Year 8 Curriculum Implementation: Mathematics

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Knowledge & Skills	**Factors, Multiples and Primes** • Finding LCM and HCF • Finding the Product of Prime Factors • Using Prime Factorisation • Squares, cubes and roots **Algebra Functions and Formulae** • Forming Expressions • Substitution into Expressions • Substitution into Formulae • Rearranging Formulae (1 step, 2 step, involving fractions, multiple steps – not needing factorising) **Direct Proportion** • Ratio and multiplicative relationships (Introduction to ratio) • Simplifying ratio • Sharing into a ratio (using bar model) • Working with connected ratios • Direct Proportion (context-based questions, best value, recipes)	**Estimation** • Rounding and estimating • Rounding to Significant Figures **Circle Area** • Circumference of circles • Area of Circles • Area of sectors **Complex Linear Functions** • Solving Equations (linear) • Solving equations with Brackets • Solving Equations with unknowns on both sides • Solving Equations with negative solutions **Listing Outcomes and Relative Frequency** • Probability • Mutually Exclusive outcomes • Listing Outcomes • Sample space diagrams • Relative Frequency • Expected outcomes and bias	**Further Percentages** • Percentages of an amount with multipliers • Percentage increase with multipliers • Percentage decrease with multipliers • Finding percentage change **Identities in Algebra** • Expanding brackets and simplifying expressions • Expanding double brackets • Factorising into single brackets • Factorising into a single bracket (including variables as factors) • Factorising Quadratics (positive terms only) **Nth Term** • Finding the nth term (increasing sequences) • Finding the nth term (decreasing sequences) • Generating sequences / terms from the nth term • Using the nth term	**Construction** • Constructing Triangles • Constructions Involving Circles • Perpendicular Bisector • Bisecting Angles **Co-ordinates and Graphs** • Using Co-ordinates • Co-ordinates and Shape • Horizontal and Vertical Lines • Plotting Straight Line Graphs **Angles in Polygons** • Interior and Exterior Angles • Sum of Interior Angles • Using Sums of Angles • Sums of Exterior Angles	**Graphs and Charts** • Proportion from Tables • Drawing Pie Charts • Interpreting Pie Charts • Types of Graphs and Charts **Frequency Trees and Two-way Tables** • Two Way Tables • Frequency Trees **Averages from Tables** • Mode and Range from a table • Medin from Tables • Mean from Tables	**Transformations** • Reflections • Translation • Rotation • Invariant Points **Surface Area of Prism** • Surface area of Cuboids • Surface area of Prisms **Scale Diagrams** • Scale **Volume** • Volume of a cuboid • Volume of a triangular prism • Volume of a Non-Triangular prisms • Volume of composite 3D shapes • Problem solving involving volume of prisms
Links to prior learning	**Factors, Multiples and Primes** • Year 7 ○ Autumn 2 ○ Powers, Roots, Factors, Multiples and Primes **Algebra Functions and Formulae** • Year 7 ○ Autumn 2 ○ Algebra Introduction • Year 7 ○ Spring 1 ○ Substitution • Year 7 ○ Spring 2 ○ Expanding Brackets • Year 7 ○ Summer 1 ○ Solving Equations **Direct Proportion** • Year 7 ○ Autumn 2 ○ Understanding ratio • Year 7 ○ Spring 2 ○ Measures • Year 7 ○ Summer 1 ○ Percentages	**Estimation** • Year 7 ○ Autumn 1 ○ Place Value and Rounding **Circle Area** • Year 7 ○ Spring 1 ○ Substitution • Year 7 ○ Spring 2 ○ Measures • Year 7 ○ Summer 1 ○ Area and Perimeter **Complex Linear Equations** • Year 7 ○ Autumn 2 ○ Algebra Introduction • Year 7 ○ Spring 2 ○ Expanding Brackets • Year 7 ○ Summer 1 ○ Solving Equations **Listing Outcomes and Relative Frequency** • Year 7 ○ Autumn 2 ○ Working with Fractions • Year 7 ○ Spring 2 ○ Basic Probability	**Further Percentages** • Year 7 ○ Summer 1 ○ Basic Percentages **Identities in Algebra** • Year 7 ○ Autumn 2 ○ Algebra Introduction • Year 7 ○ Spring 2 ○ Expanding Brackets • Year 7 ○ Summer 1 ○ Solving Equations **Nth Term** • Year 7 ○ Autumn 1 ○ Negative Numbers and Operations • Year 7 ○ Summer 2 ○ Sequences	**Construction** • Year 7 ○ Spring 1 ○ Angle Properties **Co-ordinates and Graphs** • KS2 ○ Describe the position on a 2D grid using co-ordinates **Angles in Polygons** • Year 7 ○ Spring 1 ○ Angle Properties	**Graphs and Charts** • Year 7 ○ Autumn 2 ○ Understanding Ratio • Year 7 ○ Spring 1 ○ Angle Properties **Frequency Trees and Two-Way tables** • Year 7 ○ Spring 2 ○ Basic Probability **Averages From Tables** • Year 7 ○ Summer 2 ○ Data Types and Averages	**Transformations** **Surface Area of a Prism** • Year 7 ○ Summer 1 ○ Area and Perimeter • Year 8 ○ Autumn 2 ○ Circle Area **Scale Diagrams** • Year 7 ○ Autumn 2 ○ Understanding Ratio • Year 7 • Spring 2 ○ Measures **Volume** • Year 7 ○ Spring 2 ○ Measures • Year 7 ○ Summer 1 ○ Area and Perimeter
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**	**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

