Maths — No Problem!

Calculation Policy

Introduction

Maths — No Problem! materials use real-world contexts to help pupils understand the importance of mathematics in their everyday lives.

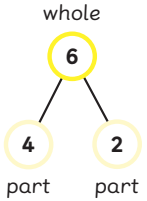
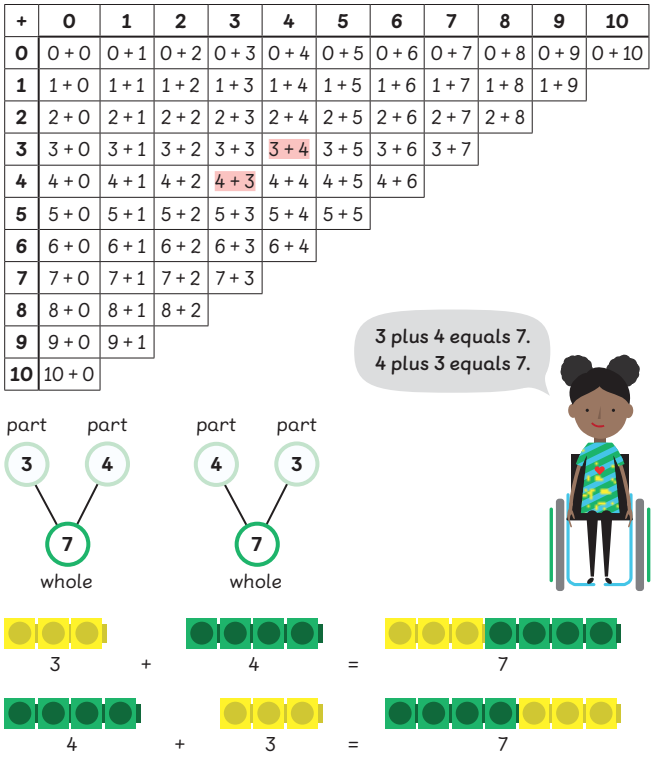
The progression of calculation skills, focusing on addition, subtraction, multiplication and division is developed using a Concrete Pictorial Abstract (CPA) approach and delivered through problem solving.

Key mathematical ideas are reinforced using Bruner's spiral curriculum: a teaching approach in which each subject or skill area is revisited in intervals at a more sophisticated level each time.

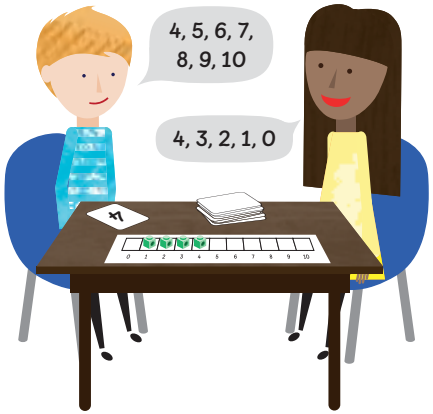
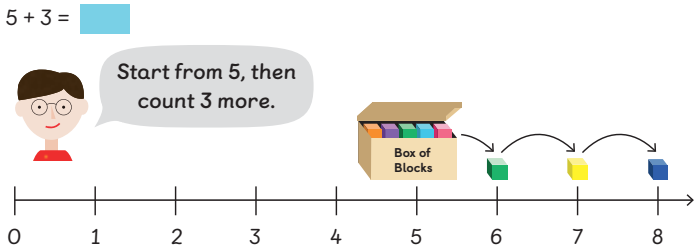
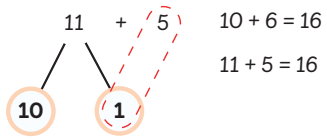
The **Maths — No Problem!** Calculation Policy guides practitioners through a clear progression of key skills and representations at each year group.

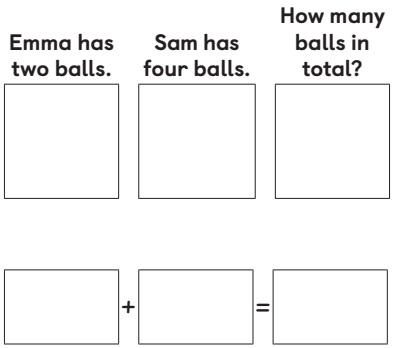
Addition Calculation Policy

Year 1

Year	Topic/Strand	Representation	Key Idea
Year 1	**Part – Part – Whole**		This is a mathematical structure that underpins all addition situations. Numbers can be understood in terms of their parts; understanding that the parts are part of a larger collection. Pupils develop an understanding of the parts and the whole within an equation.
Year 1	**Number Bonds to 10**		Pupils develop automatic recall of number bonds to 10. This can be shown using a ten frame, a number bond diagram and written as an equation. This understanding can be related to adding tens, hundreds and so on when used with a sound understanding of place value.

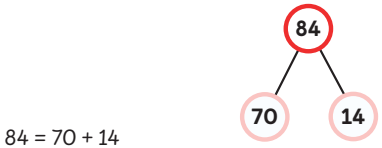
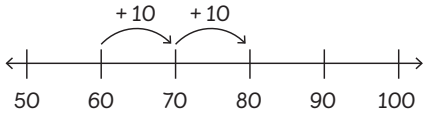
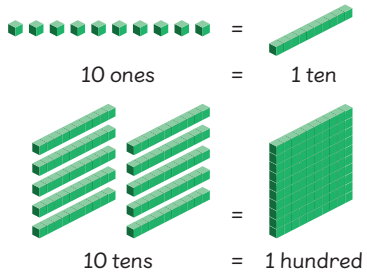
+	0	1	2	3	4	5	6	7	8	9	10
0	0 + 0	0 + 1	0 + 2	0 + 3	0 + 4	0 + 5	0 + 6	0 + 7	0 + 8	0 + 9	0 + 10
1	1 + 0	1 + 1	1 + 2	1 + 3	1 + 4	1 + 5	1 + 6	1 + 7	1 + 8	1 + 9	
2	2 + 0	2 + 1	2 + 2	2 + 3	2 + 4	2 + 5	2 + 6	2 + 7	2 + 8		
3	3 + 0	3 + 1	3 + 2	3 + 3	3 + 4	3 + 5	3 + 6	3 + 7			
4	4 + 0	4 + 1	4 + 2	4 + 3	4 + 4	4 + 5	4 + 6				
5	5 + 0	5 + 1	5 + 2	5 + 3	5 + 4	5 + 5					
6	6 + 0	6 + 1	6 + 2	6 + 3	6 + 4						
7	7 + 0	7 + 1	7 + 2	7 + 3							
8	8 + 0	8 + 1	8 + 2								
9	9 + 0	9 + 1									
10	10 + 0										

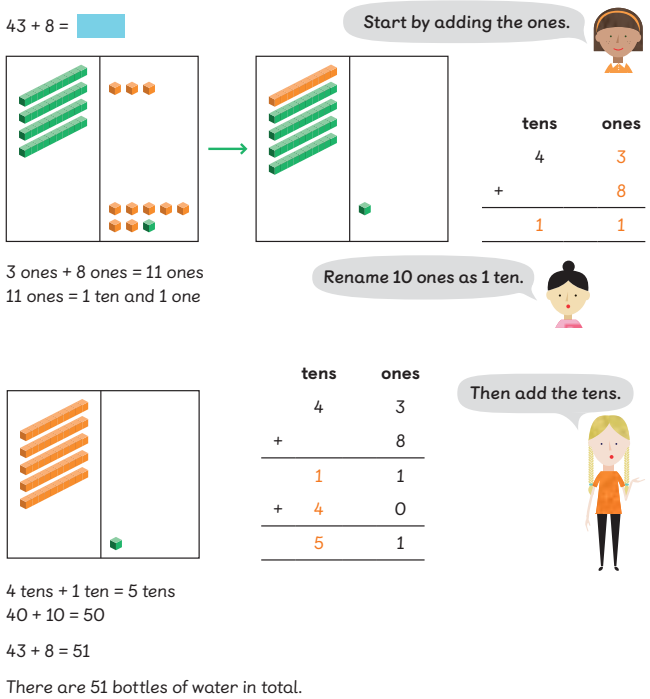
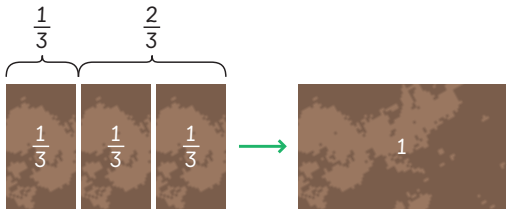
Year	Topic/Strand	Representation	Key Idea
Year 1	Using a Number Track		Pupils are first introduced to a linear number system through the number track. This is a precursor to the number line. Pupils may benefit from placing items on the number track as they count and add, before moving on to use the more abstract number line.
Year 1	Counting on Using a Number Line		Pupils move from a number track to a number line, starting from zero and having marked increments of 1. The use of the number line is further developed when counting starts from a given number, relying on pupils' ability to locate and count on from a given number.
Year 1	Adding by Making 10	 10 + 6 = 16 11 + 5 = 16	Pupils use their part–whole understanding to rename a number into its component parts in order to make 10 within an equation. Pupils also look for combinations of numbers that make 10 in addition examples that have 3 numbers with a sum greater than 10.

Year	Topic/Strand	Representation	Key Idea
Year 1	**Addition Word Problems**		Pupils apply their knowledge of addition within the context of word problems. The problems may involve different situations, contexts or strategies.

