Maths in the Broader Curriculum

A Care Group and Stars Group Collaboration
March 2020

Introduction

This document has been complied by the Maths Subject Leaders of the Schools within the CARE Hub and STARS Hub groups. It is designed to give Teachers ideas to make links with Maths across the Broader Curriculum and real life experiences. For each year group, there is a sub-division of National Curriculum Strands and Objectives with links to separate subject content.

Contents

SECTION A – YEAR 1

Year Group	*Year 1*	
National Curriculum Objective	*Number – Place Value*	
Steps within the Objective	• count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number • count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens • given a number, identify one more and one less • identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least • read and write numbers from 1 to 20 in numerals and words.	
Broader Curriculum and real life experiences (cultural capital) links	Science	• Ages of family members and friends. Teenagers are of particular interest! • Measuring, money and time • Seasonal change- recoding temperature-reading numbers on scales.
	Geography	• Page numbers in books and magazines (ordinal) Atlas work • Temperature recording-reading numbers on scales
	History	• Chronological order
	ICT	• Reading and recognising numbers on keyboard • Simple algorithms. Programming toys to move a number of spaces (Beebot)
	Art	
	DT	
	PE	• Measuring, money and time • Games of all kinds, e.g. board games, computer games, football scores
	Other	• Numerals as labels on buses, car etc., telephone numbers • Preparing for parties, planning activities and events, counting supplies
	Outdoor Learning (optional)	

Year Group	*Year 1*	
National Curriculum Objective	*Addition and Subtraction*	
Steps within the Objective	• read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs • represent and use number bonds and related subtraction facts within 20 • add and subtract one-digit and two-digit numbers to 20, including zero • solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ☐ – 9.	
Broader Curriculum and real life experiences (cultural capital) links	Science	Within the science curriculum there are opportunities to connect with addition and subtraction, for example, in the programmes of study the children are expected to use their local environment throughout the year to explore and answer questions about animals in their habitat. They need to be able to sort and group them. This would give opportunities for children add and subtract to find totals and differences.
	Geography	Within the geography curriculum, the children are expected to identify seasonal and daily weather patterns in the United Kingdom and the location of hot and cold areas of the world in relation to the Equator and the North and South Poles. When they do this they could use subtraction to find differences in the temperatures of the different areas.
	History	Within the history curriculum, the children are expected to explore where the people and events they study fit within a chronological framework. This could involve using subtraction or counting on to find time differences between these events. They could use addition to find, for example the number of years the people they studied lived or the lengths of reign of different Kings and Queens.
	ICT	
	Art	
	DT	
	PE	Totalling scores
	Outdoor Learning	

Year Group	*Year 1*	
National Curriculum Objective	*Multiplication and Division*	
Steps within the Objective	• solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	
Broader Curriculum and real life experiences (cultural capital) links	Science	**Data** - interpreting and evaluating data, calculating amounts from pie charts and pictograms.
	Geography	
	History	
	ICT	**Data** - interpreting and evaluating data, calculating amounts from pie charts and pictograms.
	Art	
	DT	**Measurement** - calculating area and perimeter, finding journey distances, reading and calculating scales, adjusting recipe quantities.
	PE	
	Other	**Money** - when shopping and recognising prices of items, ordering items by price

Year Group	*Year 1*	
National Curriculum Objective	*Fractions (including decimals and percentages)*	
Steps within the Objective	• recognise, find and name a half as one of two equal parts of an object, shape or quantity • recognise, find and name a quarter as one of four equal parts of an object, shape or quantity	
Broader Curriculum and real life experiences (cultural capital) links	Science	Fractions, in particular 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.
	Geography	
	History	
	ICT	
	Art	
	DT	
	PE	
	Outdoor Learning (optional)	

<table>
<tr><td>Year Group</td><td colspan="2">Year 1</td></tr>
<tr><td>National Curriculum Objective</td><td colspan="2">Measurement</td></tr>
<tr><td>Steps within the Objective</td><td colspan="2">

compare, describe and solve practical problems for:

lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]
mass/weight [for example, heavy/light, heavier than, lighter than]
capacity and volume [for example, full/empty, more than, less than, half, half full, quarter]
time [for example, quicker, slower, earlier, later]

measure and begin to record the following:

lengths and heights
mass/weight
capacity and volume
time (hours, minutes, seconds)

recognise and know the value of different denominations of coins and notes
sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]
recognise and use language relating to dates, including days of the week, weeks, months and years
tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.

</td></tr>
<tr><td rowspan="6">Broader Curriculum and real life experiences (cultural capital) links</td><td>Science</td><td>Within the science curriculum there are opportunities to connect with measurement, for example, the children are expected to use simple measurements and 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.</td></tr>
<tr><td>Geography</td><td></td></tr>
<tr><td>History</td><td>Within the history curriculum, the children are expected to explore where the people and events they study fit within a chronological framework. This could involve plotting the years of different events on a number line.</td></tr>
<tr><td>ICT</td><td></td></tr>
<tr><td>Art</td><td></td></tr>
<tr><td>DT</td><td>Within the design and technology curriculum there are opportunities to connect with measurement when the children carry out practical activities that might require accurate measuring of lengths.</td></tr>
</table>

	PE	
	Outdoor Learning Other	

Year Group	*Year 1*	
National Curriculum Objective	*Geometry – Properties of shapes*	
Steps within the Objective	recognise and name common 2-D and 3-D shapes, including: • 2-D shapes [for example, rectangles (including squares), circles and triangles] • 3-D shapes [for example, cuboids (including cubes), pyramids and spheres].	
Broader Curriculum and real life experiences (cultural capital) links	Science	
	Geography	**Geography** – looking at shapes within the natural environment, on maps and plans
	History	
	ICT	
	Art	Shapes in the environment, shape packaging and those in artwork and pictures.
	DT	**Design Technology** – when using construction kits children can be encouraged to describe their work using vocabulary associated with the properties of shapes
	PE	**P.E.** - Making shapes with your own body in gymnastics and dance
	Outdoor Learning (optional) Other	**Small world play** – different shaped pieces and containers used in sand and water play and shapes cut out in modelling dough.

Year Group	*Year 1*	
National Curriculum Objective	*Geometry – Position and Direction*	
Steps within the Objective	• describe position, direction and movement, including whole, half, quarter and three-quarter turns.	
Broader Curriculum and real life experiences (cultural capital) links	Science	
	Geography	
	History	
	ICT	
	Art	
	DT	Use of positional language in construction of projects.
	PE	PE and dance lessons prove easy contexts in which to apply and consolidate skills. Games can include instructions relating to position and direction, e.g. labelling the corners of a room the 'N, S, E and W'
	Outdoor Learning (optional) Other	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. *'We're Going on a Bear Hunt'* (Rosen, M.& Oxenbury, H.,1997, Walker Books) is a good example where the vocabulary of position, direction and movement can be used in context. *'Rosie's Walk'* (Hutchins, P, 1998, Bodley Head) and *'Katie Morag Delivers the Mail'* (Hedderiwck, M, 2-1-, Red Fox): both provide superb contexts in which 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.

