Where geometry meets creativity. Pupils can learn to fold their way into the wonders of maths with Artful Maths Club.	**Artful Maths Club** Where geometry meets creativity. Pupils can learn to fold their way into the wonders of maths with Artful Maths Club.	**Artful Maths Club** Where geometry meets creativity. Pupils can learn to fold their way into the wonders of maths with Artful Maths Club.	**Artful Maths Club** Where geometry meets creativity. Pupils can learn to fold their way into the wonders of maths with Artful Maths Club.	**Artful Maths Club** Where geometry meets creativity. Pupils can learn to fold their way into the wonders of maths with Artful Maths Club.

Literacy	**Key Words** **Negative Numbers and Operations** Addition, Subtraction, Sum, Total, Difference, Minus, Less, Column addition, Column subtraction, Operation, Multiply, Multiplication, Times, Product, Commutative, Factor, Short multiplication, long multiplication **Place Value and Rounding** Fraction, decimal, integer, order, inequality, equality, place value, thousands, hundreds, tens, units, tenths, hundreds, thousandths. Estimate, Approximate (noun and verb), Round, Decimal place, Check, Solution, Answer, Estimate (noun and verb), Order of magnitude, Accurate, Accuracy	**Key Words** **Powers, Roots, Factors, Multiples and Primes** Multiple, Factor, Indices, Index, Prime, Square, Cube, Root, LCM, HCF **Working with Fractions** Fraction, numerator, denominator, improper fraction, mixed number, equivalent fractions, simplify, common denominator, cross-multiply **Understanding Ratio** Ratio, Factor, Multiple, Scale, Simplest Form, Lowest Terms, Equivalent, Share, Part, Whole, Fraction, Multiplicative **Algebra Introduction** Expression, Simplify, Equation, Identity, Formulae, Term **Famous Mathematicians** Short reading and comprehension exercise through Microsoft Forms on 'Famous Mathematicians – Pythagoras'.	**Key Words** **Angle Properties** Angle, Degrees, Right angle, Acute angle, Obtuse angle, Reflex angle, Protractor, vertically opposite, angle sum, supplementary, point **Substitution** Substitute, variable, expression, unknown, formula	**Key Words** **Measures** Length, distance, Mass, weight, Volume, Capacity, Metre, centimetre, millimetre, Tonne, kilogram, gram, milligram, Litre, millilitre, Hour, minute, second, Inch, foot, yard, Pound, ounce, Pint, gallon **Basic Probability** Probability, Theoretical probability, Event, Outcome, Impossible, Unlikely, Evens chance, Likely, Certain, equally likely, mutually exclusive, Exhaustive **Expanding Brackets** Expand, factorise, variable, bracket, expression, identity **The Great Pyramid of Giza** Short reading and comprehension exercise through Microsoft Forms on 'The Great Pyramid of Giza'.	**Key Words** **Basic Percentages** Proper fraction, improper fraction, Percent, percentage, Increase, decrease **Area and Perimeter** Perimeter, area, Square, rectangle, parallelogram, triangle, trapezium (trapezia), Square millimetre, square centimetre, square metre, square kilometre, Formula, formulae, Length, breadth, depth, height, width **Solving Equations** Algebra, algebraic, algebraically, Unknown, Equation, Operation, Solve, Solution, Brackets, Symbol, Substitute	**Key Words** **Data Types and Averages** Average, Spread, Consistency, Mean, Median, Mode, Range, Measure, Data, Statistic, Statistics **Sequences** Fibonacci number, Fibonacci sequence, Square, Triangular, Geometric, Linear, Arithmetic, Pattern, Sequence, Term, Ascending, Descending **Circumference** Circle, Centre, Radius, diameter, chord, circumference, Pi
Numeracy	**Scientific Calculator** First and foremost, we always try and use our mental and written method when attempting a calculation. If a calculator is need then this needs to be a scientific calculator. This is a requirement, and pupils are expected to have their own calculator in school. Pupils need to know how to use a scientific calculator correctly and they are taught this in their Maths lessons.	**Approach** Pupils must be encouraged to always show their working out, regardless of whether they are using a calculator or not.	**Vocabulary** Mathematical vocabulary is precise and rigorously defined. It should be used carefully to avoid misinterpretation and confusion with the same similar words used elsewhere.	**Talk Through Problems** Pupils encouraged to talk through their methods of working out (explain their thinking out loud) to help clarify understanding.	**Break Down Word Problems** Focus on reading questions carefully, underlining key facts, and planning step-by-step how to solve them.	**Estimation** Errors are commonly made when students fail to check the reasonableness of their answer in the context of the question. Recognising that estimation is not just a guess, but rounding needs to be used.