Addition Calculation Policy

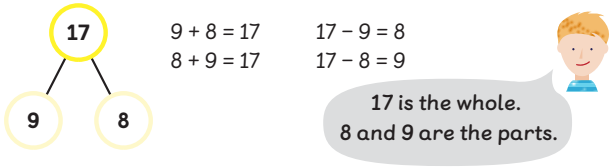
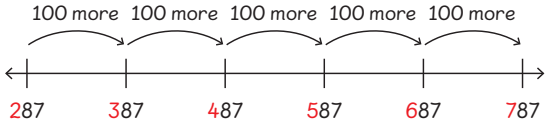
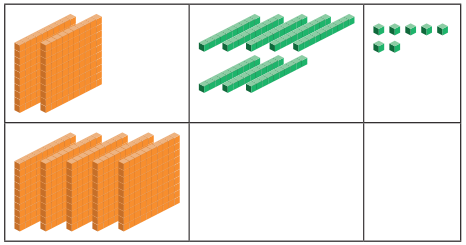
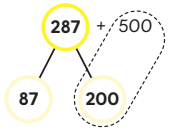
Year 2

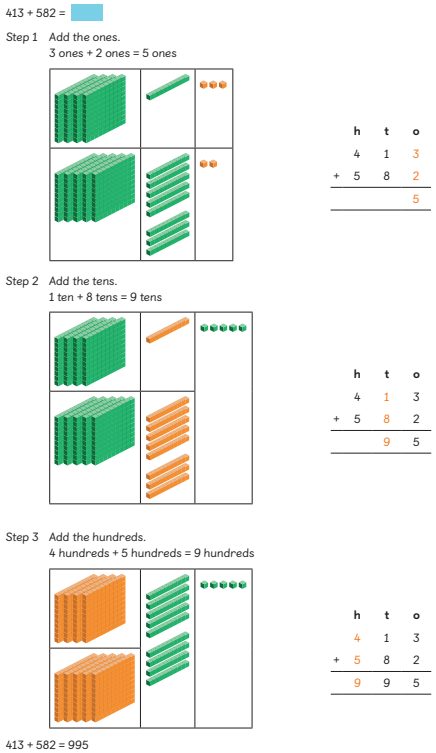
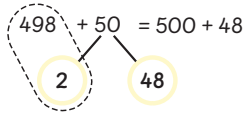
Year	Topic/Strand	Representation	Key Idea
Year 2	**Part – Part – Whole**	 84 = 70 + 14	This is a mathematical structure that underpins all addition situations. Numbers can be understood in terms of their parts; understanding that the parts are part of a larger collection. Pupils develop an understanding of the parts and the whole within an equation.
Year 2	**Counting on Using a Number Line**	 60 + 20 = 80	The use of the number line is further developed when counting starts from a given number, relying on pupils' ability to locate and count from a given number, including starting from a 2-digit number. Initially a 1-digit number is added to a 2-digit number, then this progresses to a number line shown with intervals of 10 when adding 2-digit numbers that do not have any ones.
Year 2	**Base 10 Blocks**		The use of base 10 blocks provides a representation of the place value, primarily of 2-digit numbers. This representation is related to the formal written method but also encourages pupils to use their understanding of adding the same noun to add 2-digit numbers. For example, 20 + 30 can be understood as 2 tens + 3 tens. The sum of these numbers is 50 or 5 tens. An understanding of place value will support addition as well as subtraction, multiplication and division.

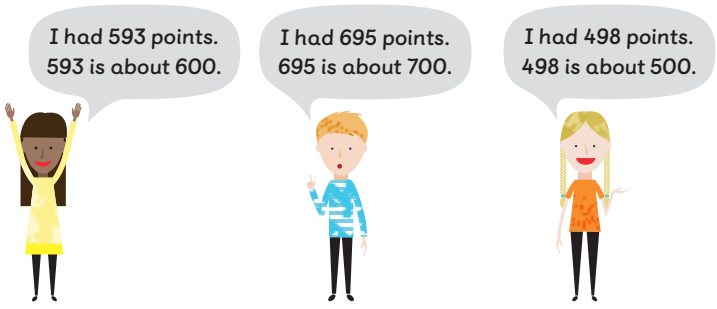
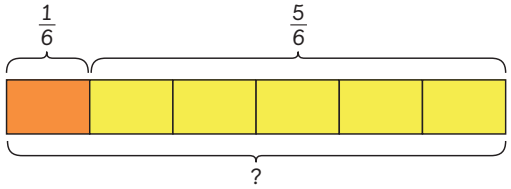
Year	Topic/Strand	Representation	Key Idea
Year 2	Formal Written Method		This is a procedural method that relies on a pupil's conceptual understanding of addition. This begins without renaming and progresses to the renaming of 10 ones into 1 ten. Pupils understand that at this stage, they start with the addition of the ones before they add the tens. This method is supported with base 10 block representation. The formal written method is always accompanied by a written equation to ensure that the relationship between the representations is made.
Year 2	Adding Fractions		Pupils use their understanding of adding the same noun when adding fractions through a written sentence. Fractions with the same denominator are added using a '[ ] and [ ] make [ ]' structure.

Addition Calculation Policy

Year 3

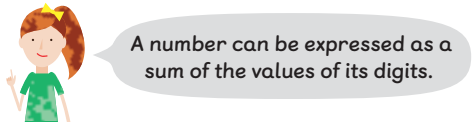
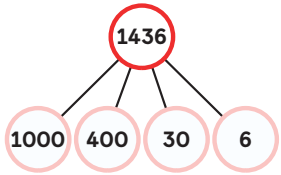
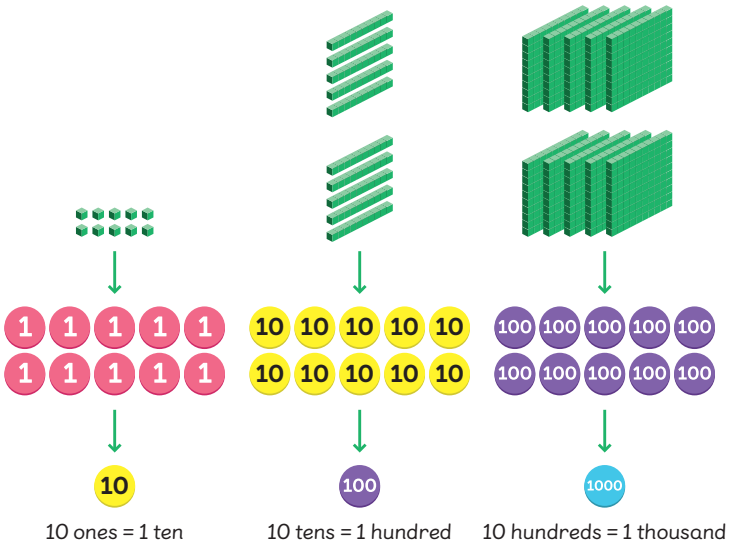
Year	Topic/Strand	Representation	Key Idea
Year 3	**Part – Part – Whole**		This is a mathematical structure that underpins all addition situations. Numbers can be understood in terms of their parts; understanding that the parts are part of a larger collection. Pupils develop an understanding of the parts and the whole within an equation.
Year 3	**Counting on Using a Number Line**	 287 + 500 = 787	The use of the number line is further developed when counting starts from a given number, relying on pupils' ability to locate and count from a given number, including starting from a 3-digit number. Initially a 1-digit number is added to a 3-digit number, then this progresses to a number line shown with intervals of 1, then 10 and eventually to 100.
Year 3	**Base 10 Blocks**	 287 + 500 = 787 787 fans watched the game in total.  h t o 2 8 7 + 5 0 0 7 8 7 200 + 500 = 700 87 + 700 = 787	The use of base 10 blocks provides a representation of the place value of 3-digit numbers. This representation is related to the formal written method but also encourages pupils to use their understanding of adding the same noun to add 3-digit numbers. For example, 200 + 500 can be understood as 2 hundreds + 5 hundreds. The sum of these numbers is 700 or 7 hundreds. Progression is made by adding ones, then tens and finally hundreds before the addition of all 3 is undertaken. An understanding of place value will support addition as well as subtraction, multiplication and division.

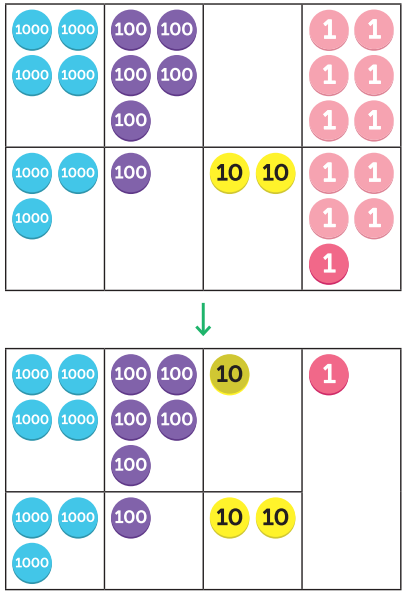
Year	Topic/Strand	Representation	Key Idea
Year 3	**Formal Written Method**	413 + 582 =  413 + 582 = 995	This procedural method progresses from the renaming of 10 ones into 1 ten to include the renaming of 10 tens to 1 hundred. The procedure remains unchanged from Year 2. Pupils understand that at this stage, they start with the addition of the ones, then the tens, then finally the hundreds. This method is supported with base 10 block representation. The formal written method is always accompanied by a written equation to ensure that the relationship between the representations is made.
Year 3	**Adding by Making 100**	498 + 50 = 	Pupils are given the opportunity to further develop their number sense by using a 'make 100' strategy with numbers that are 'near hundreds'. They use their part–whole understanding to rename a given number to make 100. For example, 498 + 50 can be renamed as 498 + 2 + 48. Pupils add 2 to 498 to make 500, then add the remaining 48.

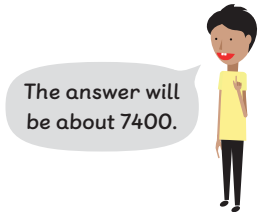
Year	Topic/Strand	Representation	Key Idea
Year 3	Estimating	 600 + 50 = 650 700 + 70 = 770 500 + 50 = 550	Pupils use their number sense to recognise numbers close to a hundred and how estimation can help accuracy in completing a precise calculation.
Year 3	Adding Fractions	 1 sixth and 5 sixths make 6 sixths. $\frac{1}{6} + \frac{5}{6} = \frac{6}{6}$ $= 1$	Pupils use their understanding of adding the same noun when adding fractions with the same denominator. The adding of fractions uses equations and is supported through pictorial representation.

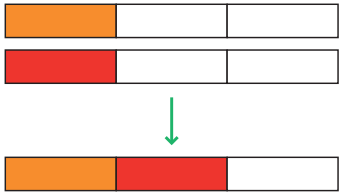
Addition Calculation Policy

Year 4

Year	Topic/Strand	Representation	Key Idea
Year 4	Part – Part – Whole	 1436 = 1000 + 400 + 30 + 6 	This is a mathematical structure that underpins all addition situations. Numbers can be understood in terms of their parts; understanding that the parts are part of a larger collection. The bar model is used as a representation of a problem that can be related to a part–whole addition situation. Pupils develop an understanding of the parts and the whole within an equation.
Year 4	Base 10 Blocks	 10 ones = 1 ten 10 tens = 1 hundred 10 hundreds = 1 thousand	The use of base 10 blocks provides a representation of the place value of 3-digit numbers. This representation is related to the formal written method but also encourages pupils to use their understanding of adding the same noun. In Year 4, a transition between base 10 blocks and place–value counters takes place.