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Home learning	**Factors/Multiples/Primes** • Primes • Multiples and Factors • Lowest Common Multiple • Highest Common Factor • Roots **Algebra Basics/Substitution** • Forming Algebraic Expressions • Simplifying Expressions • Substitute into Expressions • Simplifying Expressions : Multiplication and Division **Fractions** • Mixed and Improper Fractions • Adding and Subtracting Fractions • Multiplying Fractions • Dividing Fractions • Adding and Subtracting Mixed Numbers • Multiplying and Dividing Mixed Numbers **Revision for Assessment** Pupils will have a set of topics to revise and can produce a revision sheet for the assessment. **Ratio** • Simplifying Ratios • Sharing with a Given Ratio • Converting Ratios into Fractions • Simplifying Ratios with Units • Part of a Ratio to the Whole **Rounding/Estimation and Dividing by Decimals** • Rounding to the Nearest Whole Number • Estimation • Manipulating Decimal Calculations with Division • Rounding to Mixed Decimal Places • Dividing Decimals by Decimals	**Product of Primes** • Prime Factorisation • Uses of Prime Factorisation **Circles and Circumference** • Naming the Parts of a Circle • Circumference: From Diameter • Circumference: From Radius • Using the Circumference to find the Radius or Diameter • Perimeter of Part Circles **Solving Equations** • Multiplying and Dividing with Negatives • Solving Equations: One Step • Solving Equations: Two Steps • Generating Equations from Words **Rearranging formulae** • Recalling and Using Formulae • Rearranging Formulae • Rearranging Formulae **Basics of Probability** • Probability Scale in Numbers • Calculating Probability • Fraction of Amounts • Manipulating Decimal Calculations with Multiplication • Mutually Exclusive Events **Revision for Assessment** Pupils will have a set of topics to revise and can produce a revision sheet for the assessment. **Converting between F/D/P** • Percentage to Decimals • Decimals to Fractions • Fractions to Percentage • Fractions to Decimals • Ordering Fractions, Decimals and Percentages **Percentages** • Understanding Percentages • Finding Multiples of Tens in Percentages • Finding Percentages of Amounts • Percentage Increase and Decrease	**Significant figures** • Rounding to 1 Significant Figure • Rounding to 2 Significant Figures • Rounding to 3 Significant Figures • Rounding to Mixed Significant Figures **Area of Circle** • Area of a Circle: From Radius • Area of a Circle: From Diameter • Using the Area of a Circle to find the Radius or Diameter • Areas of Part Circles • Areas of Composite Shapes with Part Circles **Proportion** • Recipe Ratio • Better Value • Ratio: Two Ratios • Ratio: Problem Solving **Listing outcomes** • Listing Outcomes • Sample Spaces • Relative Frequency • Expected Frequency **Percentages using multipliers** • Percentage Increase and Decrease (Calculator) • Finding Percentages : Integer Percentages < 100% • Finding Percentages > 100% or Non-Integer Percentages • Percentage Change • Repeated Percentage Increase and Decrease **Revision for Assessment** Pupils will have a set of topics to revise and can produce a revision sheet for the assessment.	**Solving Harder Equations** • Solving Equations: Two Steps • Solving Equations Including Brackets • Solving Equations with Unknown on Both Sides **Sequences** • Linear Sequences: Finding the Term-to-Term Rule • Linear Sequences: Using the Term-to-Term Rule • Linear Sequences with Diagrams : Term-to-Term Rule • Continuing Sequences **Basic Angle Facts** • Straight Line Angles • Angles Around a Point • Vertically Opposite Angles **Substitution** • Substitution into Expressions • Function Machines • Substituting into a Formula **Angles in shapes** • Angles in a Triangle • Angles in a Triangle : Isosceles Triangles • Angles in Quadrilaterals • Quadrilateral Facts **Revision for Assessment** Pupils will have a set of topics to revise and can produce a revision sheet for the assessment.	