

Milestone LO (National Curriculum)

PLACE VALUE

Pupils should be taught to:

- 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 1,000
- Identify, represent and estimate numbers using different representations
- Read and write numbers up to 1,000 in numerals and in words
- Solve number problems and practical problems involving these ideas

ADDITION

Pupils should be taught to:

- Add numbers mentally, including
 - A three-digit number and ones
 - A three-digit number and tens
 - A three-digit number and hundreds
- Add numbers with up to three digits, using formal written methods of columnar addition

MULTIPLICATION

Pupils should be taught to:

- Recall and use **multiplication** and division facts for the 3, 4 and 8 multiplication tables
- Write and calculate mathematical statements for multiplication using the multiplication tables that they know
- Solve problems, including missing number problems, involving multiplication

Revisited Knowledge (children arriving from Foxhills Infant School)

New knowledge

NB: In Year 3, it is especially important that significant time is spent assessing and recapping the revisited knowledge as children will have joined our school from different feeder schools and may not have the same basis of mathematical knowledge.

Domains	Declarative knowledge (substantive knowledge)	Procedural knowledge (disciplinary knowledge)	Conditional knowledge (knowing the when and the why)
Place value	<p>Counting Children need to know that...</p> <ul style="list-style-type: none"> • <i>We can count in multiples (adding the same amount each time) (Year 1)</i> • <i>When we count in multiples of 2, (Year 1)</i> <ul style="list-style-type: none"> ○ <i>We add 2 each time</i> ○ <i>We will only say even numbers</i> ○ <i>Multiples of 2 always end in 0,2,4,6,8</i> ○ <i>The multiples of 2 up to 100</i> • <i>When we count in multiples of 3, (Year 2)</i> <ul style="list-style-type: none"> ○ <i>We add 3 each time</i> ○ <i>The pattern this makes on a hundred square</i> ○ <i>The multiples of 3 up to 36.</i> • <i>When we count in multiples of 5, (Year 1)</i> <ul style="list-style-type: none"> ○ <i>We add 5 each time</i> ○ <i>Multiples of 5 always end in 0 or 5</i> ○ <i>The multiples of 5 up to 100</i> 	<p>Counting Children need to know how...</p> <ul style="list-style-type: none"> • <i>To count in ones to and across 100 from a given number (Year 1)</i> • <i>To count in multiples of 2, 3, 5 and 10 to 100. (KS1)</i> • <i>To find one more and one less than a given number (Year 1)</i> • To count in multiples of 4, 8, 50 and 100. • To find 10 or 100 more or less than a given number, by applying their knowledge of what 10 is and what 100 is. 	<p>Children need to know...</p> <ul style="list-style-type: none"> • Where a digit is placed shows the value of the digit, based on its position (place value column) in a number. <i>Example: in the number 347, understanding that the digit 4 represents 4 tens because it is in the tens place.</i> • When we compare 3-digit numbers, we need to look at the hundreds, tens, and ones columns in order to determine which number is greater. <i>Example: 3 in the tens column is worth 30 but 3 in the hundreds column is worth 300.</i>



- When we count in multiples of 10, (Year 1)
 - We add 10 each time
 - We will only say even numbers
 - Multiples of 10 always end in 0
 - The multiples of 10 up to 100.
- When we count in multiples of 4,
 - We add 4 each time
 - We say the numbers 0,4,8,12,16,20,24,28,32,36,40,44 and 48.
- When we count in multiples of 8,
 - We add 8 each time
 - We say the numbers 0,8,16,24,32,40,48,56,64,72,80,88 and 96
- When we count in multiples of 50,
 - We add 50 each time
 - We say the numbers 0,50,100,150,200,250,300,350,400,450,500, 550,600,650,700,750,800,850,900,950,1000.
- When we count in multiples of 100
 - We add 100 each time
 - We say the numbers 0,100,200,300,400,500,600,700,800,900,1000

Representing Number

Children need to know that...

- All numbers have meaning. A number is a value that represents quantity. Each number has a name (KS1).
- A digit is a single numeral used to represent a value within a number (KS1).
- The first digit in a three-digit number represents hundreds. (Year 2)
- The second digit in a three-digit number represents tens. (Year 2)
- The third digit in a three-digit number represents ones (Year 2).
- Numbers can be represented by digits, or in words. (Year 1)
- Numbers can be represented in different ways, e.g. using resources, pictorial representations and abstract representations (including objects, pictures, money and number lines). (Year 2)
- Numbers can be partitioned. (KS1)
- Partitioning means to split a number into smaller parts (KS1)
- Estimate means to make a 'sensible guess' using your knowledge of number. This can be based on logical reasoning and rounding (Year 2)
- A hundred is equivalent to 10 tens.
- A hundred is equivalent to 100 ones.
- A ten is equivalent to 10 ones.
- The digit 1 in the number 1,000 represents thousands.
- A thousand is equivalent to 10 hundreds.
- A thousand is equivalent to 100 tens.
- A thousand is equivalent to 1,000 ones.
- Hundreds numbers can be partitioned into hundreds, tens and ones, but also in a range of other ways.
- Zero can be a place holder. It means there is no value in a place.

Comparison

Children need to know that...

- Numbers increase as they go up in the number system and decrease as we count backwards. (Year 1)
- To compare has two different meanings:
 - to say how something is like or unlike something else.
 - To describe which is larger and which is smaller (and by how many) (Year 2)
- Order means to arrange numbers by their numerical value. (Year 2)
- We can arrange numbers in ascending order (from smallest to largest) (Year 2)
- We can arrange numbers in descending order (from largest to smallest) (Year 2)
- < is a mathematical symbol which means less than (Year 2)
- > is a mathematical symbol which means more than. (Year 2)
- = is a mathematical symbol which means equal to (Year R)

Representing Number

Children need to know how...

- To read, and write numbers up to 100 in numerals and words (Year 2)
- To represent numbers up to 100 in a range of different ways (Year 2)
- To partition numbers up to 100 in different ways (Year 2)
- To estimate amounts within 100 using their knowledge of place value and counting (Year 2)
- To read and write numbers up to 1,000 as numerals and words.
- To identify the value of a number, up to 1,000.
- To represent numbers to 1,000 in different ways (concrete, pictorial, abstract)
- To partition numbers up to 1,000 in different ways.
- To estimate numbers, using their knowledge of place value, calculations and the number system.

Comparison

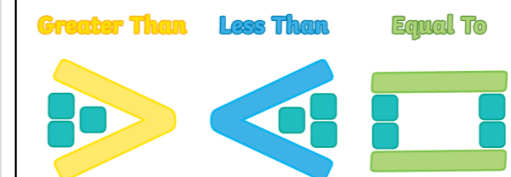
Children need to know how...

- To compare numbers to 100.
- To order numbers to 100 in ascending and descending order.
- To use the mathematical symbols <, > and =
- To compare numbers to 1,000.
- To order numbers to 1,000.

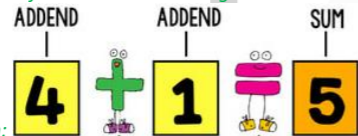
- When we order a set of numbers from least to greatest, we compare the digits in each place value column in order starting from the hundreds.
- When we partition numbers, we break the numbers down into their expanded form to show the value of each digit in its columnar place. *Example: the number 347 as 300 + 40 + 7 to demonstrate its place value composition.*
- When to use place value knowledge to solve word problems involving quantities, such as identifying the place value of different items or amounts. *Example: solving a word problem that asks how many tens are in a group of 230 marbles.*

Children need to know why...

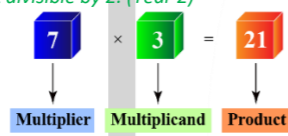
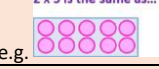
- We use place value charts and squared paper for representing number in maths. Our maths system has a base 10 structure. Each column represents a different place value. Using columns to lay out our digits allows us to represent numbers efficiently. (Year 2)
- The < = and > are written the way they are. The wide side of the symbol represents a greater quantity (you could physically fit more counters on that side of the sign). An equals sign consists of two parallel lines because you can fit the same quantity either side. (Year 2)



- We start from the left-most column when we are comparing numbers. The place value column a digit is in determines its quantitative value. The left-most column is the largest column. *Example: A 1 in the thousands column has a greater value than a 9 in the hundreds column.*

	<ul style="list-style-type: none"> Equal means the same (Year R) Double means to multiply by 2. (Year 1) When comparing and ordering numbers, we have to look at the largest place value column first. It is important to organise our numbers so it is easy to compare place value columns, for example using the squares in our books. 					
Vocabulary	NUMBER	An abstract way of representing a quantity (e.g. 2, 26, fifty-nine, $\frac{1}{2}$, 0.322)	NUMERAL	Words or symbols used to represent numbers, made up of digits.	DIGIT	The ten single symbols 0-9, used to represent numbers when placed in sequence.
	VALUE	How much something is worth. In representation of number, the position of a digit in a numeral determines its value.	PLACE VALUE CHART	A picture/diagram used to help represent the value of digits in numbers.	ESTIMATE	To make a 'sensible guess' based on your knowledge of and experience with number.
	ONE DIGIT NUMBER	A numeral which only contains one digit.	TWO DIGIT NUMBER	A numeral which contains two digits. The first digit has a value of tens.	THREE DIGIT NUMBER	A numeral which contains three digits. The first numeral has a value of hundreds.
	FOUR DIGIT NUMBER	A numeral which contains four digits. The first numeral has a value of thousands.	ONES	Where the digit represents the quantity exactly.	TENS	A digit value where the digit represents ten-times the quantity. There are 10 ones in a ten.
	HUNDREDS	A digit value where the digit represents one-hundred-times the quantity. There are 10 tens in a hundred; there are 100 ones in a hundred.	THOUSANDS	A digit value where the digit represents one-thousand-times the quantity. There are 10 hundreds in a thousand. There are 100 tens in a hundred; there are 1000 ones in a hundred.	PLACE HOLDER ZERO	Where a zero is placed in a place value column to show there are 0 of that value within the number. This is important to ensure that digits are seen in the correct place value column.
	COMPARE	Two meanings: a) to say what is the same or what is different. b) to identify the mathematical difference between numbers.	EQUAL	The same as.	EXPANDED FORM	a way of writing numbers to show the value of each digit (e.g., 325 written as $300 + 20 + 5$)
	GREATER THAN >	When the first number is more than the second number. Can be shown by the greater than symbol >	LESS THAN <	When the first number is less than the second number. Can be shown by the less than symbol <	ORDER	To arrange numbers by their numerical value.
	ASCENDING ORDER	Arranging numbers from smallest to largest.	DESCENDING ORDER	Arranging numbers from largest to smallest.	PARTITION	To split a whole into parts.
	PART	A section of the whole.	WHOLE	A total amount. This is always the sum of the parts.	REPRESENTATION	A way of showing a mathematical idea using objects, pictures or numerals.
	CONCRETE	A representation of a mathematical idea using manipulatives or real-life objects.	PICTORIAL	A representation of a mathematical idea using pictures.	ABSTRACT	A representation of a mathematical idea using symbols (e.g. numerals)
	NUMBER LINE	A picture used to represent numbers and calculations where numbers are shown on a regular scale.	PART-PART WHOLE MODEL	A pictorial representation of number showing the relationship between parts and wholes.	BAR MODEL	A form of part-part whole model where the parts are represented by adjacent bars.
	Addition	<p>Children need to know that...</p> <ul style="list-style-type: none"> Addition (adding) is when you put two or more numbers together to find a total amount (part + part = whole) (Year R) + means add (Year 1) Addition is commutative. (Year 1) Commutative means you can do it in any order. (Year 1) Number bonds refer to pairs of numbers that add together to total a given amount. (Year 1)  <ul style="list-style-type: none"> The vocabulary of addition: (Year 1) When we know both parts (addends) but not the whole (sum) we are being asked to do addition. (Year 2) Inverse is the opposite calculation. Addition is the inverse to subtraction. 		<p>Children need to know how...</p> <ul style="list-style-type: none"> To identify whether a problem is asking them to add or subtract using their knowledge of parts and wholes (addends and sum; minuend, subtrahend and difference). To add a three-digit number and ones mentally by applying knowledge of number bonds (KS1) To add a three-digit number and tens mentally by applying place value knowledge of ten more and knowledge of counting in tens (KS1) To add a three-digit number and hundreds mentally by applying place value knowledge of counting forwards in hundreds. To accurately lay out 3-digit numbers to support the formal written method of columnar addition. To add numbers with up to three digits using the formal written method of columnar addition by partitioning into hundreds, tens and ones and using number bond knowledge where no regrouping is required. To add numbers with up to three digits using the formal written method of columnar addition, regrouping tens when the total of the ones column exceeds 9. To add numbers with up to three digits using formal written methods of columnar addition, regrouping hundreds when the total of the tens column exceeds 90 (or 9 tens). 		<p>Children need to know ...</p> <ul style="list-style-type: none"> When regrouping is required in formal columnar addition. Where to start adding from when using the formal written method of columnar addition. When it is appropriate to check the sum by adding the numbers in reverse order, using the inverse or using a different method. When to estimate the sum of numbers to determine if the calculated result is reasonable. <p>Children need to know why</p> <ul style="list-style-type: none"> Regrouping is necessary. We can never have more than 9 in a single place value column as, for example, 10 ones are equivalent to 1 ten. Using estimation to check a calculation is sensible. Anyone can make calculation errors. Estimation is an efficient way of checking whether this has occurred.
PARTITION		To split a whole into parts.	EQUAL	The same as.	PART	A section of the whole.
WHOLE	A total amount. This is always the sum of the parts.	REPRESENTATION	A way of showing a mathematical idea using objects, pictures or numerals.	MANIPULATIVE	A physical object used to help represent mathematics (e.g. beadstring, Base 10).	
CONCRETE	A representation of a mathematical idea using manipulatives or real-life objects.	PICTORIAL	A representation of a mathematical idea using pictures.	ABSTRACT	A representation of a mathematical idea using symbols (e.g. numerals)	
PART-PART WHOLE MODEL	A pictorial representation of number showing the relationship between parts and wholes.	BAR MODEL	A form of part-part whole model where the parts are represented by adjacent bars.	BEADSTRING	A manipulative where coloured beads are placed on a string in alternating colours (10 red, 10 white, 10 red...) to support counting in ones and tens.	
BASE 10	A manipulative used to show the value of a digit based on the column in which it is placed.	NUMBER LINE	A picture used to represent numbers and calculations where numbers are shown on a regular scale.	NUMBER BOND	Addition and subtraction number facts which we memorise to support efficient calculation	