SECTION B – YEAR 2

Year Group	*Year 2*	
National Curriculum Objective	*Number – Place Value*	
Steps within the Objective	*count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward* *compare and order numbers from 0 up to 100; use <, > and = signs* *identify, represent and estimate numbers using different representations, including the number line* *read and write numbers to at least 100 in numerals and in words* *recognise the place value of each digit in a two-digit number (tens, ones)* *use place value and number facts to solve problems*	
Broader Curriculum and real life experiences (cultural capital) links	Science	Within the science curriculum there are opportunities to connect with number and place value, for example, in the notes and guidance it suggests that the children might work scientifically by sorting and classifying things according to whether they are living, dead or were never alive, and recording their findings using charts. The results from their findings can be compared and ordered.
	Geography	Within the geography curriculum, the children are expected to identify seasonal and daily weather patterns in the United Kingdom and the location of hot and cold areas of the world in relation to the Equator and the North and South Poles. When they do this they could order the different temperatures and compare using the greater and less than symbols.
	History	Within the history curriculum, the children are expected to explore where the people and events they study fit within a chronological framework. This could involve ordering the dates of events and the coronations of different Kings and Queens and placing these on a class number line.
	Art	Hold an auction for some of the children's art work. Children to go around and place their amount they would pay for that artwork on the table. Who gained the highest amount? How do they know? *Greater and less than can be discussed as well.
	Other	Bingo! Children need to recognise two digit numbers and play a game of bingo! Bank role play- children need to write cheques (writing numbers in words) Visit a bus stop- What number is the bus? Could they take a trip on a bus? Links with English- using a dictionary- the word is one page _____

Year Group	*Year 2*	
National Curriculum Objective	*Addition and Subtraction*	
Steps within the Objective	*recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100* *add and subtract numbers using concrete objects, pictorial representations, and mentally, including:* * *a two-digit number and ones* * *a two-digit number and tens* * *two two-digit numbers* *adding three one-digit numbers* *show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot* *recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.* *solve problems with addition and subtraction:* * *using concrete objects and pictorial representations, including those involving numbers, quantities and measures* *applying their increasing knowledge of mental and written methods*	
Broader Curriculum and real life experiences (cultural capital) links	Science	Within the science curriculum there are opportunities to connect with addition and subtraction, for example, in the notes and guidance it suggests that the children might work scientifically by sorting and classifying things according to various criteria, and recording their findings using charts. This could include finding totals and differences using the strategies for addition and subtraction that they have covered in class.
	Geography	Within the geography curriculum, the children are expected to identify seasonal and daily weather patterns in the United Kingdom and the location of hot and cold areas of the world in relation to the Equator and the North and South Poles. When they do this they could the numerical differences in the seasonal average temperatures
	History	Within the history curriculum, the children are expected to explore events beyond living memory that are significant nationally or globally. When they do this they could plot relevant dates on a number line and compare how long they went on for by counting on or back along it. They also need to explore the lives of significant individuals in the past who have contributed to national and international achievements. The children could plot the years in which they were born and died on a number line and work out, by counting on or back, for how many years they lived. They could then compare the ages of different people and work out how much older one person was than another
	Art	A paint by numbers activity involving addition or subtraction (For example: 12 + 8 = 20, 20-30= red)

	Other	Shop role play: with shopping list to add two amounts (link with money), adding 3 one-digit numbers

Year Group	*Year 2*	
National Curriculum Objective	*Multiplication and Division*	
Steps within the Objective	*recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers* *show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot* *calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs* *solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts*	
Broader Curriculum and real life experiences (cultural capital) links	Science	When creating tally charts, counting in 5's can be used. Data – interpreting and evaluating data, calculating amounts from pie charts and pictograms.
	DT	Reading and calculating scales when baking, adjusting recipe quantities
	PE	Warm-ups- can you get yourself into groups of 2, 3, 5, 10,
	Other	Shop role play: Buying multiple items, sharing the cost of items

Year Group	*Year 2*	
National Curriculum Objective	*Measurement*	
Steps within the Objective	*compare and order lengths, mass, volume/capacity and record the results using >, < and =* *compare and sequence intervals of time* *choose and use appropriate standard units to estimate and measure* ***length/height*** *in any direction (m/cm);* ***mass*** *(kg/g);* ***temperature*** *(°C);* ***capacity*** *(litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels* *recognise and use symbols for pounds* ***(£) and pence (p)****; combine amounts to make a particular value* *find different combinations of coins that equal the same amounts of money* ***solve simple problems*** *in a practical context involving addition and subtraction of money of the same unit, including giving change* *tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times.* *know the number of minutes in an hour and the number of hours in a day.*	
Broader Curriculum and real life experiences (cultural capital) links	Science	Measuring plant growth, measuring distance using metre sticks in experiments (everyday materials: which material does the car travel the fastest on?), recording temperatures- how warm is your classroom?
	History	Time is a sequence of events that relates to our daily life. Clocks / watches and calendars are tools that measure time. How did they measure things in the past?
	PE	Timing races, measuring throws or jumps
	Other	Discussions at home about how their adults at home use measurements Shop role play area: money

Year Group	*Year 2*	
National Curriculum Objective	*Fractions*	
Steps within the Objective	*recognise, find, name and write fractions $^{1}/_{3}$, $^{1}/_{4}$, $^{2}/_{4}$ and $^{3}/_{4}$ of a length, shape, set of objects or quantity* *write simple fractions e.g. $^{1}/_{2}$ of 6 = 3 and recognise the equivalence of $^{2}/_{4}$ and $^{1}/_{2}$.*	
Broader Curriculum and real life experiences (cultural capital) links	Science	
	Geography	
	ICT	
	DT	After baking- discussions about how to share that has been made
	PE	Splitting the class into groups- halves, thirds, quarters
	Other:	

Year Group	*Year 2*	
National Curriculum Objective	*Shape*	
Steps within the Objective	*identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line* *identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces* *identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]* *compare and sort common 2-D and 3-D shapes and everyday objects*	
Broader Curriculum and real life experiences (cultural capital) links	Science	
	Geography	Children need to be encouraged to use the language associated with shape in order 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. For example, 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	Creating artwork by only using 2D shape. Symmetrical art- butterflies
	PE	Warm ups involving 2D shapes- running around- say a shape- children need to create this shape with their peers.
	Outdoor Learning	Shape hunt: where have different shapes been used in our environment?

