Cross-curricular and real-life connections in maths

Number and place value

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Ages of family members and friends. Numerals as labels on buses, cars. Telephone numbers. Page numbers in books and magazines. Games of all kinds, e.g. board games, computer games, football scores. Preparing for parties, planning activities and events, counting supplies. Measuring, money and time.		Comparing quantities in real life contexts such as counting those present in school or having school dinners. Comparing measures such as length, weight or volume of different objects. Organising data by collecting information about pets that others have or the distances that they travel to get to school. PE/sports day - counting and measuring and comparing quantities. Counting the number of seeds in a packet can support understanding of large numbers and see the value of strategies such as rounding to the nearest 10.	Roman Numerals in Year 4 can be developed alongside knowledge of other number systems throughout history - common sources will be clocks, page numbers in books, production dates on films and TV programmes. Negative numbers through the contexts of temperature, or bank accounts in the 'red'. Counting in multiples, linked to 'everyday' items such multiples of six eggs, multiples of 6 players in a six-a-side football team, 9 players in a baseball team. Numbers 1000 or more such as dates and money. Rounding or estimating in the context of numbers of people in an audience or crowd.	Science - recording changes over periods of time and comparing them. Place value of periods of time and the number system. Record, for example, heights of plants using decimal notation. Geography - compare distances between countries or cities, temperatures, lengths of rivers, heights of mountains. History – how the Roman number system developed.	Geography - ordering and understanding population size of different towns, cities, countries and continents gives a useful context for looking at larger numbers. National newspapers and news programmes often provide statistics comparing values of money or other measures. Temperature is often the easiest context through which to teach a good understanding of negative numbers.

Addition and subtraction

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Science - explore and answer questions about animals in their habitat - add and subtract to find totals and differences. Geography - weather patterns - use subtraction to find differences in the temperatures of the different areas. History - chronology - subtraction or counting on to find time differences between events. Addition to find the number of years the people they studied lived or the lengths of reign of different Kings and Queens.	Science - sorting and classifying and recording their findings using charts - finding totals and differences using the strategies for addition and subtraction. Geography - weather patterns - use subtraction to find differences in the temperatures of the different areas. History - dates on a number line and compare how long they went on for by counting on or back. Plot birth and death on a number line and count on or back to see how long they lived. Compare the ages of significant individuals.	Real-life applications - the total cost of two items costing 48p and 36p - convert the answer into the appropriate units. Shop role-play area - buy combinations of different items, how much change would you get. Limited budget to buy items for a party. Sell items to raise money for school fund or charity.	Shopping - find totals, calculate change and estimate costs in pounds and pence. Planning a budget for various projects. Design technology - designing models and packaging. Calculating perimeters for fencing and borders.	Money - add prices, calculate change, add surcharges or interest. Measurement - to add lengths, calculate remaining distance in a journey, find how much more/less liquid is needed, add quantities when cooking, calculate perimeters of regular and irregular shapes, work out time differences. Statistics - comparing and combining sets of data, interpreting data. Science - when adding and subtracting test measurements. History - when comparing historical data from different periods, calculating the duration of monarchs' reign. Geography - when comparing populations, temperatures and other data for contrasting regions around the world.	Science - observing changes over different periods of time, noticing patterns, interpret graphs and charts and find totals and differences in pieces of data, including measurement. Geography - find and compare distances between countries or cities, compare population statistics, temperatures, lengths of rivers, heights of mountains. History - find differences between the duration of the different periods, such as the Stone Age and Iron Age or find the lengths of the reigns of different British monarchs.

Multiplication and division

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Money - when shopping and recognising prices of items, ordering items by price, finding quantities in multiple purchases, sales prices, sharing costs. Measurement - calculating area and perimeter, finding journey distances, reading and calculating scales, adjusting recipe quantities. Data - interpreting and evaluating data, calculating amounts from pie charts and pictograms.		Problem solving work involving finding all possibilities and combinations draws on knowledge of multiplication tables facts. Fractions work within other curriculum areas and in real life links naturally to multiplication and division work. The notion of equal groups can emerge in many different activities and contexts, e.g. when packing boxes, purchasing quantities of items for several people etc.	Counting – Calculating totals by counting small amounts then scaling up e.g. standing against a tree and using your known height to work out 'How many of me are equal to the height of the tree?' Money – adding multiple products of the same price, adding coins of same value, working out fraction/percentage discounts and special offers, sharing bills. Measurement – Scaling quantities to cater for more and less people. Geography - comparing river lengths/building heights. Statistics – Reading scales and determining appropriate scales for different types of graph relating to weather, temperature, sound etc.,	Geography - currencies used in a selection of countries.	Art - Designing and creating life size models of a sculpture or a painting where the children need to find realistic measurements and then scale them down using division. Geography - converting between miles and kilometres when looking at distances between countries or famous locations, making currency converters. History - scale models could be one way of learning about life in different periods.