	PLACE VALUE CHART	A picture/diagram used to help represent the value of digits in numbers.	ADDITION	Combining parts.	COMMUTATIVE	A calculation which will give the same answer, regardless of the order in which it is performed. Addition and multiplication are commutative.
	COUNTING ON	Starting from a number and counting forwards in the number system. This can be used as a strategy to solve addition and subtraction problems.	SYMBOL	An abstract image used to represent an idea (e.g. digits, +, =)	NUMBER SENTENCE	A way of representing a mathematical operation using symbols (+, -, x, ÷, = etc)
	ADDEND	The numbers which are being added. These are parts of the whole.	SUM	The answer to an addition. This is the whole.	FACT FAMILIES	A set of mathematical facts which are closely related. Knowing on means you know all. For example $2 + 3 = 5$, $3 + 2 = 5$, $5 - 3 = 2$, $5 - 2 = 3$
	COLUMNAR ADDITION	The formal written method of column addition	EXPANDED FORM	a way of writing numbers to show the value of each digit (e.g., 325 written as $300 + 20 + 5$)	REGROUP	In column addition: Regrouping 10 from one column to make one from the next largest place value column.
	REGROUPED DIGIT	Recording the regroup on the formal written method.	OVERFLOW	When the sum of the addends in a column is greater than 9. This indicates that you need to regroup before solving.	VERTICAL ADDITION	Adding by arranging addends in columns, organised by their place value. Formal column method is an example of vertical addition.
	PARTIAL SUM	The sum to the addends in each column (not the whole number sentence)				

Multiplication	<p>Children need to know that...</p> <ul style="list-style-type: none"> Multiplication is a mathematical operation that indicates how many times a number is added to itself. (Year 1) X is a mathematical symbol that means multiplication (Year 1) Multiplication is commutative (Year 1) Commutative means it can be done in any order (Year 1) An array is a way of showing multiplication by arranging dots or counters into rows and columns (Year 1) An even number is a number that is divisible by 2 (Year 2) An odd number is a number that is not divisible by 2. (Year 2)  <ul style="list-style-type: none"> The formal language of multiplication. (Year 1) The 0,1,2,5 and 10 times tables. (Year 2) The patterns we see in the 2,5,10 and 3 number sequences. <ul style="list-style-type: none"> The multiplication facts we are expected to learn are called times tables. A multiple of a number can be divided by that number without a remainder (e.g. 25 is a multiple of 5 because 25 can be divided by 5 without a remainder). 3 times table <ul style="list-style-type: none"> The sequence of multiples of the 3 times table up to $12 \times 3 = 36$. The 3 times table alternates odd and even numbers. 4 times table <ul style="list-style-type: none"> The 4 times table is every other number from the 2 times table. This is because 4 is double 2. Every other number in the 4 times table is in the 8 times table. This is because 4 is half as big as 8. Multiples of 4 are all even numbers. 8 times table <ul style="list-style-type: none"> The 8 times table is every other number from the 4 times table. This is because 8 is double 4. The 8 times table is every fourth number from the 2 times table. This is because 8 is 4 times bigger than 2. Multiples of 8 are all even numbers. 		<p>Children need to know how...</p> <ul style="list-style-type: none"> To count in multiples of 2 from 0 to 100. (Year 2) To count in multiples of 5 from 0 to 100. (Year 2) To count in multiples of 10 from 0 to 100. (Year 2) To count in multiples of 3 from 0 to 100 (Year 2) To count in multiples of 4, and 8 (Year 3 Autumn 1) To write multiplication number sentences using x and = (Year 1) To identify whether a problem requires multiplication or division using more advanced mathematical language and reasoning (e.g. part, whole, multiplier, multiplicand, product, dividend, divisor, quotient) (Year 2) To solve missing number questions using the inverse relationship. <ul style="list-style-type: none"> To use a range of strategies to solve multiplication problems within their knowledge of the times tables (e.g. concrete resources – numicon, counters; pictorial representations – number lines, arrays; and abstract methods – repeated addition on a number line, and mentally using known facts) To choose the most efficient method from those they have learned To describe and explain the patterns in the times tables they have learned. To describe and explain the connections between the times tables they have learned. To identify fact families. 		<p>Children need to know...</p> <ul style="list-style-type: none"> When to use a times table based on the factors in the problem. When patterns within the times tables can help solve problems. When it is appropriate to use known multiplication facts to find related products. Example: using $6 \times 4 = 24$ to find 6×8 by doubling the product of 6×4. When to apply the commutative property of multiplication to reorder factors for easier calculation. When to use times tables knowledge to check the accuracy of multiplication answers. When word problems involve quantities or groups they should use multiplication and times tables' knowledge to solve. <p>Children need to know why</p> <ul style="list-style-type: none"> We need to develop rapid recall of key multiplication and division number facts. Having fluent and automatic recall of number facts allows us to 'know' the answer rather than working it out each time. This makes it easier for our brains (reducing cognitive load) which helps us to solve trickier problems. We develop a range of strategies to help simplify and check the products to multiplication calculations. Developing efficiency will allow us to work with numbers quickly and flexibly. 	
	Vocabulary	EQUAL	The same as.	EQUAL GROUPS	The same quantity in each group.	MULTIPLICATION
	MULTIPLIER	The number you are multiplying by.	MULTIPLICAND	The number which is being multiplied	PRODUCT	A result of multiplying two or more numbers together.
	COMMUTATIVE	A calculation which will give the same answer, regardless of the order in which it is performed. Addition and multiplication are commutative.	REPEATED ADDITION	A way of solving multiplication problems where the multiplicand is added repeatedly using a number line or number sentences. E.g. $7 \times 2 = 14 = 2 + 2 + 2 + 2 + 2 + 2$	ARRAY	A way of showing (and solving) multiplication problems where groups are arranged systematically in rows and columns. Multiplier = rows. Multiplicand = columns. 2×5 is the same as... e.g. 
	INVERSE	The opposite calculation. This undoes what was done by the previous calculation. Multiplication and division are inverse operations.	TIMES TABLES	a list of multiplication facts for a particular number which need to be memorised and quickly recalled.	MULTIPLE	The products which are created from a specific multiplier. E.g. multiples of 2 are 2,4,6,8,10...
	EVEN NUMBER	Multiples of 2. These can be divided by 2 without leaving a remainder. Even numbers end in 0,2,4,6,8.	ODD NUMBER	Numbers which are not multiples of 2. These leave a remainder when divided by 2. Odd numbers end in 1,3,5,7,9	FACT FAMILIES	A set of mathematical facts which are closely related. Knowing on means you know all. For example $2 \times 3 = 6$, $3 \times 2 = 6$, $6 \div 3 = 2$, $6 \div 2 = 3$

Year 3 - Autumn 2

Milestone LO (National Curriculum)

MEASUREMENT

Length and perimeter

Pupils should be taught to:

- measure, compare and add: lengths (m/cm/mm)
- measure the perimeter of simple 2D shapes

SUBTRACTION

Pupils should be taught to:

- Subtract numbers mentally, including:
 - a three-digit number and ones
 - a three-digit number and tens
 - a three-digit number and hundreds
- Subtract numbers with up to three digits, using formal written methods of columnar 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.

DIVISION

Pupils should be taught to:

- Recall division facts for the 3, 4 and 8 multiplication tables
- Write and calculate mathematical statements for division using the multiplication tables that they know
- 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.

POSITION AND DIRECTION

Angles and lines

Pupils should be taught to:

- 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.

Revisited Knowledge

New knowledge

NB: In Year 3, it is especially important that significant time is spent assessing and recapping the revisited knowledge as children will have joined our school from different feeder schools and may not have the same basis of mathematical knowledge.

Domains	Declarative knowledge (substantive knowledge)	Procedural knowledge (disciplinary knowledge)	Conditional knowledge (knowing the when and the why)
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Length and perimeter	Children need to know that...	Children need to know how...	Children need to know...
	<ul style="list-style-type: none"> Length and height are measures of distance. (Year 1) A ruler is a tool used to measure length and draw straight lines (Year 1) A straight line is a line with no bends or curves (Year 1) A metre stick is a type of large ruler used for measuring longer distances. It is 1m long. There is sometimes space before the 0. (Year 2) There are 100cm in 1m. (Year 1) Measurement is a process that uses numbers to describe things based on what we can observe about them such as, length, breadth, height, area, mass/weight, volume, capacity, temperature and time, so that we are able to compare them. A ruler is divided into centimetres (cm) and millimetres. A metre is a standard unit of measure used to measure moderately large distances. Distances measured in metres are written as _m. A centimetre is a standard unit of measure used to measure short distances. Distances measured in centimetres are written as _cm. A millimetre is a unit of measure used to measure very short distances. Distances measured in millimetres are written as _mm. 1 metre is equal to 100 centimetres and 1000 millimetres 1 centimetre is equal to 10 millimetres Many rulers have two scales (one on either side). One scale is divided into cm. The other scale is divided into mm. Perimeter is the distance around the outside of a shape 	<ul style="list-style-type: none"> To describe distance using the language long and short. To compare lengths using comparative language: longer and shorter, longest and shortest. (Year 1) To measure distance accurately using non-standard units of measure and standard units of measure (to half a cm). (Year 1) To identify the most appropriate unit of measure (cm or m) (Year 1) To estimate lengths using non-standard measuring tools and their knowledge of measuring (Year 2) To compare lengths using <, >, = and order them. (Year 2) To use a ruler to measure precisely by: <ul style="list-style-type: none"> identifying the correct unit of measure on the ruler holding the ruler the right way up positioning the ruler at the edge of the line/object, starting from the '0' reading the scale accurately Recording the measurement with the appropriate units. To draw a straight line of a specified length by using the ruler to guide the pencil, starting the line at the correct side of the ruler and at the 0 and ending the line at the correct point on the scale. To convert to find equivalent units of measure by multiplying or dividing by 10 e.g. 80mm = 8 cm To find the perimeter of a shape by measuring each side and adding them together 	<ul style="list-style-type: none"> When a problem has mixed units of a measure, we need to convert the measurements to the same unit of measure in order to compare them. When they do not need to measure all sides of a shape to find the perimeter. Example: knowing you only need to measure one side of a square. Example: in a rectangle, recognising that opposite sides are equal in length and adding them together to find the perimeter. When information about the lengths of sides is missing, we can use the total length of the perimeter and find the length of the other side by subtracting the known lengths from the total perimeter. When to apply knowledge of addition and subtraction to understanding of shape to solve problems with length and perimeter. <p>Children need to know why...</p> <ul style="list-style-type: none"> Careful, accurate measurement is important. To ensure that we use exactly the right amount of something. Getting this wrong can have significant consequences (e.g. baking, medicine, sports). (Year 1) We have different units of measure. Things can vary in size hugely. If we didn't have units of measure, we would have to measure very large numbers, which would be very difficult. (Year 1) Rulers have two different scales. Both mm and cm are common units of measure. Having both on a ruler lets us measure in both. We need to find the perimeter of a shape so that we can calculate the area (year 4)

Vocabulary	DESCRIBE	To say what something is like.	MEASUREMENT	A way of precisely describing the quantity of something. It is a process that uses numbers to make these descriptions.	UNIT OF MEASURE	Measurements are made by working out 'how many' of something are the same size. A unit of measure tells us what the 'something' is.
	STANDARD UNIT OF MEASURE	A formally recognised and widely used unit of measure which has a consistent size and has measurement tools available for (e.g. cm)	NON-STANDARD UNIT OF MEASURE	When other objects in the world are chosen to measure the size of something.	DISTANCE	How far something is. Length and height are examples of distance.
	HEIGHT	Vertical distance	LENGTH	Horizontal distance	PERIMETER	The distance around the outline of a 2D shape.
	METRE	A large measure of distance, recorded with the unit notation m.	CENTIMETRE	A small measure of distance, recorded with the unit notation cm. There are 100cm in 1m.	MILLIMETRE	A tiny measure of distance, recorded with the unit notation mm. There are 1,000mm in 1m. There are 10mm in 1cm
	SCALE	A type of number line, often found on measuring tools. The type of scale depends on the interval between each mark. For example, most rules have a 1cm scale as there is 1cm between each mark.				