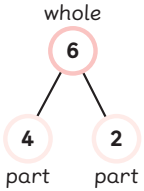
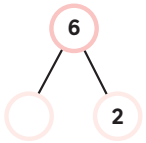
Year	Topic/Strand	Representation	Key Idea
Year 4	Place–Value Counters	4506 + 3125 = ☐ Step 1 Add the ones. 6 ones and 5 ones = 11 ones Rename the ones. 11 ones = 1 ten and 1 one  $\begin{array}{r} {}^{1} \\ 4\ 5\ 0\ 6 \\ +\ 3\ 1\ 2\ 5 \\ \hline 1 \end{array}$	Place–value counters are used to represent addition situations. This transition relies on pupils understanding the value of each counter without being able to count its physical attributes. Pupils will have the opportunity to rename 10 counters of the same value to 1 counter with a value 10 times greater and vice versa. The idea of composing and decomposing at a rate of 10 should be well understood at this stage.

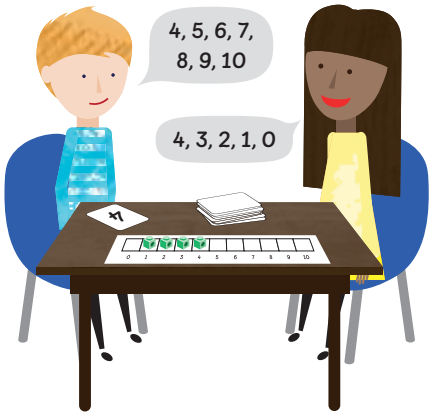
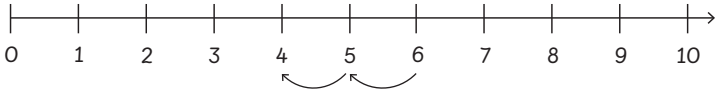
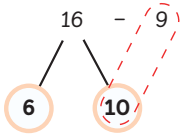
Year	Topic/Strand	Representation	Key Idea
Year 4	**Formal Written Method**	4188 + 3245 = ☐ 4 1 8 8 + 3 2 4 5 1 3 — Add the ones. 1 2 0 — Add the tens. 3 0 0 — Add the hundreds. + 7 0 0 0 — Add the thousands. 7 4 3 3 2 6 1 2 + 4 2 6 4 6 8 7 6	Pupils will have the opportunity to use a long and short version of this procedural method. In the long representation, the sum of adding each place is shown in its entirety before being added to find the final sum. In the short representation, the sum of each place is shown as part of the total sum and as a small number added to an existing place when a ten of one place is made. The procedure remains unchanged from Year 2.
Year 4	**Estimating the Sum**	Start by estimating. 4188 ≈ 4200 3245 ≈ 3200 4200 + 3200 = 7400 	Estimation is introduced as an approach to start a calculation. Estimation is a skill that helps develop number sense. Pupils are expected to be able to decide if an answer is reasonable. Beginning a calculation with estimation is developed during the addition chapter.
Year 4	**Making 10 and Making 100**	make 10 4072 + 8 = ☐ 4072 + 8 = 4070 + 10 4072 + 8 = 4080 make 100 97 + 5213 = ☐ 97 + 5213 = 100 + 5210 = 5310	A mental method that involves renaming numbers to make 10 or 100 before finding the sum. Pupils develop their number sense by recognising numbers close to a ten or close to a hundred and renaming a number in the equation to bring a number to the nearest 10 or nearest 100 without having to compensate the sum.

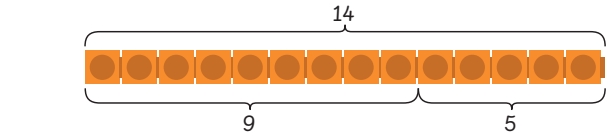
Year	Topic/Strand	Representation	Key Idea
Year 4	Adding Using Compensation	1 Lulu used this method to find the sum of 3067 and 9. 3067 + 10 = 3077 3067 + 9 = 3076 (1 less) I know adding 9 is 1 less than adding 10. 2 Ravi used this method to find the sum of 98 and 5262. 100 + 5262 = 5362 98 + 5262 = 5360 (2 less) I know adding 98 is 2 less than adding 100.	A mental method that uses a similar equation in which a number in the original calculation is shown to the nearest 10 or 100 before carrying out the calculation. This calculation is used to help find the sum of the original equation.
Year 4	Adding Fractions	 $\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$	Pupils use their understanding of adding the same noun when adding fractions with the same denominator. The adding of fractions uses equations and is supported through pictorial representation. Pupils use their understanding of equivalence to ensure denominators are the same before carrying out the addition.

Subtraction Calculation Policy

Year 1

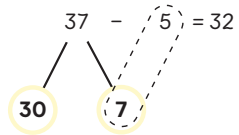
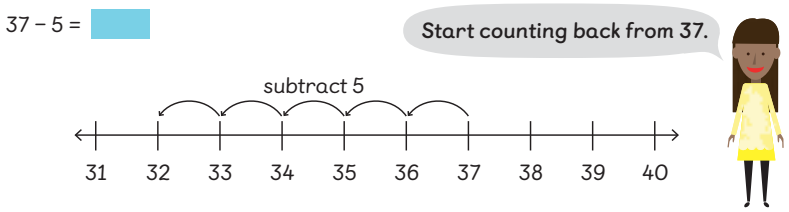
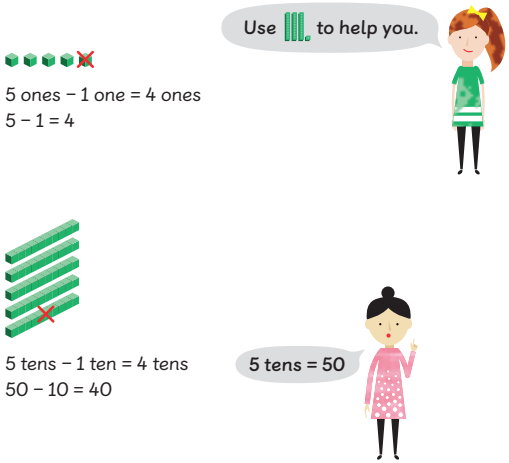
Year	Topic/Strand	Representation	Key Idea
Year 1	**Part–Part–Whole**	 6 – 4 = 2   2 elephants are not adults.	This is a mathematical structure that underpins subtraction situations. Numbers can be understood in terms of their parts; understanding that the parts are part of a larger collection. Pupils develop an understanding of the parts and the whole within an equation.
Year 1	**Number Bonds to 10**	6 – 2 = ☐ 	Pupils develop automatic recall of number bonds to 10. This can be shown using a ten frame, a number bond diagram and written as an equation. This understanding can be related to subtracting tens, hundreds and so on when used with a sound understanding of place value.

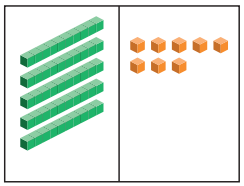
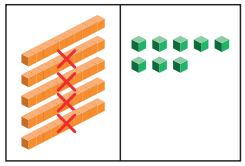
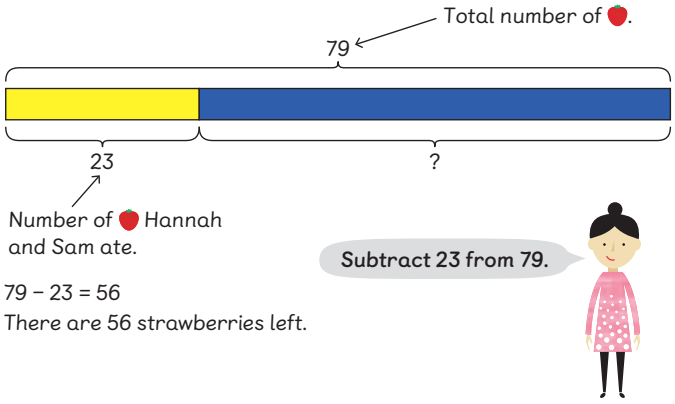
Year	Topic/Strand	Representation	Key Idea
Year 1	**Using a Number Track**		Pupils are first introduced to a linear number system through the number track. This is a precursor to the number line. Pupils may benefit from placing items on the number track as they count and subtract before moving on to use the more abstract number line.
Year 1	**Counting Back Using a Number Line**	 6 – 2 = 4	Pupils move from a number track to a number line, starting from zero and having marked increments of 1. The use of the number line is further developed when counting back starts from a given number, relying on pupils' ability to locate and count back from a given number.
Year 1	**Subtracting from 10**	 10 – 9 = 1 1 + 6 = 7 16 – 9 = 7 There are 7 logs left.	Pupils use their part–whole understanding to rename a number into its component parts in order to subtract from 10 within an equation.

Year	Topic/Strand	Representation	Key Idea
Year 1	**Subtraction Word Problems**	 14 − 9 = 5 *The number of people at the bus stop.* *The number of people who got on the bus.* *The number of people left at the bus stop.* *There are 5 people left at the bus stop.*	Pupils develop an understanding of situations and problems that require subtraction.

Subtraction Calculation Policy

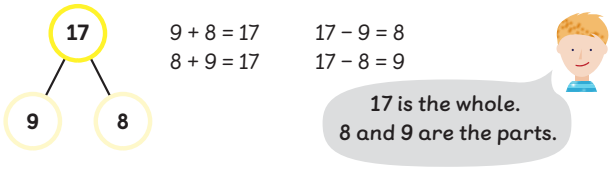
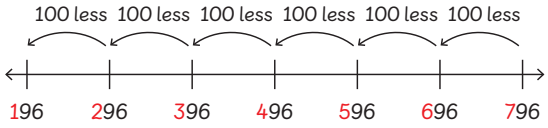
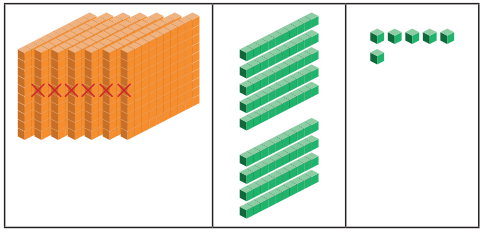
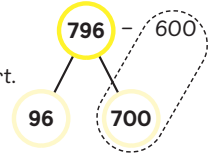
Year 2

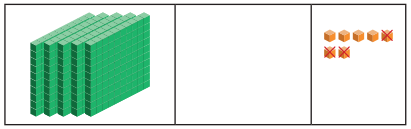
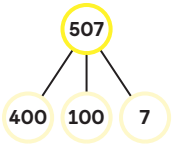
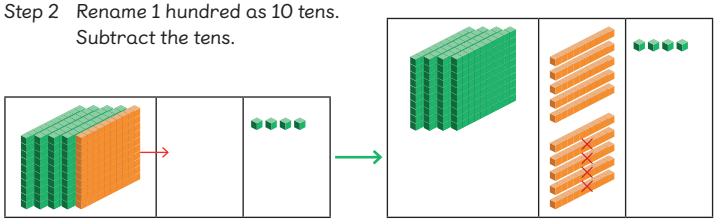
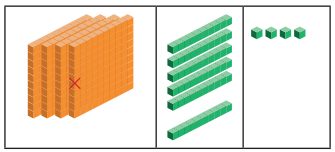
Year	Topic/Strand	Representation	Key Idea
Year 2	Part–Part–Whole	 7 – 5 = 2 37 – 5 = 32	This is a mathematical structure that underpins subtraction situations. Numbers can be understood in terms of their parts; understanding that the parts are part of a larger collection. Pupils develop an understanding of the parts and the whole within an equation.
Year 2	Counting Back Using a Number Line	 37 – 5 = 32	The use of the number line is further developed when counting back starts from a given number, relying on pupils' ability to locate and count back from a given number, including starting from a 2-digit number. Initially a 1-digit number is subtracted from a 2-digit number, then this progresses to a number line shown with intervals of 10 when subtracting 2-digit numbers that do not have any ones.
Year 2	Base 10 Blocks		The use of base 10 blocks provides a representation of the place value primarily of 2-digit numbers. This representation is related to the formal written method but also encourages pupils to use their understanding of subtracting the same noun to subtract 2-digit numbers. For example, 50 – 30 can be understood as 5 tens – 3 tens. The difference between the numbers is 20 or 2 tens. An understanding of place value will support subtraction as well as addition, multiplication and division.