Fractions (including decimals and percentages)

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Halves and quarters can be linked to many different 'real-life' contexts - children naturally use the term 'half' or 'halve' in general conversation. Encourage them, and the adults working with them, to refine their use of the word, and try to use it accurately.		Sharing: build on children's earliest experiences of fractions which are associated with sharing food, toys and money etc. with family and friends. Money - shopping: comparing prices, sales (1/2 price) Measurement: Link to scaling and proportion, for example, halving recipes Fractions all around us: What fractions can you see in the classroom, around the school, in the local environment? For example, what fraction of the class are boys, girls or adults? What fraction of the class have pets?	Measurements - Children can be asked to find the position 1/10 along a metre stick. Where would ¾ be? How many centimetres along the stick is that? Reading scales - When using a tape measure, kitchen scales, a measuring jug. They may be asked to find 1/10 of a metre, a kilogram, a litre. Exploring fractions in everyday contexts - how many square pieces make half of this chocolate bar? Data handling - which flavour crisps did ¼ of the children like best?	Measurement - when calculating measures for recipes, calculating journey times and fuel consumption. Money - working out the result of sales offers, tips/gratuities on bills, comparing prices. Geography - interpreting and evaluating data e.g. 19% of the world's population lives in China.	When shopping, compare prices presented in decimal form. Consider reductions in price when the reduction is given as a fraction (e.g. 'one third off') or percentage ('20% off today'). Sharing the cost of a total bill equally in a restaurant provides a useful context in which to practise estimation of fractions as well as calculating. Journey times and fuel consumption can be estimated and calculated. Measurement of area and perimeter: what proportion of the playground needs to be set aside for ball games? Interpreting and evaluating data: e.g. half a million people are earning 20% below the minimum wage.

Measurement

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Science – take simple measurements using equipment e.g. hand lenses, egg timers to gather data, carry out simple tests, record simple data, and talk about what they have found out and how they found it out. They can also connect measurement with the four seasons by observing and describing how day length varies. History - plotting the years of different events on a number line. Design technology - practical activities may require measuring of lengths.	Time is a sequence of events that relates to our daily life. Clocks, watches and calendars are tools that measure time. Using money involves using different mathematics skills like counting, adding, and subtracting amounts of money. Measurement skills are extensively used in every kitchen, every recipe. Science - measuring plant growth and monitoring and recording temperatures. P.E. – measuring long jumps, counting skips, timing races, etc.	Measurement is a practical application of mathematics in real life. Work with money, estimate and/or calculate length, mass, capacity and time e.g. how long it will take us to travel somewhere, what time we need to leave home to get to an appointment, how much water to put in the kettle to make a mug of coffee. Science - taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.	Science - measuring temperatures using a thermometer and tracking the changes, making a note of the time in 24 hour digital format. Design and technology - opportunities for accurate measuring of length using different units in the designing and making stages. Cooking - need to measure mass and volume. Scale them up or down for different numbers of people. Timetables to show preparation, cooking and clearing up times using 12 or 24 hour digital formats. Everyday uses - length (distance walking into school), mass (weight of their back pack), capacity and volume (filling their flask with juice), time (leaving home to get to school on time).	Measurement is an area of mathematics that is used constantly in real-life situations. When decorating a room, measurement of area is needed for carpeting the floor, as well as calculating the rolls of wallpaper needed, or litres of paint required. Working with drawings of a room to a specified scale and determining the measurements of furniture to fit. Design Technology - work to scale, accurately measuring plans and products as they are developed.	Geography - map work involves the use of scale, and conversion between measurements. Convert between pounds Sterling and currencies of other countries, using formulae or straight line conversion graphs. Calculations of area and perimeter are often used when decorating rooms (for carpet, paint, skirting board etc.) or a garden (circular/square pond area, lawn area, perimeter fencing, etc.).