Subtraction	Children need to know that...	Children need to know how...	Children need to know when...
	<ul style="list-style-type: none"> Subtraction is when you take one number away from another number (Year R) - is a symbol that means subtract. (Revisiting from Year R) $\begin{array}{r} 8 - 6 = 2 \\ \text{Minuend} \quad \text{Subtrahend} \quad \text{Difference} \end{array}$ <ul style="list-style-type: none"> The formal language of subtraction (Year 1) When we know one part (subtrahend) and the whole (minuend) but not the other part (difference), we are being asked to do subtraction. In mathematics, difference means the 'gap' between two numbers. This is also the answer to a subtraction question. Inverse is the opposite calculation, the operation that undoes what was done by a previous operation. Addition is the inverse to subtraction. We lay our digits out in columns, one digit per square to make the place value of these numbers obvious. (Year 2) 	<ul style="list-style-type: none"> To know when a question is asking them to do subtraction based on their knowledge of parts and wholes. (KS1) To subtract a one-digit number from a number up to three digits using their knowledge of counting back in ones, number bonds and written strategies. (Year 2) To subtract ones from a two-digit number within 100. (Year 2) To subtract tens from a two-digit number within 100. (Year 2) To subtract a two-digit number from a two-digit number. (Year 2) To solve missing number problems using the inverse relationship. (Year 2) To subtract ones, tens and hundreds from a three-digit number mentally and supported by jottings by using their knowledge of counting backwards. 	<ul style="list-style-type: none"> A specific calculation strategy may be most useful (e.g. number line, mental strategies, use of manipulatives, pictorial representations, formal written subtraction) exchanging will be necessary. to use addition or subtraction to work out a missing number problem (based on reasoning about parts and wholes). different checking strategies will be most useful (e.g. inverse, estimation, recalculation)



	<ul style="list-style-type: none"> In the formal written method of columnar subtraction, digits with the same place value must always be placed in the same column. In the formal written method of columnar subtraction, we begin our calculation with the smallest place value column. Exchanging is when you substitute 1 unit from a larger place value for 10 units from the next smallest place value. We can exchange 1 ten for 10 ones We can exchange 1 hundred for 10 tens 	<ul style="list-style-type: none"> To subtract numbers with up to three digits using the formal written method of columnar subtraction. To exchange one ten for ten ones when the ones digit in the minuend is smaller than the ones digit in the subtrahend. To exchange one hundred for ten tens when the tens digit in the minuend is smaller than the tens digit in the subtrahend. To check their answer using estimation (based on their knowledge of place value). To identify fact families. To identify the inverse calculation. To check their calculations using the inverse relationship. 	<ul style="list-style-type: none"> we need to use reasoning language to explain our confidence in our calculations or to justify the approach we have taken. <p>Children need to know why...</p> <ul style="list-style-type: none"> <i>We need to know whether we are looking at a part or a whole. Knowing whether we are looking at a part or a whole helps us to know whether we need addition or subtraction.</i> <i>We learn to manipulate numbers mentally first. It is often most efficient to use a mental method. The best mathematicians use the most efficient method to solve a problem.</i> Subtraction is important. We need to subtract so that we are able to establish 'how much of something is left' in real life contexts. We cannot simply switch the digits in the minuend and subtrahend around. Subtraction is not commutative as the minuend is the whole, not a part. We can exchange from the next largest column. 10 ones are equivalent to 1 ten. 10 tens are equivalent to 1 hundred. Therefore, exchanging them does not change the overall value.
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Vocabulary	PARTITION	To split a whole into parts.	EQUAL	The same as.	PART	A section of the whole.
	WHOLE	A total amount. This is always the sum of the parts.	REPRESENTATION	A way of showing a mathematical idea using objects, pictures or numerals.	MANIPULATIVE	A physical object used to help represent mathematics (e.g. beadstring, Base 10).
	CONCRETE	A representation of a mathematical idea using manipulatives or real-life objects.	PICTORIAL	A representation of a mathematical idea using pictures.	ABSTRACT	A representation of a mathematical idea using symbols (e.g. numerals)
	PART-PART WHOLE MODEL	A pictorial representation of number showing the relationship between parts and wholes.	BAR MODEL	A form of part-part whole model where the parts are represented by adjacent bars.	NUMBER LINE	A picture used to represent numbers and calculations where numbers are shown on a regular scale.
	BASE 10	A manipulative used to show the value of a digit based on the column in which it is placed.	PLACE VALUE CHART	A picture/diagram used to help represent the value of digits in numbers.	SYMBOL	An abstract image used to represent an idea (e.g. digits, +, =)
	COUNTING ON	Starting from a number and counting forwards in the number system. This can be used as a strategy to solve subtraction problems (starting at the subtrahend or difference and counting on to the minuend).	COUNTING BACK	Starting from a number and counting backwards. This can be used as a strategy for solving subtraction problems (starting at the minuend and counting back to the subtrahend or difference).	NUMBER SENTENCE	A way of representing a mathematical operation using symbols (+, -, x, ÷, = etc)
	SUBTRACTION	Removing a part from the whole.	FACT FAMILIES	A set of mathematical facts which are closely related. Knowing on means you know all. For example $2 + 3 = 5$, $3 + 2 = 5$, $5 - 3 = 2$, $5 - 2 = 3$		
	MINUEND	The whole in a subtraction problem. This is the amount you subtract from and must always come first.	SUBTRAHEND	The part which you are taking away from the whole. This always comes after the minuend.	DIFFERENCE	The answer to a subtraction question. This shows the remaining part (the gap between the part and the whole)
	INVERSE	The opposite calculation. This undoes what was done by the previous calculation. Addition and subtraction are inverse.	EXCHANGING	Using your knowledge of the relationship between different place value columns to 'exchange' from a larger column when the digit in the minuend is smaller than the digit in the subtrahend.		

Division	<p>Children need to know that...</p> <ul style="list-style-type: none"> <i>Equal means the same and is shown by the symbol = (Year 1)</i> <i>'Equal groups' means you have the same number of objects in each group. (Year 1)</i> <i>Division can be seen in two ways: (Year 1)</i> <ul style="list-style-type: none"> <i>Division as sharing: sharing the dividend into a specific number of groups (e.g. $12 \div 2 \rightarrow$ share 12 equally between two groups. How many counters are in each group?).</i> <i>Division as grouping: is sharing the dividend into equal size groups. (e.g. $12 \div 2 \rightarrow$ group the 12 counters into lots of groups of two. How many groups are there?)</i> <i>\div is a symbol that means division. (Year 1)</i> 	<p>Children need to know how...</p> <ul style="list-style-type: none"> <i>To identify equal groups (Year 1)</i> <i>To justify how they know a group is equal. (Year 1)</i> <i>To write division number sentences using the \div symbol and =. (Year 1)</i> <i>To represent division as sharing and grouping (Year 1)</i> <i>To solve division problems using an appropriate method (mentally by recalling the number facts they have learned, practically or repeated subtraction on a number line) (Year 1)</i> <i>To identify whether a problem requires multiplication or division using more advanced mathematical language and reasoning (e.g. part, whole, multiplier, multiplicand, product, dividend, divisor, quotient) (Year 2)</i> <i>To use the inverse relationship between multiplication and division. (Year 2)</i> <i>To solve missing number problems using the inverse relationship. (Year 2)</i> <i>To check their calculations using the inverse relationship. (Year 2)</i> <i>To count forwards and backwards in 1,2,3,4,5,8 and 10. (Year 3 Autumn 1)</i> <i>To recall and find multiplication facts (for the 2,3,4,5,8 and 10 times tables (Year 3 Autumn 1)</i> 	<p>Children need to know...</p> <ul style="list-style-type: none"> <i>When a question requires multiplication or division based on their knowledge of the underlying structures of these calculations. (Year 2)</i> <i>When a strategy is useful and appropriate for solving a division problem (Year 2)</i> <i>When a problem can be solved mentally using a known fact (Year 2)</i> Which multiplication fact they have learned will help them solve a division problem. When we are looking at missing number problems, we need to work out which part of the problem we are missing. Example: knowing that $3 \times 8 = 24$, using this fact to find $24 \div 3 = 8$ or $24 \div 8 = 3$. When to use the inverse to check an answer.
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- *Half means dividing something by 2 (Year 1)*
- *Division is not commutative. (Year 2)*
- *In division, the whole (dividend) must always be before the divisor (Year 2)*
- *Multiplication is the inverse of division (Year 2)*
- *A multiple of a number can be divided by that number without a remainder (e.g. 25 is a multiple of 5 because 25 can be divided by 5 without a remainder).*
- *The 4 times table is double the 2 times table (Year 3 Autumn 1).*
- *The 4 times table is every other number from the 2 times table. (Year 3 Autumn 1)*
- *Multiples of 4 are all even numbers. (Year 3 Autumn 1)*
- *Multiples of 8 are all even numbers (Year 3 Autumn 1)*
- *An odd number cannot be divided by 2 without a remainder (Year 2)*
- *An even number can be divided exactly by 2 (Year 2)*
- A remainder is the amount left over when something cannot be shared or grouped equally.
- Dividend is the whole. The number which is to be divided.
- Divisor is the number the dividend is going to be divided by. This could tell us the number of groups to create (dividing by sharing) or the number in each group (dividing by grouping).
- Quotient is the answer to a division question. This could mean the number of groups created or the quantity in each group, depending on whether we are dividing by grouping or by sharing.
- Divisibility Rules:
 - 1 times table
 - Any whole number
 - 2 times table
 - The ones digit is even.
 - 3 times table
 - The sum of the digits is divisible by 3 (this rule can be repeated if you are working with very large numbers)
 - 4 times table
 - The last two digits are divisible by 4.
 - Half the number twice. Is the answer still a whole number?
 - 5 times table
 - The ones digit is 0 or 5
 - 8 times table
 - The last three digits are divisible by 8.
 - Half the number three times. Is it still a whole number?
 - 10 times table.
 - The ones digit is 0.


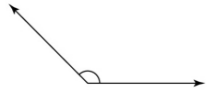
- To find the associated division facts for the times tables that they already know (2,3,4,5,8,10)
- To represent and solve division problems confidently using bar models, part-part whole models, arrays and open arrays.
- To use divisibility rules to suggest whether a division will be possible without a remainder before calculating.

- Where patterns can be used to help solve more complex division problems efficiently (e.g. repeatedly dividing by 2).

Children need to know why...

- *There are a range of ways of solving multiplication and division problems. Different problems may be visualised better using different representations. (Year 1)*
- *You get the same quotient regardless of whether you solve a division problem by grouping or sharing. We can rotate our array to show the commutative nature of multiplication. (Year 1)*
We need to develop rapid recall of key multiplication and division number facts. Having fluent and automatic recall of number facts allows us to 'know' the answer rather than working it out each time. This makes it easier for our brains (reducing cognitive load) which helps us to solve trickier problems. (Year 2)
- **An open array is a useful way of visualising division problems.** Open arrays can help us when we are multiplying and dividing much larger numbers. They also help us to solve area problems later on.

Vocabulary	EQUAL	The same as.	EQUAL GROUPS	The same quantity in each group.	INVERSE	The opposite calculation. This undoes what was done by the previous calculation. Multiplication and division are inverse operations.
	DIVISION	Where a whole is split into two or more equal groups.	DIVISION AS SHARING (PARTITIVE DIVISION)	The divisor tells you the number of groups to share the dividend between. E.g. $10 \div 2 = 5$	DIVISION AS GROUPING (QUOTIENT DIVISION)	The divisor tells you the number in each group. E.g. $10 \div 2 = 5$
	DIVIDEND	A number to be divided by another number (the whole)	DIVISOR	The number which the dividend is being divided by. Tells you either the number of parts or the size of each part.	QUOTIENT	A result of dividing one number by another. Depending on the role of the divisor, this either tells you the number of parts or the size of each equal part.
	FACT FAMILIES	A set of mathematical facts which are closely related. Knowing one means you know all. For example $2 \times 3 = 6$, $3 \times 2 = 6$, $6 \div 3 = 2$, $6 \div 2 = 3$	REMAINDER	The amount left over when you divide a dividend by a divisor which cannot divide perfectly.	REPEATED SUBTRACTION	A strategy for solving division problems where you count back in multiples, sometimes supported by a number line.

Position and Direction	<p>Lines Children need to know that...</p> <ul style="list-style-type: none"> A straight line is a line with no bends or curves. (Year 2) A line is a long narrow mark. (Year 2) Lines can either be straight or curved. (Year 2) Straight lines move only in one direction, without a curve or a bend. (Year 2) Curved lines bend and change direction. (Year 2) Straight lines can be drawn using a ruler. (Year 2) <ul style="list-style-type: none"> A vertical line is a straight line that runs from top to bottom, or bottom to top. A horizontal line is a straight line that runs from left to right, or right to left. Parallel lines are lines that are an equal distance from one another. Parallel lines, if extended will never cross. Perpendicular lines are two straight lines that cross or meet to form a right angle. <p>Angles Children need to know that...</p> <ul style="list-style-type: none"> Position describes where something or someone is. (Year 1) Direction means the line along which something moves, lies or points. (Year 1) Movement means a change of position or direction. (Year 1) Rotation is when something turns or spins around a point. Sometimes, this point is located at the centre. (Year 2) Clockwise is the direction in which the hands of a clock turn. It is a turn to the right. (Year 2) Anti-clockwise is a turn to the left, opposite to the direction of the clock hands. (Year 2) A quarter turn can also be called a right-angled turn. (Year 2) A half turn is 2 right-angled turns in the same direction. (Year 2) A three-quarter turn three right-angled turns in the same direction (Year 2) <ul style="list-style-type: none"> Angles measure turns. This turn can describe the rotation of an object, or it can describe the space between two intersecting lines/surfaces at the point where they meet. Angles are measured in degrees. The symbol for the unit of measure, degrees, is ° (the degree symbol). Unlike the unit of measure for temperature, this is not followed by a letter. There are 360° in a whole turn. There are 90° in a right angle. A right angle is the same as a quarter turn. It is also the angle found where the sides of rectangles and squares meet. You can find the size of an angle using a protractor. In diagrams, a right angle is shown using this notation:  <ul style="list-style-type: none"> In diagrams, other angles are identified using this notation:  <ul style="list-style-type: none"> A protractor is a tool you will use later in school to measure the size of angles. Like a ruler, this has two scales which can be used. 	<p>Children need to know how...</p> <ul style="list-style-type: none"> To describe position, direction and movement using appropriate directional language (near to, far from, left, right, in front of, behind, forwards, backwards, left, right, full-turns/whole-turn, half turn, quarter turn, three-quarter turn, straight, curved. (KS1) To describe whether a rotation is clockwise or anticlockwise. (Year 2) To describe the rotation of an object in terms of right angles (e.g. 3 right angles for a three-quarter turn). (Year 2) <ul style="list-style-type: none"> To use the terms quarter/half turn or 90°/two 90° turns turn to describe position To recognise right angles in shapes To recognise straight angles. To use the correct notation to show angles in diagrams. To describe angles as multiples of right angles To use a protractor to say if an angle is a 'right angle' or 'not a right angle', matching up the lines and starting from 0 on the appropriate side of the protractor. To compare angles in relation to right angles using the terms greater than and less than. To recognise and draw vertical lines To recognise and draw horizontal lines. To recognise and draw diagonal lines. To recognise and draw pairs of parallel lines. To recognise and draw pairs of perpendicular lines. To identify horizontal lines. 	<p>Children need to know when...</p> <ul style="list-style-type: none"> an angle is a property of shape and when it is a measure of turn. an angle is made up of right angles. When we draw lines, we use a ruler to draw a horizontal/vertical line segment of a specified length we see different types of angle and line in real life. <p>Children need to know why...</p> <ul style="list-style-type: none"> We learn to describe movement. Sometimes we will need to explain where/how something is moving to someone who is not there. Having the language of position and direction allows us to do this. (Year 1) Parallel lines look visually similar to the equals sign. The equals sign is made up of a pair of parallel lines. This is because parallel lines will always have exactly the same gap between them. This helps us to visualise how numbers either side of the equals sign are the same size. A right angle notation uses a 'box'. Because this reflects the 90° turn of a right angle. This visual similarity helps people to identify this important angle efficiently in diagrams.
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Vocabulary	2D SHAPE	A shape with 2 dimensions (flat). They have width and height. They can only be drawn, not held.	POLYGON	a closed two-dimensional shape with straight sides.	SIDES	The lines which define the outside of a shape.
	VERTEX (2D)	The points at which two sides of a shape meet.	HORIZONTAL	A straight line which goes from left to right/right to left.	VERTICAL	A straight line which goes up and down.
	DIAGONAL	A straight line which joins non-adjacent corners of a straight-sided shape.	LINE OF SYMMETRY	A line that cuts a shape exactly in half, so the two sides are mirror images of one another.	SYMMETRICAL	A shape with at least one line of symmetry.
	STRAIGHT	A line which does not curve. These are drawn with a ruler.	CURVED	A line that is bent. Usually this is smooth and continuous.	INTERSECT	Where two lines cross
	PARALLEL LINES	lines that are always the same distance apart and never intersect.	PERPENDICULAR LINES	lines that intersect at a right angle (90 degrees).	INTERSECTING LINES	lines that cross or meet (but not at a right angle)