Year Group	*Year 2*	
National Curriculum Objective	*Position and Direction*	
Steps within the Objective	*use mathematical vocabulary to describe position, direction and movement including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise)* *order and arrange combinations of mathematical objects in patterns and sequences*	
Broader Curriculum and real life experiences (cultural capital) links	Science	Within the science curriculum there are opportunities to connect with geometry: position and direction, for example, one of the requirements states that 'pupils should be taught to: identify and name a variety of plants and animals in their habitats, including micro-habitats. When studying animals, including those in micro-habitats, the children could 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	Within the geography curriculum, the children are expected to 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. Give children the opportunity to identify places on maps and to work out in which direction they need to travel to get from one place to another.
	History	
	ICT	Using the BeeBots- lots of printable mats on Twinkl are available that can be linked to other areas (geography-maps)
	PE	Warm up activities involving following instructions Dance unit- instructions given (2 steps forward)
	Outdoor Learning	

Year Group	*Year 2*	
National Curriculum Objective	*Statistics*	
Steps within the Objective	*interpret and construct simple pictograms, tally charts, block diagrams and simple tables* *ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity* *ask and answer questions about totaling and comparing categorical data*	
Broader Curriculum and real life experiences (cultural capital) links	Science	In Science ; • Living things and their habitats Non-statutory guidance: Pupils might work scientifically by: sorting and classifying things according to whether they are living, dead or were never alive, and recording their findings using charts. • Plants Non-statutory guidance: Pupils might work scientifically by: observing and recording, with some accuracy, 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; setting up a comparative test to show that plants need light and water to stay healthy. • Uses of everyday materials Non-statutory guidance Pupils might work scientifically by: comparing different sound sources and looking for patterns; carrying out tests to find the best places to locate fire bells in school. • Sound Non-statutory guidance Pupils should be encouraged to think about unusual and creative uses for everyday materials. They could ask questions about the movement of objects such as toy cars on different surfaces; comparing

		them, by measuring how far they go; ordering their findings and recording their observations and measurements, for example by constructing tables and charts, and drawing on their results to answer their questions.
	Geography	Recording temperatures over a period of time, recording weather patterns over a period of time
	History	Looking at how change has happen over time- for example: how many people drove a car 20 years ago compared to now?
	ICT	Using online platforms if access to (Purple Mash) to create their graphs online
	PE	
	Outdoor Learning (optional)	

SECTION C – YEAR 3

Year Group	*Year 3*	
National Curriculum Objective	*Number – Place Value*	
Steps within the Objective	• *count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number* • *recognise the place value of each digit in a three-digit number (hundreds, tens, ones)* • *compare and order numbers up to 1000* • *identify, represent and estimate numbers using different representations* • *read and write numbers up to 1000 in numerals and in words* • *solve number problems and practical problems involving these ideas.*	
Broader Curriculum and real life experiences (cultural capital) links	Science	Recording data and taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.
	Geography	Find and compare distances between countries or cities temperatures, lengths of rivers heights of mountains. These comparisons will involve finding differences, which involve a secure understanding of place value.
	History	Create a chronological timeline as stated 'know and understand the history of these islands as a coherent, chronological narrative, from the earliest times to the present day.'
	ICT	
	Art	
	DT	
	PE	School sports day can offer opportunities for counting and measuring and comparing quantities. Measure distances in running, javelin,
	Outdoor Learning (optional)	Create number line using natural materials outside. Use metre sticks to estimate and measure length of field etc. Create our own place value resource using the natural objects you find.

Year Group	*Year 3*	
National Curriculum Objective	*Addition and Subtraction*	
Steps within the Objective	• *add and subtract numbers mentally, including:* • *a three-digit number and ones* • *a three-digit number and tens* • *a three-digit number and hundreds* • *add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction* • *estimate the answer to a calculation and use inverse operations to check answers* • *solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.*	
Broader Curriculum and real life experiences (cultural capital) links	Science	Finding the difference when making comparisons in tests, adding and subtracting liquids.
	Geography	Comparing temperatures around the world.
	History	Comparing length of reign for different monarchs. Calculating the length of wars etc.
	ICT	
	Art	
	DT	Cooking – measuring amounts, adding or subtracting amounts. Calculating cooking times.
	PE	Adding up scores. Subtracting points for penalties etc.
	Outdoor Learning (optional)	Add and subtract numbers from your created place value resource using the natural materials. Estimate and measure lengths of sticks and other natural resources and compare the difference.

Year Group	*Year 3*	
National Curriculum Objective	*Multiplication and Division*	
Steps within the Objective	• *recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables* • *write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods* • *solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.*	
Broader Curriculum and real life experiences (cultural capital) links	Science	
	Geography	
	History	
	ICT	
	Art	
	DT	Change a recipe from serving 4 to serving 8 for example. Multiplying the ingredients.
	PE	Play games such as, you have 4 limbs can you make a group of 12 limbs, how many people do you need in your group etc.
	Outdoor Learning (optional)	Make arrays outside to help learn the 3, 4 and 8 multiplication tables.

Year Group	*Year 3*	
National Curriculum Objective	*Fractions (including decimals and percentages)*	
Steps within the Objective	• count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10 • recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators • recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators • recognise and show, using diagrams, equivalent fractions with small denominators • add and subtract fractions with the same denominator within one whole [for example, 5/7 + 1/7 = 6/7] • compare and order unit fractions, and fractions with the same denominator • solve problems that involve all of the above.	
Broader Curriculum and real life experiences (cultural capital) links	Science	When making predictions, what fraction of the class were correct with their prediction?
	Geography	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 children travel by car etc.
	History	
	ICT	
	Art	
	DT	
	PE	What fraction of the class are able to jump a certain height or distance etc.
	Outdoor Learning (optional)	Create fractions using people, natural resources or chalk drawing outside.

Year Group	*Year 3*	
National Curriculum Objective	*Measurement*	
Steps within the Objective	• *measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)* • *measure the perimeter of simple 2-D shapes* • *add and subtract amounts of money to give change, using both £ and p in practical contexts* • *tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks* • *estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight* • *know the number of seconds in a minute and the number of days in each month, year and leap year* • *compare durations of events [for example to calculate the time taken by particular events or tasks].*	
Broader Curriculum and real life experiences (cultural capital) links	Science	Measure in testing – length of an object or distance. Convert this into different units – which is the best for recording results? Why?
	Geography	Use measures and scales on maps to calculate distances between locations.
	History	Who are the Romans? Link with Roman numerals. History timelines with dates and years. Compare durations of events [for example to calculate the time taken by particular events or tasks].
	ICT	
	Art	
	DT	Cooking – weigh in grams and millilitres. Measure equipment in cm, m and mm..
	PE	Measure length of a throw, a running race time etc
	Outdoor Learning (optional)	Create own clocks using chalk and sticks for clock hands.

