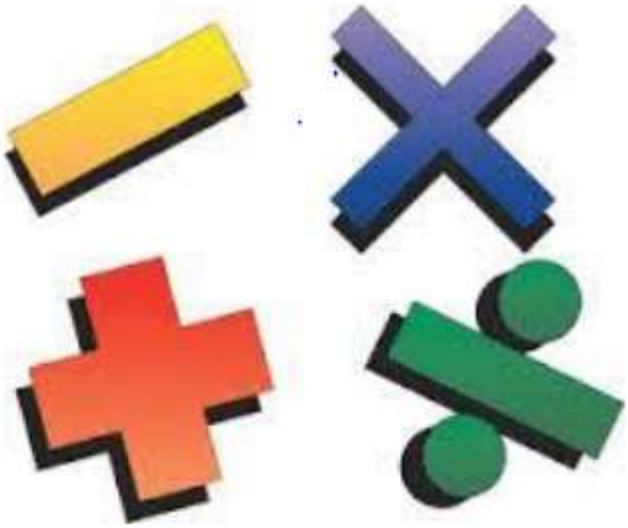
Mathematics
Calculation Policy



At Sparsholt CE Primary, we believe that children should be introduced to the processes of calculation through practical, oral and mental activities. We aim to do this progressively and effectively through the school to allow children to develop confidence and mental fluency.

Initially, children will be introduced to a new mathematical concept (including the four operations – addition, subtraction, multiplication and division) using a range of concrete resources to allow them to become familiar and confident. This approach will be complemented through pictorial representations before introducing the abstract idea (e.g a number sentence).

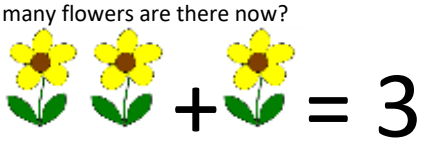
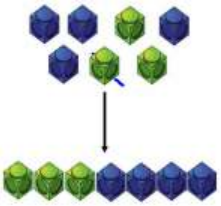
Across all year groups, children will be introduced to a variety of strategies to use to solve mathematical problems. While the aim would be for children to develop secure methods of mental calculation that they are proficient in using whenever possible, it is equally important that they are able to identify and use an appropriate written method accurately and with confidence. Written methods should be seen as complementary to mental ones, allowing each pupil to progress in their mathematical understanding.

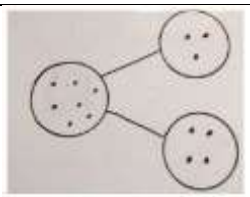
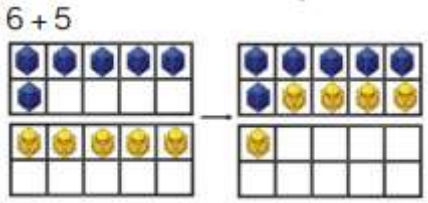
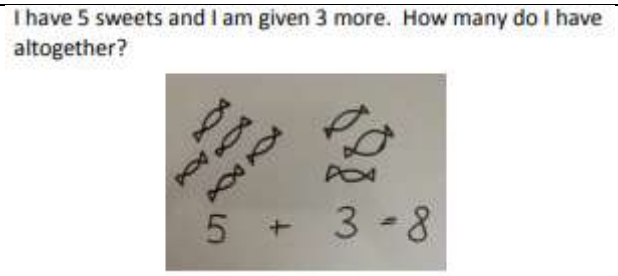
This document identifies progression in calculation strategies rather than specifying which method should be taught in a particular year group. Children should not be made to go onto the next stage if:

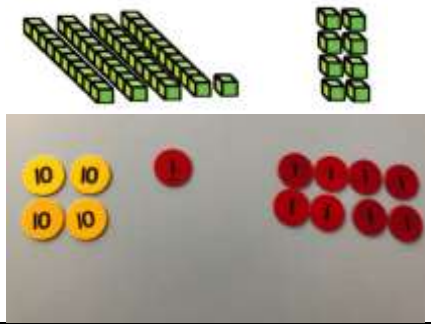
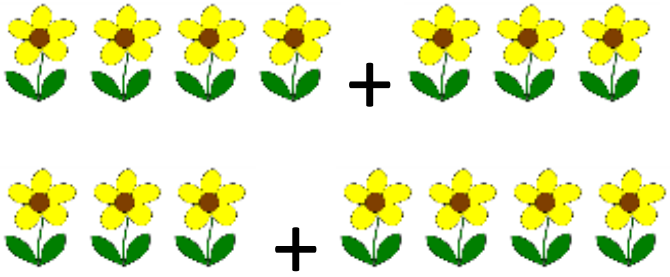
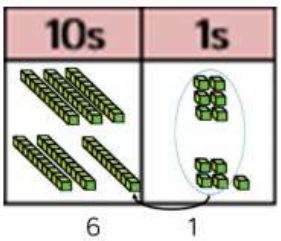
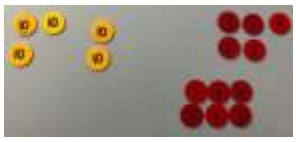
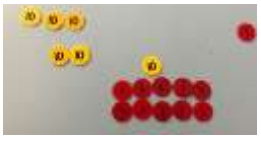
1) they are not ready