	RAY	a part of a line that has one endpoint and extends indefinitely in one direction.	ANGLE	A measure of turn. This can describe movement or can be a property of shape.	DEGREE	The unit of measure for angles. Uses the unit notation X°
	FULL TURN	Turning a full circle: starting and finishing in the same position. A full turn is 360°	STRAIGHT ANGLE (HALF TURN)	Half the size of a full turn. The object will face the opposite direction at the end of the turn. A half turn is 180°	RIGHT ANGLE (QUARTER TURN)	Quarter the size of a full turn. The object will be facing to the left or right of its starting direction. A right angle is 90°
	PROTRACTOR	A measurement tool used for measuring the size of angles.				
Enrichment & wider development	Winter Gift Shop Designing and running a stall at the winter fayre.					



Milestone LO (National Curriculum)

Fractions

Pupils should be taught to:

- Count up and down in tenths
- Recognise that tenths arise from dividing an object into 10 equal parts and 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
- Compare and order unit fractions, and fractions with the same denominators
- Solve problems that involve all of the above

Revisited Knowledge

New knowledge

NB: In Year 3, it is especially important that significant time is spent assessing and recapping the revisited knowledge as children will have joined our school from different feeder schools and may not have the same basis of mathematical knowledge.

Domains	Declarative knowledge (substantive knowledge)	Procedural knowledge (disciplinary knowledge)	Conditional knowledge (knowing the when and the why)
Fractions	<p>Representing Fractions Pupils need to know that...</p> <ul style="list-style-type: none"> • A fraction represents part of a whole. (Year 1) • A whole is your total amount/shape. (Year 1) • A part is an equal section of your total amount/ shape. (Year 1) • The number 1 represents 1 whole. (Year 2) • When we write a fraction, the bottom number describes the total number of equal parts that the whole has been split into. This is called the denominator (Year 2) • When we write a fraction, the top number describes the number of parts you have. This is called the numerator. (Year 2) • The straight line between the numerator and the denominator is called the dividing line. (Year 2) • Why the following fractions are written the way they are: $\frac{1}{2}, \frac{1}{4}, \frac{2}{4}, \frac{3}{4}, \frac{1}{3}$ (Year 2) <ul style="list-style-type: none"> • A unit fraction is any fraction with 1 as its numerator, and a whole number for the denominator (e.g. $\frac{1}{2}$) • A non-unit fraction is a fraction where the numerator is greater than 1 (e.g. $\frac{3}{4}$). • A tenth is 1 part out of 10. • Tenths arise from dividing an object into 10 equal parts. • To find a fraction of a quantity, we need to first divide by the denominator and then multiply by the numerator. <p>Adding and Subtracting Fractions Pupils need to know that...</p> <ul style="list-style-type: none"> • When we add/subtract fractions with the same denominator, we add/subtract the numerator, but the denominator stays the same. 	<p>Representing Fractions Pupils need to know how...</p> <ul style="list-style-type: none"> • To identify when you have equal parts/groups (Year 1) • To identify a half of a shape, object or quantity by splitting it into 2 equal parts. (Year 1) • To identify a quarter of a shape, object or quantity by splitting it into 4 equal parts. (Year 1) • To identify one third of a shape, object or quantity by splitting the whole into 3 equal parts. (Year 2) • To identify two quarters of a shape, object or quantity by splitting the whole into 4 equal parts and selecting two of the parts. (Year 2) • To identify three quarters of a shape, object or quantity by splitting the whole into 4 equal parts and selecting three of the parts. (Year 2) • To write number sentences to describe fractions of quantities (including lengths) – e.g. $\frac{1}{2}$ of 6 = 3. (Year 2) • To find a tenth of a quantity or shape by dividing the whole by 10 • To count up and down in tenths e.g. 1/10, 2/10, 3/10... • To recognise, find and write unit fractions of a discrete set of objects by counting the objects to find the denominator • To recognise, find and write non-unit fractions of a discrete set of objects by counting all the objects to find the denominator and counting the taken part to find the numerator • To recognise, find and write unit fractions of a quantity • To recognise, find and write non-unit fractions of a quantity <p>Adding and Subtracting Fractions Pupils need to know how...</p> <ul style="list-style-type: none"> • To add two fractions with the same denominator, by adding the numerators of both addends together • To subtract fractions with the same denominator by subtracting the numerator of the subtrahend from the numerator of the minuend. 	<p>Children need to know when...</p> <ul style="list-style-type: none"> • To use the language of half and quarter. (Year 1) • A part is equal or unequal. (Year 1) • Fractions which look different are describing the same thing (equivalent fractions $\frac{2}{4}$ and $\frac{1}{2}$) (Year 2) • To use the simpler fraction to solve the problem (e.g. finding $\frac{1}{2}$ rather than $\frac{2}{4}$) (Year 2) • To use visual models (e.g. equivalence) and when to use calculation (e.g. simple fractions of quantities) to solve fractions problems. • Multiplication and division facts can be used to help solve fractions problems. • We can just add/subtract the numerators (when the denominators are the same) • To use fraction knowledge to help us solve real-life problems (e.g. sharing an object equally between friends, making a recipe work for less people). <p>Children need to know why...</p> <ul style="list-style-type: none"> • Recognising equal parts is so important. Recognising equality of parts is the fundamental knowledge required for multiplication, division and fractional reasoning. (Year 1) • Fractions may look different but be describing the same amount. Some fractions are equivalent. This means that they describe the same amount. They have been split into a different number of parts. (Year 2) • We can only add/subtract numerators without doing anything else to the fractions when denominators are the same. The parts must be the same size in order to be added together.



	<p>Equivalence Pupils need to know that...</p> <ul style="list-style-type: none"> • <i>Equivalent means equal to (Year 2)</i> • $\frac{2}{4}$ is equivalent to $\frac{1}{2}$. (Year 2) <ul style="list-style-type: none"> • Equivalent fractions are fractions that describe the same fraction of an amount/number but which look different. • We can find equivalent fractions by using manipulatives, drawing bar models/pictures and using a fraction wall. <p>Comparing and Ordering Fractions Pupils need to know that...</p> <ul style="list-style-type: none"> • <i>< means is greater than (more than) (Year 2)</i> • <i>> means is fewer than (less than) (Year 2)</i> • <i>= means is equal to (Year 2)</i> <ul style="list-style-type: none"> • We can compare fractions with the same denominator by looking at the numerator. The larger the numerator, the larger the fraction. • We can compare fractions with the same numerator by looking at the denominator. The larger the denominator, the smaller the fraction. • We can compare fractions with different numerators and denominators using pictorial representations, such as a fraction wall or bar model. 	<p>Equivalence Pupils need to know how...</p> <ul style="list-style-type: none"> • <i>To show that $\frac{2}{4}$ is equivalent to $\frac{1}{2}$. (Year 2)</i> <ul style="list-style-type: none"> • To recognise and show pairs of equivalent fractions by writing and drawing diagrams <p>Comparing and Ordering Fractions Pupils need to know how...</p> <ul style="list-style-type: none"> • To compare unit fractions by using <, > and = • To compare fractions with the same denominator by using <, > and = • To solve problems using knowledge of fractions 	<ul style="list-style-type: none"> • When the numerator is the same, a larger denominator means a smaller fraction. The denominator tells us how many parts it is split into. More parts means the parts will be smaller. • We use a fraction wall to help us solve equivalence problems. A fraction wall shows fractions side by side, so it is very easy for us to draw a line and see which ones are bigger and which ones are smaller. 																																							
Vocabulary	<table border="1"> <tr><td>FRACTION</td><td>A way of representing mathematically how many equal parts of a whole you have.</td></tr> <tr><td>DENOMINATOR</td><td>The bottom number in a fraction. This describes the number of equal parts the whole has been split into.</td></tr> <tr><td>HALF</td><td>When a whole has been split into two equal parts.</td></tr> <tr><td>QUANTITY</td><td>A numerical amount.</td></tr> <tr><td>EQUIVALENT FRACTION</td><td>Fractions that represent the same amount/number, but which look different.</td></tr> <tr><td>LIKE NUMERATORS</td><td>Numerators are the same.</td></tr> <tr><td>TENTH</td><td>One whole when a part is divided by 10.</td></tr> </table>	FRACTION	A way of representing mathematically how many equal parts of a whole you have.	DENOMINATOR	The bottom number in a fraction. This describes the number of equal parts the whole has been split into.	HALF	When a whole has been split into two equal parts.	QUANTITY	A numerical amount.	EQUIVALENT FRACTION	Fractions that represent the same amount/number, but which look different.	LIKE NUMERATORS	Numerators are the same.	TENTH	One whole when a part is divided by 10.	<table border="1"> <tr><td>PART</td><td>A section of the whole. In fractions, parts must always be equal.</td></tr> <tr><td>DIVIDING LINE</td><td>The horizontal line which separates the numerator from the denominator.</td></tr> <tr><td>QUARTER</td><td>When a whole has been split into four equal parts.</td></tr> <tr><td>COMPARE</td><td>Two meanings: a) to say what is the same or what is different. b) to identify the mathematical difference between numbers.</td></tr> <tr><td>FRACTION WALL</td><td>A pictorial representation of small fractions. This helps to find equivalent fractions.</td></tr> <tr><td>UNIT FRACTION</td><td>A fraction with a numerator of 1</td></tr> </table>	PART	A section of the whole. In fractions, parts must always be equal.	DIVIDING LINE	The horizontal line which separates the numerator from the denominator.	QUARTER	When a whole has been split into four equal parts.	COMPARE	Two meanings: a) to say what is the same or what is different. b) to identify the mathematical difference between numbers.	FRACTION WALL	A pictorial representation of small fractions. This helps to find equivalent fractions.	UNIT FRACTION	A fraction with a numerator of 1	<table border="1"> <tr><td>WHOLE</td><td>A total amount. This is the sum of all the parts. In fractions, the number 1 represents 1 whole.</td></tr> <tr><td>NUMERATOR</td><td>The top number in a fraction. This describes the number of parts you have.</td></tr> <tr><td>THIRD</td><td>When a whole has been split into three equal parts.</td></tr> <tr><td>EQUAL/ EQUIVALENT</td><td>The same as.</td></tr> <tr><td>LIKE DENOMINATORS</td><td>Denominators are the same</td></tr> <tr><td>NON-UNIT FRACTION</td><td>A fraction with a numerator larger than 1.</td></tr> </table>	WHOLE	A total amount. This is the sum of all the parts. In fractions, the number 1 represents 1 whole.	NUMERATOR	The top number in a fraction. This describes the number of parts you have.	THIRD	When a whole has been split into three equal parts.	EQUAL/ EQUIVALENT	The same as.	LIKE DENOMINATORS	Denominators are the same	NON-UNIT FRACTION	A fraction with a numerator larger than 1.	
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Enrichment & wider development	NSPCC Number Day																																									



Milestone LO (National Curriculum)

Geometry, Shape and Space

Pupils should be taught to:

- Draw 2D shapes and make 3D shapes using modelling materials
- Recognise 3D shapes in different orientations and describe them

Measures: Time

- 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
- Use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight

Revisited Knowledge

New knowledge

Domains	Declarative knowledge (substantive knowledge)	Procedural knowledge (disciplinary knowledge)	Conditional knowledge (knowing the when and the why)																								
Properties of shape	<p>2D Shape Children need to know that...</p> <ul style="list-style-type: none"> • A 2D shape is a shape that has 2 dimensions (width and height). It is flat and can only ever be drawn, not held. (Year 1) • 2D shapes have sides and vertices (Year 1) • The properties of a range of different 2D shapes: (Year 1) • Symmetry means when something is exactly the same on either side. Lines of symmetry can be diagonal, horizontal or vertical. (Year 2) <table border="1"> <thead> <tr> <th>Name</th> <th>Number of sides</th> <th>Number of Vertices</th> </tr> </thead> <tbody> <tr> <td>Circle</td> <td>1 (curved, continuous)</td> <td>0</td> </tr> <tr> <td>Triangle</td> <td>3 (straight)</td> <td>3</td> </tr> <tr> <td>Square</td> <td>4 (straight, equal length)</td> <td>4</td> </tr> <tr> <td>Rectangle</td> <td>4 (straight, opposite sides equal)</td> <td>4</td> </tr> <tr> <td>Pentagon</td> <td>5 (straight)</td> <td>5</td> </tr> <tr> <td>Hexagon</td> <td>6 (straight)</td> <td>6</td> </tr> <tr> <td>Octagon</td> <td>8 (straight)</td> <td>8</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • A semicircle is exactly half of a circle. • A polygon is a word for a multiple sided shape. • Quadrilateral is the name for a four-sided shape. • The names and properties of a range of quadrilaterals. 	Name	Number of sides	Number of Vertices	Circle	1 (curved, continuous)	0	Triangle	3 (straight)	3	Square	4 (straight, equal length)	4	Rectangle	4 (straight, opposite sides equal)	4	Pentagon	5 (straight)	5	Hexagon	6 (straight)	6	Octagon	8 (straight)	8	<p>2D Shape Children need to know how...</p> <ul style="list-style-type: none"> • To recognise and identify each of the 2D shapes, based on their properties. (Year 1) • To recognise 2D shapes in different orientations and sizes (including irregular shapes). (Year 1) • To recognise 2D shapes in everyday life. (Year 1) • To identify a line of symmetry in a shape. (Year 2) • To recognise and describe a 2D shape by its lines of symmetry (Year 2) • To describe 2D shapes using the terms 'side' and 'vertex'/'vertices' • To accurately identify and describe types of quadrilaterals. • To draw 2D shapes with accuracy • To complete a drawing of a 2D shape which is symmetrical when given one side of the line of symmetry. 	<p>Children need to know when...</p> <ul style="list-style-type: none"> • We see a shape; we can identify it by its properties. (Year 1) • We see symmetry in real life. (Year 2) • We draw shapes with straight sides, we use a ruler. • We draw a symmetrical shape, it can be divided into two parts which are mirror images of one another. • Comparing shapes, we can choose to compare them based on their properties such as the number of sides, angles, or symmetry. • we make 3D shapes; all sides must connect to each other with no gaps. <p>Children need to know why...</p> <ul style="list-style-type: none"> • We identify shapes. We identify shapes because we can use 3D shapes to build. Different shapes have different properties so are useful for different things. (Year 1) • There is no gap between the sides in 3D shapes. 3D shapes describe complete, enclosed shapes.
Name	Number of sides	Number of Vertices																									
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Name	Number of sides/vertices	Unique properties
Square	4	All sides are equal lengths. All angles are right angles. 2 pairs of parallel lines.
Rectangle	4	All angles are right angles. 2 pairs of parallel lines. Parallel sides are equal lengths.
Trapezium	4	Not all trapeziums look the same. 1 pair of parallel lines. 2 pairs of equal angles. 2 lines of equal length; 2 lines that are different lengths. 2 obtuse angles and 2 acute angles.
Rhombus	4	All sides are equal lengths 2 pairs of parallel lines Opposite angles are equal.
Parallelogram	4	2 pairs of parallel lines. 2 acute and 2 obtuse angles. 2 pairs of sides that are equal lengths.

3D Shape

Children need to know that...

- A 3D shape is a solid figure or an object or shape that has three dimensions— length, width, and height (Year 1)
- 3D shapes have edges, vertices and faces. (Year 1)
- A face is a surface of a 3D shape. (Year 1)
- An edge is the straight line where 2 edges meet. (Year 1)
- A vertex is the point where at least 3 edges meet (Year 1)
- The properties of a range of 3D shapes (Year 1)

Name	Number of edges	Number of Vertices	Number of faces
Sphere	0	0	1 continuous, curved
Pyramid	6	4	Triangular base: 4 flat triangles (inc. base)
	8	5	Square base: 1 flat square 4 flat triangles
Cone	1	1	1 flat, circle 1 curved
Cylinder	2	0	2 flat circles 1 curved rectangle
Triangular prism	9	6	2 flat triangles 3 flat squares
Cube	12 (equal length)	8	6 flat squares
Cuboid	12 (parallel are equal length)	8	6 flat faces - some squares, some rectangles

- Orientation is the angle at which an object or shape is presented from.

3D Shape

Children need to know how...

- To recognise and identify each of the 3D shapes, based on their properties. (Year 1)
- To recognise 3D shapes in different orientations and sizes (including irregular shapes). (Year 1)
- To recognise 3D shapes in everyday life (Year 1)
- To identify the 2D shapes on the surface of 3D shapes (faces) by their properties. (Year 2)
- To compare 2D and 3D shapes using everyday objects. (Year 2)
- To describe 3D shapes using the terms face, edge, curved surface, flat surface and vertex/vertices.
- To recognise 3D shapes in different orientations.
- To construct 3D shapes using a variety of equipment e.g. Multilink, plasticine, k-nex.

Vocabulary	EQUAL	The same as.	2D Shape	A shape with 2 dimensions (flat). They have width and height. They can only be drawn, not held.	3D SHAPE	A shape with 3 dimensions (height, width and depth). These can be held as well as drawn.
	SIDES	The lines which define the outside of a shape.	VERTEX (2D)	The points at which two sides of a shape meet.	VERTEX (3D)	The point at which three or more edges meet.
	EDGE	The line where two faces meet.	FACE	The flat surfaces of a 3D shape.	SURFACE	The outside layer of something.
	HORIZONTAL	A straight line which goes from left to right/right to left.	VERTICAL	A straight line which goes up and down.	DIAGONAL	A straight line which joins non-adjacent corners of a straight-sided shape.
	STRAIGHT	A line which does not curve. These are drawn with a ruler.	CURVED	A line that is bent. Usually this is smooth and continuous.	LINE OF SYMMETRY	A line that cuts a shape exactly in half, so the two sides are mirror images of one another.
	SYMMETRICAL	A shape with at least one line of symmetry.	MIRROR IMAGE	An image of object which is identical to another, but with the structure reversed (like your reflection in a mirror or either side of a symmetrical shape)	ORIENTATION	The angle at which an object or shape is presented from.

Time	<p>Describing Time Children need to know that...</p> <ul style="list-style-type: none"> Time is a measurement for how long it takes for things to happen. (Year 1) When we describe time, we use comparative language, such as before, after, next, first, today, yesterday, tomorrow, quicker, slower, earlier, later. (Year 1) Chronological order means listing events in order from earliest to latest. (Year 1) A date is a way of describing when something happened, by stating the day, month (and sometimes year) it happened. (Year 1) There are 24 hours in a day. 12 in the morning and 12 in the evening. (Year 1) There are 7 days in a week: Monday, Tuesday, Wednesday, Thursday, Friday, Saturday and Sunday. (Year 1) In England, we often describe weeks as starting on Monday and ending on Sunday. (Year 1) There are twelve months in a year. (Year 1) There are about 365 and one quarter days in a year. Therefore, most years have 365 days; every fourth year has 366 days. This is the time it takes earth to orbit the sun. (Year 1) Am stands for ante meridiem. This means a time 'before noon' and refers to the period from midnight until noon. Pm stands for post meridiem. This means 'after noon' and refers to the period from noon until midnight. Morning is a general term used to describe the period of time before noon Afternoon is a general term used to describe the period of time after noon Midday means noon/12:00pm Midnight is at 00:00am <p>Telling the Time Children need to know that...</p> <ul style="list-style-type: none"> Time can be measured in seconds, minutes and hours (these are called units of time). (Year 1) There are 60 seconds in a minute. (Year 1) There are 60 minutes in an hour. (Year 1) Time is shown on a clock. (Year 1) We have analogue and digital clocks. (Year 1) An analogue clock has two hands which move around a number line on the outside to show the time. (Year 1) <ul style="list-style-type: none"> Long hand – minutes. This moves quickly. Short hand – hours. This moves slowly. We need to look at both hands to tell the time. (Year 1) O'clock describes what hour we are on. We say it after the hour number. (e.g. three o'clock) (Year 1) Half-past describes being half-way (30 minutes) through an hour. (Year 1) Clockwise describes a movement to the right (Year 2 Spring 2) Times starting with '...past' mean you have not yet gone past 'half-past' the hour. You describe how many minutes you are past (after) the current hour. Times starting with '...to' mean you have gone past 'half-past' and are now going towards the next hour. You describe how many minutes left until you reach the next hour. Quarter past means you have gone 15 minutes past (after) the current hour. The minute hand points at the 3 (hours)/15 (minutes). Quarter to means there are 15 minutes to the next hour. The minute hand points at the 9 (hours)/45 (minutes). The longer lines on an analogue clock with the numbers 1-12 show five-minute intervals (minute hand) or hour intervals (hour hand). Some clocks show the numbers for both minutes and hours. Some clocks just show the numbers for minutes. 	<p>Describing Time Children need to know how...</p> <ul style="list-style-type: none"> To compare the duration and sequence of events using the language quicker, slower, earlier, later (Year 1) To sequence events in chronological order and verbalise their justification using the language before, after, next, first, today, yesterday, tomorrow, morning, after and evening. (Year 1) To use language relating to dates including <ul style="list-style-type: none"> days of the week, weeks months of the year years. (Year 1) <p>Telling the Time Children need to know how...</p> <ul style="list-style-type: none"> To measure and record time in hours, minutes and seconds. (Year 1) To tell and show the time on an analogue clock to the nearest o'clock, half past, quarter to, quarter past and 5 minutes (Year 2) To read the time on an analogue clock to the nearest minute To read the time on a digital clock to the nearest half hour, quarter hour, five minutes and minute To read 12hour time on a digital clock e.g. 3:45am To read 24hour time on a digital clock e.g. 22:30 To use a.m. and p.m. to say which part of the day something is To describe time using the terms a.m. and p.m., noon (midday), midnight, afternoon and morning. To identify the positions of the numbers on a blank clock face and understand what alternative symbols (e.g. roman numerals, dots, blank space) are representing. 	<p>Children need to know when...</p> <ul style="list-style-type: none"> To use language such as fast or slow. (Year 1) Someone asks, 'What time is it?' to look at a clock to find the answer. (Year 1) 'Today' is using precise language. (Year 1) To read the numbers on the outside of the clock face and when to count in 5s. (Year 2) To look at the minute hand and when to look at the hour hand. (Year 2). We count in 5s and when we count in ones: we read the clock in 5-minute intervals first, and then in ones. We reach 60 minutes to move to a new hour. When the second hand gets back around to the 12 the minute hand will move to the next minute. When reading a digital clock, we always read it as minutes past. <p>Children need to know why...</p> <ul style="list-style-type: none"> Clocks have two hands and two sets of numbers around the outside. Each hand points at a different scale and helps us to work out how many hours and minutes there are. (Year 1) We normally describe events in chronological order because that is often the way our memories store episodic information. (Year 1) Sometimes we describe time using 'past' and sometimes we describe time using 'to'. The half hour mark is really important to us. This separates when we use past and to. Times which are 'past' are closer to the current hour. Times which are 'to' are closer to the next hour. It helps us to understand how far through the hour we are. (Year 2) We have two types of clocks: analogue and digital. Digital clocks are more popular today because of electricity and because they are easier to read. Analogue clocks are an older design because they used to be clockwork powered.
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	<ul style="list-style-type: none"> When the minute hand is on the right of the clock, we give our times as 'past'; when the minute hand is on the left of the clock, we give our times as 'to'. Some clocks have three hands. The third hand (long, thin and moves quickly) shows seconds. A clock face is the part of the clock that displays the numbers. Some analogue clocks use Roman Numerals not Arabic digits.(i, ii, iii, etc.) A Roman numeral is a number represented by letters and was designed and used by the Roman Empire. This system uses seven letters as numerals e.g. I = 1; v = 5; x = 10; Some clocks have no numbers at all. To tell the time using these clocks, you need to look at the position of the hands on the clock face. A digital clock does not have moving hands; instead, it displays numbers in the format XX:XX. 					
Vocabulary	TIME	A measurement of how long things take to happen.	CHRONOLOGICAL ORDER	Listing events in order from the earliest to the latest.	MORNING	The first part of the day, from 00:00-11:59
	AFTERNOON	The second part of the day, from 12:00-23:59.				
	SECONDS	A unit of measure for time. The smallest common unit of measure. There are 60 seconds in a minute.	MINUTE	A unit of measure for time. There are 60 minutes in an hour.	HOURLY	A unit of measure for time. There are 24 hours in a day.
	ANALOGUE CLOCK	A clock with a circle face and 2 (or 3) hands which move around clockwise to show the time.	DIGITAL CLOCK	A clock which is usually rectangular and shows time in numbers.	MINUTE HAND	Longer thinner hand on the analogue clock which moves quicker.
	HOURLY HAND	Shorter, thicker hand of the analogue clock which moves slower.	O'CLOCK	Describes the hour of the day we are currently on.	HALF-PAST	Suggests we are half-way through the current hour (30 minutes)
	Ante Meridiem (am)	On the 12-hour clock, indicates a time between midnight and midday.	Post meridiem (pm)	On the 12-hour clock, indicates a time between midday and midnight. (12:00 and 23:59)	24 HOUR CLOCK	a timekeeping system in which the day is divided into 24 hours, starting at midnight (00:00) and ending at midnight the next day (23:59).
Enrichment & wider development	Maths Day					

FOXHILLS
FEDERATION

Milestone LO (National Curriculum)

Multiplication

Pupils should be taught to:

- 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.

Money

Pupils should be taught to:

- Add and subtract amounts of money to give change, using both £ and p in practical contexts

Measure: mass and capacity

Pupils should be taught to:

- Measure, compare, add and subtract: mass (kg/g); volume/capacity (l/ml)



Revisited Knowledge

New knowledge

NB: In Year 3, it is especially important that significant time is spent to assessing and recapping the revisited knowledge as children will have joined our school from different feeder schools and may not have the same basis of mathematical knowledge.