Year Group	*Year 3*	
National Curriculum Objective	*Geometry – Properties of shapes*	
Steps within the Objective	• *draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them* • *recognise angles as a property of shape or a description of a turn* • *identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle* • *identify horizontal and vertical lines and pairs of perpendicular and parallel lines.*	
Broader Curriculum and real life experiences (cultural capital) links	Science	
	Geography	
	History	
	ICT	Use digital cameras to capture geometric shapes and objects in the environment and around school.
	Art	The children should be taught to improve their mastery of art and design techniques, including drawing, painting and sculpture with a range of materials (e.g. pencil, charcoal, paint, clay). You could ask the children to 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.
	DT	Within the design and technology curriculum, the children should be taught the knowledge, understanding and skills needed to design and make things working in a range of relevant contexts. You could give the children opportunities to make packaging for something to be sold. This could involve exploring nets of cubes and cuboids.
	PE	Movement – full turn, half turn. Use body to create a right angle.
	Outdoor Learning (optional)	Draw 2D shapes outside on the playground, ensure they have a square you could incorporate their understanding of measure.

Year Group	*Year 3*	
National Curriculum Objective	*Statistics*	
Steps within the Objective	• *interpret and present data using bar charts, pictograms and tables* • *solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.*	
Broader Curriculum and real life experiences (cultural capital) links	Science	Give the children opportunities to gather relevant data and present it in tables and bar charts and then analyse their findings.
	Geography	Give the children opportunities to gather relevant data and present it in tables, bar charts or pictograms and then analyse their findings.
	History	
	ICT	
	Art	
	DT	
	PE	
	Outdoor Learning (optional)	Create human graphs outside.

SECTION D – YEAR 4

Year Group	*Year 4*	
National Curriculum Objective	*Number and Place value*	
Steps within the Objective	• count in multiples of 6, 7, 9, 25 and 1000 • find 1000 more or less than a given number • count backwards through zero to include negative numbers • recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) • order and compare numbers beyond 1000 • identify, represent and estimate numbers using different representations • round any number to the nearest 10, 100 or 1000 • solve number and practical problems that involve all of the above and with increasingly large positive numbers read Roman numerals to 100 (I to C)	
Broader Curriculum and real life experiences (cultural capital) links	Science	
	Geography	Negative numbers can be introduced through the context of temperature in weather or bank accounts in the 'red'. Comparisons can be made between the lengths of rivers, heights of mountains, areas of countries and populations of villages and towns.
	History	The introduction of Roman Numerals in Year 4 can be developed in the study of 'The Roman Empire and its impact on Britain' and alongside knowledge of other number systems throughout history. Common sources will be clocks, page numbers in books, production dates on TV programmes and films. The start of the Dewey Decimal library referencing system can be explored. Numbers from 0 to 2020 as dates ordered on a timeline.
	ICT	
	Art	

	DT	
	PE	When counting in multiples, try to link to multiples of 6 players in a six-a-side football team, 9 players in a rounders team. Ordering numbers, children stand on benches each with a number and have to get in the correct order without falling off. Making a human number line and human abacus. Measuring distance in athletics.
	Outdoor Learning (optional)	

Year Group	*Year 4*	
National Curriculum Objective	*Addition and Subtraction*	
Steps within the Objective	• add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate • estimate and use inverse operations to check answers to a calculation • solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.	
Broader Curriculum and real life experiences (cultural capital) links	Science	To compare measurements recorded as results from scientific investigations in the form of decibels (Sound) and temperatures (States of Matter).
	Geography	Planning a budget for various projects will involve a great deal of calculation for example planning a trip to a European Capital City. Comparison of the lengths of rivers, heights of mountains, areas of countries and populations of villages and towns to find differences. Calculation of the length of journeys taken between different countries or cities in several stages for example flying to Sydney from London via Singapore.
	History	Working out how to spend ration coupons in WWII. Comparison of the price of items over time.
	ICT	Shopping, children will be required to find totals, calculate change. This can be checked by creating an Excel spreadsheet.
	Art	
	DT	Practical tasks such as designing models and packaging. Adding quantities of ingredients when cooking.
	PE	Find total scores from cricket teams, by how many runs did a team win a match? Sports Day related activities.
	Outdoor Learning (optional)	Calculating perimeters for fencing and borders, playgrounds

Year Group	*Year 4*	
National Curriculum Objective	*Multiplication and Division*	
Steps within the Objective	• recall multiplication and division facts for multiplication tables up to 12 × 12 • use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers • recognise and use factor pairs and commutativity in mental calculations • multiply two-digit and three-digit numbers by a one-digit number using formal written layout • solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.	
Broader Curriculum and real life experiences (cultural capital) links	Science	Reading scales and unlabelled increments on measuring apparatus. Reading scales and determining appropriate scales for different types of graph relating to weather, temperature, sound etc.
	Geography	Comparing river lengths/building heights e.g. the River Nile is x times longer than the River X. The height of Snowdon is (fraction) of the height of Everest.
	History	
	ICT	
	Art	Scaling shapes to scale geometric artwork e.g. 'How would you make this triangle three times its size/half its size?'
	DT	Scaling quantities (e.g. recipes) to cater for more and less people when cooking.
	PE	Counting people in one part of a sports stadium and multiplying to calculate an estimate of the total number of spectators. Calculating the length of a run by multiplying the length of one lap by the number of laps. Aiming games where different parts of a target are worth different scores, multiplying the number which hit the bullseye by its value.
	Outdoor Learning (optional)	Standing against a tree and using your known height to work out 'How many of me are equal to the height of the tree?'

Year Group	*Year 4*	
National Curriculum Objective	*Fractions (including decimals and percentages)*	
Steps within the Objective	• recognise and show, using diagrams, families of common equivalent fractions • count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. • solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number • add and subtract fractions with the same denominator • recognise and write decimal equivalents of any number of tenths or hundredths • recognise and write decimal equivalents to ¼, ½, ¾ • find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths • round decimals with one decimal place to the nearest whole number • compare numbers with the same number of decimal places up to two decimal places • solve simple measure and money problems involving fractions and decimals to two decimal places.	
Broader Curriculum and real life experiences (cultural capital) links	Science	
	Geography	
	History	Introduction of decimalisation to the United Kingdom.
	ICT	When learning how to input data into an Excel spreadsheet, use decimal numbers to include costings (£ and pence).
	Art	The National Gallery of Art website provides a wonderful resource based on Thiebaud's 'Cakes' picture, and provides some wonderful starting points for fractions work in mathematics.
	DT	Exploring fractions in everyday contexts 'How many square pieces make half of this chocolate bar?' when cooking.
	PE	Dividing into groups which are a specific fraction of the class. Playing with fraction, decimal equivalent beanbags.
	Outdoor Learning (optional)	

