



Gawber Primary School FS2 - Maths long term plan - 2023/2024

Autumn Term - All pupils by the end of this term pupils will develop their subitising and counting skills. They will explore the composition of numbers within 5. They will begin to compare sets of objects and use the language of comparison. They will be able to talk about measure and patterns, shapes with 4 sides, order events and talk about what happens first, next, last.

Week	Topic	Mastery Focus	Learning Knowledge
1	Baseline/Nursery Rhymes		Children will join in and learn Nursery Rhymes linked to counting eg - Once I caught a fish alive.
2	Subitising 1, 2 and 3	Subitising	Children will be encouraged to quantify sets of objects by subitising, rather than counting.
3	Counting skills	Counting, cardinality and ordinality	Find out 'how many' objects there are. They have used subitising to identify the number in a set; they will now develop their counting skills to enable them to identify how many there are in a set that cannot be subitised. This connects subitising and counting to cardinality whereby the last number in the count tells us 'how many' things there are altogether. Using a 'circling' gesture to indicate all of the objects in a set will support children to develop an understanding of cardinality. They will also practise developing 1:1 correspondence, by counting numbers at the same time as moving or tagging the objects.
4	Explore how all numbers are made of 1s Focus on composition of 3 and 4	Composition	Children will explore how numbers can be composed of 1s and, from this, begin to investigate the composition of 3 and 4. Composing and de-composing numbers involves children investigating part-whole relations, e.g. seeing that 3 can be composed of 1 and 2. The children will learn from practical experience that a 'whole' is made up of smaller parts and is, therefore, bigger than its parts.
5	Talk about measure and patterns	SSM	Children will compare size, mass and the capacity of objects/containers. Using key vocabulary - big, small, bigger, smaller, tall, taller, long, short, longer, shorter / mass, weight, heavy, light, heavier, lighter / capacity, more, less, most, least, full, empty. Children will be able to continue, copy and create AB patterns
6	Subitise objects and sounds	Subitising	Children will say the number of sounds that they can hear, such as claps or drum beats, without needing to count. They will be encouraged to look closely at small quantities and observe whether the quantity has changed or only the arrangement.
7	Comparison of sets - 'just by looking'	Comparison	Children will use the language of comparison to describe sets of objects that they can see. Key language to use 'more than' and 'fewer than'

	Use the language of comparison: more than and fewer than		
8	Focus on counting skills Focus on the 'five-ness of 5' using one hand and the die pattern for 5	Counting, ordinality and cardinality	Children will find out 'how many' objects there are altogether. They will reinforce their understanding of cardinality - that the last number in the count tells us 'how many' things there are altogether in a set of objects - and they will further practise their 1:1 correspondence skill, by counting numbers at the same time as moving or tagging objects. A key focus this week is deepening their understanding of 5 as a quantity by linking the number itself to the 5 fingers on one hand. The children will also begin to explore ways to represent numbers to 5 using both their fingers and the Hungarian number pattern.
9	Circles and triangles/position	SSM	Talk about and explore 2D shapes, using informal and mathematical language: 'sides', 'corners'; 'straight', 'flat', 'round'. Children will discuss position, using words like 'in front of' and 'behind'.
10	Comparison of sets - by matching Use the language of comparison: more than, fewer than, an equal number	Comparison	Children will be encouraged to compare the number of objects in 2 sets by matching them 1:1. Seeing that objects in some sets can be matched without any being left over will draw the children's attention to instances when the quantities of objects are equal. Language is a key focus and adults will need to reinforce the language of 'more than', 'fewer than' and 'an equal number' to describe how many objects there are in each set.
11	Explore the concept of 'whole' and 'part'	Composition	This week, the children will begin to explore composition by focusing on the preliminary skills: the concept of 'wholes' and 'parts'. By investigating their own bodies and familiar toys they will begin to understand that whole things are often made up of smaller parts and that a whole is, therefore, bigger than its parts.
12	Focus on the composition of 3, 4 and 5	Composition	Understanding of the composition of numbers by investigating the composition of 3, 4 and 5. Composing and de-composing numbers involves the children investigating part-part-whole relations, e.g. seeing that 3 can be composed of 1 and 2.
13	Shapes with 4 sides/day and night	SSM	Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can. Identify and name shapes in the environment. Understand what happens in the day/night. - order events.
14	Practise object counting skills Match numerals to quantities within 10 Verbal counting beyond 20	Counting, ordinality and cardinality	Children will continue to engage with activities that draw attention to the purpose of counting - to find out 'how many' objects there are. Adults will need to continue to name the objects being counted to emphasise the numerosity of the set, e.g. Would you please collect 6 crayons and bring them to me? The children will revisit the concept of 1:1 correspondence by making sure that they match collections of objects to their representations

15	Subitise within 5 focusing on die patterns Match numerals to quantities within 5	Subitising	Children will be encouraged to continue representing quantities in different ways, including by showing amounts on 1 hand 'all at once'. There will also be a new focus on the symbolic representation of number and the children will work on their recognition of numerals to 5, matching numerals to correct quantities in various games.
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Spring Term - All pupils by the end of this term will continue to develop their subitising and counting skills and explore the composition of numbers within and beyond 5. They will begin to identify when two sets are equal or unequal and connect two equal groups to doubles. They will begin to connect quantities to numerals.