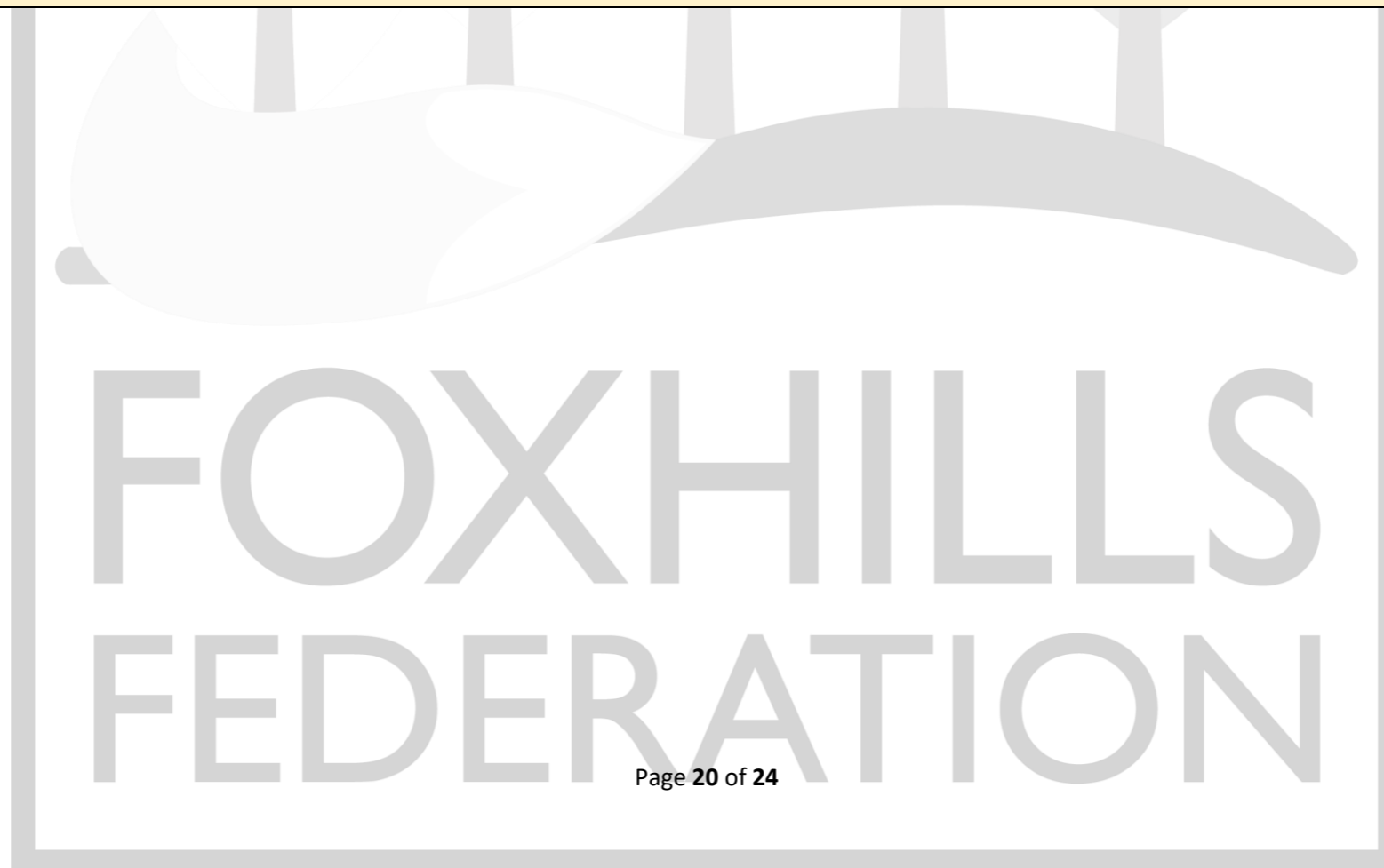
Domains	Declarative knowledge (substantive knowledge)	Procedural knowledge (disciplinary knowledge)	Conditional knowledge (knowing the when and the why)
Multiplication	<p>Children need to know that...</p> <ul style="list-style-type: none"> • <i>Multiplication is a mathematical operation that indicates how many times a number is added to itself. (Year 1)</i> • <i>X is a mathematical symbol that means multiplication (Year 1)</i> • <i>Multiplication is commutative (Year 1)</i> • <i>Commutative means it can be done in any order (Year 1)</i> • <i>An array is a way of showing multiplication by arranging dots or counters into rows and columns (Year 1)</i> • <i>An even number is a number that is divisible by 2 (Year 2)</i> • <i>An odd number is a number that is not divisible by 2. (Year 2)</i> • <i>The formal language of multiplication. (multiplier, multiplicand, product) (Year 1)</i> • <i>The 0,1,2,5 and 10 times tables. (Year 2)</i> • <i>The patterns we see in the 2,5,10 and 3 number sequences. (Year 3 Autumn 1)</i> • <i>The multiplication facts we are expected to learn are called times tables. (Year 3 Autumn 1)</i> • <i>A multiple of a number can be divided by that number without a remainder (e.g. 25 is a multiple of 5 because 25 can be divided by 5 without a remainder). (Year 3 Autumn 1)</i> • <i>3 times table (Year 3 Autumn 1)</i> <ul style="list-style-type: none"> ○ <i>The sequence of multiples of the 3 times table up to $12 \times 3 = 36$.</i> ○ <i>The 3 times table alternates odd and even numbers.</i> • <i>4 times table (Year 3 Autumn 1)</i> <ul style="list-style-type: none"> ○ <i>The 4 times table is every other number from the 2 times table. This is because 4 is double 2.</i> ○ <i>Every other number in the 4 times table is in the 8 times table. This is because 4 is half as big as 8.</i> ○ <i>Multiples of 4 are all even numbers.</i> • <i>8 times table (Year 3 Autumn 1).</i> <ul style="list-style-type: none"> ○ <i>The 8 times table is every other number from the 4 times table. This is because 8 is double 4.</i> ○ <i>The 8 times table is every fourth number from the 2 times table. This is because 8 is 4 times bigger than 2.</i> ○ <i>Multiples of 8 are all even numbers.</i> • Related facts are those which are linked. We can use related facts to help us find the answer to mathematical questions quickly. <ul style="list-style-type: none"> ○ We can multiply larger groups using our knowledge of place value (e.g. $2 \times 20 = 2 \times 2$ tens) and partitioning. ○ Inverse means the opposite. A group of facts and their opposite is called a fact family. If we know one fact in the family, we know all facts in the family. 	<p>Children need to know how...</p> <ul style="list-style-type: none"> • <i>To count in multiples of 2 from 0 to 100. (Year 2)</i> • <i>To count in multiples of 5 from 0 to 100. (Year 2)</i> • <i>To count in multiples of 10 from 0 to 100. (Year 2)</i> • <i>To count in multiples of 3 from 0 to 100 (Year 2)</i> • <i>To count in multiples of 4, and 8 (Year 3 Autumn 1)</i> • <i>To write multiplication number sentences using \times and $=$ (Year 1)</i> • <i>To identify whether a problem requires multiplication or division using more advanced mathematical language and reasoning (e.g. part, whole, multiplier, multiplicand, product, dividend, divisor, quotient) (Year 2)</i> • <i>To solve missing number questions using the inverse relationship.</i> • <i>To continue to use a range of strategies to solve multiplication problems (e.g. concrete resources – numicon, counters; pictorial representations – number lines, arrays- and abstract methods – repeated addition on a number line and mentally using known facts)(Year 3 Autumn 1)</i> • <i>To choose the most efficient method from those they have learned (Year 2)</i> • <i>To identify fact families (Year 3 Autumn 1)</i> • To use knowledge of place value to multiply. • To write and calculate mathematical statements for 2s x 1d multiplication statements using the related facts of tables they know (e.g. 2×20 as linked to 2×2) • To use the expanded column method as a way of recording and solving multiplication problems using their knowledge of related facts. • To solve problems including missing number problems and inverse operations. 	<p>Children need to know when...</p> <ul style="list-style-type: none"> • <i>to use a times table based on the factors in the problem. (Year 3 Autumn 1)</i> • <i>patterns within the times tables can help solve a problem.</i> • <i>it is appropriate to use known multiplication facts to find related products. (Year 3 Autumn 1)</i> • <i>to apply the commutative property of multiplication to reorder factors for easier calculation. (Year 3 Autumn 1)</i> • <i>to use times tables knowledge to check the accuracy of multiplication answers. (Year 3 Autumn 1)</i> • <i>word problems involve quantities or groups they should use multiplication knowledge to solve them. (Year 3 Autumn 1)</i> • When to use expanded short multiplication to solve a problem. • When accurate use of place value columns is important to ensure accurate calculation. <p>Children need to know why</p> <ul style="list-style-type: none"> • <i>We need to develop rapid recall of key multiplication and division number facts. Having fluent and automatic recall of number facts allows us to 'know' the answer rather than working it out each time. This makes it easier for our brains (reducing cognitive load) which helps us to solve trickier problems. (Year 2)</i> • <i>We develop a range of strategies to help simplify and check the products to multiplication calculations. Developing efficiency will allow us to work with numbers quickly and flexibly. (Year 3 Autumn 1)</i> • You need to multiply each digit from the multiplier by the multiplicand before adding to find the product. The expanded column method works by partitioning the multiplier into tens and



	<ul style="list-style-type: none"> The distributive law states that larger numbers can be multiplied by partitioning a large number into smaller parts, multiplying the smaller parts by the multiplier and then adding the products together. (e.g. 29×4 can be solved by doing $(20 \times 4) + (9 \times 4)$) The formal written method of expanded short multiplication uses the distributive law to simplify multiplication of larger numbers. 				<ul style="list-style-type: none"> ones and completing two smaller multiplications which can be assisted by knowing our number facts. Regrouping is also important in formal written multiplication. Often, the products of your multiplications will be greater than 9. Therefore, because 10 ones are equivalent to one 10, it is important to exchange to know how many are in each column. 	
Vocabulary	EQUAL	The same as.	EQUAL GROUPS	The same quantity in each group.	MULTIPLICATION	When you have lots of copies of the same group or number.
	MULTIPLIER	The number you are multiplying by.	MULTIPLICAND	The number which is being multiplied	PRODUCT	A result of multiplying two or more numbers together.
	COMMUTATIVE	A calculation which will give the same answer, regardless of the order in which it is performed. Addition and multiplication are commutative.	REPEATED ADDITION	A way of solving multiplication problems where the multiplicand is added repeatedly using a number line or number sentences. E.g. $7 \times 2 = 14 = 2 + 2 + 2 + 2 + 2 + 2$ 	ARRAY	A way of showing (and solving) multiplication problems where groups are arranged systematically in rows and columns. Multiplier = rows. Multiplicand = columns. e.g.  <small>2 x 5 is the same as...</small>
	INVERSE	The opposite calculation. This undoes what was done by the previous calculation. Multiplication and division are inverse operations.	TIMES TABLES	a list of multiplication facts for a particular number which need to be memorised and quickly recalled.	MULTIPLE	The products which are created from a specific multiplier. E.g. multiples of 2 are 2,4,6,8,10...
	EVEN NUMBER	Multiples of 2. These can be divided by 2 without leaving a remainder. Even numbers end in 0,2,4,6,8.	ODD NUMBER	Numbers which are not multiples of 2. These leave a remainder when divided by 2. Odd numbers end in 1,3,5,7,9	FACT FAMILIES	A set of mathematical facts which are closely related. Knowing one means you know all. For example $2 \times 3 = 6$, $3 \times 2 = 6$, $6 \div 3 = 2$, $6 \div 2 = 3$
	DISTRIBUTIVE LAW	The mathematical law that states larger numbers can be multiplied by partitioning the large number into smaller parts, multiplying the smaller parts by the multiplier and then adding the products together. (e.g. 29×4 can be solved by doing $(20 \times 4) + (9 \times 4)$)				
Money	<p>Calculation Children need to know that...</p> <ul style="list-style-type: none"> Change is the amount we have left when we have bought something with coins/notes. (Year 2) We describe amounts of money as £_ and __p. (Year 2) £ sign formation: (Year 2) <p>Currency Children need to know that...</p> <ul style="list-style-type: none"> 'Money' describes a currency used to pay. (Year 1) In the UK, our currency uses pounds/pence. (Year 1) Pence is the plural of penny and is used when referring to 2 or more pennies. (Year 1) £ is a symbol which means pounds. (Year 1) p is a symbol which means pence. (Year 1) <p>Equivalences Children need to know that...</p> <ul style="list-style-type: none"> £1 = 100 p (Year 1) <p>Coins and Notes Children need to know that...</p> <ul style="list-style-type: none"> In the UK, money can be made up of coins and notes that have a value. (Year 1) There isn't a coin/note for every number of the number system. (Year 1) The size of a coin/note does not relate to its quantitative value. (Year 1) We have 8 different coins – their value and appearance: 1p, 2p, 5p, 10p, 20p, 50p, £1 and £2 (shown from smallest to largest value) (Year 1) We have 4 different notes – their value and appearance: £5, £10, £20, and £50 (Year 1) 		<p>Children need to know how...</p> <ul style="list-style-type: none"> To recognise the value of each coin and note in British currency. (Year 1) To describe money as £___ and ___ p (Year 2) To find different combinations of coins that total the same amount. (Year 2) To solve problems by adding amounts (of the same unit) together, giving their answer in one unit (not converting between £ and p). (Year 2) To solve problems by subtracting amounts of the same unit to find change. (Year 2) To calculate the value of an amount of money by counting in multiples, starting with the largest value. To add and subtract amounts of money (increasingly relying on mental methods and jottings), including calculating change. 		<p>Children need to know when...</p> <ul style="list-style-type: none"> They may see and need to use notes in real life (Year 1) Why they may not see them as much today. (Year 1) To use certain coins to make an amount. (Year 2) When to choose coins or notes based on the amounts of money involved. When a money problem requires addition or subtraction based on their understanding of parts and wholes. When to apply knowledge of money to solve real-world problems or word problems by identifying currency symbols or words. <p>Children need to know why...</p> <ul style="list-style-type: none"> Recognising currency is important. They may need to use coins and notes to pay for things when they are older. Electronic money still uses the same system of £ We need to add money together in real life situations. We will often want to buy more than one thing, or we will want to spend money with a friend to buy something bigger. (Year 2) We need to subtract money in real life situations. We will often need to work out whether we have enough money to buy the thing that we want to buy. (Year 2) We learn to calculate change. It is unfair for a shop to keep more of your money than is needed for the thing that you are buying. If the coins you have do not make the perfect amount for the item you want, change allows you to buy it and get the extra money back. (Year 2) 	