Careers Information, Education, Advice and Guidance (CEIAG)	**Negative Numbers and Operations** **Multiplication and Division** • Music: Repetition of multiplication to build musical phrases • MFL: Learning number and number calculations in French/Spanish • Art: Multiplication of shapes and figures. Use of Scale factors • Science: Working with formulas and units • Technology: Scaling of ingredients to increase/decrease amounts made. Calculations for resources (all technologies) • Multiplication and division of decimals • PE: Totals of times, distances, when calculating multiple scores, averages etc • Business and computing: Working with money, profits/losses etc. and estimations of costings • Geography: Global costings. Data collection of measurements, distances etc. • Arithmetic with negative numbers • Geography: Working with temperatures and analysing weather forecasts. Distances above/below sea level • Business and computing: Working with money (negative equities, overdrafts etc) • Science: Monitoring of temperatures in experiments **BIDMAS** • Business/Computing: Inputting data into spreadsheets and programming • Science: Inputting numbers into formulae to calculate variables • History: Interpreting cyphers and code breaking **Where are these skills transferred to real life contexts?** • Any business setting: Whether that be a restaurant, a hairdresser, or a car garage, all workers within a business need to be able to add, subtract, multiply and divide. They use these skills to efficiently forecast trends, work out what resources they need to buy, work out prices, calculate profit and losses and much more • Nurse/NHS: Nurses need to be able to correctly calculate the amount of medicine/drug to give a person based upon their individual needs • Weather forecasters: Weather forecasters use aircrafts and satellites to monitor the changes in temperatures, wind speeds, and air pressure to correctly predict the weather **Place Value and Rounding**	**Powers, Roots, Factors, Multiples and Primes** • Finding HCF and LCM from listing • Business and computing: Cost effective problems • Technology: Effective use of resources and waste management • Powers and roots • Science: Use of large and small numbers represented in index form. Formulae used which included powers and roots • ICT/Business/Computing: Cryptography and programming **Where are these skills transferred to real life contexts?** • Any business setting: Business will use factors and multiples to optimise resources and minimise waste for cost effectiveness. This can also be used for timetabling purposes too • Construction workers: When working with building materials, as above, they would need to minimise waste and correctly distribute resources • Event planners: When planning events with large seating areas, distribution of rows, chairs etc would need to be done efficiently using HCF and LCM • Traffic systems: HCF and LCM would need to be used when planning the traffic light systems in a town, so they are in sync at certain times • Machinery: Prime numbers are used in developing machine tools. Utilising primes can avoid setting up harmonics which can damage tools • Encryption: Prime numbers are used to encrypt information through	**Angle Properties** • Art: Shape properties will be widely used in drawings, constructions and creating 3D drawings. Pupils in art will need to be able to measure and draw angles as well as calculate using angle facts • Technology: Shape and angle properties are needed in design projects especially in resistant materials and textiles • Science: Angles are used in Science when working with elevations and positionings **Where are these skills transferred to real life contexts?** • Construction workers: Construction workers and builders need to accurately work with angles and dimensions to ensure the safety of the designs • Interior designers: Need to know properties of room spaces to ensure maximum efficient use of space • Animation and games design: Creation of objects and people in games rely on properties of shapes and angles • Architect: The building of offices, homes and buildings requires extensive knowledge of shapes (of rooms), to ensure well designed and manufactured spaces **Substitution** • Science: Equations, Substitution, Formulae and manipulating formulae are used in Science regularly, particularly in Physics and Chemistry • Business: Substituting into formulae is also commonly used across	**Measures** • Geography: Using standard units of measure to calculate distances, temperatures, river flows etc. • Science: Calculating speed, distance and time in Physics • Art: Using measurements in drawings for scale and proportionality. Converting between measurements when scaling • Technology: Conversions between capacity and mass units when working with ingredients. Working with standard units of length in textiles and resistant materials • PE: Working with speed, distance and time in athletics. Conversions between standard units of length on throws and jumps **Where are these skills transferred to real life contexts?