**Expanding Single brackets** • Expanding Single Brackets of the form: $a(x \pm b)$ $\pm a(x \pm b)$ $\pm a(\pm bx \pm c)$ $\pm ax(\pm bx \pm c)$ • Expanding and Simplifying **Angles in Polygons** • Sum of Interior Angles • Angles in Regular Shapes • Interior Angles in Irregular Shapes • Exterior Angles • Using Multiple Rules with Angles in Polygons **Expanding Double Brackets** • Expanding Double Brackets of the form: $(x \pm a)(x \pm b)$ $(ax \pm b)(cx \pm d)$ $(x \pm a)^2$ $a(bx \pm c)(dx \pm e)$ $a(bx \pm c)^2$ **Nth term** • Linear Sequences: Using the nth Term (Substitute) • Linear Sequences: Using the nth Term (Solve) • Linear Sequences: Finding the nth Term (Increasing) • Linear Sequences: Finding the nth Term (Decreasing) **Charts and Graphs** • Bar Charts • Multiple and Composite Bar Charts • Creating Pie Charts • Interpreting Pie Charts	**Revision for Assessment** Pupils will have a set of topics to revise and can produce a revision sheet for the assessment. **Graphs and Coordinates** • Plotting coordinates in all four quadrants • Horizontal and vertical lines • Drawing straight line graphs (positive) • Drawing straight line graphs (negative) **Frequency Trees** • Reading from frequency trees • Completing frequency trees • Probability from frequency trees **Area** • Area of rectangles • Area of triangles • Area of composite shapes **Averages** • Calculating Mean, Median and Mode of data sets • Calculating Mean from frequency tables • Calculating Mean from grouped frequency tables **Transformations** • Translations - completing and describing using vectors • Rotations - completing and describing • Reflections - completing and describing
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** **Factors, Multiple and Primes** Multiple, Factor, Common, LCM, HCF, Power, Index, Indices, Root, Square, Cube, Product, Prime **Algebra Functions and Formulae** Formula, Function, Equation, Expression, Substitute, Rearrange, Subject, Term, Coefficient, Variable, Constant **Direct Proportion** Ratio, Proportion, Proportional, Multiplier, Unitary method, Direct	**Key Words** **Estimation** Approximate, Round, Decimal place, Estimate, Accurate, Accuracy, Significant figure **Circle Area** Circle, Centre, Radius, diameter, chord, circumference, Pi, arc, tangent, sector, segment **Complex Linear Functions** Symbol, Expression, Variable, Substitute, Equation, Unknown, Enumerate, Operation, Solve, Solution, Brackets, Balance, Reverse	**Key Words** **Further Percentages** Percent, percentage, Percentage change, original amount, Multiplier, Exact, Increase, decrease **Identities in Algebra** Algebra, Expression, Term, Formula (formulae), Equation, Function, Variable, like terms, Simplify / Collect, Identity, Equivalent, Expression, Expand, Linear, Quadratic, factorise **Nth Term**	**Key Words** **Construction** Compass, protractor, Intersect, Arc, Line Segment, Perpendicular, Construct, Equal, Measure, Degrees, Accurate, Triangle, Angle, Equilateral, Isosceles, Bisector **Co-ordinates and Graphs** Grid, Axis, axes, x-axis, y-axis, Origin, Quadrant,	**Key Words** **Graphs and Charts** Data, Categorical data, Discrete data, Continuous data, Pictogram, Symbol, Key, Frequency, Table, Frequency table, Tally, Bar chart, Time graph, Time series, Bar-line graph, Vertical line chart, Scale, Graph, Axis, axes, Line graph, Pie chart, Sector, Angle **Frequency Trees and Two-way Tables**	**Key Words** **Transformations** (Cartesian) coordinates, Axis, axes, x-axis, y-axis, Origin, Quadrant, Translation, Reflection, Rotation, Transformation, Object, Image, Congruent, congruence, Mirror line, Vector, Centre of rotation **Surface Area of Prism** (Right) prism, surface area, compound, composite, cuboid, triangular, edge, face, vertices **Scale Diagrams** Compasses, Arc, Line segment, Perpendicular, Bisect, Perpendicular bisector, Locus, Loci, Scale factor, Scale drawing