Vocabulary	CURRENCY	The name for the specific system of money used in a particular country. Different countries have different currencies.	MONEY	The objects used to pay for items. In the UK, we use pounds and pennies (which can be found in coins and notes or electronically).	PAY	To provide money in exchange for something.
	COST	How much money you have to pay to buy the item.	AFFORD	Whether you have enough money to pay the full cost of the item.	CHANGE	The money a seller has to give you back if the coins you give have a higher value than the cost of the item.
	COIN	A small, flat piece of metal which represents a particular amount of money.	NOTE	A thin paper-like plastic rectangle sheet which represents a particular amount of money.	POUND	The larger 'unit' of money in the GBP currency. Represented by £. £1 = 100p
	PENCE	The smaller 'unit' of money in the GBP. Represented by p. 100p = £1				
Mass and capacity	General Language of Measure Children need to know that... <ul style="list-style-type: none"> To compare has two different meanings: <ul style="list-style-type: none"> to say how something is like or unlike something else. To describe which is larger and which is smaller (and by how many) (Year 2 Autumn 1) Measurement is a precise way to describe the quantity of something (e.g. length, height, weight or capacity). (Year 1) Measurements are always expressed in 2 parts, the quantity and the specific unit of measure. (Year 1) In measurement, double compares two amounts - meaning twice the size. (Year 1) In measurement, half compares two amounts - meaning half the size. (Year 1) Estimate means to make a 'sensible guess' using your knowledge of number. This can be based on logical reasoning and rounding. (Year 2 Autumn 1) < is a symbol that means less than (Year 2 Autumn 1) > is a symbol that means greater than (Year 2 Autumn 1) = means equals (the same as). (Year 2 Autumn 1). Measuring scales are an instrument used to measure length, weight, area, or volume 					Children need to know when... <ul style="list-style-type: none"> We use different types of measure in real life. (Year 1) They might need different measuring tools to support them. (Year 1) Measuring temperature may be important (Year 2) to use measurement tools like balances, scales, measuring jugs, and measuring cups based on what they are trying to measure To select a particular unit of measurement for mass (e.g., grams, kilograms) and capacity (e.g., millilitres, litres) When to use estimation strategies for mass and capacity to make reasonable approximations and reason using their understanding of measurement units.
	Mass and Weight Children need to know that... <ul style="list-style-type: none"> Weight is a measure of 'heaviness'. Weight is affected by gravity. (Year 1) Mass is also a measure of 'heaviness'. It measures the specific amount of matter something contains. It is not affected by gravity. (Year 1) Both mass and weight can be measured in grams and kilograms. (Year 1) Grams are a small unit of measure, used to measure light things. (Year 1) Amounts measured in grams are written as Xg. (Year 1) Kilograms are a large unit of measure, used to measure heavy things. (Year 1) Amounts measured in kilograms are written as Xkg. (Year 1) Heavy and light are opposites (Year 1) We can estimate mass by using our experience of weighing masses with balance and dial scales. (Year 2) We can use known weights to estimate the weight of an object. (Year 2) Mass is a measurement of the amount of matter in an object. It depends on what type of atoms the object is made of, and how many atoms there are. Matter is anything that occupies space and has mass, and it is all around us. A kilogram is a unit of mass equal to 1,000 grams e.g. 1kg = 1,000g 			Mass and Weight Children need to know how... <ul style="list-style-type: none"> To describe weight using the language heavy or light. To compare weights using comparative language: heavier and lighter, heaviest and lightest. (Year 1) To measure the weight of an object in non-standard units of measure and standard units of measure. (Year 1) To measure accurately with both balance and dial scales by making sure the scales are balancing, or the dial is at 0 to start. (Year 1) To identify what unit of measure is most appropriate to use when measuring objects (grams or kilograms). (Year 1) To compare and order weights/masses using <, > and =. (Year 2) To estimate weights/masses using previous experience measuring. (Year 2) To estimate weights/masses using weights/masses of known mass. (Year 2) To measure mass in kg/g with increasing accuracy using measuring scales To compare measures of mass using <, > and = To add and subtract measures of mass to find the total or find the difference 		
Capacity and Volume Children need to know that... <ul style="list-style-type: none"> Capacity describes the container: the amount of something a container can hold. (Year 1) A container with a larger capacity can hold more. (Year 1) Full is when a container cannot hold/contain any more. There is no more capacity. (Year 1) Empty is when a container contains nothing. (Year 1) Half-full is when a container holds exactly half of its total capacity. (Year 1) Quarter full is when a container holds exactly a quarter of its total capacity. (Year 1) Volume describes the substance: the amount of space it takes up. (Year 1) Something with a larger volume takes up more space. Litres are a unit of measure used to measure larger amounts of liquids (both capacity and volume). (Year 1) Amounts measured in litres are written l. (Year 1) 			Capacity and Volume Children need to know how... <ul style="list-style-type: none"> To describe capacity using the language full, empty, half-full, quarter-full. (Year 1) To compare the capacity of an object using comparative language fuller, emptier, more than or less than. (Year 1) To measure the capacity an object can hold in non-standard units of measure and standard units of measure (l). (Year 1) To measure accurately with a range of different measuring jugs, making sure the full line is clear. (Year 1) 			

	<ul style="list-style-type: none"> • Millilitres is a unit of measure to measure smaller amounts of liquid (both capacity and volume). (Year 1) • Amounts measured in millilitres are written Xml. (Year 1) • We can estimate capacity and volume by using our experience of measuring with different containers. (Year 2) • We can use the capacity of a small container to estimate the capacity of a larger container. (Year 2) • Volume is the measure of the 3-dimensional space occupied by matter, or enclosed by a surface, measured in cubic units. • A litre is a unit of capacity equal to 1,000 millilitres e.g. 1l = 1,000ml 		<ul style="list-style-type: none"> • To identify what unit of measure is appropriate to use when measuring the capacity of a container or volume a substance (litres or millilitres). (Year 1) • To compare and order volume/capacity using <, > and =. (Year 2) • To estimate capacity/volume using our experience of measuring. (Year 2) • To estimate capacity/volume using a different container with a known length (Year 2). • To measure volume and capacity in l/ml using measuring jugs, tubes and beakers with increasing accuracy. • To compare measures of capacity using <, > and = • To add and subtract measures of volume/capacity to find the total or find the difference. 			
Vocabulary	DESCRIBE	To say what something is like.	MESAUREMENT	A way of precisely describing the quantity of something.	UNIT OF MEASURE	Measurements are made by working out 'how many' of something are the same size. A unit of measure tells us what the 'something' is.
	STANDARD UNIT OF MEASURE	A formally recognised and widely used unit of measure which has a consistent size and has measurement tools available for (e.g. cm)	NON-STANDARD UNIT OF MEASURE	When other objects in the world are chosen to measure the size of something.	DOUBLE	Compares two measurements. One is 2 times the size.
	HALF	Compares two measurements. One is half the size.	DISTANCE	How far something is.	HEIGHT	Vertical distance
	LENGTH	Horizontal distance	LONG	Relatively great length	SHORT	Relatively little length
	TALL	Relatively great height	SHORT	Relatively little height.	CENTIMETRE	A small measure of distance.
	METRE	The base unit of measure for distance in the UK. A relatively large unit of measure.	RULER	A tool used to measure distance.	SCALE	A type of number line, often found on measuring tools.
	WEIGHT	A measure of heaviness affected by gravity.	MASS	A measure of heaviness not affected by gravity.	GRAM	A small unit of measure for mass/weight
	KILOGRAM	A large unit of measure for mass/weight.	HEAVY	Relatively great weight	LIGHT	Relatively little weight.
	BALANCE SCALE	A tool used to compare the mass of different objects by balancing them against each other	CAPACITY	The amount of something a container can hold.	VOLUME	The amount of something you have.
	FULL	When a container can hold no more.	HALF-FULL	When the container holds exactly half of its full capacity. It could hold exactly the same again.	QUARTER FULL	When a container holds exactly a quarter of its total capacity. It could hold four times the amount.
	EMPTY	When a container holds nothing	MEASURING JUG/CUP/SPOON	Containers used to measure the volume of liquid.		
	MILLILITRE	A small unit of measure for volume and capacity.	LITRE	A large unit of measure for volume and capacity.	ESTIMATE	To make a 'sensible guess' based on your knowledge of and experience with number.
Enrichment & wider development	HSBC Financial Services Outreach Tuck Shop First Maths Challenge					



Milestone LO (National Curriculum)

Division

Pupils should be taught to:

- Write and calculate mathematical statements for division 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.

Measure: Time

Pupils should be taught to:

- Record and compare time in terms of seconds, minutes and hours
- 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].

Statistics

Pupils should be taught to:

- 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.



Revisited Knowledge

New knowledge

NB: In Year 3, it is especially important that significant time is spent to assessing and recapping the revisited knowledge as children will have joined our school from different feeder schools and may not have the same basis of mathematical knowledge.

Domains	Declarative Knowledge (Substantive Knowledge)	Procedural Knowledge (Disciplinary Knowledge)	Conditional Knowledge (Knowing the when and the why)
Division	<p>Children need to know that...</p> <ul style="list-style-type: none"> • <i>Equal means the same and is shown by the symbol =. ‘Equal groups’ means the same number in each group. (Year 1)</i> • <i>Division can be seen in two ways: (Year 1)</i> <ul style="list-style-type: none"> ○ Division as sharing: <i>sharing the dividend into a specific number of groups (e.g. $12 \div 2 \rightarrow$ share 12 equally between two groups. How many counters are in each group?).</i> ○ Division as grouping: <i>is sharing the dividend into equal size groups. (e.g. $12 \div 2 \rightarrow$ group the 12 counters into lots of groups of two. How many groups are there?)</i> • <i>\div is a symbol that means division. (Year 1)</i> • <i>Formal language of division (dividend, divisor, quotient) (Year 1)</i> • <i>Half means dividing something by 2 (Year 1)</i> • <i>Division is not commutative. In division, the whole (dividend) must always be before the divisor (Year 2)</i> • <i>Multiplication is the inverse of division (Year 2)</i> • <i>A multiple of a number can be divided by that number without a remainder (e.g. 25 is a multiple of 5 because 25 can be divided by 5 without a remainder).</i> • <i>The 4 times table is double the 2 times table. It is every other number from the 2 times table. (Year 3 Autumn 1)</i> • <i>Multiples of 4 are all even numbers. (Year 3 Autumn 1)</i> • <i>Multiples of 8 are all even numbers (Year 3 Autumn 1)</i> • <i>An odd number cannot be divided by 2 without a remainder (Year 2)</i> • <i>An even number can be divided exactly by 2 (Year 2)</i> • <i>A remainder is the amount left over when something cannot be shared or grouped equally. (Year 3 Autumn 2)</i> • <i>Dividend is the whole. The number which is to be divided. (Year 3 Autumn 2)</i> • <i>Divisor is the number the dividend is going to be divided by. This could tell us the number of groups to create (dividing by sharing) or the number in each group (dividing by grouping). (Year 3 Autumn 2)</i> • <i>Quotient is the answer to a division question. This could mean the number of groups created or the quantity in each group, depending on whether we are dividing by grouping or by sharing. (Year 3 Autumn 2)</i> • <i>Divisibility Rules (Year 3 Autumn 2)</i> • Number lines can be oriented in different ways: a vertical number line comes down the page rather than across 	<p>Children need to know how...</p> <ul style="list-style-type: none"> • <i>To identify equal groups and justify how they know a group is equal. (Year 1)</i> • <i>To write division number sentences using the \div symbol and =. (Year 1)</i> • <i>To represent division as sharing and grouping (Year 1)</i> • <i>To solve division problems using an appropriate method (mentally by recalling the number facts they have learned, practically or repeated subtraction on a number line) (Year 1)</i> • <i>To identify whether a problem requires multiplication or division using more advanced mathematical language and reasoning (e.g. part, whole, multiplier, multiplicand, product, dividend, divisor, quotient) (Year 2)</i> • <i>To use the inverse relationship between multiplication and division. (Year 2)</i> • <i>To solve missing number problems using the inverse relationship. (Year 2)</i> • <i>To check their calculations using the inverse relationship. (Year 2)</i> • <i>To count forwards and backwards in 1,2,3,4,5,8 and 10. (Year 3 Autumn 1)</i> • <i>To recall and find multiplication facts (for the 2,3,4,5,8 and 10 times tables (Year 3 Autumn 1) (Year 3 Autumn 2)</i> • <i>To represent division problems confidently using bar models, part part whole models, arrays and open arrays. (Year 3 Autumn 2)</i> • <i>To use divisibility rules to identify whether a division will be possible without a remainder before calculating. (Year 3 Autumn 2)</i> • To write and calculate mathematical statements for division using related facts of tables they know, supported by practical resources. • To calculate mathematical statements for division using fact families (e.g. given $25 \times 6 = 150$, know $150 \div 25 = 6$). • To use number lines oriented in different ways and repeated subtraction as a formal way of recording working out for division problems. 	<p>Children need to know when...</p> <ul style="list-style-type: none"> • <i>a question requires multiplication or division based on their knowledge of the underlying structures (Year 2)</i> • <i>a strategy is appropriate for solving a division problem (Year 2)</i> • <i>a problem can be solved mentally using a known fact (Year 2)</i> • <i>a multiplication fact will help solve a division problem. (Year 3)</i> • <i>we are looking at missing number problems, we need to work out which part of the problem we are missing. (Year 3 Autumn 1)</i> • <i>to use the inverse to check an answer. (Year 3 Autumn 1)</i> • <i>a word problem suggests we need to divide. (Year 3 Autumn 1)</i> • <i>patterns can be used to help solve more complex division problems efficiently. (Year 3 Autumn 1)</i> • When to use known multiplication facts to find related division facts and vice versa. • When to use multiplication to check division or vice versa to ensure accuracy • When there are patterns in division problems we can apply them to solve related problems efficiently. <p>Children need to know why...</p> <ul style="list-style-type: none"> • You get the same quotient regardless of whether you solve a division problem by grouping or sharing. (Year 1) • We need to develop rapid recall of key multiplication and division number facts. Fluent and automatic recall of number facts allows us to ‘know’ the answer rather than working it out each time. This makes it easier for our brains (reducing cognitive load) which helps us to solve trickier problems. (Year 2)