Geometry – properties of shapes

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
P.E. - Making shapes with your own body in gymnastics and dance. Geography – looking at shapes within the natural environment, on maps and plans. Small world play – different shaped pieces and containers used in sand and water play and shapes cut out in modelling dough. Design Technology – when using construction kits children can be encouraged to describe their work using vocabulary associated with the properties of shapes. Shapes in the environment, shape packaging and those in artwork and pictures.	Children use the language associated with shape to describe the physical world and their environment. Understanding how things fit together (or when and why they do not) is important for making connections. Building anything involves a lot of critical consideration about shape in three dimensions, as well as angles. Reading maps and simple plans also involves an understanding of the relationship between 2-D and 3-D shape.	Art - make a selection of 3D shapes, such as, spheres, cubes, cuboids and pyramids out of clay and then put them together to make a sculpture of their own design. Design technology - make packaging for something to be sold, explore nets of cubes and cuboids. Art - the works of famous artists such as Mondrian and Kandinsky, explore the shapes that they can see, the angles, parallel and perpendicular lines. In real life, shape and pattern are everywhere. Explore shape in their environment. What 3D shapes can they see in the classroom? What 2D shapes can they see in patterns?	The world around them – e.g. symmetry on wrapping paper, tiles, letters and digits on labels. Design technology - the use of different triangles in bridge building. P.E. - using symmetry to create dance sequences, gymnastic routines. Computing - using programmable robots to create specific shapes. Art - Islamic Patterns.	Art - geometric shapes and properties, using digital cameras to capture geometric shapes and objects in the environment and around school.	The world around them – recognise and describe 3-D shapes used in building houses, packaging used by supermarkets and storage boxes used in and around the home. Design technology – draw 2-D shapes using given dimensions and angles to make and construct technology projects. Building simple and more complex 3-D shapes using plastic toy construction materials. P.E. - orienteering, use knowledge of angles to find clues and use an understanding of properties of shapes to solve problems. Computing - design sequences, building of 3-D models. History – Pyramids and obelisks, build models to understand the faces and angles used in building 3-D shapes used throughout history.

Geometry – position and direction

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
P.E. - games include instructions relating to position and direction, e.g. labelling the corners of a room the 'N, S, E and W'. Action songs, rhymes and games such as 'Simon Says...' can be adapted to include directional instructions. Many popular children's stories can provide engaging contexts for this mathematical work to teach an understanding of directional maps and models. Small world play resources, using play mats and figures, can provide excellent settings for creating real life scenarios (traffic following set routes, animals being delivered to a zoo, stacking classroom shop shelves with supplies etc.) to physically demonstrate and practise key skills.	Science - compare the way different animals move. They could record these in tables or on charts, for example, finding out animals that fly, swim, crawl or run. They could observe how they do this. Do they travel in straight lines, move in a circular motion or dart about in different directions. Geography - use simple compass directions (North, South, East and West) and locational and directional language (e.g. near and far; left and right) to describe the location of features and routes on a map. Identify places on maps and to work out in which direction they need to travel to get from one place to another.		Geography - map referencing and directions. Design technology – designing rooms, planning buildings and construction projects, scaling up and down. Art - looking at patterns and architecture.		

Statistics

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Science - sorting and classifying things according to whether they are living, dead or were never alive, and recording their findings using charts, observing and recording the growth of a variety of plants as they change over time from a seed or bulb, or observing similar plants at different stages of growth. Geography - atlases are a great source of different types of graphs. Activities that go on in school to give statistics work some relevance and purpose - How many children walk to school? What type of library books are borrowed the most often?	Science - record findings using keys, bar charts, and tables - Venn and Carroll diagrams. Geography - gather relevant data and present it in tables, bar charts or pictograms and then analyse their findings.		Science - represent and interpret data collected in science investigations. Geography - plotting and interpreting data for international and local weather as well as other geographical data for population, land use etc. Statistics are also used in everyday life. e.g. when reading bus timetables and information charts.	Geography - data and information based on other regions and countries. Science - recording measurements and readings e.g. temperature, plant height, etc, can all be used as datasets.