** • Journey planners: Businesses which may work in haulage or transport need to work with speed distance and time to ensure efficient, scheduled deliveries and services • Town planners/Architects: Need to work with scale, conversion of measures and compound measures when planning building work • Athletics: Competitive sports such as athletics will use speed distance and time as a measure to calculate standings. Measurements may often need to be converted **Basic Probability** • Geography: Using probability in weather forecasting • Science: In any experiment to predict the chance of an outcome. In Biology	**Basic Percentages** • Geography: Calculating percentage of amounts, increase and decreases in populations, GDP, or any other data. Percentages can be used to show the percentage of land compared to water in certain areas. Population density is expressed as a percentage • Science: Calculating percentage quantities of amounts to compare and analyse data • Business: Profit/loss, percentage changes in business trends. Interest rates, and calculating interest on loans • Art: Proportion of shapes, diagrams for shading. Percentage of paper/space used for drawings **Where are these skills transferred to real life contexts?** • Any business setting: Workers within a business, but more importantly managers and owners, need to be able to calculate percentages of amounts, percentage increase and decreases and percentage changes. They use these skills to efficiently forecast trends, work out what resources they need to buy, work out prices, calculate profit and losses and much more • Retail: Retailers use percentages in promotions and sales. This links to the businesses above • Banks: Banks work with percentages when calculating interest rates on savings, loans, mortgages and working with inflation	**Data Types and Averages** • Geography: Using averages and range on a wide variety of data sets from rainfall and temperature to populations • History: The grouping of data, data collection and classification of data • Science: Averages, range and spread used on a wide variety of data sets in Science and can be used after experiments to analyse data • PE: Working with measurements and times in sport. Averages can be used to analyse the data Where are these skills transferred to real life contexts? • Financial planners: The mean or average value in financial planning is implied in calculating average monthly expenditure calculation. Considering the expenditures of the previous year, the financial planners can design the budget for the next year. Average expenditure value also helps find how much savings one can make in a year • Sports analyst: Average goals per match, average runs scored by a batsman, etc. are some of the values analysts consider for drawing trends in sports performance • Media and production companies: The concept of average is applied in finding how many hours the people watch TV, which may help advertisers buy media space profitably • Insurance and motor vehicles: Using the speed and distance data, makers find the mileage of the vehicles and advertise it as a selling point **Sequences**

	• Place value: Multiplication and Division by powers of 10 • Science: Powers of 10 are used commonly when calculating large distances (eg between planets), sizes, or working with speed of light in Physics • In Chemistry using powers of 10 is seen when working with small measurements such as the distance between sub-atomic particles. • In Biology, the size of bacteria may be calculated using powers of 10 due to the small size • Conversion between fractions and decimals • Science: When working with chemicals, conversion may be needed for liquids • Geography: Conversion and comparison of currencies **Inequality notation** • Science: Algebraic balance is required in chemical formulas, growth ratios, and genetic matrices • Geography: Global comparisons of wealth and population can be represented using inequality symbols • Business/Computing: Profit, loss and intervals of error can be shown using inequalities • Rounding and estimation • Science: Rounding in calculations and measures. Using estimations to make predictions in experiments • Geography: Using rounding and estimation when calculating percentage growths, losses, land space etc • Business: Estimation of costings, resources, profits and losses • Tech; Using rounding when working with lengths and materials Estimation of materials/ingredients needed to plan for production **Where are these skills transferred to real life contexts?** • Currency exchange/stocks and shares: Currency exchange and businesses which trade or work internationally will use fraction and decimal conversion when converting between different currencies • Law enforcement: Roads with speed limits are used with inequalities. Law enforcement would need to use inequalities to show the interval of error for speeding in an area • Accounting/auditors: Frequently use linear inequalities to balance accounts, determine pricing and set budgets • Astronomer: Working with planets requires the use of multiplying and dividing with powers of 10 from measuring distances to mass • Scientists/Astrophysicists/Chemists: Large and small values ranging from speed of light to atomic particles • Engineers: Engineers may work with powers of 10 when calculating distances, lengths and mass of materials • Business: Any business setting will require a certain amount of rounding and estimating when forecasting trends, purchasing stock/resources, and calculating budgets	communication networks utilised by mobile phones and the internet **Working with Fractions** • Calculations with fractions • Technology: In food tech, fractions are used in baking, cooking and measuring ingredients. In RM and Textiles, measurements are important and therefore calculating fractional lengths can be used • Science: Fractions can be used when substituting into equations, formulae and be used as variables in experiments. Liquids may well need to be measured in fractional quantities • Business: Profit, loss and accounts may well use fractional quantities, including working with time and money **Where are these skills transferred to real life contexts?