2) they are not confident.

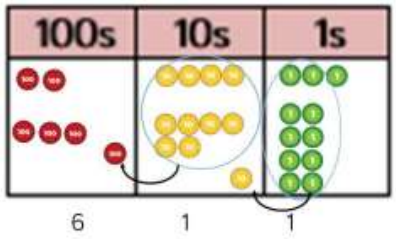
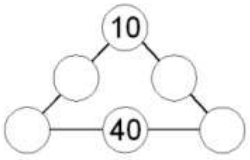
By the end of Year 6, children should be able to choose the most appropriate approach to solve a problem.

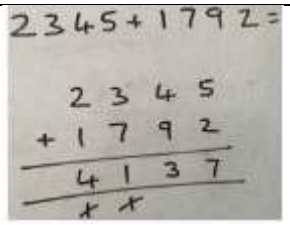
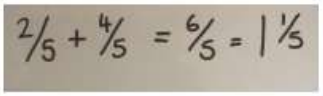
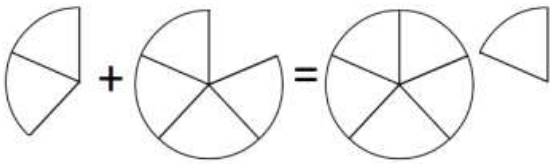
Addition	
EYFS	
VOCABULARY: add, more, plus, make, sum, total, altogether, one more, two more, ten more…, how many more to make… ?, how many more is… than…?	
Method	**Representation**
Using real-life concepts, children are introduced to addition through counting activities using a range of resources.	How many dinosaurs are there?  What about if I give you two more? How many are there now? 
Children are introduced to the addition (+) and equals (=) symbols and pictorial (as well as concrete) resources are used.	There are two flowers in the garden. Another one appears. How many flowers are there now? 
Storing larger numbers mentally and counting on.	Children are able to identify the larger number and count on from there using fingers (or other resources) to solve the problem. For example, the child retains '5' in their head and counts on – '6,7,8.'  3 +5 = 8
Children can start to combine two parts to make a whole (using a range of concrete resources).	
Children use simple games to learn to count on and to familiarise themselves with number tracks.	

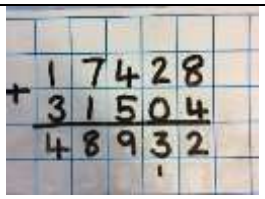
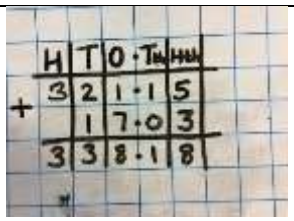
Addition	
YEAR 1	
VOCABULARY: number bonds, add, more, and, make, is the same as, sum, total, altogether, equals, one more, two more, ten more…, how many more to make… ?, how many more is… than…?	
Method	**Representation**
Children will use number tracks and prepared number lines to help solve addition stories or number sentences (with both concrete and pictorial resources).	
Children draw part whole models and use dots to solve addition problems. For example, 3 + 4 = 7	
Children will be taught number bonds to twenty (including adding two-digit and one-digit numbers) using concrete and pictorial resources as well as mental methods.	
Children will solve one-step addition problems using concrete resources or pictorial representations.	