	Topic	Mastery Focus	Learning Goals
16	Counting - focus on ordinality and the 'staircase' pattern See that each number is one more than the previous number	Counting, ordinality and cardinality	Rehearsing the order of the first 5 numbers and understanding that the position each number holds in our number sequence does not change. While continuing to work with numbers to 5, the children will develop their understanding of the ordinal aspect by investigating the difference in value of consecutive whole numbers. They will spend time discovering that each number has a value of 1 more than the previous number
17	Mass and capacity	SSM	Children will compare the mass of two objects using a balance. They will compare the capacity of three containers and explore the capacity of a container.
18	Focus on 5	Composition	Composing and decomposing numbers involves the children investigating part-part-whole relations, e.g. seeing that 5 can be made of 3 and 2 They will begin to recognise that numbers can be made by combining parts in different ways, and will be encouraged to make links by considering similarities and differences in the ways of making 5.
19	Focus on 6 and 7 as '5 and a bit'	Composition	Represent numbers using the Hungarian number pattern (die pattern). These key representations will help to underline the '5-ness' of 5, and provide structures that will support exploration of its composition and its relationships with other numbers. The children will secure their understanding of the pairs of numbers that make 5, and then use double dice frames to begin to explore 6 and 7 as numbers that are composed of '5 and a bit'.
20	Compare sets and use language of comparison: more than, fewer than, an equal number to Make unequal sets equal	Comparison	Children are encouraged to focus exclusively on the numerosity of sets, without being diverted by colour, shape or size. They will then be encouraged to notice when quantities are equal or unequal, and will begin to consider how they can manipulate the number of objects in 2 sets to make them equal. Language of 'more than', 'fewer than' and 'an equal number' to describe how many objects there are in each set.

21	Focus on the 'staircase' pattern and ordering numbers	Counting, ordinality and cardinality	Rehearsing the order of the first 10 numbers and understanding that the position that each number holds in our number sequence does not change. While working with numbers to 10, the children will develop their understanding of the ordinal aspect by consolidating their understanding that each number has a value of '1 more' than the previous number.
22	Focus on ordering of numbers to 8 Use language of less than	Comparison	This week will focus on further developing this innate skill as the children are encouraged to focus exclusively on ordinality: considering where numbers to 8 are in relation to each other. Language is a key focus 'more than', 'less than' and 'equal to' to describe the relationships between numbers.
23	Focus on 7	Composition	Children will consolidate their understanding of the composition of numbers by investigating the numbers within 7. Composing and de-composing numbers involves the children investigating part-part-whole relations, e.g. seeing that 7 can be made of 5 and 2. A key focus will be on partitioning 7 (splitting it into parts) and thinking about the missing part.
24	Doubles - explore how some numbers can be made with 2 equal parts	Composition	When 2 equal parts combine to make a whole. The children will first use their skills of comparison and identify when 2 sets are equal or NOT equal. This week the children will begin to 'know' the whole when they see 2 parts the same size for larger numbers within 10, as well as begin to recall some doubles facts when an image or physical resource is not available to support them.
25	Length and height/time	SSM	Recognise and order 3 objects - shortest/tallest/longest. Use correct vocabulary to compare objects. What can you do in a minute?

Summer Term

All pupils by the end of this term will consolidate their counting skills, counting to larger numbers and developing a wider range of counting strategies. They will secure knowledge of number facts through varied practice.

	Topic	Mastery Focus	Learning Goals
26	Sorting numbers according to attributes - odd and even numbers	Composition	Sorting and classifying are important early years' skills that encourage children to identify similarities and differences. They will investigate when a number can be composed of 2 equal parts. It is anticipated that the children will quickly identify that even numbers can be composed as doubles, through their experience of seeing numbers composed of 2 equal parts.
27	Counting - larger sets and things that cannot be seen	Cardinality, ordinality and counting	Develop confidence in counting strategies, including counting on from different starting numbers. The children will also consider strategies for counting larger numbers of objects, including those that cannot be moved
28	Subitising - to 6, including in structured arrangements	Subitising	Some arrangements are easier to subitise than others - e.g. a set of 6 dots arranged in a structured die pattern that exposes the double-3 pattern is easier to recognise than a random arrangement of 6 dots. A key focus this week is to use the children's developing understanding of doubles to support their subitising skills rather than counting.

29	3D shape and more complex patterns	SSM	Identify and name some 3D shapes. Can these shapes roll or stack ? Make patterns.
30	Composition - '5 and a bit'	Composition	Children will consolidate their understanding of the composition of 5 and practise recalling the parts of 5 when 1 part is not visible. Making 6,7,8,9 on ten frames, discussing and comparing these representations will enable children to generalise that each of the numbers 6 to 9 can have 5 as a part.
31	Composition - of 10	Composition	Children will review the composition of the numbers 6 to 9 using the '5 and a bit' structure, and then begin to explore how 10 can be composed. They will also develop a sense of the 'ten-ness of 10' by making their own collections of 10 objects.
32	Manipulate, compose and decompose shapes	SSM	Compose and decompose 2D shapes. Show an awareness of the relationships between shapes.
33	Comparison - linked to ordinality Play track games	Comparison	Focus on ordinality: considering where numbers to 10 are in relation to each other. Through practical activities and games, the children will reason about numbers and think carefully about which is more or less. They will use linear number tracks to play games that encourage them to compare numbers that are far apart, near and next to each other
34	Subitise to 5 Introduce the Rekenrek	Subitising on a Rekenrek	subitising beads on a rekenrek. This key piece of equipment will allow the children to continue to develop their subitising skills as they explore the structure of small numbers
35	Revise: Automatic recall of bonds to 5 How many left? (add and take away)	Automatic recall	Find ways to partition (split) a set of 5 Understand that 5 can be partitioned in different ways.
36	Revise: Composition of numbers to 10 To 20 and beyond (teen numbers and counting patterns)	Understanding of numbers to 10	Recognise a quantity up to 5 without counting, particularly when arranged in a 'pattern'. Tell you the sum of some doubles within 10. Recognise and match numerals to quantities up to 10
37	Revise: Comparison To 20 and beyond	Understanding of numbers to 10	Compare numbers - larger/smaller/equal. Doubles
38	Revise: Number patterns Pattern and position	Patterns within numbers to 10	Making a whole number from 2 parts. Splitting some numbers into 2 groups that each have an equal amount. Odd and even. Recognising that 2 equal groups can make a double.
39	Revise: Counting Mapping	Counting beyond 20	Recognising the pattern of the counting system, when beginning to count beyond 20.