** • Any business setting: Whether that be a restaurant, a hairdresser, or a car garage, all workers within a business need to be able to work with fractional quantities. They use these to work out what resources they need to buy, work out prices, calculate profit and losses and much more • Nurse/NHS: Fractions are very important for pharmacists and nurses, particularly because errors can have serious consequences. For example, nurses need to be able to use the following stock equation in order to know how to dilute a solution • Engineering: There would be no buildings, cars, aeroplanes or manufacturing without engineering, it is the foundation of the modern world. An example of the use of fractions is in air-fuel ratios. Inside a car's engine you need both air and fuel to burn together, and you need fractions to decide on the right proportions • Set design and architecture: If you are making a scale model such as in architecture or set design, then you will need fractions. If your model is at a scale of 1:200 then this means that you need to take the real lengths and multiply them by a fraction get the model length. Another interesting use of fractions is in movie making and the technique of forced perspective. In the film The Hobbit, actor Martin Freeman who plays Hobbit Bilbo Baggins appears much smaller than Gandalf. This is achieved using forced perspective • Chef (cooking & baking): Cooking is full of fractions. What if you have a recipe for four people which contains a fractional teaspoon of vanilla extract, and you want to make your cake for six people. On the Great British Bake Off Paul Hollywood once	Business/ICT and computing in spreadsheets and revenue calculations • Technology: Substitution is used when working out areas and volumes of objects or materials **Where are these skills transferred to real life contexts?** • Accountancy: Formulae/Substitution is used regularly when working with financial planning. They use formulas every day to measure rates of interest and tax forms • Computer programmer: Uses formulae and substitution when evaluating and analysing designs • Financial analyst: Use formulae when analysing risk and reward of investments. Substitution of values is key for forecasting pay offs • Pharmacy Technician: Substitution and formulae are used when calculating quantities, counting and pricing • Management analysts: Use function machines and substitution to analyse outputs/rewards/profits for businesses based upon their inputs and the process of the business	probability is used for predictions of genetics and births • PE: Making predictions on sporting events using previous data and analysis **Where are these skills transferred to real life contexts?** • Engineering: requires probability analysis. Engineers must calculate the probability of such things as a heavy gust of wind or a car's front suspension hitting a pothole on an average day • Computer programmers sharpen their products by using statistics • Biologists and medical experts use probabilities to better understand sophisticated mechanisms within the human body and to develop drugs • Physicists deal with uncertainty as they delve into the realm of sub-atomic particles and model these interactions by using probability models • Weather forecasting: Probability is needed to foresee the chance of rain/sun etc. • Economics and business: Economists use probability as a tool to analyse economic competition and phenomena such as bargaining, voting theory, auction, mechanism design. Executives, investors, and managers in the business world use probability for investments, launching of new products, or entering a new business • In politics: Diplomats and politicians use probability to analyse any situation of conflict between individuals, companies, states, and political parties. It is also used in war strategies, political voting, and political affairs **Expanding Brackets** **Equations, manipulating formulae** • Science: Equations, manipulating formulae, and using algebraic notation are used in Science regularly, particularly in Physics and Chemistry **Algebraic notation** • Business: Algebraic notation is also commonly used across Business/ICT and computing in spreadsheets and revenue calculations • Technology: Algebraic notation and substitution are used when working out areas and volumes of objects or materials **Where are these skills transferred to real life contexts?** • Accountancy: Algebraic notation and formulae are used regularly when working with financial planning. They use formulas every day to measure rates of interest and tax forms, some of which will involve complex equations with brackets	• Tax/Pensions: Percentage proportions are taking from wages to contribute to pensions and pay tax **Area and Perimeter** • Art: Area: Used to determine the amount of material or space for painting, sculpture bases, or installations. Perimeter: Planning frame sizes, borders, and edging designs for artwork • Textiles: Calculating the fabric required for garments or cushions, often involving rectangular or triangular patterns • Resistant Materials (RM): Cutting wood or metal pieces to specific dimensions (e.g. rectangular panels, triangular supports) • Food Technology: Portioning and packaging foods (e.g. brownies, flapjacks, sandwiches) often requires working with rectangular or triangular shapes for consistency • Physics: Surface area and perimeter are used when designing experiments (e.g. calculating heat loss from surfaces, pressure distribution) • Biology: Estimating areas of leaves or habitats during ecological surveys • Chemistry: Shapes of reaction surfaces (e.g. catalyst plates) are measured to understand rates of reaction • Geography: Area: Measuring land use (e.g. rectangular plots on a farm, triangular zones on a map). Perimeter: Calculating boundaries for fields, development zones, or natural features • Physical Education (PE): Perimeter: Marking out playing fields and courts (e.g. rectangular pitches, triangular zones in athletics).Area: Ensuring safe space per student for warm-ups or activities **Where are these skills transferred to real life contexts?