		Listing outcomes and Relative Frequency Probability, Theoretical, Event, Outcome, Impossible, Unlikely, Even, Likely, Certain, equally likely, mutually exclusive, Exhaustive, Experiment, Frequency tree, Possibility space, sample space, Random, Bias, Fairness, Relative frequency **Famous Mathematicians** Short reading and comprehension exercise through Microsoft Forms on 'Famous Mathematicians – Hypatia'.	Pattern, Sequence, Linear, Term, Ascending, Descending, Term-to-term rule, Difference, Position-to-term rule, nth term, Generate	(Cartesian) coordinates, Point, Plot, Equation (of a graph), Function, Formula, Linear, Gradient, y-intercept, Substitute **Angles in Polygons** Angle, Degrees, Right angle, Acute angle, Obtuse angle, Reflex angle, Protractor, vertically opposite, Interior angle, exterior angle, Regular polygon **The Great Wall of China** Short reading and comprehension exercise through Microsoft Forms on 'The Great Wall of China'.	Frequency, branch, data, subgroup, two-way table, row, column, cell, row total, column total, grand total **Averages from Tables** Average, Spread, Consistency, Mean, Median, Mode, Range, Measure, Data, calculate an estimate, Grouped frequency, Midpoint	**Volume** (Right) prism, cylinder, Cross-section, pyramid, volume, compound, composite, cuboid, triangular, edge, face, vertices
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.	**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.	**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.	**Approach** Pupils must be encouraged to always show their working out, regardless of whether they are using a calculator or not.	**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.
Careers Information, Education, Advice and Guidance (CEIAG)	**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 Prime factor decomposition • 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 **Algebra Functions and Formulae** Algebraic notation, Substitution, Function Machines and Rearranging formulae • 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	• Estimation • 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?** • Business: The ability to estimate the time, resources and money needed to complete a project is necessary in almost any career • Teachers, for example, distribute supplies based upon their predictions of student use • Managers use these skills for creating yearly budgets, and most businesses depend on this ability for cost effectiveness • Circle Area • Area of a circle • 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	**Further Percentages** • Geography: Calculating percentage 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,	**Construction** Scale diagrams, Congruence, Similarity, Constructions and Loci • Technology: When creating and designing scale diagrams are used for the initial planning phase • Geography: Maps are scale diagrams of larger scale places (countries, continents etc) • Art: Scale drawings are required for design and creating of projects. The use of congruence and similarity is used for some drawings **Where are these skills transferred to real life contexts?** • Architects/interior designers: Scale drawings are used in the planning and design of houses, offices and any other areas • Builders, Plumbers and Electricians: Will need to use scale diagrams and floor plans to ensure safety in building, plumbing and design • Athletes: Loci is used to calculate the best path to take for the	**Graphs and Charts** Bar charts, Pie charts, Scatter graphs etc • Geography: Using scatter graphs to plot two variables such as death rates, earthquakes, population changes etc. Correlation is used to recognise trends and patterns in data. Population data or comparisons can be shown on pie charts • Science: Scatter graphs are used as above to plot two variables and compare using lines of best fit and correlation. Bar charts can be used when collecting and displaying results **Where are these skills transferred to real life contexts?** • Economists conduct research and analyse trends on a wide range of economic phenomena, including prices, employment, production, inflation and business cycles. Scatter graphs help visually illustrate relationships between two economic phenomena, such as employment and output, inflation and retail sales, and taxes and economic growth • Market research analyst - Market research involves conducting consumer surveys and focus groups, as well as gathering and analysing data on prices, sales and distribution. Often researchers analyse data on past sales to project future revenues.	**Transformations** Enlargements/Rotations/Reflections/Translation • Technology: When creating and designing, scale diagrams and enlargements are used for the initial planning phase • Geography: Maps are scale diagrams of larger scale places (countries, continents etc) and therefore enlargements and scale factors are used • Art: Scale drawings are required for design and creating of projects. The use of enlargements and scale factors are often used **Where are these skills transferred to real life contexts?** **Architects/interior designers: Scale drawings are used in the planning and design of houses, offices and any other areas** • Builders, Plumbers and Electricians: Will need to use scale diagrams and floor plans to ensure safety in building, plumbing and design **Surface Area of Prism** • Geography: Calculating space of territories, land, and sea • Science: Surface area is a fundamental concept used across various scientific disciplines. It is crucial in understanding phenomena related to reactions, heat transfer, and even the structure of living organisms • Art: Surface area is considered when creating sculptures, paintings, and other artistic pieces • DT: When creating 3D models in textiles/RM, pupils will need to consider the surface area of a shape to create packaging **Where are these skills transferred to real life contexts?** **Construction and Engineering: Surface area is crucial for calculating the amount of materials like concrete, steel and paint needed for building projects** • Packing and Manufacturing: Minimising the surface area of packaging while ensuring product protection is essential for cost-effectiveness and sustainability • Product design: Surface area calculations help in designing products that are both functional and aesthetically pleasing, like the shape of a container for optimal storage