Year 1

Autumn	
Number and place value	Addition and Subtraction
- Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number. (Daily counting) - Count, read and write numbers to 20 in numerals. - Given a number, identify 1 more and 1 less - Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least - Read and write numbers from 1 to 20 in numerals and words - Pupils practise counting (1, 2, 3...), ordering (for example, first, second, third...), and to indicate a quantity (for example, 3 apples, 2 centimetres), including solving simple concrete problems, until they are fluent. - They practise counting as reciting numbers and counting as enumerating objects, and counting in twos, fives and tens from different multiples to develop their recognition of patterns in the number system (for example, odd and even numbers), including varied and frequent practice through increasingly complex questions. (Daily counting) - Count in multiples of 2s, 5s and 10s (Daily counting)	- Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example, $9 + 7 = 16$; $16 - 7 = 9$; $7 = 16 - 9$). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations. - Pupils combine and increase numbers, counting forwards and backwards. (Daily counting)
	Fractions
	- Recognise, find and name a half as one of two equal parts of an object, shape or quantity - Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity. - Pupils are taught half and quarter as 'fractions of' discrete and continuous quantities by solving problems using shapes, objects and quantities. For example, they could recognise and find half a length, quantity, set of objects or shape. Pupils connect halves and quarters to the equal sharing and grouping of sets of objects and to measures, as well as recognising and combining halves and quarters as parts of a whole.
Measurement	Geometry – properties of shapes
- Compare, describe and solve practical problems for: mass / weight (for example, heavy, light, heavier than, lighter than). - Compare, describe and solve practical problems for: capacity and volume (for example, full/empty, more than, less than, half, half full, quarter) - Measure and begin to record: mass/weight - Measure and begin to record: capacity and volume. - The pairs of terms: mass and weight, volume and capacity, are used interchangeably at this stage. - Pupils move from using and comparing different types of quantities and measures using non-standard units, including discrete (for example, counting) and continuous (for example, liquid) measurement, to using manageable common standard units.	- Recognise and name common 2-D and 3-D shapes 2-D shapes (for example, rectangles (including squares), circles and triangles) 3-D shapes (for example, cuboids (including cubes), pyramids and spheres) - Pupils handle common 2-D and 3-D shapes, naming these and related everyday objects fluently. They recognise these shapes in different orientations and sizes, and know that rectangles, triangles, cuboids and pyramids are not always similar to each other.

Year 1

Spring	
Number and place value	Addition and Subtraction
- Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number. (Daily counting) - Count, read and write numbers to 20 in numerals. - Given a number, identify 1 more and 1 less - Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least - Read and write numbers from 1 to 20 in numerals and words - Pupils practise counting (1, 2, 3...), ordering (for example, first, second, third...), and to indicate a quantity (for example, 3 apples, 2 centimetres), including solving simple concrete problems, until they are fluent. - They practise counting as reciting numbers and counting as enumerating objects, and counting in twos, fives and tens from different multiples to develop their recognition of patterns in the number system (for example, odd and even numbers), including varied and frequent practice through increasingly complex questions. (Daily counting) - Count in multiples of 2s, 5s and 10s (Daily counting) - They make connections between arrays, number patterns and counting in twos, fives and tens.	- Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example, $9 + 7 = 16$; $16 - 7 = 9$; $7 = 16 - 9$). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations. - Pupils combine and increase numbers, counting forwards and backwards. (Daily counting) - Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs - Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = ? - 9$ - They discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms: put together, add, altogether, total, take away, distance between, difference between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly. - Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.
	Geometry – properties of shapes (To continue from autumn)
	- Recognise and name common 2-D and 3-D shapes 2-D shapes (for example, rectangles (including squares), circles and triangles) 3-D shapes (for example, cuboids (including cubes), pyramids and spheres) - Pupils handle common 2-D and 3-D shapes, naming these and related everyday objects fluently. They recognise these shapes in different orientations and sizes, and know that rectangles, triangles, cuboids and pyramids are not always similar to each other.
	Number and place value (Taught as part of geometry)
	They recognise and create repeating patterns with objects and with shapes.

Year 1

Summer	
Number and place value - Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number. (Daily counting) - Count, read and write numbers to 20 in numerals. - Given a number, identify 1 more and 1 less - Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least - Read and write numbers from 1 to 20 in numerals and words - Pupils practise counting (1, 2, 3...), ordering (for example, first, second, third...), and to indicate a quantity (for example, 3 apples, 2 centimetres), including solving simple concrete problems, until they are fluent. - They practise counting as reciting numbers and counting as enumerating objects, and counting in twos, fives and tens from different multiples to develop their recognition of patterns in the number system (for example, odd and even numbers), including varied and frequent practice through increasingly complex questions. (Daily counting) - Count in multiples of 2s, 5s and 10s (Daily counting)	Addition and Subtraction - Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example, $9 + 7 = 16$; $16 - 7 = 9$; $7 = 16 - 9$). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations. - Pupils combine and increase numbers, counting forwards and backwards. (Daily counting) - Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs - Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = ? - 9$ - They discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms: put together, add, altogether, total, take away, distance between, difference between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.
Measurement - Compare describe and solve practical problems for: length and heights (for example, long/short, longer/shorter, tall/short, double/half) - Measure and begin to record: lengths and heights. - In order to become familiar with standard measures, pupils begin to use measuring tools such as a ruler, weighing scales and containers. - Measure and begin to record: recognise and know the value of different denominations of coins and notes,	Measurement - Time - Compare, describe and solve problems for time (for example, quicker, slower, earlier and later) - Measure and begin to record time (hours, minutes, seconds). - Sequence events in chronological order using language (for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening) - Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times - Recognise and use language relating to dates, including days of the week, weeks, months and years - Pupils use the language of time, including telling the time throughout the day, first using o'clock and then half past
Geometry - Position and Direction - Describe position, direction and movement, including whole, half, quarter and three quarter turns. - Pupils use the language of position, direction and motion, including: left and right, top, middle and bottom, on top of, in front of, above, between, around, near, close and far, up and down, forwards and backwards, inside and outside. - Pupils make whole, half, quarter and three-quarter turns in both directions and connect turning clockwise with movement on a clock face.	