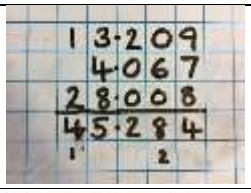
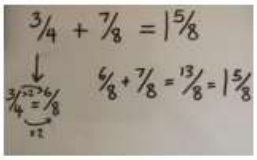
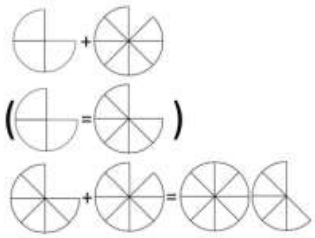
Addition	
YEAR 2	
VOCABULARY: add, more, and, make, sum, total, altogether, one more, two more, ten more, one hundred more, commutative, how many more to make… ?, how many more is… than…?	
Method	**Representation**
Children will use concrete objects and pictorial representations to add: • a two-digit number and ones • a two-digit number and tens • 2 two-digit numbers • 3 one-digit numbers	41 + 8 
Children will recognise that two numbers can be added in any order (that addition is commutative)	
Children will continue to use base 10 to develop understanding of partitioning and place value	36 + 25 = 61     

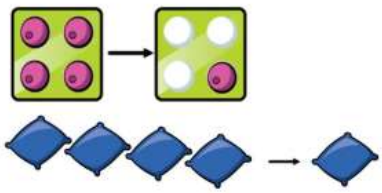
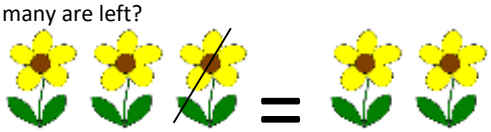
Children will derive and use related facts up to 100 (initially supported by the use of a hundred square)	11 + 7 = 18 

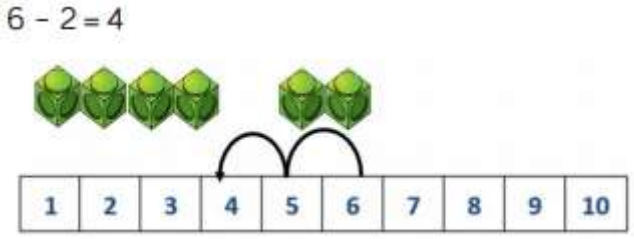
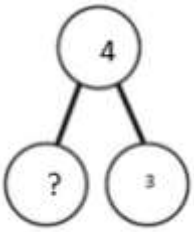
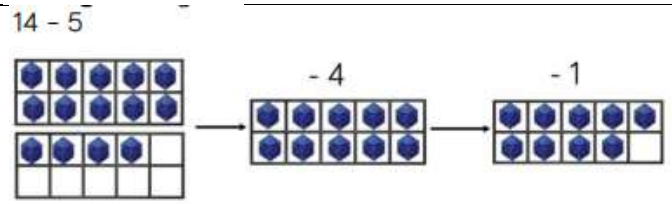
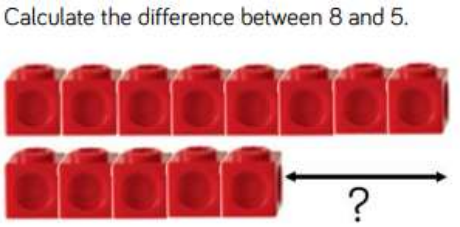
Addition	
YEAR 3	
VOCABULARY: add, increase, more, make, sum, inverse, column addition, total, altogether, one more, two more, ten more, tens boundary, hundreds boundary, exchange, how many more to make… ?, how many more is… than…?	
Method	**Representation**
Children will build on previous knowledge to be able to add a variety of numbers mentally: • a three-digit number and 1s • a three-digit number and 10s • a three-digit number and 100s	
Children become able to add numbers with up to 3 digits (including ones and tens boundary exchanges) using formal column addition methods. This will initially be taught using concrete resources (e.g place value counters and place value grids) and progress gradually.	 243 +368 611 1 1
Children will begin to add fractions with the same denominator.	$^{5}/_{7} + {}^{1}/_{7} = {}^{6}/_{7}$ 
Children will solve one-step and two-step addition problems (including missing number problems) using concrete resources or pictorial representations.	This number triangle has missing numbers. The numbers along each edge must add up to 90. Put all the numbers: 20, 30, 50 and 60 in the circles to make the totals correct. 