Year	Topic/Strand	Representation	Key Idea
Year 2	**Formal Written Method**	 8 ones − 0 ones = 8 ones 8 − 0 = 8 tens ones 5 8 − 4 0 8  5 tens − 4 tens = 1 ten 50 − 40 = 10 58 − 40 = 18 tens ones 5 8 − 4 0 1 8	This is a procedural method that relies on a pupil's conceptual understanding of subtraction. Initially, this begins without renaming and progresses to the renaming of 1 ten into 10 ones. Pupils understand that at this stage, they start with the subtraction of the ones before they subtract the tens. This method is supported with base 10 block representation. The formal written method is always accompanied by a written equation to ensure that the relationship between the representations are made.
Year 2	**Subtraction Word Problems**	 79 − 23 = 56 There are 56 strawberries left.	Pupils develop an understanding of situations and problems that require subtraction.

Subtraction Calculation Policy

Year 3

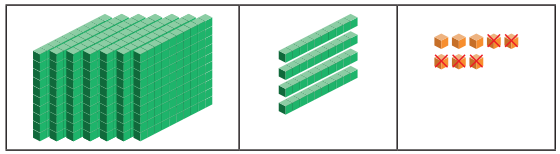
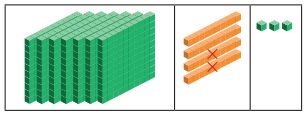
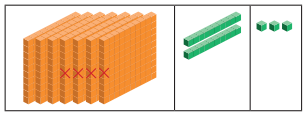
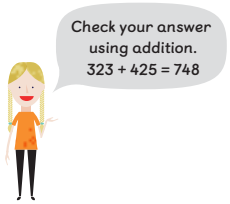
Year	Topic/Strand	Representation	Key Idea
Year 3	Part–Part–Whole		This is a mathematical structure that underpins subtraction situations. Numbers can be understood in terms of their parts; understanding that the parts are part of a larger collection. Pupils develop an understanding of the parts and the whole within an equation.
Year 3	Counting Back Using a Number Line	 796 − 600 = 196	The use of the number line is further developed when counting back starts from a given number, relying on pupils' ability to locate and count back from a given number, including starting from a 3-digit number. Initially a 1-digit number is subtracted from a 3-digit number, then this progresses to a number line shown with intervals of 1, then 10 and then progressing to 100.
Year 3	Base 10 Blocks	 796 − 600 = 196 *There were 196 people left at the airport.*  700 − 600 = 100 96 + 100 = 196 h t o 7 9 6 − 6 0 0 1 9 6	The use of base 10 blocks provides a representation of the place value of 3-digit numbers. This representation is related to the formal written method but also encourages pupils to use their understanding of subtracting the same noun to subtract from 3-digit numbers. For example, 700 – 400 can be understood as 7 hundreds – 4 hundreds. The difference between these numbers is 300 or 3 hundreds. Progression is made by subtracting ones, then tens and finally hundreds before the subtraction of all 3 places is undertaken. An understanding of place value will support subtraction as well as addition, multiplication and division.

Year	Topic/Strand	Representation	Key Idea
Year 3	**Formal Written Method**	507 − 143 = ☐ Step 1 Subtract the ones.  7 ones − 3 ones = 4 ones  Step 2 Rename 1 hundred as 10 tens. Subtract the tens.  10 tens − 4 tens = 6 tens Step 3 Subtract the hundreds.  4 hundreds − 1 hundred = 3 hundreds 507 − 143 = 364	This procedural method progresses from the renaming of 10 ones into 1 ten to include the renaming of 10 tens to 1 hundred when necessary. The procedure itself remains unchanged from Year 2. Pupils understand that at this stage, they start with the subtraction of the ones, then the tens, then finally the hundreds. This method is supported with base 10 block representation. The formal written method is always accompanied by a written equation to ensure that the relationship between the representations are made.

	h	t	o
	5	0	7
−	1	4	3
			4

	h	t	o
	4	10	
	~~5~~	~~0~~	7
−	1	4	3
		6	4

	h	t	o
	4	10	
	~~5~~	~~0~~	7
−	1	4	3
	3	6	4

Year	Topic/Strand	Representation	Key Idea
Year 3	**Inverse Operation**	748 − 425 = ☐ Step 1 Subtract the ones. 8 ones − 5 ones = 3 ones  Step 2 Subtract the tens. 4 tens − 2 tens = 2 tens  Step 3 Subtract the hundreds. 7 hundreds − 4 hundreds = 3 hundreds  748 − 425 = 323 323 tomatoes are left. 	Pupils should understand that subtraction is the inverse operation of addition. They are encouraged to check completed subtraction calculations using addition. Pupils are required to find the difference in a comparison problem when represented by a bar model. To find the difference, the known part is subtracted from the quantity it is being compared to. The comparison model reinforces the understanding of difference in subtraction.
Year 3	**Difference Using a Bar Model**		

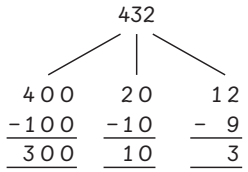
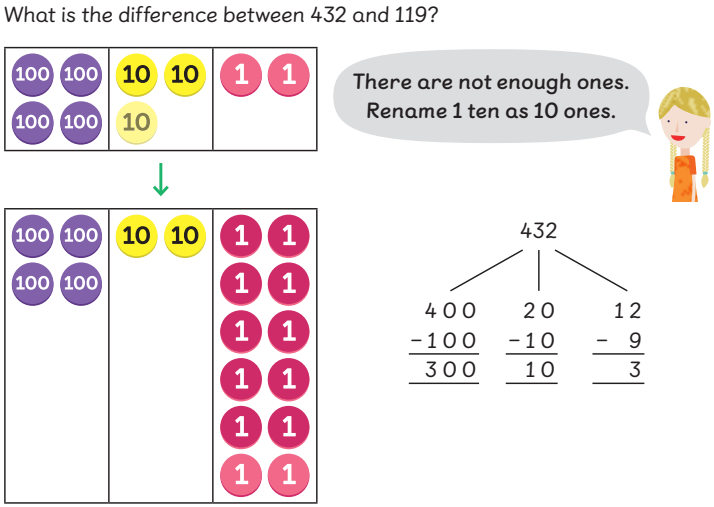
	h	t	o
	7	4	8
−	4	2	5
			3

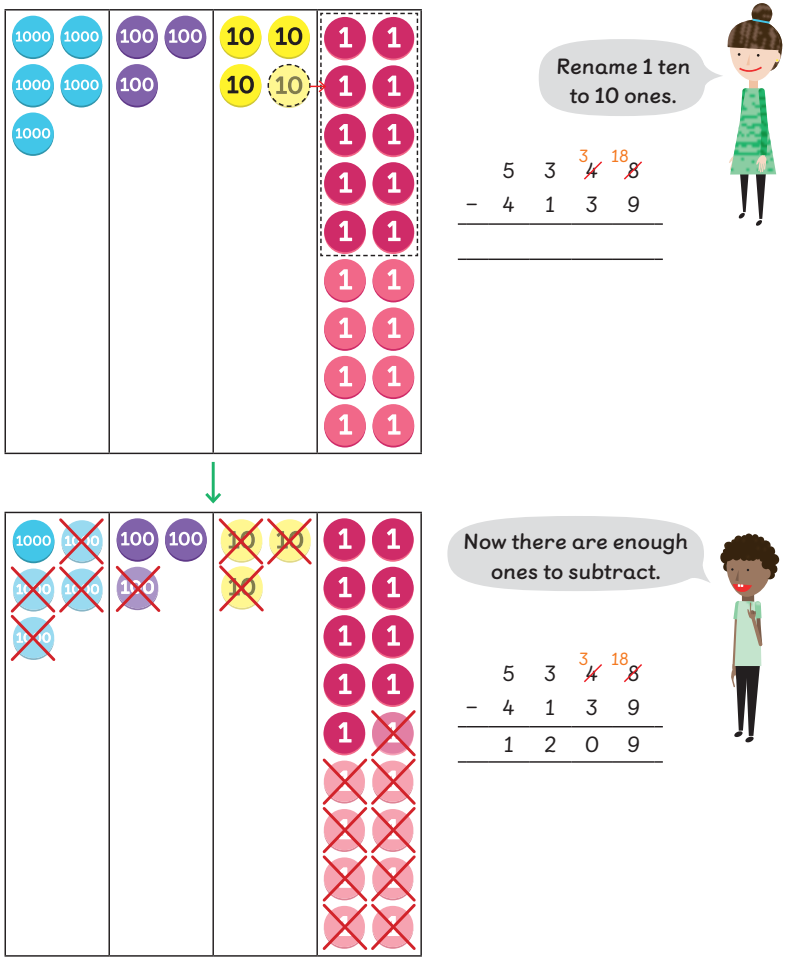
	h	t	o
	7	4	8
−	4	2	5
		2	3

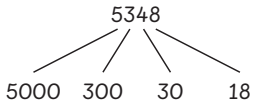
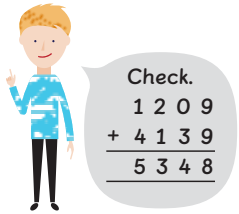
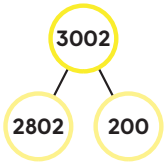
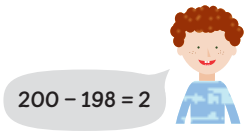
	h	t	o
	7	4	8
−	4	2	5
	3	2	3

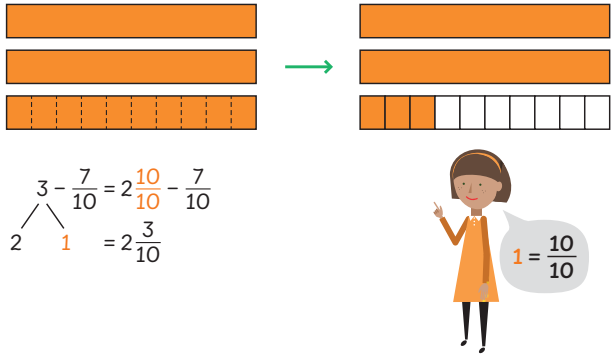
Subtraction Calculation Policy

Year 4

Year	Topic/Strand	Representation	Key Idea
Year 4	Part–Part–Whole		This is a mathematical structure that underpins subtraction situations. Numbers can be understood in terms of their parts; understanding that the parts are part of a larger collection. Pupils develop an understanding of the parts and the whole within an equation.
Year 4	Place–Value Counters		Place–value counters are used to represent subtraction situations. This transition from base 10 blocks relies on pupils understanding the value of each counter without being able to count its physical attributes. Pupils will have the opportunity to rename 1 counter to 10 counters with a value 10 times smaller in order to carry out a formal written method. The idea of decomposing at a rate of 10 should be well understood at this stage.