Autumn	
Number and place value - Count, read and write numbers to 100 in numerals. - Pupils begin to recognise place value in numbers beyond 20 by reading, writing, counting and comparing numbers up to 100, supported by objects and pictorial representations. - Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward. (Daily counting) - Recognise the place value of each digit in a two-digit number (tens, ones) - Identify, represent and estimate numbers using different representations, including the number line - Compare and order numbers from 0 up to 100; use and = signs - Read and write numbers to at least 100 in numerals and in words - Use place value and number facts to solve problems. - Using materials and a range of representations, pupils practise counting, reading, writing and comparing numbers to at least 100 and solving a variety of related problems to develop fluency. They count in multiples of three to support their later understanding of a third. - As they become more confident with numbers up to 100, pupils are introduced to larger numbers to develop further their recognition of patterns within the number system and represent them in different ways, including spatial representations. - Pupils should partition numbers in different ways (for example, $23 = 20 + 3$ and $23 = 10 + 13$) to support subtraction. They become fluent and apply their knowledge of numbers to reason with, discuss and solve problems that emphasise the value of each digit in two-digit numbers. They begin to understand zero as a place holder.	Addition and Subtraction - Represent and use number bonds and related subtraction facts within 20. - Add and subtract one-digit and two-digit numbers to 20, including zero. - Solve problems with addition and subtraction: - Using concrete objects and pictorial representations, including those involving numbers, quantities and measures - Applying their increasing knowledge of mental and written methods - Recall and use addition and subtraction facts to 20 fluently (Daily fluency). - Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones, a two-digit number and tens, adding three one-digit numbers - Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot - Pupils extend their understanding of the language of addition and subtraction to include sum and difference. - Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using $3 + 7 = 10$; $10 - 7 = 3$ and $7 = 10 - 3$ to calculate $30 + 70 = 100$; $100 - 70 = 30$ and $70 = 100 - 30$. They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (for example, $5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5$). This establishes commutativity and associativity of addition.
Multiplication and Division - Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. - Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities. - Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers - Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication ($\times$), division ($\div$) and equals ($=$) signs - Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot - Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts. - Pupils use a variety of language to describe multiplication and division. - Pupils are introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations. - Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures (for example, $40 \div 2 = 20$, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example, $4 \times 5 = 20$ and $20 \div 5 = 4$).	

Spring	
Number and place value	Multiplication and Division (Continued from autumn term)
Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward. (Daily counting)	- Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers - Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication ($\times$), division ($\div$) and equals (=) signs - Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot - Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts. - Pupils use a variety of language to describe multiplication and division. - Pupils are introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations. - Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures (for example, $40 \div 2 = 20$, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example, $4 \times 5 = 20$ and $20 \div 5 = 4$).
Geometry – properties of shape	
- Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line. - Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces. - Identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid] - Compare and sort common 2-D and 3-D shapes and everyday objects. - Pupils handle and name a wide variety of common 2-D and 3-D shapes including: quadrilaterals and polygons, and cuboids, prisms and cones, and identify the properties of each shape (for example, number of sides, number of faces). Pupils identify, compare and sort shapes on the basis of their properties and use vocabulary precisely, such as sides, edges, vertices and faces. - Pupils read and write names for shapes that are appropriate for their word reading and spelling. - Pupils draw lines and shapes using a straight edge.	
Addition and Subtraction	Statistics
- Solve problems with addition and subtraction: - Using concrete objects and pictorial representations, including those involving numbers, quantities and measures - Applying their increasing knowledge of mental and written methods - Recall and use addition and subtraction facts to 20 fluently (Daily fluency). - Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: two two-digit numbers. - Pupils extend their understanding of the language of addition and subtraction to include sum and difference. - Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using $3 + 7 = 10$; $10 - 7 = 3$ and $7 = 10 - 3$ to calculate $30 + 70 = 100$; $100 - 70 = 30$ and $70 = 100 - 30$. They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (for example, $5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5$). This establishes commutativity and associativity of addition. - Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.	- Interpret and construct simple pictograms, tally charts, block diagrams and simple tables. - Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity - Ask and answer questions about totalling and comparing categorical data. - Pupils record, interpret, collate, organise and compare information (for example, using many-to-one correspondence in pictograms with simple ratios 2, 5, 10).

Summer	
Fractions - Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity. - Write simple fractions for example, $\frac{1}{2}$ of $6 = 3$ and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$. - Pupils use fractions as 'fractions of' discrete and continuous quantities by solving problems using shapes, objects and quantities. They connect unit fractions to equal sharing and grouping, to numbers when they can be calculated, and to measures, finding fractions of lengths, quantities, sets of objects or shapes. They meet 4×3 as the first example of a non-unit fraction. - Pupils should count in fractions up to 10, starting from any number and using the $\frac{1}{2}$ and $\frac{2}{4}$ equivalence on the number line (for example, $1 \frac{1}{4}$, $2 \frac{2}{4}$ (or $1 \frac{1}{2}$), $1 \frac{3}{4}$, 2). This reinforces the concept of fractions as numbers and that they can add up to more than one.	Multiplication and Division (Continued from autumn term) - Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers - Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication ($\times$), division ($\div$) and equals ($=$) signs - Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot - Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts. - Pupils use a variety of language to describe multiplication and division. - Pupils are introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations. - Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures (for example, $40 \div 2 = 20$, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example, $4 \times 5 = 20$ and $20 \div 5 = 4$).
Measurement - Time - Compare and sequence intervals of time. - Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times. - Know the number of minutes in an hour and the number of hours in a day. - They become fluent in telling the time on analogue clocks and recording it.	
Geometry - Position and Direction - Order and arrange combinations of mathematical objects in patterns and sequences - Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise). - Pupils should work with patterns of shapes, including those in different orientations. - Pupils use the concept and language of angles to describe 'turn' by applying rotations, including in practical contexts (for example, pupils themselves moving in turns, giving instructions to other pupils to do so, and programming robots using instructions given in right angles).	
Measurement - Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature ($^{\circ}\text{C}$); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels. - Compare and order lengths, mass, volume/capacity and record the results using $>$, $<$ and $=$ - Pupils use standard units of measurement with increasing accuracy, using their knowledge of the number system. They use the appropriate language and record using standard abbreviations.	Measurement - Money - Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value. - Find different combinations of coins that equal the same amounts of money. - Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change - Pupils become fluent in counting and recognising coins. They read and say amounts of money confidently and use the symbols £ and p accurately, recording pounds and pence separately.