Year Group	*Year 4*	
National Curriculum Objective	*Measurement*	
Steps within the Objective	• Convert between different units of measure [for example, kilometre to metre; hour to minute] • measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres • find the area of rectilinear shapes by counting squares • estimate, compare and calculate different measures, including money in pounds and pence • read, write and convert time between analogue and digital 12- and 24-hour clocks • solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.	
Broader Curriculum and real life experiences (cultural capital) links	Science	Measure temperatures using a thermometer and tracking the changes over, for example, a morning.
	Geography	Measure the size of features before creating maps of the school.
	History	• The history of length • The history of mass • The history of volume and capacity • The history of time Articles on these can be found in the Primary Magazine Archives issues 10 to 13.
	ICT	
	Art	
	DT	There are plenty of opportunities for accurate measuring, particularly of length using different units in the designing and making stages. Within the cooking and nutrition curriculum as they work practically they will need to measure mass and volume. If they require cooking time, the children could make up timetables to show preparation, cooking and clearing up times using 12 or 24 hour digital formats.
	PE	
	Outdoor Learning (optional)	Estimate the length of playground markings, measure them draw life size plans of buildings on the playground.

Year Group	*Year 4*	
National Curriculum Objective	*Geometry – Properties of shapes*	
Steps within the Objective	• compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes • identify acute and obtuse angles and compare and order angles up to two right angles by size • identify lines of symmetry in 2-D shapes presented in different orientations • complete a simple symmetric figure with respect to a specific line of symmetry.	
Broader Curriculum and real life experiences (cultural capital) links	Science	
	Geography	
	History	
	ICT	Using programmable robots to create specific shapes and the use of Logo to draw simple 2d shapes.
	Art	The world around them – e.g. symmetry on wrapping paper, tiles, letters and digits on labels. Primary Magazine 'Art of Mathematics', features has many different articles where works of art are used as a stimulus for shape work. E.g. Islamic Patterns e.g.https://www.ncetm.org.uk/resources/18030 The work of Kandinsky and William Morris.
	DT	
	PE	Using symmetry to create dance sequences, gymnastic routines
	Outdoor Learning (optional)	Andy Goldsworthy inspired Art creating symmetrical patterns or 2d shapes. Children working in pairs, one acting as a robot with the partner giving algorithms using Logo language to walk a specific shape.

Year Group	*Year 4*	
National Curriculum Objective	*Geometry – Position and Direction*	
Steps within the Objective	• describe positions on a 2-D grid as coordinates in the first quadrant • describe movements between positions as translations of a given unit to the left/right and up/down • plot specified points and draw sides to complete a given polygon.	
Broader Curriculum and real life experiences (cultural capital) links	Science	
	Geography	Learning about map referencing and directions, use the eight points of a compass, four-figure grid references.
	History	
	ICT	
	Art	Looking at patterns and architecture.
	DT	Designing rooms, planning buildings and construction projects.
	PE	In gymnastics get children to slide forward, back, right and left a set number of steps.
	Outdoor Learning (optional)	Create a large map with different features on a tarpaulin labelled with coordinates.

Year Group	*Year 4*	
National Curriculum Objective	*Statistics*	
Steps within the Objective	• interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. • solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.	
Broader Curriculum and real life experiences (cultural capital) links	Science	In working scientifically there is a requirement that the children record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. In living things they should identify and name a variety of living things, using classification keys (branching databases) to assign them to groups. This can also be done using tables or Venn and Carroll diagrams.
	Geography	
	History	Give the children opportunities to research relevant data and present it in tables, bar charts or pictograms and then analyse their findings. This could be
	ICT	Give the children opportunities to research relevant data and present it in tables, bar charts or pictograms and then analyse their findings. This could be number of personal computers, laptops, tablets or mobile phones over time.
	Art	
	DT	
	PE	Indoor athletics data collection and analysis in many forms.
	Outdoor Learning (optional)	

SECTION E – YEAR 5

Year Group	*Year 5*	
National Curriculum Objective	*Number – Place Value*	
Steps within the Objective	• *Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero.* • *Count forwards or backwards in steps of powers of 10 for any given numbers up to 1000 000.* • *Read, write, order and compare numbers to at least 1000 000 and determine the value of each digit.* • *Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.* • *Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.* • *Round any number up to 1000 000 to the nearest 10, 100, 1000, 10 000 and 100 000.* • *Round decimals with two decimal places to the nearest whole number and to one decimal place.* • *Solve number problems and practical problems that involve all of the above.*	
Broader Curriculum and real life experiences (cultural capital) links	Science	Within the science curriculum there are opportunities to work with number and place value, for example, in the introduction of the Upper Key Stage 2 Programme of Study it states that pupils should select the most appropriate ways to answer science questions using different types of scientific enquiry including observing changes over different periods of time noticing patterns grouping and classifying things carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. The children could, for example, record changes over periods of time and compare them. You could discuss the differences in the place value of periods of time and the number system. They could record, for example, heights of plants accurately using decimal notation.
	Geography	Within the geography curriculum there are opportunities to connect with number and place value for example in the introduction of the Key Stage 2 Programme of Study it states that pupils should extend their knowledge and understanding beyond the local area to include the United Kingdom and Europe North and South America. This will include the location and characteristics of a range of the world's most significant human and physical features. Children could, for example, find and compare distances between countries or cities temperatures, lengths of rivers heights of mountains. These comparisons will involve finding differences which involve a secure understanding of place value.
	History	Within the history curriculum there are opportunities to work with number and place value for example in the introduction of the Key Stage 2 Programme of Study it states that pupils should continue to develop a chronologically secure knowledge and understanding of British local and world history establishing clear

		narratives within and across the periods they study. The children could, when studying the Roman period, focus on their number system and find out how it developed. **A Little bit of History** in issue 2 of the Primary Magazine has information about this. They could also look at the development of our number system. **A Little bit of History** in issue 8 of the Primary Magazine has information about this.
	ICT	When learning how to input data into an Excel spreadsheet, use decimal numbers to include costings (£ and pence).
	Art	
	DT	
	PE	Measuring distance in field events – long jump, javelin, etc, use decimals for precision.
	Outdoor Learning (optional)	Create 100 000 number lines using materials found in the outside environment.

Year Group	*Year 5*	
National Curriculum Objective	*Addition and Subtraction*	
Steps within the Objective	• *Add and subtract numbers mentally with increasingly large numbers.* • *Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction).* • *Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.* • *Solve addition and multi-step problems in contexts, deciding which operations and methods to use and why.*	
Broader Curriculum and real life experiences (cultural capital) links	Science	**Measurement** – when required to add lengths, calculate remaining distance in a journey, find how much more/less liquid is needed, work out time differences. When adding and subtracting test measurements.
	Geography	When comparing populations, temperatures and other data for contrasting regions around the world.
	History	When comparing historical data from different periods, calculating the duration of monarchs' reign.
	ICT	
	Art	
	DT	**Measurement -** find how much more/less liquid is needed, add quantities when cooking, work out time differences.
	PE	Aim at targets with 6 digit numbers on. Calculate your total.
	Outdoor Learning (optional)	Estimate how long you think something is. Measure it and then compare your estimate and real measurement. Which is longer, find the difference between the two measurements.