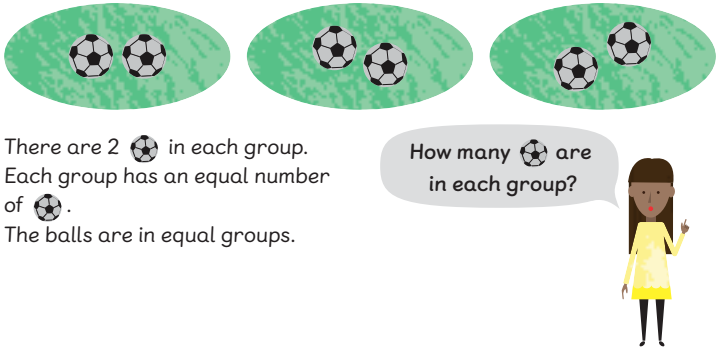
Year	Topic/Strand	Representation	Key Idea
Year 4	Formal Written Method		Pupils will use the formal written method initially without renaming, and then move to subtraction that requires renaming. The procedure remains the same as learned in Year 3 but the numbers increase to include 4-digit numbers being subtracted from 4-digit numbers.

Year	Topic/Strand	Representation	Key Idea
Year 4	**Using Addition to Check Subtraction**	 $\begin{array}{r} \overset{3}{5}\ 3\ \overset{\cancel{4}}{\cancel{4}}\ \overset{18}{\cancel{8}} \\ -\ 4\ 1\ 3\ 9 \\ \hline 1\ 2\ 0\ 9 \end{array}$ Step 1 Subtract the ones. 18 ones − 9 ones = 9 ones Step 2 Subtract the tens. 3 tens − 3 tens = 0 tens Step 3 Subtract the hundreds. 3 hundreds − 1 hundred = 2 hundreds Step 4 Subtract the thousands. 5 thousands − 4 thousands = 1 thousand 5348 − 4139 = 1209 	Pupils are encouraged to check subtraction calculations by adding the parts (the subtrahend and the difference) to ensure the sum is equal to the whole (the minuend).
Year 4	**Mental Methods**	3002 − 198 = 2804  3002 − 198 = 2802 + 2 	Mental subtraction methods include partitioning the minuend to simplify the subtraction calculation. The approach shown is supported by an understanding of number bonds to 10 and to 100.

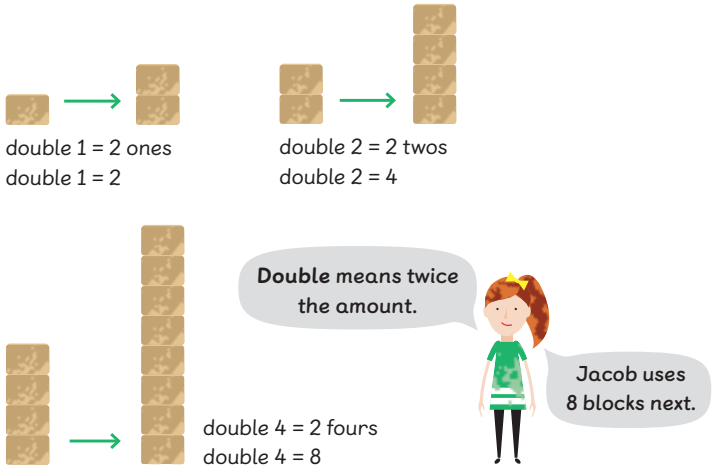
Year	Topic/Strand	Representation	Key Idea
Year 4	**Subtracting Fractions**		Pupils use their understanding of subtracting the same nouns when subtracting fractions with the same denominator. The subtraction of fractions or finding the difference between fractions is supported through pictorial representation. Pupils use their understanding of equivalence to ensure denominators are the same before carrying out the subtractions.

Multiplication Calculation Policy

Year 1

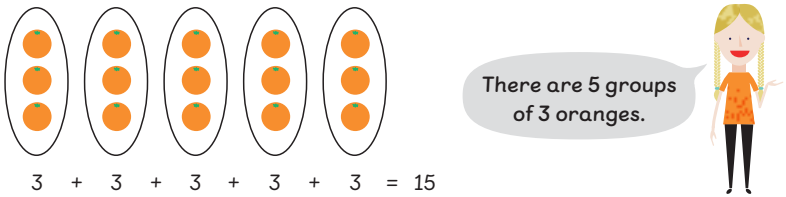
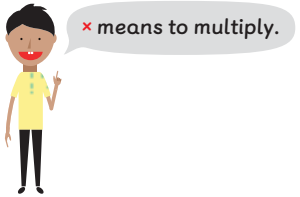
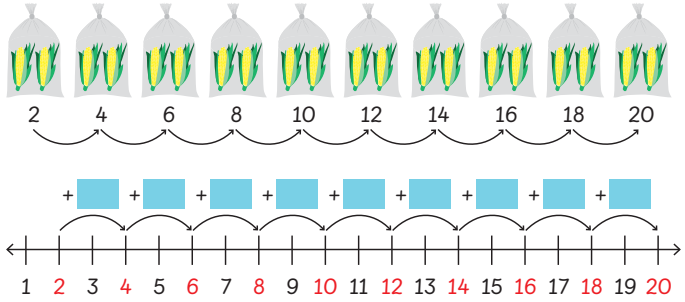
Year	Topic/Strand	Representation	Key Idea
Year 1	**Equal Groups**		Pupils learn to recognise groups that are equal in quantity, initially using like items and then progressing to different items. Pupils understand that equal groups can be represented by concrete items, diagrams and written numbers. Pupils need to be secure in the abstraction principle of counting the quantity of items, regardless of the properties or characteristics of the items, in order to recognise equal groups in a range of situations.
Year 1	**Repeated Addition**		Initially, multiplication is shown as the addition of equal groups. The key idea of adding like nouns still applies in multiplication. A group of 3 bananas and 3 apples does not result in 6 bananas or 6 apples. In order to add, the nouns must be the same, in this case 6 pieces of fruit. This is also true of multiplication: 2 groups of 3 pieces of fruit makes 6 pieces of fruit.

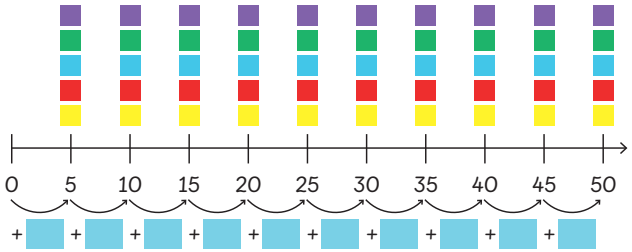
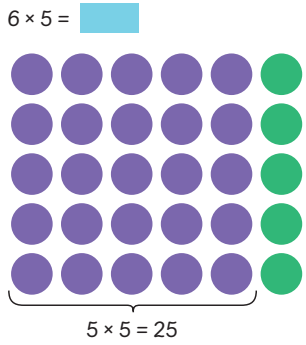
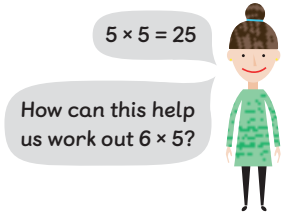
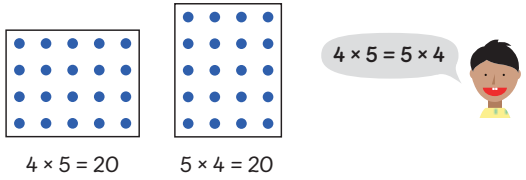
Year	Topic/Strand	Representation	Key Idea
Year 1	**Counting in 2s, 5s and 10s**	There are 3 groups of 2  .  2 2 2 3 groups of 2 = 6 3 twos = 6 There are 6  . 	Pupils start to count in multiples of 2 and multiples of 10, then progress to counting in multiples of 2, 5 and 10 supported by discrete, countable representations.
Year 1	**Arrays**	 3 rows of 5 3 fives = 15 There are 15 children altogether. 1 row of 5 = 5 2 rows of 5 = 10 3 rows of 5 =  	Multiplication is represented by arrays, beginning with making equal rows and further developing the language associated with arrays. For example: 'There are 3 rows of 5. There are 15 altogether.'

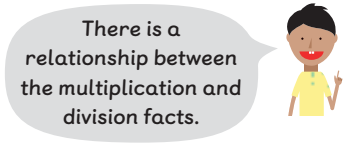
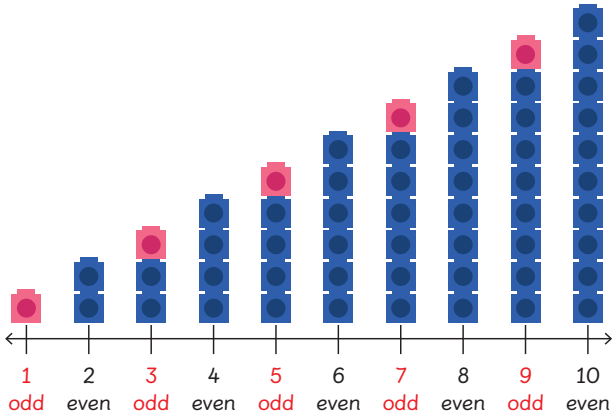
Year	Topic/Strand	Representation	Key Idea
Year 1	Doubles		The diagrams used to support learning how to double numbers, not only show equal groups of 2 being added each time, but also show the pattern scaling up and each 'tower' being twice the height of the tower just before it. Pupils can develop the language associated with multiplication by describing the growing block pattern. This also provides the basis for understanding halving, in which the representation scales down.