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
- Pharmacy Technician: Substitution and formulae is 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

Direct Proportion

Ratio manipulation, Direct Proportion, Best Buys, and Recipes

- Technology: When working with recipes, ratios are used for scaling up or down ingredients measures
- 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 ratio and proportions when using scale drawings and creating designs in real life
- Construction: Will need to work with scale ratios and proportion in the same way as above
- Chefs/Bakers: Any profession which works with ingredients will need to use ratio and proportion when working with ingredients. Specifically, when baking/cooking on a large scale
- Business: Most businesses which require purchases of stock (clothes, ingredients etc), will need to use proportion when calculating 'best buys. Businesses need to calculate the best possible price of buying stock based upon the units they are purchasing when buying in bulk

- 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
- Complex Linear Functions
- Forming and solving linear 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
- Listing outcomes and Relative Frequency
- Cross curricular and career links
- Geography: Using probability in weather forecasting
- Science: In any experiment to predict the chance of an outcome. In Biology 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

mortgages and working with inflation

- Tax/Pensions: Percentage proportions are taking from wages to contribute to pensions and pay tax

Identities in Algebra

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 everyday 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 is 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

Nth Term

Linear, Quadratic, Geometric and Fibonacci

- 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

shortest possible distances in running

- Phone networking: Pylons need to be placed in exact locations to ensure efficient signalling to certain areas
- Farmers: When planning the dimensions of their land regarding to pens, fencing and animal space, loci is needed

Co-ordinates and Graphs

Graphs (Linear, Quadratic, Exponential, Reciprocal)

- Science: Linear equations formed in Physics from real life contexts can be plotted onto graphs and used for forecasting trends, solving problems and making predictions for experiments
- Business: Again, used for predictions, trends and forecasting
- Geography: Graphs used to compare data and information

Where are these skills transferred to real life contexts?