Autumn	
Number and place value	Addition and Subtraction
- Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number. - Recognise the place value of each digit in a three-digit number (hundreds, tens, ones) - Compare and order numbers up to 1000. - Identify, represent and estimate numbers using different representations - Read and write numbers up to 1000 in numerals and in words. - Solve number problems and practical problems involving these ideas. - Pupils now use multiples of 2, 3, 4, 5, 8, 10, 50 and 100. (Daily counting) - They use larger numbers to at least 1000, applying partitioning related to place value using varied and increasingly complex problems, building on work in year 2 (for example, $146 = 100 + 40$ and $6, 146 = 130 + 16$). - Using a variety of representations, including those related to measure, pupils continue to count in ones, tens and hundreds, so that they become fluent in the order and place value of numbers to 1000.	Derive and use related facts up to 100. (Daily fluency)
	Measurement (link to addition and subtraction)
	- Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml). - Pupils continue to measure using the appropriate tools and units, progressing to using a wider range of measures, including comparing and using mixed units (for example, 1 kg and 200g) and simple equivalents of mixed units (for example, 5m = 500cm).
Statistics	
- 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. - Pupils understand and use simple scales (for example, 2, 5, 10 units per cm) in pictograms and bar charts with increasing accuracy. - They continue to interpret data presented in many contexts	

Year 3

Spring

Geometry – Properties of shapes (right angles)	Addition and Subtraction
- 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.	- Add and subtract numbers mentally, including: - A three-digit number and ones. - A three-digit number and tens - A three-digit number and hundreds - Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction - Estimate the answer to a calculation and use inverse operations to check answers. - Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction. Notes and guidance (non-statutory) - Pupils practise solving varied addition and subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100. - Pupils use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent
Multiplication and Division	
- Recall and use multiplication and division facts for the 2, 4 and 8 multiplication tables. - Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables.	

Year 3

Summer	
Fractions	Geometry – Properties of shapes

• Recognise, find and write fractions of a discrete set of objects: unit fractions and nonunit fractions with small denominators. • Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators. • Add and subtract fractions with the same denominator within one whole [for example, $5/7 + 1/7 = 6/7$] • Compare and order unit fractions, and fractions with the same denominators. • Solve problems that involve all of the above. • They begin to understand unit and non-unit fractions as numbers on the number line, and deduce relations between them, such as size and equivalence. They should go beyond the $[0, 1]$ interval, including relating this to measure. • Pupils understand the relation between unit fractions as operators (fractions of), and division by integers. • They continue to recognise fractions in the context of parts of a whole, numbers, measurements, a shape, and unit fractions as a division of a quantity. • Pupils practise adding and subtracting fractions with the same denominator through a variety of increasingly complex problems to improve fluency. • Pupils make connections between fractions of a length, of a shape and as a representation of one whole or set of quantities.	• Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them. • Identify horizontal and vertical lines and pairs of perpendicular and parallel lines. • Pupils' knowledge of the properties of shapes is extended at this stage to symmetrical and non-symmetrical polygons and polyhedra. Pupils extend their use of the properties of shapes. They should be able to describe the properties of 2-D and 3-D shapes using accurate language, including lengths of lines and acute and obtuse for angles greater or lesser than a right angle. • Pupils connect decimals and rounding to drawing and measuring straight lines in centimetres, in a variety of contexts.
Measurement - Time	
• Add and subtract amounts of money to give change, using both £ and p in practical contexts. • Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks. • Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight. • Know the number of seconds in a minute and the number of days in each month, year and leap year. • Compare durations of events [for example to calculate the time taken by particular events or tasks]. • Pupils use both analogue and digital 12-hour clocks and record their times. In this way they become fluent in and prepared for using digital 24-hour clocks in year 4.	

Year 4

Autumn	
Addition and Subtraction	Place Value

• Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate. • Estimate and use inverse operations to check answers to a calculation. • Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why. Notes and guidance (non-statutory) • Pupils continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency	• Count in multiples of 6, 7, 9, 25 and 1000. (Daily Counting) • Find 1000 more or less than a given number. • Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones). • Order and compare numbers beyond 1000. • Identify, represent and estimate numbers using different representations. • Round any number to the nearest 10, 100 or 1000. • Solve number and practical problems that involve all of the above and with increasingly large positive numbers. • Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value. • Using a variety of representations, including measures, pupils become fluent in the order and place value of numbers beyond 1000, including counting in tens and hundreds, and maintaining fluency in other multiples through varied and frequent practice. • They connect estimation and rounding numbers to the use of measuring instruments. • Roman numerals should be put in their historical context so pupils understand that there have been different ways to write whole numbers and that the important concepts of zero and place value were introduced over a period of time.
Measurement – perimeter Geometry – properties of shape	
• Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres. • Perimeter can be expressed algebraically as $2(a + b)$ where a and b are the dimensions in the same unit. • Measure the perimeter of simple 2D shapes. • Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres. • Pupils calculate the perimeter of rectangles and related composite shapes, including using the relations of perimeter or area to find unknown lengths. Missing measures questions such as these can be expressed algebraically, for example $4 + 2b = 20$ for a rectangle of sides 2 cm and b cm and perimeter of 20cm. • Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes. • Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. • Pupils continue to classify shapes using geometrical properties, extending to classifying different triangles (for example, isosceles, equilateral, scalene) and quadrilaterals (for example, parallelogram, rhombus, trapezium). • Pupils compare and order angles in preparation for using a protractor and compare lengths and angles to decide if a polygon is regular or irregular.	
Multiplication and Division	
• Recall and use multiplication and division facts for the 3 multiplication tables. • Recall multiplication and division facts for multiplication tables up to 12×12. (Focus on 3, 6 and 9) • Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency	

Year 4

Spring

Multiplication and Division	Geometry – position and direction
- Recall multiplication and division facts for multiplication tables up to 12×12 (focus on 7's) - Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency. - Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit. - Pupils write statements about the equality of expressions (for example, use the distributive law $39 \times 7 = 30 \times 7 + 9 \times 7$ and associative law $(2 \times 3) \times 4 = 2 \times (3 \times 4)$). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations for example, $2 \times 6 \times 5 = 10 \times 6 = 60$.	- Describe positions on a 2-D grid as coordinates in the first quadrant. - Describe movements between positions as translations of a given unit to the left/right and up/down. - Plot specified points and draw sides to complete a given polygon. Notes and guidance (non-statutory). - Pupils draw a pair of axes in one quadrant, with equal scales and integer labels. They read, write and use pairs of coordinates, for example (2, 5), including using coordinate plotting ICT tools.
Statistics	
- Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. - Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs. Notes and guidance (non-statutory) - Pupils understand and use a greater range of scales in their representations. - Pupils begin to relate the graphical representation of data to recording change over time.	