Multiplication Calculation Policy

Year 2

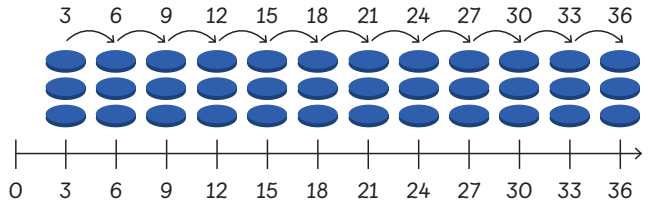
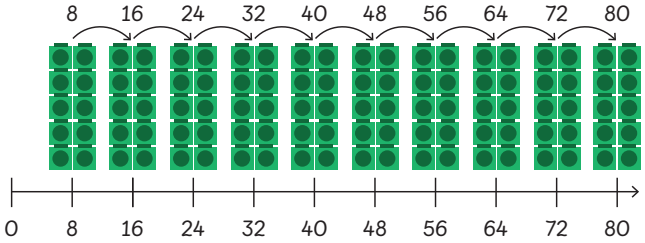
Year	Topic/Strand	Representation	Key Idea
Year 2	Equal Groups	 *There are 15 oranges in total.* 5 threes = 15 5 groups of 3 = 15 5 × 3 = 15 5 times 3 equals 15 *We read 5 × 3 = 15 as 5 times 3 equals 15.* 	Pupils learn to recognise groups that are equal in quantity, initially using like items and then progressing to different items. Pupils understand that equal groups can be represented by concrete items, diagrams and written numbers. In Year 2, the progression to multiplication from repeated addition is shown as 3 + 3 + 3 + 3 + 3 being equal to 5 groups of 3 and 5 groups of 3 being equal to 5 × 3. Pupils read 5 × 3 as 5 groups of 3.
Year 2	Counting in 2s, 5s and 10s		When a pupil knows that the size of a group is 2, 5 or 10 and the group size remains consistent, they can count in multiples of 2, 5 and 10 to find the product. Counting in multiples is supported by representation on a number line.

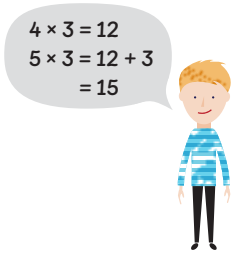
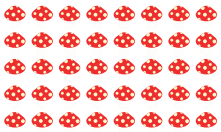
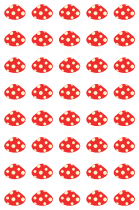
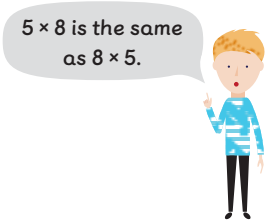
Year	Topic/Strand	Representation	Key Idea
Year 2	Number Line		Counting in multiples is shown on a number line. The increasingly abstract nature of the number line is shown as intervals change from 1 to 2, 5 and 10.
Year 2	Associated Facts	6 × 5 =   6 × 5 = 25 + 5 = 30	As pupils become more fluent and their understanding of their times tables increases, they are expected to use this knowledge to calculate associated facts. A pupil should be able to relate 10 × 5 to 9 × 5, knowing that the latter expression is 1 group of 5 less. So, 9 × 5 = 50 – 5.
Year 2	Commutativity		Pupils learn that the order of the factors in an equation does not affect the product. This is supported pictorially through the use of arrays.

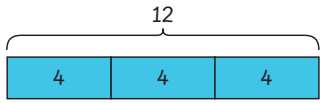
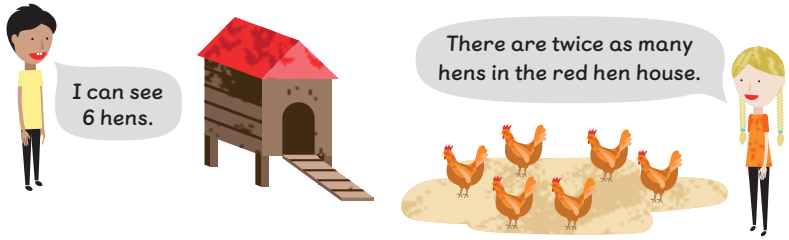
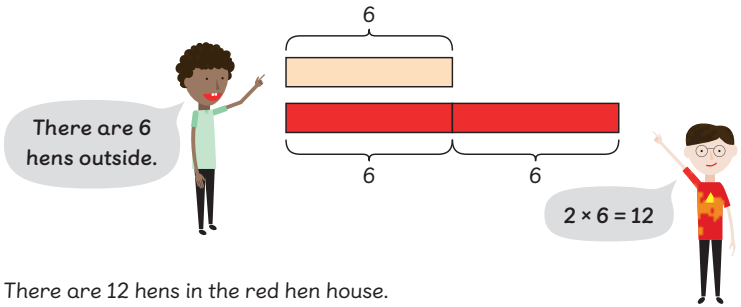
Year	Topic/Strand	Representation	Key Idea
Year 2	Fact Families	$10 \times 2 = 20$ $\quad 20 \div 2 = 10$ $2 \times 10 = 20$ $\quad 20 \div 10 = 2$ 	Pupils relate multiplication and division and see the connection between them when completing fact families. Pupils develop an understanding that factor × factor = product and product ÷ factor = factor. Once the understanding of this is secure, pupils can relate this to both multiplication and division situations.
Year 2	Odd and Even Numbers		Pupils develop an understanding that even numbers can be put into groups of 2 exactly but when odd numbers are grouped in twos, there is always 1 remaining.

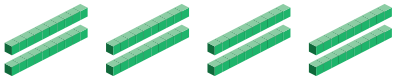
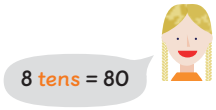
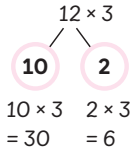
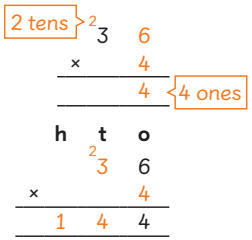
Multiplication Calculation Policy

Year 3

Year	Topic/Strand	Representation	Key Idea
Year 3	Counting in 3s, 4s and 8s		When a pupil knows that the size of a group is 3, 4 and 8 and the group size remains consistent, they can count in multiples of 3, 4 and 8 to find the product. Counting in multiples is supported by representation on a number line.
Year 3	Equal Groups		Multiplication by 3, 4 and 8 is shown initially using equal groups. Specific language is used to support these examples, in this case '4 groups of 3', and this is immediately followed by the equation 4 × 3. This forms the basis of using known facts to find unknown facts.
Year 3	Number Line		Counting in multiples is shown on a number line. Multiples of 3, 4 and 8 are used as the intervals on a number line to support skip counting using these multiples.

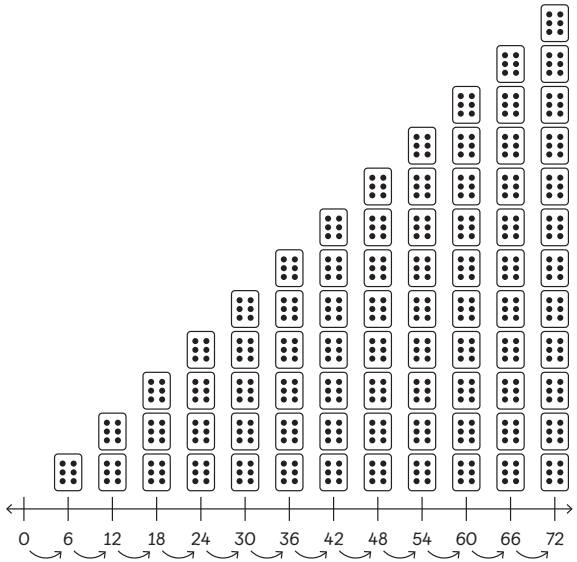
Year	Topic/Strand	Representation	Key Idea
Year 3	Associated Facts	 	Once the understanding of multiplication as the adding of equal groups is secure, this knowledge can be used to find unknown facts. For example, if a pupil knows 5 × 3 as 5 groups of 3, they can understand that 6 × 3 is simply 1 more group of 3. So, 6 × 3 = 15 + 3; 4 × 3 is seen as 1 group fewer than 5 × 3; 4 × 3 = 15 – 3. This structure is used in all multiplication tables.
Year 3	Number Patterns		Pupils count in multiples of 3, 4 or 8 to identify missing multiples in a sequence. This reinforces the products found within the 3, 4 and 8 times tables.
Year 3	Commutativity	 *There are 5 rows of 8 mushrooms.* 5 × 8 = 40  *There are 8 rows of 5 mushrooms.* 8 × 5 = 40 *There are 40 mushrooms.* 	The representation of multiplication as an array is used to further develop the understanding of commutativity. Having first understood multiplication as [ ] groups of [ ], pupils develop an understanding that 5 × 3 can also be read as 5 multiplied 3 times. Pupils should have a firm understanding that the order the factors are multiplied in does not change the product.

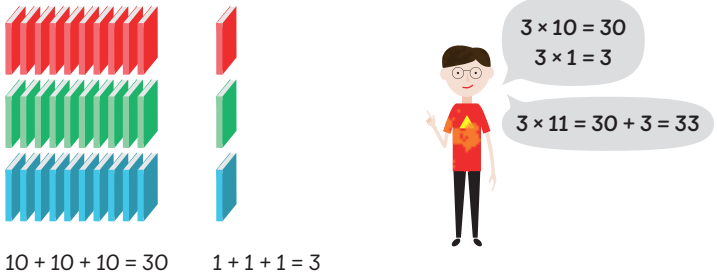
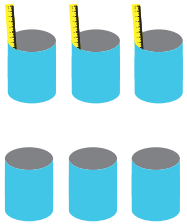
Year	Topic/Strand	Representation	Key Idea
Year 3	Fact Families	12 ÷ 3 = 4 4 × 3 = 12 	The relationship between multiplication and division is shown using fact families. The product is a result of multiplying factors and dividing the product by a factor will equal the factor used during multiplication.
Year 3	Multiplication Using Bar Models	 How many hens are in the red hen house?  There are 12 hens in the red hen house.	Bar models are used in multiplicative comparison problems. Pupils use multiplication skills to determine quantities in comparison to another quantity. Language such as 'twice as many', 'three times as many' and so on is developed in relation to multiplicative comparison problems.