** • Construction & Architecture: Area: Calculating floor space for rooms (usually rectangular), wall coverage for painting or wallpapering, or tiling. Perimeter: Fencing, baseboards, and skirting around rooms • Engineering & Manufacturing: Rectangles and triangles are used when cutting, welding, and assembling materials. Engineers use area to estimate surface finishes or load distribution • Catering, Baking & Food Industry: Area: Used when preparing trays or packaging for uniform food portions (e.g. slicing brownies into equal rectangles or sandwiches into triangles). Perimeter: Wrapping food, cutting edges neatly, and measuring for packaging	• Science: Geometric sequences can be used for growth and decay including bacteria and infection growth • Geography: Geometric sequences can be used to determine population growth. • Drama: Set production and plays follow sequences. • Business: Arithmetic sequences can be used to make estimations about how something will change in the future **Where are these skills transferred to real life contexts?** • Business/Demographics: The ability to forecast growth and population using sequencing including pricing and profits. • Farmers/agriculture: Need sequencing to predict crop growth and corresponding revenue growth. • Food production/factory production: Preparation of food/goods need to be followed in a sequenced order. Machinery will need to be programmed to follow a certain sequence. • Theatre production/Media: Plays and production follow sequencing for running orders. **Circumference** • Art: When working with 3D shapes in art, area of a circle will be need to be calculated for certain surface areas • Technology: In textiles and RM, pupils need to calculate area and circumference of circles when making clothing, and other objects. In food tech, making cakes, pizzas, and any other circular foods may require the calculation of area • Science: Area of a circle can be used when calculating with vehicles (wheels) and other cylindrical objects **Where are these skills transferred to real life contexts?** • Architecture: Architects and builders use the symmetrical properties of a circle to design Ferris-wheels, buildings, athletic tracks, roundabouts etc. • Engineering: The circular measurements are significant in the designing and manufacture of airplanes, bicycles, rockets etc. • Pizza factory/restaurant: Areas of circles are need when making and selling pizzas for pricing and sizing purposes • Bakery/cake shop: For the same reasons as above, area of a circle is needed in baking cakes

		asked the contestants to “take 2/5 of your dough and divide it into six biscuit balls” **Understanding Ratio** • Sharing into a ratio • Technology: When working with recipes, ratios are used for scaling up or down ingredients measures • Ratio notation, Simplifying and finding equivalent Ratios • Geography: When working with scales on a map, these are often given as a ratio and will need to be converted and simplified • Art: Scale drawings may require the use of working out equivalent ratios in lengths and measurements **Where are these skills transferred to real life contexts?** • Stock analysts: Evaluate publicly traded companies and make recommendations to investors based upon information given in ratio form. The stock investors will look at a price to earnings ratio • Lenders (property): Lenders who lend money for the purchase of mortgages are concerned with a debt ratio • Architecture: Architects and designers will need ratios when using scale drawings and creating designs in real life • Construction: Will need to work with scale ratios in the same way as above • Chefs/Bakers: Any profession which works with ingredients will need to use ratio when working with ingredients. Specifically, when baking/cooking on a large scale **Algebra Introduction** • Algebraic notation, Expressions and Substitution • Science: Equations, Substitution, Formulae and manipulating formulae are used in Science regularly, particularly in Physics and Chemistry • Business: Formulae is also commonly used across Business/ICT and computing in spreadsheets and revenue calculations. Functions and function machines are often used for showing processes • Technology: Substitution is used when working out areas and volumes of objects or materials **Where are these skills transferred to real life contexts?