Year 4

Summer	
Fractions	Geometry - properties of shape
- Add and subtract fractions with the same denominator. - They extend the use of the number line to connect fractions, numbers and measures. - Pupils continue to practise adding and subtracting fractions with the same denominator, to become fluent through a variety of increasingly complex problems beyond one whole. - They practise counting using simple fractions and decimals, both forwards and backwards. (Daily Counting). - Find the term-to-term rule in words (for example, add $\frac{1}{2}$). - Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number. - Pupils practise adding and subtracting fractions to become fluent through a variety of increasingly complex problems. They extend their understanding of adding and subtracting fractions to calculations that exceed 1 as a mixed number.	- Identify lines of symmetry in 2-D shapes presented in different orientations. - Complete a simple symmetric figure with respect to a specific line of symmetry. - Pupils draw symmetric patterns using a variety of media to become familiar with different orientations of lines of symmetry; and recognise line symmetry in a variety of diagrams, including where the line of symmetry does not dissect the original shape.
Measurement - Time	
- Convert between different units of measure [for example, hour to minute] - Read, write and convert time between analogue and digital 12- and 24-hour clocks. - Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.	

Year 5

Autumn
Number and place value • They continue to use number in context, including measurement. Pupils extend and apply their understanding of the number system to the decimal numbers and fractions that they have met so far. • They should recognise and describe linear number sequences, including those involving fractions and decimals, and find the term-to-term rule. • They should recognise and describe linear number sequences (for example, 3, 3 2 1, 4, 4 2 1 ...), including those involving fractions and decimals. • Pupils learn decimal notation and the language associated with it, including in the context of measurements. They make comparisons and order decimal amounts and quantities that are expressed to the same number of decimal places. They should be able to represent numbers with one or two decimal places in several ways, such as on number lines.
Number and place value • Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero. • Solve number problems and practical problems that involve all of the above (see NC) • They begin to extend their knowledge of the number system to include the decimal numbers and fractions that they have met so far. • Use negative numbers in context, and calculate intervals across zero. • Using the number line, pupils use, add and subtract positive and negative integers for measures such as temperature. • Count backwards through zero to include negative numbers.
Fractions / Measurement - Money • Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10. • Add and subtract amounts of money to give change, using both £ and p in practical contexts. • Pupils should go beyond the measurement and money models of decimals, for example, by solving puzzles involving decimals. • Pupils continue to become fluent in recognising the value of coins, by adding and subtracting amounts, including mixed units, and giving change using manageable amounts. They record £ and p separately. • Estimate, compare and calculate different measures, including money in pounds and pence. • Build on their understanding of place value and decimal notation to record metric measures, including money. • Read and write decimal numbers as fractions [for example, $0.71 = 71/100$] • Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. • Round decimals with two decimal places to the nearest whole number and to one decimal place. • Read, write, order and compare numbers with up to three decimal places. • Solve problems involving number up to three decimal places. • They extend their knowledge of fractions to thousandths and connect to decimals and measures. • Pupils say, read and write decimal fractions and related tenths, hundredths and thousandths accurately and are confident in checking the reasonableness of their answers to problems. • They mentally add and subtract tenths, and one-digit whole numbers and tenths. • They practise adding and subtracting decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 (for example, $0.83 + 0.17 = 1$). • Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. • Recognise and write decimal equivalents of any number of tenths or hundredths. • Round decimals with one decimal place to the nearest whole number. • Compare numbers with the same number of decimal places up to two decimal places. • Solve simple measure and money problems involving fractions and decimals to two decimal places.

- Pupils should connect hundredths to tenths and place value and decimal measure.
- Pupils understand the relation between non-unit fractions and multiplication and division of quantities, with particular emphasis on tenths and hundredths.
- Pupils are taught throughout that decimals and fractions are different ways of expressing numbers and proportions.
- Pupils' understanding of the number system and decimal place value is extended at this stage to tenths and then hundredths. This includes relating the decimal notation to division of whole number by 10 and later 100.
- Pupils learn decimal notation and the language associated with it, including in the context of measurements. They make comparisons and order decimal amounts and quantities that are expressed to the same number of decimal places. They should be able to represent numbers with one or two decimal places in several ways, such as on number lines.

Multiplication and Division

- Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.
- Multiply and divide numbers mentally drawing upon known facts.
- Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.
- Pupils practise and extend their use of the formal written methods of short multiplication and short division (see Mathematics Appendix 1). They apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations.
- Distributivity can be expressed as $a(b + c) = ab + ac$.
- 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.
- Pupils develop efficient mental methods, for example, using commutativity and associativity (for example, $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$) and multiplication and division facts (for example, using $3 \times 2 = 6$, $6 \div 3 = 2$ and $2 = 6 \div 3$) to derive related facts (for example, $30 \times 2 = 60$, $60 \div 3 = 20$ and $20 = 60 \div 3$).
- Pupils develop reliable written methods for multiplication and division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication and division.
- Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers.
- recognise and use factor pairs and commutativity in mental calculations.
- Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.
- Pupils practise mental methods and extend this to three-digit numbers to derive facts, (for example $600 \div 3 = 200$ can be derived from $2 \times 3 = 6$).¹⁹ Mathematics - key stages 1 and 2 26 Notes and guidance (non-statutory)
- Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answers (see Mathematics Appendix 1).
- Pupils interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding (for example, $98 \div 4 = 4 \text{ r } 2$ $98 = 24 \text{ r } 2 = 24 \frac{2}{4} = 24.5 \approx 25$).