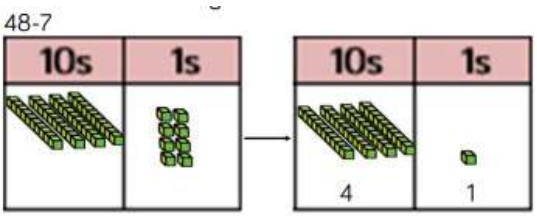
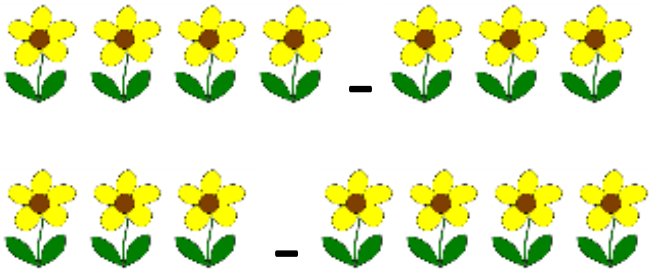
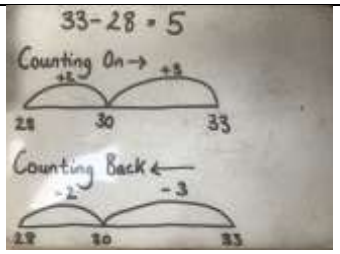
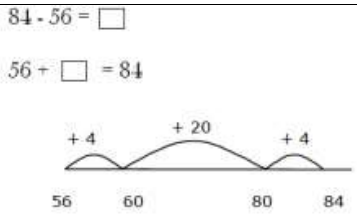
Addition	
YEAR 4	
VOCABULARY: add, increase, more, make, sum, inverse, column addition, total, altogether, one more, two more, ten more, tens boundary, hundreds boundary, thousands boundary, exchange, how many more to make… ?, how many more is… than…?	
Method	**Representation**
Children will build on previous knowledge to be able to add mentally a four-digit number and 1000s.	
Children will use formal written column method to add two numbers of up to 4 digits (including ones that involve boundary exchanges).	
Children will continue to add fractions with the same denominator, looking at more complex problems such as those involving mixed numbers and improper fractions.	 

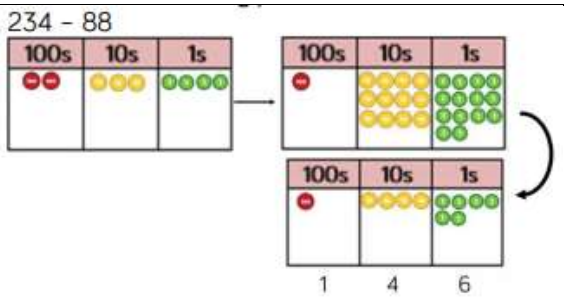
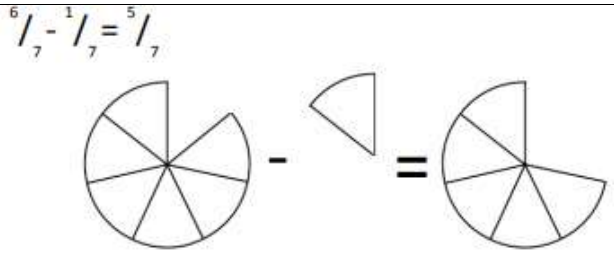
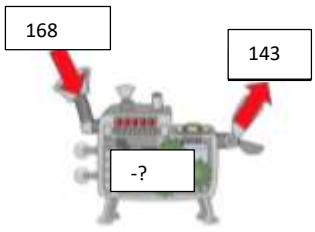
Addition	
YEAR 5	
VOCABULARY: add, increase, more, make, sum, inverse, column addition, total, altogether, one more, two more, ten more, tens boundary, hundreds boundary, thousands boundary, exchange.	
Method	**Representation**
Children will use formal written column method to add two numbers with more than 4 digits (including ones that involve boundary exchanges).	
Children will use the formal written column method to add numbers with both the same and different numbers of decimal places (including using 0 as a place holder).	
Children solve multi-step written problems by choosing the most effective strategies and/or methods.	A museum had 15,000 visitors over the Bank Holiday weekend. 5,458 arrive on Saturday and a further 8,762 visited on the Sunday. How many people came on Monday?

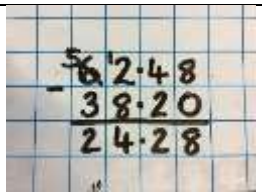
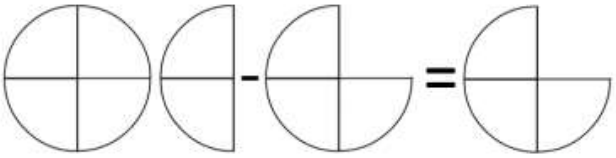
Addition	
YEAR 6	
VOCABULARY: add, increase, more, make, sum, inverse, column addition, total, altogether, one more, two more, ten more, tens boundary, hundreds boundary, thousands boundary, exchange, decimal place.	
Method	**Representation**
Using column addition, children will add several numbers of increasing complexity.	
Children will use the formal written column method to add several numbers with different numbers of decimal places (including using 0 as a place holder).	
Children will learn to add fractions and mixed numbers with different denominators using the concept of equivalent fractions.	 