Year Group	*Year 5*	
National Curriculum Objective	*Multiplication and Division*	
Steps within the Objective	• *Count forwards or backwards in steps of powers of 10 for any given numbers up to 1000 000.* • *Multiply and divide numbers mentally drawing upon known facts.* • *Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.* • *Multiply numbers up to 4 digits by a one- or two- digit number using a formal written method, including long multiplication for two-digit numbers.* • *Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.* • *Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.* • *Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.* • *Establish whether a number up to 100 is prime and recall prime numbers up to 19.* • *Recognise and use square numbers and cube numbers, and the notation for squared and cubed.* • *Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes.* • *Solve problems involving addition, subtractions, multiplication and division and a combination of these, including understanding the meaning of the equals sign.* • *Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.*	
Broader Curriculum and real life experiences (cultural capital) links	Science	
	Geography	Within the geography curriculum there are opportunities to connect with multiplication and division, for example in the introduction of the Key Stage 2 Programme of Study it states that pupils should extend their knowledge and understanding beyond the local area to include the United Kingdom and Europe, North and South America. This will include the location and characteristics of a range of the world's most significant human and physical features. Children could, for example, find out about the currencies used in a selection of countries. They could then make up a currency converter using mental calculation strategies and then check using multiplication,

		for example: £1= 1.20 Euros £2 = 2.40 Euros £3 = 3.60 Euros £4 = 4.80 Euros £5 = 6 Euros
	History	
	ICT	
	Art	
	DT	
	PE	Pass a ball in a circle, call out a number, recipient of the ball has to call out what the number squared or cubed would be.
	Outdoor Learning (optional)	

<table>
<tr><td>Year Group</td><td colspan="2">Year 5</td></tr>
<tr><td>National Curriculum Objective</td><td colspan="2">Fractions (including decimals and percentages)</td></tr>
<tr><td>Steps within the Objective</td><td colspan="2">Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.
Compare and order fractions whose denominators are all multiples of the same number.
Read, write, order and compare numbers with up to three decimal places.
Round decimals with two decimal places to the nearest whole number and to one decimal place.
Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.
Read and write decimal numbers as fractions (e.g. 0.71 = 71/100).
Recognise the per cent symbol (%) and understand that per cent relates to “number of parts per hundred”, and write percentages as a fraction with a denominator 100 as a decimal fraction.
Add and subtract fractions with the same denominator and multiples of the same number.
Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number (e.g. 2/5 + 4/5 = 6/5 = 1 1/5).
Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.
Solve problems involving numbers up to three decimal places.
Solve problems which require knowing percentage and decimal equivalents of ½, ¼, 1/5, 2/5, 4/5 and those with a denominator of a multiple of 10 or 25.</td></tr>
<tr><td rowspan="8">Broader Curriculum and real life experiences (cultural capital) links</td><td>Science</td><td></td></tr>
<tr><td>Geography</td><td></td></tr>
<tr><td>History</td><td></td></tr>
<tr><td>ICT</td><td></td></tr>
<tr><td>Art</td><td></td></tr>
<tr><td>DT</td><td></td></tr>
<tr><td>PE</td><td></td></tr>
<tr><td>Outdoor Learning (optional)</td><td>Create fractions of objects (sticks) to represent when adding, subtracting or multiplying fractions.</td></tr>
</table>

Year Group	*Year 5*	
National Curriculum Objective	*Measurement*	
Steps within the Objective	• *Calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes (also including in measuring).* • *Estimate volume (e.g. using 1cm3 blocks to build cubes and cuboids) and capacity (e.g. using water).* • *Use all four operations to solve problems involving measure (e.g.* ***length, mass, volume, money****) using decimal notation including scaling.* • *Measure and calculate the* ***perimeter*** *of composite rectilinear shapes in centimetres and metres.* • *Solve problems involving converting between units of time.* • *Convert between different units of metric measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre).* • *Understand and use equivalences between metric units and common imperial units such as inches, pounds and pints.* •	
Broader Curriculum and real life experiences (cultural capital) links	Science	Measure in testing – length of an object or distance. Convert this into different units – which is the best for recording results? Why?
	Geography	Use measures and scales on maps to calculate distances between locations.
	History	Convert periods of time between years, decades, centuries, etc.
	ICT	In coding, when programing an object to move, think about the best unit to measure in.
	Art	
	DT	In Design Technology, children are often required to work to scale, accurately measuring their plans and products as they are developed. Food Teach: Look at measurements in recipes, convert between imperial and metric.
	PE	Measuring distance in field events – long jump, javelin, etc.
	Outdoor Learning (optional)	Estimate the length of playground markings, measure them and use this to calculate perimeter and area.

Year Group	*Year 5*	
National Curriculum Objective	*Geometry – Properties of shapes*	
Steps within the Objective	• *Identify 3-D shapes, including cubes and other cuboids, from 2-D representations.* • *Draw given angles, and measure them in degrees.* • *Use the properties of rectangles to deduce related facts and find missing lengths and angles.* • *Distinguish between regular and irregular polygons based on reasoning about equal sides and angles.* • *Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles.* • *Identify:* **angles at a point and one whole turn (total 360 degrees)* **angles at a point on a straight line and ½ a turn (total 180 degrees)* **other multiples of 90 degrees*	
Broader Curriculum and real life experiences (cultural capital) links	Science	Look at angles of a ramp compared with how far a car travels. Discuss which angle is best for a ramp for speed/ for safety.
	Geography	Work on properties of shape can be integrated with work in several other areas of the curriculum. e.g. *When working with 2D representations e.g. maps, nets, isometric drawings, plans and elevations
	History	
	ICT	Work on properties of shape can be integrated with work in several other areas of the curriculum. e.g. *When using digital cameras to capture geometric shapes and objects in the environment and around school *When using digital technology e.g. Logo, dynamic geometry to create geometric patterns
	Art	Work on properties of shape can be integrated with work in several other

		areas of the curriculum. e.g. *When looking at art and architecture to identify geometric shapes and properties *Create geometric art work and look at artists who use this style (Mondrian, etc).
	DT	
	PE	Look at angles towards a target (goal, etc) what angle is best? Make different types of triangles with your body – thinking about angles (isosceles triangle, right angle triangle, etc).
	Outdoor Learning (optional)	Look for 2D representations in nature – what is the 3D shape of the object? Find or make (using sticks) angles in nature. What type of angles are they? Measure the angle. Order angles found/ made in the environment.