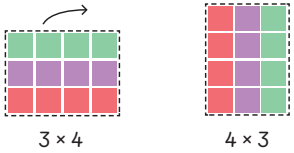
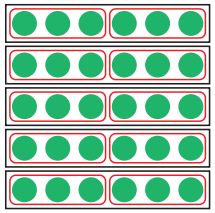
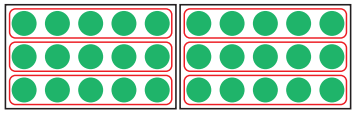
Year	Topic/Strand	Representation	Key Idea
Year 3	Base 10 Blocks	Multiply 2 tens by 4.  4 × 2 tens = 8 tens 4 × 20 = 80 	Base 10 blocks are used to support the understanding of multiplication of 2-digit numbers. Language and understanding is developed through the representation of 3 × 20 as 3 × 2 tens = 6 tens. Pupils use known multiplication tables to 10 together with the place–value names of the digits being used to carry out the multiplication.
Year 3	Number Bonds		Number bonds are used to show numbers partitioned into tens and ones before being multiplied. The examples being used move from a number bond relating to an equation to an equation and the formal written method.
Year 3	Formal Written Method	Step 1 Multiply the ones. 6 ones × 4 = 24 ones 24 ones = 2 tens + 4 ones Step 2 Multiply the tens. 3 tens × 4 = 12 tens 12 tens + 2 tens = 14 tens 36 × 4 = 144 	This method is used to multiply a 2-digit number by a 1-digit number. Initially, the method shows the product of the multiplication of the ones, then the product of the multiplication of the tens, before adding the products to find the total. This method progresses to include renaming and finally moves to a shortened form of the written method. The method is finally shown as a version of the formal written method, in which the product of the multiplication of each place is shown as a single product, with any renaming added above each place in the multiplication.

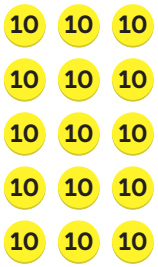
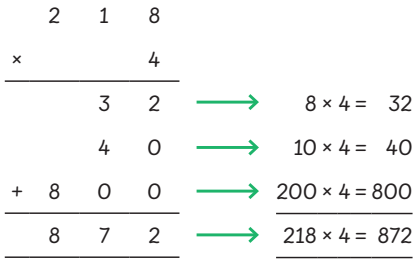
Multiplication Calculation Policy

Year 4

Year	Topic/Strand	Representation	Key Idea
Year 4	**Counting in 6s, 7s and 9s**	Count on in sixes. 1 2 3 4 5 **6** 7 8 9 10 11 **12** 13 14 15 16 17 **18** 19 20 21 22 23 **24** 25 26 27 28 29 **30**	When pupils know that the size of a group is 6, 7 and 9 and the group size remains consistent, they can count in multiples of 6, 7 and 9 to find the product. Counting in multiples is supported by representation on a number line using intervals of 6, 7 and 9.
Year 4	**Equal Groups**	 4 boxes of 6 4 × 6 = 24	Multiplication by 6, 7 and 9 is shown initially using equal groups. Specific language is used to support these examples, in this case '4 groups of 6', and this is immediately followed by the equation 4 × 6. This forms the basis of using known facts to find unknown facts.
Year 4	**Number Line**	 0 6 12 18 24 30 36 42 48 54 60 66 72	Counting in multiples is shown on a number line. Multiples of 6, 7 and 9 are used as the intervals on a number line to support skip counting using these multiples. A growing pattern in multiples of 6, 7 and 9 is also shown to support pupils' understanding.

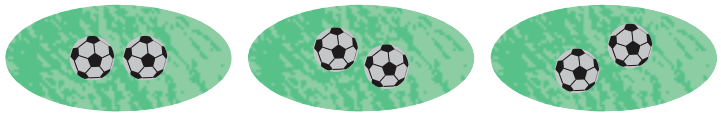
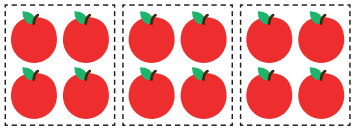
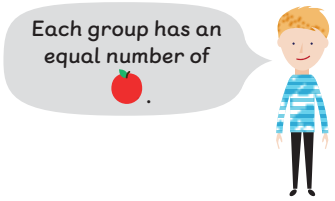
Year	Topic/Strand	Representation	Key Idea
Year 4	Multiplying by 11 and 12 Using Associated Facts	 10 + 10 + 10 = 30 1 + 1 + 1 = 3	Learning to multiply by 11 and 12 is supported by partitioning 11 and 12 and using the 10 times table as the basis for initial understanding, building towards immediate recall.
Year 4	Fact Families	 30 ÷ 6 = 5 6 × 5 = 30	Fact families are used in the introduction of division, represented using arrays to show the relationship between factors and a product. Pupils relate 6 × 11 = 66 to 66 ÷ 6 = 11. They understand that multiplication can be used in division calculations.
Year 4	Multiplying by 0 and 1	 3 pots of 1 ruler 3 × 1 = 3 3 empty pots 3 × 0 = 0	Pupils initially use their understanding of 'groups of' to understand multiplying by zero. For example, 0 × 4 is read as 'There are zero groups of 4'. Pupils' understanding then moves to read 0 × 4 as zero multiplied 4 times. The language is an extension of what they have already learned about multiplication.

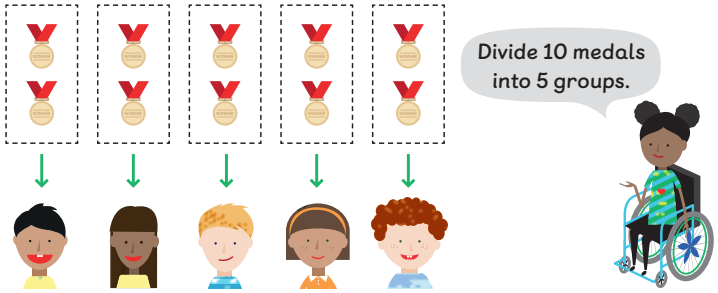
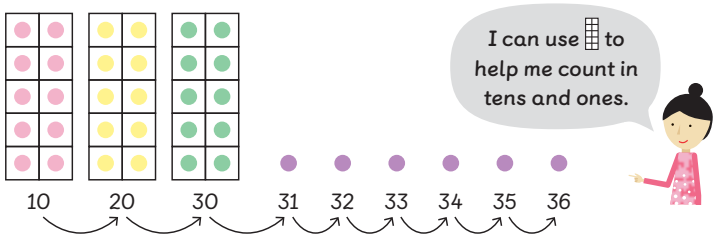
Year	Topic/Strand	Representation	Key Idea
Year 4	Commutativity	 3 × 4 = 4 × 3 3 × 4 is equal to 4 × 3. 5 × 2 × 3 = ☐  2 × 3 × 5 = ☐ 	Arrays are used to support the understanding of commutativity. Pupils learn the pattern of a × b = b × a. Regardless of the order in which the factors are multiplied, the product remains the same. The commutative property is further developed through the multiplication of 3 numbers. 3 factors are multiplied in different orders and the product remains the same.

Year	Topic/Strand	Representation	Key Idea
Year 4	**Multiplying Multiples of 10**	30 is equal to 3 tens. 5 × 3 = 15 5 × 3 tens = 15 tens = 150  5 × 30 = 150	Pupils learn to scale a product by a factor of 10 when multiplying a multiple of 10. For example, we know 3 × 4 = 12, therefore the product of 30 × 4 is 10 times greater: 30 × 4 = 120. Naming the place value of the digit supports this approach and pupils relate a known fact to multiplying multiples of 10. For example, we can read 30 × 4 as 3 tens × 4. So, 3 tens × 4 = 12 tens or 120. We would expect pupils to generalise and see that 30 × 4 = 3 × 4 × 10. While this isn't formalised, this forms the basis of the distributive property of multiplication.
Year 4	**Formal Written Method**	 	Pupils use formal written methods, short and long, to multiply a 2-digit number by a 1-digit number. Initially the long method is used, showing the product of the multiplication of the ones, tens and hundreds, before adding the products to find the total. Pupils are shown the corresponding short formal written method so can make the links between the two procedures. Multiplication then moves from a 2-digit number by a 1-digit number to a 3-digit number by a 1-digit number. Pupils should be aware that even though the number of digits in one number increases, the procedure remains the same.

Division Calculation Policy

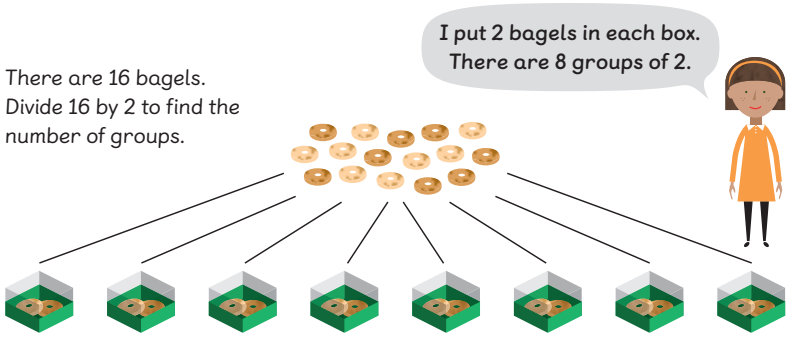
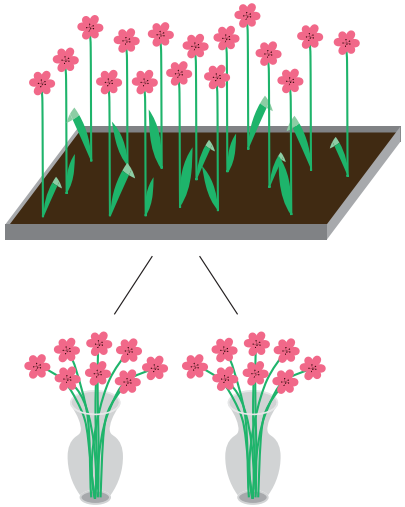
Year 1

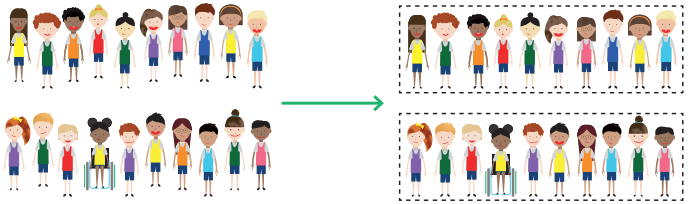
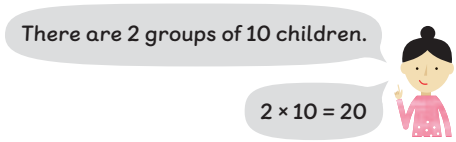
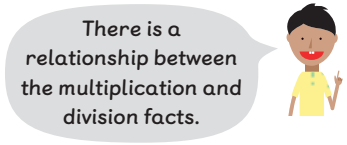
Year	Topic/Strand	Representation	Key Idea
Year 1	**Equal Groups**	 There are 2 ⚽ in each group. Each group has an equal number of ⚽. The balls are in equal groups. 	Pupils learn to recognise groups that are equal in quantity, initially using like items and then progressing to different items. Pupils understand that equal groups can be represented by concrete items, diagrams and written numbers. Pupils need to be secure in the abstraction principle of counting the quantity of items regardless of the items' properties or characteristics, in order to recognise equal groups in a range of situations.
Year 1	**Grouping**	Sam has 12 apples. He puts the apples into groups of 4.  How many groups does he make? Sam makes ▭ groups. 	Pupils initially use grouping for division. They put items into equal groups to find the number of equal groups that can be made from a set amount.