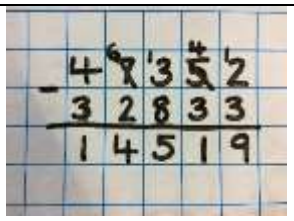
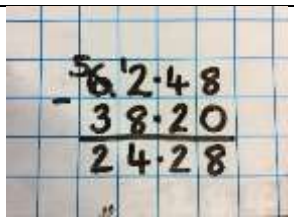
Subtraction	
EYFS	
VOCABULARY: take (away), leave, how many are left over?, one less, two less, how many have gone?	
Method	**Representation**
The concept of subtraction is introduced through the 'taking away' of physical objects/concrete resources from a whole. (These resources can be anything – fingers, toys, mathematical resources etc)	4 – 3 = 1 
Children are introduced to the subtraction through the use of stories or questions, represented either physically or pictorially.	There are three flowers in the garden and one is picked. How many are left? 
Children use simple games to learn to count back and to familiarise themselves with number tracks.	

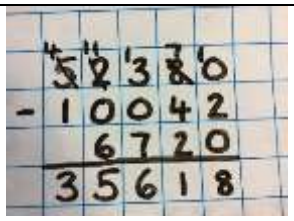
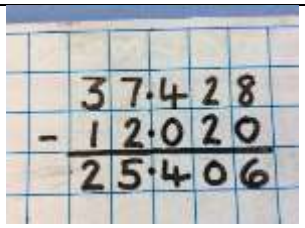
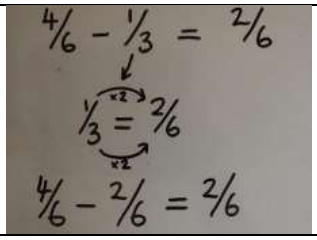
Subtraction	
YEAR 1	
VOCABULARY: take (away), leave, subtract, minus, count back, equals, difference (between), how many are left over?, one less, two less, how many have gone?	
Method	**Representation**
Children will use number tracks and prepared number lines to help solve subtraction stories or number sentences (with both concrete and pictorial resources).	
Children draw part whole models to solve subtraction problems (initially starting with dots) For example, 4 -3 = 1	
Children will subtract one-digit and two-digit numbers to 20, using mental methods, concrete resources and pictorial representations (such as ten frames).	
Children will solve one-step subtraction problems (including missing number problems) using concrete resources or pictorial representations.	
Children will also be introduced to subtraction as 'finding the difference' between two numbers (up to 20).	

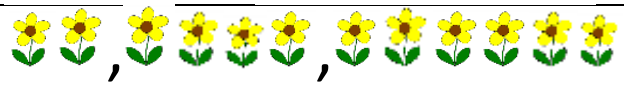
Subtraction	
YEAR 2	
VOCABULARY: take (away), difference (between), less, minus, sum, total, altogether, equals, inverse, one less, two less, ten less, one hundred less, inverse, partition, count on, count back, how many fewer to make… ?, how many fewer is… than…?	
Method	**Representation**
Children will use concrete objects and pictorial representations to subtract: • a two-digit number and ones • a two-digit number and tens • 2 two-digit numbers • 3 one-digit numbers	
Children recognise that subtraction is not commutative and that the order of the numbers matters (unlike in addition) – e.g 4 – 3 does not equal 3 – 4.	
Children will use both counting back and counting on when subtracting two numbers to help them devise the most efficient strategy for them.	
Children should recognise and use the inverse relationship between addition and subtraction to check calculations and solve missing number problems.	

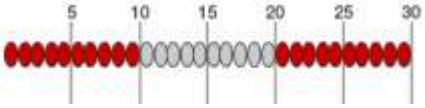
Subtraction	
YEAR 3	
VOCABULARY: take (away), difference (between), less, minus, sum, total, altogether, equals, inverse, one less, two less, ten less, one hundred less, inverse, partition, exchange, how many fewer to make… ?, how many fewer is… than…?	
Method	**Representation**
Children will build on previous knowledge to be able to subtract a variety of numbers mentally: • a three-digit number and 1s • a three-digit number and 10s • a three-digit number and 100s	
Children become able to subtract numbers with up to 3 digits (including ones and tens boundary exchanges) using formal column addition methods. This will initially be taught using concrete resources (e.g place value counters and place value grids).	
Children will begin to subtract fractions with the same denominator.	
Children will solve one-step and two-step subtraction problems (including missing number problems) using concrete resources or pictorial representations.	