Year Group	*Year 5*	
National Curriculum Objective	*Geometry – Position and Direction*	
Steps within the Objective	• *Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.*	
Broader Curriculum and real life experiences (cultural capital) links	Science	
	Geography	Learners will encounter coordinates in Geography when learning about map referencing.
	History	
	ICT	Programme BeeBots to move using degree turns.
	Art	When focusing on patterns and architecture in Art & Design, translations will be recognised and used.
	DT	Learners will encounter a range of translations in Design Technology when designing rooms, planning buildings and object designs of their own.
	PE	Working in pairs to give directions (turn 180 degrees, turn 3 turns anti-clockwise, etc) build up to using obstacles and blindfolds. Orienteering using compass directions and degree turns.
	Outdoor Learning (optional)	

Year Group	*Year 5*	
National Curriculum Objective	*Statistics*	
Steps within the Objective	• *Complete, read and interpret information in tables, including timetables.* • *Solve comparison, sum and difference problems using information presented in a line graph.*	
Broader Curriculum and real life experiences (cultural capital) links	Science	In science, they will be required to represent and interpret data collected in science investigations.
	Geography	In geography, they will be plotting and interpreting data for international and local weather as well as other geographical data for population, land use etc.
	History	Read tables about historical data (number of fatalities in WW2, etc).
	ICT	Learners will encounter statistics when comparing data and analysing information. Use Excel to present data in a graph. Which graph is best for continuous/ discrete data? Why?
	Art	
	DT	
	PE	
	Outdoor Learning (optional)	Create human graphs outside. Discuss comparisons between the data.

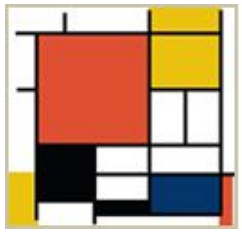
SECTION F – YEAR 6

Year Group	Year 6	
National Curriculum Objective	Number – Place Value	
Steps within the Objective	• 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 • solve number problems and practical problems that involve all of the above	
Broader Curriculum and real life experiences (cultural capital) links	Science	Temperature is often the easiest context through which to teach a good understanding of negative numbers.
	Literacy	National newspapers and news programmes often provide statistics comparing values of money or other measures.
	Geography	Ordering and understanding population size of different towns, cities, countries and continents gives a useful context for looking at larger numbers.
	History	Ordering dates in timelines

Year Group	Year 6	
National Curriculum Objective	Addition and Subtraction	
Steps within the Objective	• 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 • identify common factors, common multiples and prime 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 • use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.	
Broader Curriculum and real life experiences (cultural capital) links	Science	Within the science curriculum there are opportunities to connect with addition and subtraction, for example in the introduction of the Upper Key Stage 2 Programme of Study it states that pupils should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. The children could, for example, interpret graphs and charts and find totals and differences in pieces of data, including measurement.
	Geography	Within the geography curriculum there are opportunities to connect with addition and subtraction. In the introduction of the Key Stage 2 Programme of Study it states that pupils should extend their knowledge and understanding beyond the local area to include the United Kingdom and Europe, North and South America. This will include the location and characteristics of a range of the world's most significant human and physical features. Children could, for example, find and compare distances between countries or cities, compare population statistics, temperatures, lengths of rivers, heights of mountains etc.

		For example: Weather and Environments around the world
	History	Within the history curriculum, there are opportunities to connect with addition and subtraction, for example in the introduction of the Key Stage 2 Programme of Study it states that pupils should continue to develop a chronologically secure knowledge and understanding of British, local and world history, establishing clear narratives within and across the periods they study. The children could 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.

<table>
<tr><td>Year Group</td><td colspan="2">Year 6</td></tr>
<tr><td>National Curriculum Objective</td><td colspan="2">Multiplication and Division</td></tr>
<tr><td>Steps within the Objective</td><td colspan="2">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
identify common factors, common multiples and prime 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
use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy</td></tr>
<tr><td rowspan="3">Broader Curriculum and real life experiences (cultural capital) links</td><td>Geography</td><td>Within the geography curriculum there are opportunities to connect with multiplication and division, for example in the introduction of the Key Stage 2 Programme of Study it states that pupils should extend their knowledge and understanding beyond the local area to include the United Kingdom and Europe, North and South America. This will include the location and characteristics of a range of the world's most significant human and physical features. Work on multiplication and division could include converting between miles and kilometres and vice versa when looking at distances between countries or famous locations, making currency converters for pounds stirling and the currency in the country they are investigating.</td></tr>
<tr><td>Art</td><td rowspan="2">Within the art and design curriculum there are opportunities to connect with multiplication and division, for example in the introduction of the Key Stage 2 Programme of Study it states that pupils should be taught to develop their techniques, including their control and their use of materials, with creativity, experimentation and an increasing awareness of different kinds of art, craft and design. This could include designing and creating life size models of, for example a Barbara Hepworth sculpture or a Van Gogh painting where the children need to find realistic measurements and then scale them down using division.</td></tr>
<tr><td></td></tr>
</table>

<table>
<tr><td>Year Group</td><td colspan="2">Year 6</td></tr>
<tr><td>National Curriculum Objective</td><td colspan="2">Fractions (including decimals and percentages)</td></tr>
<tr><td>Steps within the Objective</td><td colspan="2">use common factors to simplify fractions; use common multiples to express fractions in the same denomination
compare and order fractions, including fractions >1
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 [for example, ¼ × ½ = $^1/_8$]
divide proper fractions by whole numbers [for example, $^1/_3 \div 2 = {}^1/_6$]
associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $^3/_8$]
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
multiply one-digit numbers with up to two decimal places by whole numbers
use written division methods in cases where the answer has up to two decimal places.
solve problems which require answers to be rounded to specified degrees of accuracy
recall and use equivalences between simple fractions, decimals and percentages including in different contexts</td></tr>
<tr><td rowspan="2">Broader Curriculum and real life experiences (cultural capital) links</td><td>Music</td><td>Equivalent fractions can be shown using musical notation where a different type of note is worth a different fraction of a whole beat.</td></tr>
<tr><td>Art
  </td><td>Mondrian's painting “Komposition” lends itself to an interesting exploration of simple fractions for KS2. Give pairs of children a small copy of the painting and some scissors. They cut out all the pieces and find those that are ¼ of the red square, those that are half the yellow oblong, those that are ⅛ of the red square and so on. As you do this, compare the fractions and find how many of the quarters/halves/eighths will make the whole, or a half and quarter as appropriate, so developing the basics of equivalent fractions.
You could also use this as a vehicle for estimating lengths, perimeters and areas.
Another great activity involves asking the children to cut all the pieces out and make their own ‘Mondrian’, using the pieces to make their own design which has one line of symmetry. You may need to let them know that the line of symmetry will need to go through the shapes that are only there once. Let them have a think first though! Once they have made their design, you could use them to develop the concepts of rotation and</td></tr>
</table>

		translation.
	Outdoor Learning (optional)	Fractions skills can be also emphasised when focusing on measurement. Journey times and fuel consumption can be estimated and calculated (e.g. what fraction of the journey do we have remaining?) Measurement of area and perimeter is strongly linked to work with fractions, ratio and proportion; what proportion of the playground needs to be set aside for ball games?
	Other	When shopping, children can 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.