	<ul style="list-style-type: none"> Known facts can help us to solve more complex, related problems. E.g. $4 \div 2$ can be used to help us solve $40 \div 2$ 		<ul style="list-style-type: none"> To solve problems, including missing number problems, involving division. To check and solve problems using inverse operations. 		<ul style="list-style-type: none"> <i>An open array is a useful way of visualising division problems. Open arrays can help us when we are multiplying and dividing much larger numbers. They also help us to solve area problems later on. (Year 3 Autumn 1)</i> 	
Vocabulary	EQUAL	The same as.	EQUAL GROUPS	The same quantity in each group.	INVERSE	The opposite calculation. This undoes what was done by the previous calculation. Multiplication and division are inverse operations.
	DIVISION	Where a whole is split into two or more equal groups.	DIVISION AS SHARING (PARTITIVE DIVISION)	The divisor tells you the number of groups to share the dividend between. E.g. $10 \div 2 = 5$ 	DIVISION AS GROUPING (QUOTIENT DIVISION)	The divisor tells you the number in each group. E.g. $10 \div 2 = 5$ 
	DIVIDEND	A number to be divided by another number (the whole)	DIVISOR	The number which the dividend is being divided by. Tells you either the number of parts or the size of each part.	QUOTIENT	A result of dividing one number by another. Depending on the role of the divisor, this either tells you the number of parts or the size of each equal part.
	FACT FAMILIES	A set of mathematical facts which are closely related. Knowing one means you know all. For example $2 \times 3 = 6$, $3 \times 2 = 6$, $6 \div 3 = 2$, $6 \div 2 = 3$	REMAINDER	The amount left over when you divide a dividend by a divisor which cannot divide perfectly.	REPEATED SUBTRACTION	A strategy for solving division problems where you count back in multiples, sometimes supported by a number line.
Time	Describing Time Children need to know that... <ul style="list-style-type: none"> Time is a measurement for how long it takes for things to happen. (Year 1) When we describe time, we use comparative language, such as before, after, next, first, today, yesterday, tomorrow, quicker, slower, earlier, later. (Year 1) Chronological order means listing events in order from earliest to latest. (Year 1) A date is a way of describing when something happened, by stating the day, month (and sometimes year) it happened. (Year 1) There are 24 hours in a day. 12 in the morning and 12 in the evening. (Year 1) There are 7 days in a week: Monday, Tuesday, Wednesday, Thursday, Friday, Saturday and Sunday. (Year 1) In England, we often describe weeks as starting on Monday and ending on Sunday. (Year 1) There are twelve months in a year. (Year 1) There are about 365 and one quarter days in a year. Therefore, most years have 365; every fourth year has 366 days. This is the time it takes earth to orbit the sun. (Year 1) Am means a time 'before noon' and refers to the period from midnight until noon. (Year 3 Spring 2) Pm means 'after noon' and refers to the period from noon until midnight. (Year 3 Spring 2) Morning is a general term used to describe the period of time before noon (Year 3 Spring 2) Afternoon is a general term used to describe the period of time after noon (Year 3 Spring 2) Midday means noon/ 12:00pm (Year 3 Spring 2) Midnight is at 00:00am (Year 3 Spring 2) <ul style="list-style-type: none"> The number of days in each month varies between 28 and 31. January, March, May, July, August, October and December all have 31 days. April, June, September and November all have 30 days. February has 28 days except in a leap year when it has 29 days. A leap year is a calendar year that contains an additional day in February. 		Describing Time Children need to know how... <ul style="list-style-type: none"> To compare the duration and sequence of events using the language quicker, slower, earlier, later (Year 1) To sequence events in chronological order and verbalise their justification using the language before, after, next, first, today, yesterday, tomorrow, morning, after and evening. (Year 1) To use language relating to dates including <ul style="list-style-type: none"> days of the week, weeks months of the year years. (Year 1) <ul style="list-style-type: none"> To compare units of time in terms of seconds, minutes and hours To compare units of time in terms of hours and days To compare units of time in terms of days, weeks and years. To compare durations of events [for example to calculate the time taken by particular events or tasks] using addition and subtraction. 		Children need to know when... <ul style="list-style-type: none"> To use language such as fast or slow. (Year 1) Someone asks 'What time is it?' to look at a clock to find the answer. (Year 1) 'Today' is using precise language. (Year 1) To read the numbers on the outside of the clock face and when to count in 5s. (Year 2) To look at the minute hand and when to look at the hour hand. (Year 2). We count in 5s and when we count in ones: we read the clock in 5 minute intervals first, and then in ones. (Year 3 Spring 2) We reach 60 minutes to move to a new hour. (Year 3 Spring 2) When the second hand gets back around to the 12 the minute hand will move to the next minute (Year 3 Spring 2). When reading a digital clock, we always read it as minutes past. (Year 3 Spring 2) Children need to know why... <ul style="list-style-type: none"> Clocks have two hands and two sets of numbers around the outside. Each hand points at a different scale and helps us to work out how many hours and minutes there are. (Year 1) We normally describe events in chronological order. It is useful to recount events in chronological order because that is often the way our memories store episodic information. (Year 1) Sometimes we describe time using 'past' and sometimes we describe time using 'to'. The half hour mark is really important to us. This separates when we use past and to. Times which are 'past' are closer to the current hour. Times which are 'to' are closer to the next hour. It helps us to understand how far through the hour we are. (Year 2) We have two types of clock: analogue and digital. Digital clocks are more popular today because of electricity and because they are easier to read. Analogue clocks are an older design because they used to be clockwork powered. (Year 3 Spring 2) February has an extra day in a leap year. There are $365 \frac{1}{4}$ days in a year. To make up the extra quarter day, every four years, February has an extra whole day. 	
	Vocabulary	TIME	A measurement of how long things take to happen.	CHRONOLOGICAL ORDER	Listing events in order from the earliest to the latest.	MORNING
AFTERNOON		The second part of the day, from 12:00-23:59.	DAYS	A 24-hour period, starting at midnight. There are 7 days in a week.	WEEK	The 7 days (normally seen as starting with Monday and ending with Sunday)
WEEKEND		Saturday and Sunday.	MONTHS	Approximately 4 weeks. There are 12 months in a year. Based on the movement of the moon.	YEAR	365 days. Based on the movement of the Earth around the sun.
SECONDS		A unit of measure for time. The smallest common unit of measure. There are 60 seconds in a minute.	MINUTE	A unit of measure for time. There are 60 minutes in an hour.	HOUR	A unit of measure for time. There are 24 hours in a day.
LEAP YEAR		A year when February has one extra day. This happens because a year has $365 \frac{1}{2}$ days.	ANALOGUE CLOCK	A clock with a circle face and 2 (or 3) hands which move around clockwise to show the time.	DIGITAL CLOCK	A clock which is usually rectangular and shows time in numbers.
ANTE MERIDIEM (AM)		On the 12-hour clock, indicates a time between midnight and midday.	POST MERIDIEM (PM)	On the 12-hour clock, indicates a time between midday and midnight. (12:00 and 23:59)	24 HOUR CLOCK	a timekeeping system in which the day is divided into 24 hours, starting at midnight (00:00) and ending at midnight the next day (23:59).

<p>Statistics</p>	<p>Understanding Statistics Children need to know that...</p> <ul style="list-style-type: none"> To compare has two different meanings: <ul style="list-style-type: none"> to say how something is like or unlike something else. To describe which is larger and which is smaller (and by how many) (Year 2 Autumn 1) Total is another word used to describe the 'sum' of numbers. (Year 1) Data is the word used to describe information. This information could include facts, observations, numbers or measurements. (Year 2) Data can be presented in different types of charts and diagrams to make it easy to understand. (Year 2) A question is a type of sentence. It begins with a question word, ends with a ? and normally requires an answer. (Year 2) To categorise is to group things that share some commonality. (Year 2) Categorical data is when you count the number of data points in a category (e.g. the number of children with blue, green and brown eyes). (Year 2) Statistics is the collection, analysis, interpretation, presentation, and organisation of data. Scaling is when you are given information about something and then have to apply it to a smaller or larger quantity by multiplying or dividing. In graphs, this can be used to help us show data where larger numbers are involved. When drawing graphs and charts, <ul style="list-style-type: none"> intervals on scales must be evenly spaced. Axes must be drawn with a ruler and meet at a right angle. Charts must have a clear title which describes what they show. Axes must be clearly labelled (with units if appropriate) <p>Pictograms Children need to know that...</p> <ul style="list-style-type: none"> A pictogram is a chart that uses picture or symbols to represent data. (Year 2) Sometimes a picture in a pictogram may represent more than one. Then we need to use our knowledge of counting number sequences. (Year 2) Sometimes we may see half a picture. That means we have half the amount the picture is worth. (Year 2) <p>Tally Charts Children need to know that...</p> <ul style="list-style-type: none"> A tally chart is used to collect data quickly and efficiently. (Year 2) Each line drawn adds one. (Year 2) The first four lines are drawn as short vertical lines next to one another. (Year 2) Every fifth line is drawn diagonally across 4 vertical lines to create a group of 5 lines. (Year 2) You can work out how many tally marks you have by counting your 'groups' by using your multiples of 5, then counting on in ones to finish. (Year 2) <p>Block Diagrams Children need to know that...</p> <ul style="list-style-type: none"> A block diagram is a simple chart which displays units of data with blocks. (Year 2) Each block represents one. (Year 2) Categories are written along the X axis (horizontal line) (Year 2) Blocks are placed on top of each category to show how many are in each group. (Year 2) Sometimes the number of blocks is recorded on the Y axis (vertical line) (Year 2) Generally, we use a bar chart rather than a block diagram. <p>Bar Charts Children need to know that...</p> <ul style="list-style-type: none"> Have two axes (straight, perpendicular line scales which meet at a point called the origin) <ul style="list-style-type: none"> The X axis is the horizontal axis The Y axis is the vertical axis. 	<p>Children need to know how...</p> <ul style="list-style-type: none"> To ask and answer simple questions about categorical data. To calculate the total of different categories within categorical datasets shown in different ways (pictogram, tally chart, block diagram and table) (Year 2) To compare different categories within categorical datasets shown in different ways (pictogram, tally chart, block diagram and table) (Year 2) To sort categories within categorical datasets by quantity. To interpret the data shown in different ways (pictograms, tally charts, block diagrams and tables) (Year 2) To construct pictograms, tally charts, block diagrams and tables. (Year 2) To use and interpret a simple key. (Year 2) To present, read and interpret information from pictograms with a key, bar charts and tables To interpret keys using knowledge of multiplication and division To solve one-step and two-step problems using information presented in bar charts and pictograms with keys and tables. 	<p>Children need to know when...</p> <ul style="list-style-type: none"> To use different charts to represent data (pictograms, tally charts, block diagrams, tables, bar charts) (Year 2) Bar charts are good for showing categorical and discrete data. (Year 2) to use appropriate data collection techniques like surveys, tallies, or observations based on the data required. you have collected enough data to draw conclusions and compare data. there is a pattern or trend in the data, there is a conclusion to be drawn. <p>Children need to know why...</p> <ul style="list-style-type: none"> There are lots of different styles of chart. Different charts represent different types of data better. For example, categorical data is represented well by the charts we have learned in year 2 and 3 because these charts help us to 'count' the numbers in each category. (Year 2) We need to use charts to represent data. Data can be very complicated. Charts make it easier for people to look out the data and understand what it is teaching us. (Year 2) We use different types of charts to collect and present data. Some charts are good for recording data quickly (tally chart) – these are useful for data collection; others are helpful for people to look at and make inferences about the data but take longer to construct (bar charts, scaled pictograms) – these are useful for data presentation. Although block diagrams and bar charts look the same, we generally use a bar chart. They show the same class of information in the same way. Block diagrams restrict the quantities that you can show without using scaling.
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	<ul style="list-style-type: none"> • Display categorical data by using rectangular bars of different heights. • The X axis shows the category • The Y axis shows the number of data points in that category. 					
	Tables Children need to know that... <ul style="list-style-type: none"> • <i>A table is a way of presenting data using rows and columns. (Year 2)</i> 					
Vocabulary	DATA	Information.	CHART/DIAGRAM	A visual way of presenting data to make it easier to understand.	QUESTION	A type of sentence which requires an answer. It usually starts with a question word and ends with a ?
	KEY	A small picture to the side of a chart which tells the reader how to interpret the chart. For example, it may tell you how many data points a picture in a pictogram is worth.	TALLY MARK	The small lines used in a tally chart to record individual data points.	CATEGORICAL DATA	Data which counts the number of things (e.g. people) in each category.
	CATEGORY	Group	X AXIS	The horizontal axis. On a bar chart, the X axis records the categories.	Y AXIS	The vertical axis. On a bar chart, the X axis records the frequency.
	ORIGIN	The point where the X and Y axis meet at a right angle.	SCALE	The 'number line' which runs along the axis/axes.	INTERVALS	The gap between individual data points on the axis.
Enrichment & wider development	Dream Jobs Day Attending and spending money at Year 6's Enterprise Fayre.					