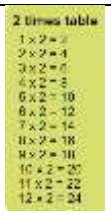
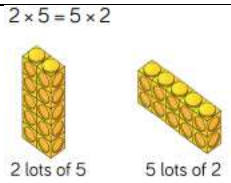
Subtraction	
YEAR 4	
VOCABULARY: take (away), difference (between), decrease, less, minus, sum, total, altogether, equals, inverse, one less, two less, ten less, one hundred less, inverse, partition, exchange, how many fewer to make… ?, how many fewer is… than…?	
Method	**Representation**
Children will build on previous knowledge to be able to subtract mentally a four-digit number and 1000s.	
Children will use formal written column method to subtract two numbers of up to 4 digits (including ones that involve boundary exchanges).	
Children will continue to subtract fractions with the same denominator, looking at more complex problems such as those involving mixed numbers and improper fractions.	$^{6}/_{4} - {}^{3}/_{4} = {}^{3}/_{4}$ 

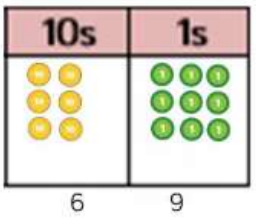
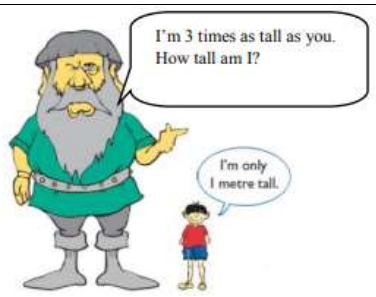
Subtraction	
YEAR 5	
VOCABULARY: take (away), difference (between), decrease, less, minus, sum, total, altogether, equals, inverse, exchange, column subtraction, decimals	
Method	**Representation**
Children will use formal written column method to subtract two numbers with more than 4 digits (including ones that involve boundary exchanges).	
Children will use the formal written column method to subtract numbers with both the same and different numbers of decimal places (including using 0 as a place holder).	
Children solve multi-step written problems by choosing the most effective strategies and/or methods.	A museum hoped to get 15,000 visitors over the Bank Holiday weekend but ended 541 short of its aim. 5,458 arrived on Saturday and a further 8,762 visited on the Sunday. How many people came on Monday?

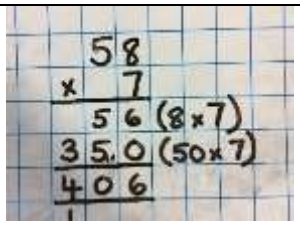
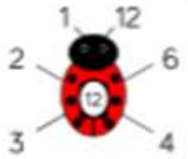
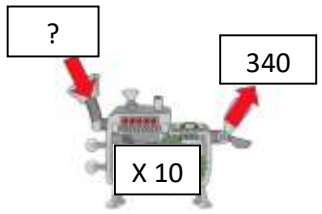
Subtraction	
YEAR 6	
VOCABULARY: take (away), difference (between), decrease, less, minus, sum, total, altogether, equals, inverse, exchange, column subtraction, decimals, tenths, hundredths, decomposition	
Method	**Representation**
Using column subtraction, children will subtract several numbers of increasing complexity.	
Children will use the formal written column method to subtract several numbers with different numbers of decimal places (including using 0 as a place holder).	
Children will learn to subtract fractions and mixed numbers with different denominators using the concept of equivalent fractions.	