Spring	
Multiplication and Division Measure – Volume	Fractions
- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. - Know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers. - Establish whether a number up to 100 is prime and recall prime numbers up to 19. - Recognise and use square numbers and cube numbers, and the notation for squared (2^2) and cubed (3^3). - Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes. - They use and understand the terms factor, multiple and prime, square and cube numbers. - They understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalence statements (for example, $4 \times 35 = 2 \times 2 \times 35$; $3 \times 270 = 3 \times 3 \times 9 \times 10 = 9^2 \times 10$). - Identify common factors, common multiples and prime numbers. - Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units [for example, mm^3 and km^3]. - Estimate volume [for example, using 1cm^3 blocks to build cuboids (including cubes)] and capacity. - Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000. - Common factors can be related to finding equivalent fractions.	- Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places. - Multiply one-digit numbers with up to two decimal places by whole numbers. - Pupils can explore and make conjectures about converting a simple fraction to a decimal fraction (for example, $3 \div 8 = 0.375$). For simple fractions with recurring decimal equivalents, pupils learn about rounding the decimal to three decimal places, or other appropriate approximations depending on the context. Pupils multiply and divide numbers with up to two decimal places by one-digit and two-digit whole numbers. Pupils multiply decimals by whole numbers, starting with the simplest cases, such as $0.4 \times 2 = 0.8$, and in practical contexts, such as measures and money. - Pupils are introduced to the division of decimal numbers by one-digit whole number, initially, in practical contexts involving measures and money. They recognise division calculations as the inverse of multiplication. - Pupils also develop their skills of rounding and estimating as a means of predicting and checking the order of magnitude of their answers to decimal calculations. This includes rounding answers to a specified degree of accuracy and checking the reasonableness of their answers. - Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.
Measurement – Area and scaling	
- Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes. - Pupils calculate the area from scale drawings using given measurements. - Find the area of rectilinear shapes by counting squares. - They relate area to arrays and multiplication. - They use multiplication to convert from larger to smaller units. - The comparison of measures includes simple scaling by integers (for example, a given quantity or measure is twice as long or five times as high) and this connects to multiplication. - Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates. - Pupils use multiplication and division as inverses to support the introduction of ratio in year 6, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres.	

- Pupils connect multiplication by a fraction to using fractions as operators (fractions of), and to division, building on work from previous years. This relates to scaling by simple fractions, including fractions > 1 .
- Recognise that shapes with the same areas can have different perimeters and vice versa.
- Recognise when it is possible to use formulae for area and volume of shapes.
- Calculate the area of parallelograms and triangles.
- They relate the area of rectangles to parallelograms and triangles, for example, by dissection, and calculate their areas, understanding and using the formulae (in words or symbols) to do this.
- Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits?; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).
- Integer scaling problems and harder correspondence problems such as n objects are connected to m objects.
- Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.

Statistics

- Solve comparison, sum and difference problems using information presented in a line graph.
- Complete, read and interpret information in tables, including timetables.
- Pupils connect their work on coordinates and scales to their interpretation of time graphs.
- They begin to decide which representations of data are most appropriate and why.

Summer	
Fractions	Measures – converting units
- Compare and order fractions whose denominators are all multiples of the same number. - Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths. - Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. - Pupils continue to practise counting forwards and backwards in simple fractions. (Daily counting) - Pupils continue to develop their understanding of fractions as numbers, measures and operators by finding fractions of numbers and quantities. - Pupils extend counting from year 4, using decimals and fractions including bridging zero, for example on a number line. (Daily counting) - Pupils use their understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity (for example, if $\frac{1}{4}$ of a length is 36cm, then the whole length is $36 \times 4 = 144\text{cm}$). - Recognise and show, using diagrams, equivalent fractions with small denominators. - Recognise and show, using diagrams, families of common equivalent fractions. - Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number. - Recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$	- Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre). - Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints. - Solve problems involving converting between units of time. - Pupils use all four operations in problems involving time and money, including conversions (for example, days to weeks, expressing the answer as weeks and days). - Pupils use their knowledge of place value and multiplication and division to convert between standard units. - Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate. - Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places. - Convert between miles and kilometres. - Pupils connect conversion (for example, from kilometres to miles) to a graphical representation as preparation for understanding linear/proportional graphs. - They know approximate conversions and are able to tell if an answer is sensible.
Geometry – properties of shape	
- Identify 3-D shapes, including cubes and other cuboids, from 2-D representations. - Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles. - Draw given angles, and measure them in degrees ($^{\circ}$). - Identify: angles at a point and one whole turn (total 360°), angles at a point on a straight line and $\frac{1}{2}$ a turn (total 180°), other multiples of 90°, use the properties of rectangles to deduce related facts and find missing lengths and angles. - Pupils become accurate in drawing lines with a ruler to the nearest millimetre, and measuring with a protractor. They use conventional markings for parallel lines and right angles. - Pupils use the term diagonal and make conjectures about the angles formed between sides, and between diagonals and parallel sides, and other properties of quadrilaterals, for example using dynamic geometry ICT tools. - Pupils use angle sum facts and other properties to make deductions about missing angles and relate these to missing number problems - Identify acute and obtuse angles and compare and order angles up to two right angles by size.	

Geometry – position and direction

- Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.²³
- Pupils recognise and use reflection and translation in a variety of diagrams, including continuing to use a 2-D grid and coordinates in the first quadrant. Reflection should be in lines that are parallel to the axes.