** • Accountancy: Formulae is used regularly when working with financial planning. They use formulas every day to measure rates of interest and tax forms • Computer programmer: Uses formulae and substitution when evaluating and analysing designs • Financial analyst: Use formulae when analysing risk and reward of investments. Substitution of values is key for forecasting pay offs		• Computer programmer: Uses formulae and substitution when evaluating and analysing designs • Financial analyst: Use formulae when analysing risk and reward of investments. Substitution of values is key for forecasting pay offs • Pharmacy Technician: Substitution and formulae is used when calculating quantities, counting and pricing	• Landscaping & Gardening: Area: Calculating lawn space, paving areas, or planting beds (often rectangular or triangular plots). Perimeter: Measuring garden borders, fencing lines, or edging paths • Interior Design & Home Improvements: Area: Estimating wallpaper, paint, or flooring needed for rectangular or triangular walls and rooms. Perimeter: Planning skirting boards, curtain tracks, or perimeter lighting • Retail & Business: Area: Display floor planning, shelving space, window display dimensions. Perimeter: Shop layout planning, calculating materials for signage or decoration • Transport & Automotive: Area and perimeter used in designing vehicle components, boot spaces, and loading areas—usually involving basic shapes like rectangles or right-angled triangles **Solving Equations** • Science: Equations are used in Science regularly, particularly in Physics and Chemistry • Business: Equations are used when forecasting future trends, profits, revenue, customer numbers etc **Where are these skills transferred to real life contexts?** • Almost any situation where there is an unknown quantity can be represented by a linear equation, like figuring out income over time, calculating mileage rates, or predicting profit • Event planners: A party planner has a limited budget for an upcoming event. They will need to figure out how much it will cost the client to rent a space and pay per person for meals. A linear equation can be constructed to show the total cost, expressed for any number of people in attendance • Any business setting: One of the most helpful ways to apply linear equations in everyday life is to make predictions about what will happen in the future. While real world factors certainly impact how accurate predictions are, they can be a good indication of what to expect in the future. Linear equations are a tool that make this possible	

		• Pharmacy Technician: Substitution and formulae are used when calculating quantities, counting and pricing • Management analysts: Use function machines to analyse outputs/rewards/profits for businesses based upon their inputs and the process of the business				
Spirituality	**Zero (0) and Emptiness:** • In Eastern philosophy (Buddhism, Taoism), zero resonates with the void, emptiness, and potential • In Hinduism, linked to the concept of Shunyata (emptiness) and cosmic cycles	The golden ratio: A unique ratio that appears in nature, art, and architecture.		Mathematical Order and Cosmic Harmony: The universe is governed by mathematical laws (e.g., gravity, motion, relativity).	Geometric shapes with symbolic and sacred meanings.	Geometric shapes with symbolic and sacred meanings. The golden ratio: A unique ratio that appears in nature, art, and architecture.
How can parents support the curriculum?	**Talk with your child about what they are learning about in Maths** • Be positive about Maths. Try not to say things like 'I can't do Maths' or 'I hated Maths at school' - your child may start to think like that themselves • Emphasize effort over innate talent. Praise your child's hard work rather than solely focussing on whether they get the right answer • Celebrate mistakes as learning opportunities. Frame errors as chances to learn and improve, rather than as failures • Be patient and encouraging. Take it slow, provide support, and celebrate even small successes	**Literacy and Oracy** • Discus the key words, that can be found in the 'Literacy' section of this document, that are associated with units of work covered throughout the corresponding half-term • Can they pronounce these words correctly? • Can they spell them correctly? • Can they explain what the mathematical meaning of these words is? • Can they give an example to show how the words are relevant to what they are learning about?	**Point out Maths in the Real World** • Refer to the information given in the 'CEIAG' sections of this document to help • Is your child aware of the different subjects in which they might use some of the same key skills as listed in the 'Knowledge & Skills' sections of this document? • Is your child aware of, and maybe interested in, some of the careers in which they might use some of the same key skills as listed in the 'Knowledge & Skills' sections of this document?	**Revision and Preparation for End of Year Assessments** • Support your child in creating a revision schedule to help them prepare for the end of year assessments • Refer to the 'Knowledge & Skills' sections, and the 'Links to prior learnings sections of this document, to help populate the schedule • Monitor your child to ensure that they are developing good habits by sticking to the agreed schedule that they have created • We recommend a minimum of 2 hours revising and practising their Maths skills, spread out over the course of each week	**Maths City** Consider taking a trip to Leeds to visit 'Maths City'. This is a National Mathematics Discovery centre, an interactive space in which visitors will enjoy and appreciate the power and importance of Mathematics as a tool for understanding the world in which we live.	**Summer Home Learning** • All students will be provided with a bespoke list of topics for which they need to work on to progress and improve in Mathematics • Their performance in the end of year exams will help to inform this • The list will be provided before they break for the Summer • Monitor your child's progress in working through their list so that they may make an optimum start to studying Maths in the next academic year