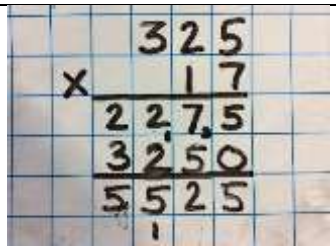
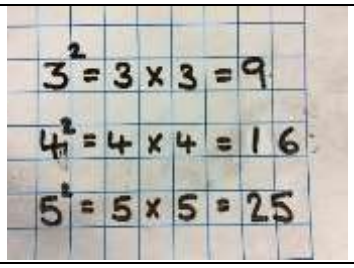
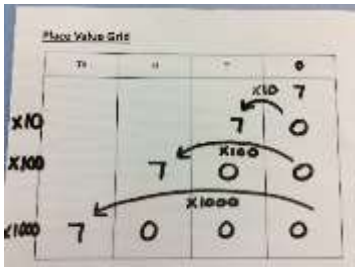
Multiplication	
EYFS	
VOCABULARY: groups, lots of, double/doubling	
Method	**Representation**
Children learn to count in groups and to make equal groups of the same object. Repeated addition is introduced to allow them to count the total.	Count groups of 2 and then count all objects to add them together. 
Children solve simple problems involving doubling an existing amount.	Double 2 is 4 
Children begin to count in simple multiples – 2s, 5s, 10s	 2 4 6

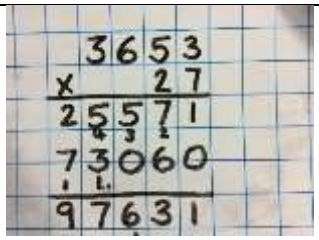
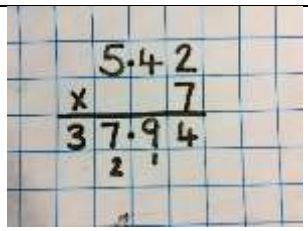
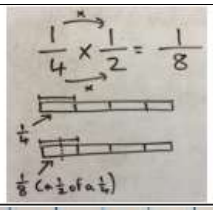
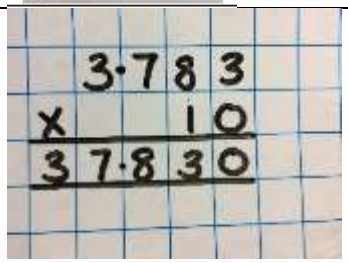
Multiplication	
Year 1	
VOCABULARY: times, multiply by, array, count in 2s, count in 5s, count in 10s, row, column, lots of, groups of, once, twice	
Method	**Representation**
Children begin to solve one step problems by grouping, using objects or pictorial representations, and building on their knowledge of multiplication as repeated addition.	I have 5 pairs of socks in the bag. How many socks are there?  _____
Children will recognise and complete sequences and patterns using multiples of 2, 5 and 10.	
Children are introduced to arrays as a method of solving multiplication.	 3 x 5 = 15

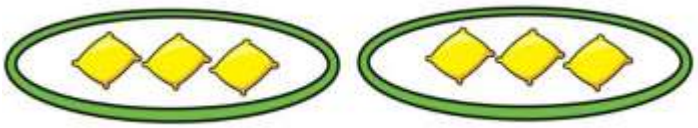
Multiplication	
Year 2	
VOCABULARY: times, multiply by, array, count in 2s, count in 5s, count in 10s, row, column, lots of, groups of, once, twice, three times…, repeated addition, commutative	
Method	**Representation**
Children can recognise and use the multiplication symbol in number sentences (abstract approach)	3 x 4 = 12
Children become fluent in 2s, 5s and 10s Times Tables and use these facts to solve problems mentally.	
Children recognise that multiplication is commutative – e.g 5 x 2 = 2 x 5 – and use arrays and other strategies to prove this.	

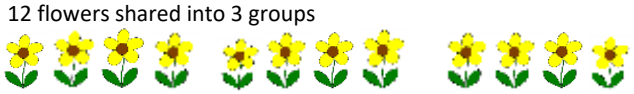
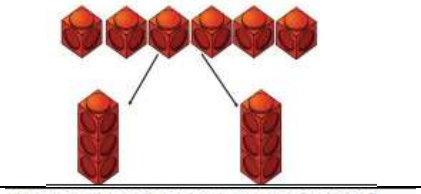
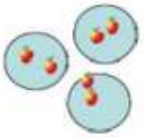
Multiplication	
Year 3	
VOCABULARY: times, multiply by, array, count in 2s, count in 5s, count in 10s, row, column, lots of, groups of, once, twice, three times…, repeated addition, commutative, product	
Method	**Representation**
Children learn a variety of strategies to solve 2-digit multiplied by 1-digit problems, including written methods.	23 x 3  $\begin{array}{r} 23 \\ \times\ 3 \\ \hline 69 \\ \hline \end{array}$
Children become fluent in 3s, 4s and 8s Times Tables and use these facts to solve problems mentally.	
Children use multiplication to solve word problems (involving scaling and correspondence).	