Year 6

Autumn	
Addition and Subtraction and Multiplication and Division	Geometry – properties of shapes.
- Pupils use and explain the equals sign to indicate equivalence, including in missing number problems (for example, $13 + 24 = 12 + 25$; $33 = 5 \times ?$). - Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction). - Add and subtract numbers mentally with increasingly large numbers. - Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy. - Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. - Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency (see Mathematics Appendix 1). - They practise mental calculations with increasingly large numbers to aid fluency (for example, $12\,462 - 2300 = 10\,162$).	- Draw 2-D shapes using given dimensions and angles. - Recognise, describe and build simple 3-D shapes, including making nets. - Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons. - Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. - Pupils draw shapes and nets accurately, using measuring tools and conventional markings and labels for lines and angles. - Pupils describe the properties of shapes and explain how unknown angles and lengths can be derived from known measurements. These relationships might be expressed algebraically for example, $d = 2 \times r$; $a = 180 - (b + c)$.
Number and place value	
- Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit. - Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000. (Daily counting) - Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000. - Read Roman numerals to 1000 (M) and recognise years written in Roman numerals. - Pupils identify the place value in large whole numbers. - Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit. - Round any whole number to a required degree of accuracy. - Solve number and practical problems that involve all of the above. - Pupils use the whole number system, including saying, reading and writing numbers accurately. - Perform mental calculations, including with mixed operations and large numbers. - Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. - Solve problems involving addition, subtraction, multiplication and division. - Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. - Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division (see Mathematics Appendix 1). - They undertake mental calculations with increasingly large numbers and more complex calculations. #Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency. - Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc., but not to a specified number of significant figures.	

- Fractions**

- Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.
- Compare and order fractions, including fractions > 1 .
- Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.
- Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, $1/4 \times 1/2 = 1/8$].
- Divide proper fractions by whole numbers [for example, $1/3 \div 2 = 1/6$].
- Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $3/8$]
- Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.
- Pupils should practise, use and understand the addition and subtraction of fractions with different denominators by identifying equivalent fractions with the same denominator. They should start with fractions where the denominator of one fraction is a multiple of the other (for example, $2 \frac{1}{2} + 8 \frac{1}{2} = 8 \frac{5}{2}$) and progress to varied and increasingly complex problems.
- Pupils should use a variety of images to support their understanding of multiplication with fractions. This follows earlier work about fractions as operators (fractions of), as numbers, and as equal parts of objects, for example as parts of a rectangle.
- They practise calculations with simple fractions and decimal fraction equivalents to aid fluency, including listing equivalent fractions to identify fractions with common denominators.
- Add and subtract fractions with the same denominator and denominators that are multiples of the same number.
- Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal.
- Solve problems which require knowing percentage and decimal equivalents of $1/2$, $1/4$, $1/5$, $2/5$, $4/5$ and those fractions with a denominator of a multiple of 10 or 25.
- Pupils should be taught throughout that percentages, decimals and fractions are different ways of expressing proportions.
- Pupils should make connections between percentages, fractions and decimals (for example, 100% represents a whole quantity and 1% is $1/100$, 50% is $50/100$, 25% is $25/100$) and relate this to finding 'fractions of'.

Year 6

Spring	
Multiplication and Division (Plus Fractions)	Measurement – Area and perimeter and Geometry – Position and Direction
• Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. • Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. • Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context. • Use written division methods in cases where the answer has up to two decimal places. • Solve problems which require answers to be rounded to specified degrees of accuracy. • Pupils connect equivalent fractions > 1 that simplify to integers with division and other fractions > 1 to division with remainders, using the number line and other models, and hence move from these to improper and mixed fractions.	• Describe positions on the full coordinate grid (all four quadrants). • Draw and translate simple shapes on the coordinate plane, and reflect them in the axes. • Pupils draw and label a pair of axes in all four quadrants with equal scaling. This extends their knowledge of one quadrant to all four quadrants, including the use of negative numbers. • Pupils draw and label rectangles (including squares), parallelograms and rhombuses, specified by coordinates in the four quadrants, predicting missing coordinates using the properties of shapes. These might be expressed algebraically for example, translating vertex (a, b) to (a - 2, b + 3); (a, b) and (a + d, b + d) being opposite vertices of a square of side d. • Recognise that shapes with the same areas can have different perimeters and vice versa. (Y5) • Calculate the area of parallelograms and triangles. (Y5)

Year 6

Summer	
Statistics	Ratio and Proportion
- Interpret and construct pie charts and line graphs and use these to solve problems. - Pupils connect their work on angles, fractions and percentages to the interpretation of pie charts. - Pupils both encounter and draw graphs relating two variables, arising from their own enquiry and in other subjects. - They should connect conversion from kilometres to miles in measurement to its graphical representation.	- Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts. - Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison. - Solve problems involving similar shapes where the scale factor is known or can be found. - Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples. - Pupils recognise proportionality in contexts when the relations between quantities are in the same ratio (for example, similar shapes and recipes). - Pupils link percentages or 360° to calculating angles of pie charts. - Pupils should consolidate their understanding of ratio when comparing quantities, sizes and scale drawings by solving a variety of problems. They might use the notation a:b to record their work. - Pupils solve problems involving unequal quantities, for example, 'for every egg you need three spoonfuls of flour', '53 of the class are boys'. These problems are the foundation for later formal approaches to ratio and proportion. - Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the numbers of choices of a meal on a menu, or three cakes shared equally between 10 children. - Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits?; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).
Geometry – Properties of shapes	
Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.	
Statistics – mean average	
- Calculate and interpret the mean as an average. - Pupils know when it is appropriate to find the mean of a data set.	
Measures – Science link	
Pupils could be introduced to compound units for speed, such as miles per hour, and apply their knowledge in science or other subjects as appropriate.	
Algebra	Addition and Subtraction, Multiplication and Division
- Use simple formulae. - Generate and describe linear number sequences. - Express missing number problems algebraically. - Find pairs of numbers that satisfy an equation with two unknowns. - Enumerate possibilities of combinations of two variables. - Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand, such as: - Missing numbers, lengths, coordinates and angles. - Formulae in mathematics and science. - Equivalent expressions (for example, $a + b = b + a$). - Generalisations of number patterns. - Number puzzles (for example, what two numbers can add up to).	- Pupils explore the order of operations using brackets; for example, $2 + 1 \times 3 = 5$ and $(2 + 1) \times 3 = 9$. - Use their knowledge of the order of operations to carry out calculations involving the four operations. - Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.