Year Group	Year 6	
National Curriculum Objective	Ratio and Proportion	
Steps within the Objective	• 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 the calculation of percentages [for example, of measures, and such as 15% of 360] and use percentages for comparison • solve problems involving similar shapes where the scale factor is known or can be found • solve problems involving unequal sharing and grouping using knowledge of fractions and multiples	
Broader Curriculum and real life experiences (cultural capital) links	Science	Within the science curriculum there are opportunities to work with ratio and proportion. For example pupils should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. The children could, for example, construct pie charts or use ratio and proportion to compare groupings and classifications or the results of tests that they carry out.
	Geography	Within the geography curriculum there are opportunities to connect with ratio and proportion, for example in the introduction of the Key Stage 2 Programme of Study it states that pupils should extend their knowledge and understanding beyond the local area to include the United Kingdom and Europe, North and South America. This will include the location and characteristics of a range of the world's most significant human and physical features. Children could, for example, find and compare distances between countries or cities, compare population statistics, temperatures, lengths of rivers, heights of mountains. The results of any comparisons could be displayed in a pie chart. For example: Weather and Environments around the world
	History	There are also opportunities to work with ratio and proportion, linked to history, for example, 'pupils should continue to develop a chronologically secure knowledge and understanding of British, local and world history, establishing clear narratives within and across the periods they study. The children could, for example, represent the lengths of the different periods in history and the rules of different British monarchs using pie charts' (History Programme of Study). This would enable them to make comparisons using proportion as fractions or percentages.
	Art	• Ratio is used to mix paints. For example, to make purple, you mix 3 parts red to 7

		parts blue. Many artists and architects have proportioned their works to approximate the Golden Ratio believing this proportion to be aesthetically pleasing. This is sometimes given in the form of the Golden Rectangle in which the ratio of the longer side to the shorter side is the golden ratio.
	DT	• Measuring ingredients and working out proportions. • Using ratios in recipes.

Year Group	Year 6	
National Curriculum Objective	Measurement	
Steps within the Objective	• 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 • recognise that shapes with the same areas can have different perimeters and vice versa • recognise when it is possible to use the formulae for area and volume of shapes • calculate the area of parallelograms and triangles • calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units [for example, mm^3 and km^3]	
Broader Curriculum and real life experiences (cultural capital) links	Geography	In geography, children will learn of other countries around the world, their climate, landscape and traditions. Map work involves the use of scale, and conversion between measurements. Children could convert between pounds Sterling and currencies of these other countries, using formulae or straight line conversion graphs.
	Other	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)

Year Group	Year 6	
National Curriculum Objective	Geometry – Properties of Shape	
Steps within the Objective	• draw 2-D shapes using given dimensions and angles • recognise, describe and build simple 3-D shapes including making nets • compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons • illustrate and name parts of circle, including radius, diameter and circumference and know that the diameter is twice the radius • recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles	
Broader Curriculum and real life experiences (cultural capital) links	History	Pyramids and obelisks – using plasticine or modelling equipment to build models and gain an understanding of the faces and angles used in building 3-D shapes used throughout history.
	ICT	Use of programming technology to design sequences, using knowledge of angles, to compare and classify geometric shapes based on their properties. Pupils use knowledge of angles to support program writing and building of 3-D models.
	Art	• The Art of Mathematics looks at a variety of artists and styles of art. For each artist we give a brief history of their life, links to examples of their work and ideas for mathematical activities to go with specific works. https://www.ncetm.org.uk/resources/38454 • Symmetrical art can be analysed and the number of lines of symmetry can be found. Also, the order of rotational symmetry can be studied. • Lots of different tesselations can be found in Escher drawings. • Works of art from the Cubism era of the 20th century link to nets and 3D shapes
	DT	Using an ability to 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 as an example.
	PE	In orienteering, pupils use knowledge of angles to find clues and use an understanding of properties of shapes to solve problems.

	Other	**The World around them** – Using their ability to recognise and describe 3-D shapes used in building houses, packaging used by supermarkets and storage boxes used in and around the home.

Year Group	Year 6	
National Curriculum Objective	Geometry – Position and Direction	
Steps within the Objective	• describe positions on the full coordinate grid (all four quadrants) • draw and translate simple shapes on the coordinate plane, and reflect them in the axes.	
Broader Curriculum and real life experiences (cultural capital) links	Geography	In geography, learners will encounter coordinates through map work.
	ICT	Angles and direction which can be drawn and measured using floor robots and apps too.
	DT	• In Design & Technology, learners may be required to use their knowledge of translation, in particular, scaling up and down. • Coordinates and translation may also be used when designing rooms, planning buildings and floor layouts, or when scaling drawings or patterns in Art & Design. • Being able to measure things accurately is an important skill in both D&T and mathematics. • Estimation is also important when working out quantities of raw materials.

Year Group	Year 6	
National Curriculum Objective	Statistics	
Steps within the Objective	• interpret and construct pie charts and line graphs and use these to solve problems • calculate and interpret the mean as an average	
Broader Curriculum and real life experiences (cultural capital) links	Science	Measurements and readings recorded in science lessons, e.g. of sound levels, temperature, plant height etc, can all be used as datasets for statistics work in mathematics.
	Geography	Geographical data and information based on other regions and countries can provide a good context for statistics work
	Other	There are many, many examples of 'real life' situations where a wealth of data needs to be digested, sorted, presented or interpreted. Websites such as 'Stats4Schools', the content of which is now hosted by the National Stem Centre, has a large number of 'real' datasets' that children could use in other curriculum areas. 'Census at School' also provides a vast bank of data resources that can be utilised in the classroom.

Year Group	Year 6	
National Curriculum Objective	Algebra	
Steps within the Objective	• use simple formulae • generate and describe linear number sequences • express missing number problems algebraically • find pairs of numbers that satisfy number sentences involving two unknowns • enumerate possibilities of combinations of two variables	
Broader Curriculum and real life experiences (cultural capital) links	Other	Learners will encounter algebra in: Recipes or formulae such as: Child's dose = Age × Adult dose Age + 12 or F = 9/5 C + 32 Working out the reading age of a particular text – e.g. where N is the number of one-syllable words in a passage of 150 words. $$R = 25 - \frac{N}{10}$$ • FORECAST formula $$R = \frac{2}{5}\left(\frac{A}{n} + \frac{100L}{A}\right)$$ • FOG index where A = no. of words in passage n = no. of sentences L = no. of words containing 3 or more syllables (excluding the'-ing' and 'ed' endings).