- Politics: Used for election votes, predictions and trends. The government use graphs to support their data on the economy and health (eg covid)
- NHS: Graphs will be used to compare and make predictions from regarding treatments, for monitoring purposes for example heart rates, blood sugar levels etc.
- 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 and is made even clearer by representing this information on a graph

Market research often involves writing reports that include statistical charts that report past sales and predict future sales

- Frequency Trees and Two-way Tables
- Geography: Using probability in weather forecasting
- Science: In any experiment to predict the chance of an outcome. In Biology 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 or 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
- Averages from Tables
- Averages and range, Data
- 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

- Ecosystem studies: Surface area measurements of land, water bodies and even leaves help scientists understand sunlight absorption, plant growth and carbon dioxide absorption rates
- Healthcare: Measuring skin temperature, heart rate, and respiratory rate (all related to surface area) helps doctors to assess organ function

Scale Diagrams

Scale diagrams, Congruence, Similarity, Constructions and Loci

- Technology: When creating and designing scale diagrams are used for the initial planning phase
- Geography: Maps are scale diagrams of larger scale places (countries, continents etc)
- Art: Scale drawings are required for design and creating of projects. The use of congruence and similarity is used for some drawings

Where are these skills transferred to real life contexts?

- Architects/interior designers: Scale drawings are used in the planning and design of houses, offices and any other areas
- Builders, Plumbers and Electricians: Will need to use scale diagrams and floor plans to ensure safety in building, plumbing and design
- Athletes: Loci is used to calculate the best path to take for the shortest possible distances in running
- Phone networking: Pylons need to be placed in exact locations to ensure efficient signalling to certain areas
- Farmers: When planning the dimensions of their land regarding to pens, fencing and animal space, loci is needed

Volume

- Geography: Calculating space of territories, land, and sea
- Science: Volume is used across a lot of the Physics curriculum with regards to density and mass of objects. Chemistry also uses volumes for substances, and volume of gases. In Biology, Volume is calculated for cells
- Art: 3D shapes are commonly drawn and volume is calculated from these. In Art they may need to create 3D objects linked to scale drawings and therefore will need to scale the volume
- DT: When creating 3D models in textiles/RM, pupils will need to consider the volume of the 3D shape

Where are these skills transferred to real life contexts?

- Gardeners, landscaping and construction: They will need to consider the volume of spaces, land, or buildings when purchasing materials, pricing, and costing
- Medicine: Any NHS worker who needs to administer drugs/medication needs to be aware of the volume of the substance to be given linked tp the rate at which It is administered
- Product packaging/manufacturing: Product packaging needs to be made to fit the quantity of the item inside and therefore volume needs to be accurately measured to minimise waste
- Transportation of goods: The volume of space inside the lorry/boat/van would need to be sufficient to carry certain amounts of goods

		• 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 or 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	• 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	**Angles in Polygons** Angle and shape 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 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	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	
Spirituality	• Pythagorean Mysticism: Numbers are the essence of all things • The golden ratio: A unique ratio that appears in nature, art, and architecture	Geometric shapes with symbolic and sacred meanings.	Fibonacci sequences can be seen as a natural blueprint.		Mathematical infinity: Symbol of the infinite nature of the divine or the soul.	Platonic Solids: Used by Plato to represent the classical elements (earth, air, fire, water, ether).
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	**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?	**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	**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	**Equipment** Check that your child has a full geometry set in readiness for units of work coming up next half-term, and that they are bringing it to school with them. • Pencils • Sharpener • Eraser • Ruler • Protractor • Compass	**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

	• Be patient and encouraging. Take it slow, provide support, and celebrate even small successes	• Can they give an example to show how the words are relevant to what they are learning about?	same key skills as listed in the 'Knowledge & Skills' sections of this document?	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	Please note that black pens, a scientific calculator, a green pen, a purple pen and a mini-whiteboard pen, will still be required.	