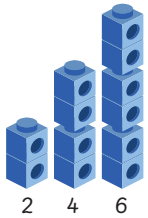
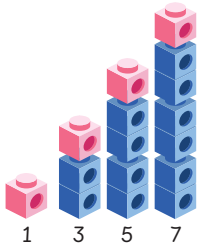
Year	Topic/Strand	Representation	Key Idea
Year 1	**Sharing**	*10 medals are shared equally among 5 friends.* *How many medals does each friend get?*  *Each friend gets 2 medals.*	Pupils move from division through grouping to division through sharing. They share a set amount of items equally between a number of groups. The number of groups is known and pupils find the number of items in each group.
Year 1	**Counting in 2s, 5s and 10s**	 	Pupils start to count in multiples of 2 and multiples of 10, then progress to counting in multiples of 2, 5 and 10 supported by discrete, countable representations.

Division Calculation Policy

Year 2

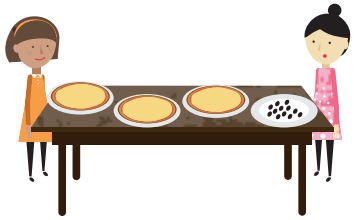
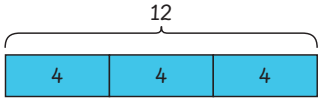
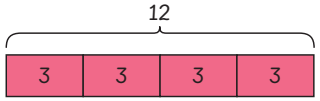
Year	Topic/Strand	Representation	Key Idea
Year 2	Grouping	There are 16 bagels. Divide 16 by 2 to find the number of groups. 	Pupils initially use grouping for division. They put items into equal groups to find the number of equal groups that can be made from a set amount.
Year 2	Sharing	There are 16 flowers. Elliott cuts the flowers and puts them equally into 2 vases.  There are 8 flowers in each vase. 16 ÷ 2 = 8	Pupils move from division through grouping to division through sharing. They share a set amount of items equally between a number of groups. The number of groups is known and pupils find the number of items in each group.

Year	Topic/Strand	Representation	Key Idea
Year 2	**Division by 2, 5 and 10**	*20 children can be put into teams of 10.*  $20 \div 10 = 2$ *There are 2 equal teams.*  $10 \times 2 = 20$ $\quad 20 \div 2 = 10$ $2 \times 10 = 20$ $\quad 20 \div 10 = 2$  *This is a multiplication and division fact family.*	Pupils start to make the connection between division and multiplication. They see amounts as equal groups and relate this to multiplication.

Year	Topic/Strand	Representation	Key Idea
Year 2	**Odd and Even Numbers**	 2 4 6 2 cubes can be put into a group of 2. 4 cubes can be put into groups of 2. 6 cubes can be put into groups of 2. 2, 4 and 6 are even numbers.  1 3 5 7 1 cube cannot be put into a group of 2. 3 cubes cannot be put into groups of 2. 5 cubes cannot be put into groups of 2. 7 cubes cannot be put into groups of 2. 1, 3, 5 and 7 are odd numbers.	Pupils develop an understanding that even numbers can be put into groups of 2 exactly. Numbers that can be put into groups of 2 and have 1 remaining are described as odd numbers.

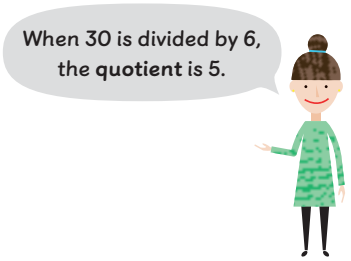
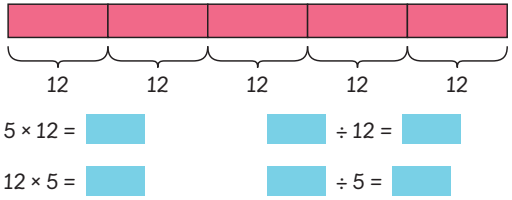
Division Calculation Policy

Year 3

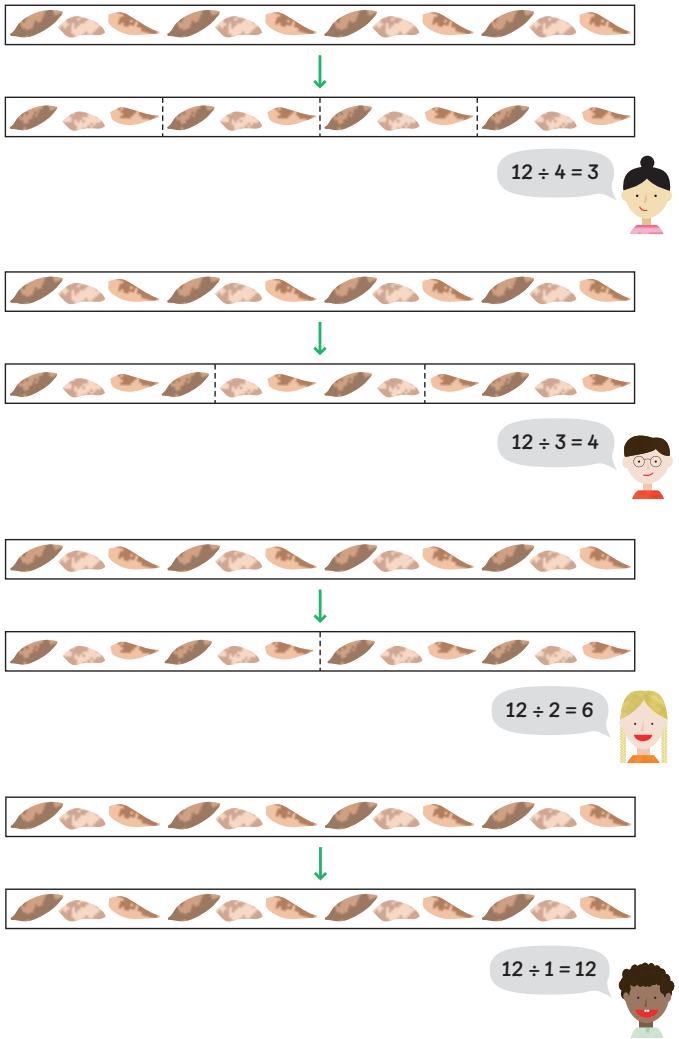
Year	Topic/Strand	Representation	Key Idea
Year 3	**Dividing by 3, 4 and 8**	Sam put 32 cobs of corn into 4 equal groups.  4 groups of 8 is 32. 4 × 8 = 32  32 ÷ 4 = 8 Each group has 8 cobs of corn.	Pupils are introduced to the division of numbers by 3, 4 and 8 using grouping initially. They make groups of 3, 4 and 8 and then move on to sharing a total.
Year 3	**Division within Word Problems**	Amira and Ruby are making pizzas. They have 12 olives. They want to put 3 or 4 olives on each pizza. Can we make a family of multiplication and division equations to help them?   4 times 3 is 12, so 12 divided by 3 is 4. 12 divided into groups of 4 is equal to 3.  3 times 4 is 12, so 12 divided by 4 is 3. 12 shared between 4 is equal to 3.	Pupils extend their understanding of division by relating the division facts to multiplication facts, creating a multiplication and division fact family. Word problems get increasingly more complex and bar models are used to represent problems involving division.

Division Calculation Policy

Year 4

Year	Topic/Strand	Representation	Key Idea
Year 4	**Dividing by 6, 7 and 9**	 30 ÷ 6 = 5 6 × 5 = 30 *Each packet can hold 5 pencils.* 	Pupils are given division word problems and immediately relate the division used to solve the problem to the multiplication fact they have previously learned. The language associated with division is given, with pupils understanding that when the number is divided, the outcome is called the quotient.
Year 4	**Dividing by 11 and 12**		Arrays and bar models are used to show the relationship between multiplication and division when learning to multiply and divide by 11 and 12, building on the relationship already learned when dividing by 6, 7 and 9.

Year	Topic/Strand	Representation	Key Idea
Year 4	**Dividing with Remainders**	There are 13 flowers.  13 ÷ 3 = 4 with 1 left over The quotient is 4. The remainder is 1.	Pupils learn that when dividing into equal groups, we can be left with a number of items less than the group size. This is introduced as the remainder. Initially, the remainder is shown as a whole number.
Year 4	**Word Problems Involving Division**	 6 units ⟶ £54 1 unit ⟶ £54 ÷ 6 = £9	Division word problems are supported by the use of arrays and bar models, reinforcing the idea of equal groups. Pupils relate the representations of the problems to the equations given. Comparison division models are also used to determine amounts when two separate amounts are compared.

Year	Topic/Strand	Representation	Key Idea
Year 4	Dividing by 1		Pupils look for a pattern and generalise about dividing by 1. They systematically work through dividing a single amount by 4, 3, 2 and finally 1 to make observations about the number of groups and the size of each group.

Year	Topic/Strand	Representation	Key Idea
Year 4	Dividing 2-Digit Numbers	Step 1 Divide 4 tens by 2.  4 tens ÷ 2 = 2 tens 40 ÷ 2 = 20 Step 2 Divide 6 ones by 2.  6 ones ÷ 2 = 3 ones 6 ÷ 2 = 3 46 ÷ 2 = 23 20 2 / 4 6 − 4 0 2 3 2 / 4 6 − 4 0 6 6 0	Pupils initially use place–value counters to support the division of 2-digit numbers, then move on to use a long formal written method. The long written method shows the systematic division of parts of the dividend resulting in the quotient.
Year 4	Dividing 3-Digit Numbers	306 ÷ 3 = ☐  	The same procedure used for dividing 2-digit numbers is used for dividing 3-digit numbers. Place–value counters are used to represent the problem before moving on to use the long formal written method.