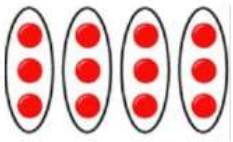
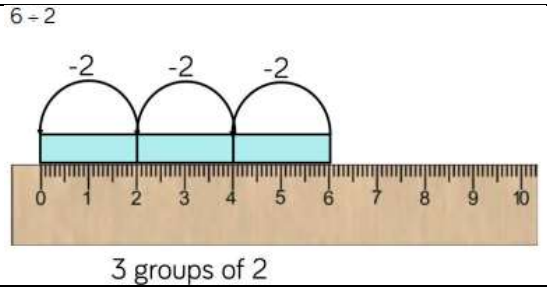
Multiplication	
Year 4	
VOCABULARY: times, multiply by, array, count in 2s, count in 5s, count in 10s, row, column, repeated addition, commutative, product, distributive law, associative law, factor pairs	
Method	**Representation**
Children learn a variety of strategies to solve 2-digit and 3-digit numbers multiplied by 1-digit number problems, including partitioning and formal written methods.	
Children become fluent in all Times Tables up to 12 x 12 and use these facts to solve problems mentally.	**7 times table** 1 x 7 = 7 2 x 7 = 14 3 x 7 = 21 4 x 7 = 28 5 x 7 = 35 6 x 7 = 42 7 x 7 = 49 8 x 7 = 56 9 x 7 = 63 10 x 7 = 70 11 x 7 = 77 12 x 7 = 84
Children use factor pairs and commutativity to improve mental calculations.	This is a 'factor bug' for the number 12 
Using a range of strategies, children solve a variety of problems that use their multiplication skills, such as two-step problems and missing numbers.	

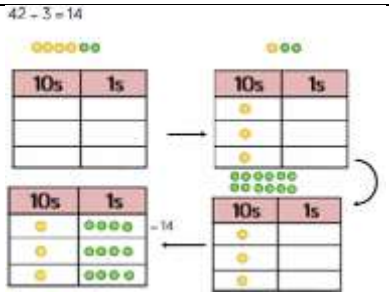
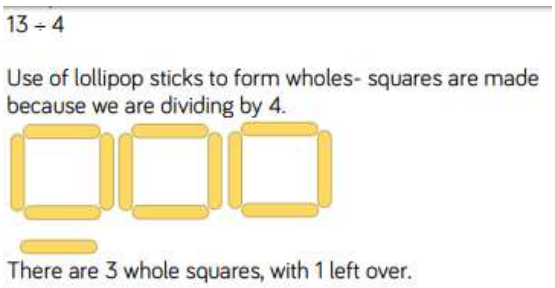
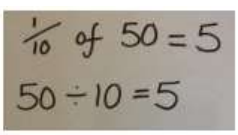
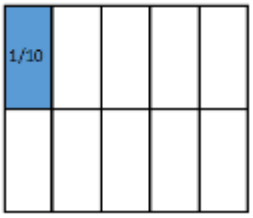
Multiplication	
Year 5	
VOCABULARY: composite numbers, prime numbers, prime factor, cube number, square number, common factor, derive, factor pairs, times, multiply, multiplied by, multiple of, product, partition, scaling, decimal place, distributive law, associative law	
Method	**Representation**
Children learn to multiply numbers up to 4-digits by 1- digit and/or 2-digit numbers, using formal written methods, including long multiplication.	
Children understand and identify prime numbers, prime factors and composite (non-prime) numbers.	
Children can recognise and use square numbers and cube numbers, and correctly use the appropriate notation for each (x^2), (x^3)	
Children multiply whole numbers and decimals by 10, 100 and 1,000, using place value grids. Recognising that the digits move one place value column to the left each time.	
Children learn to multiply fractions and mixed numbers	
Children use multiplication strategies and facts (including mental methods) to solve mathematical problems, including multi-step ones.	John drives 35 miles every day for his job. How far does he travel each week? How far does he travel in a year?

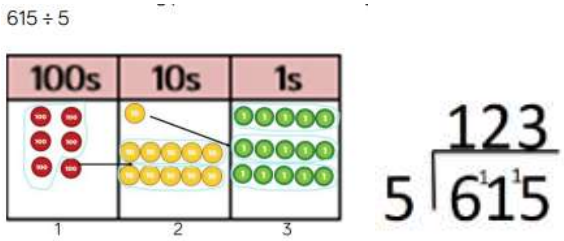
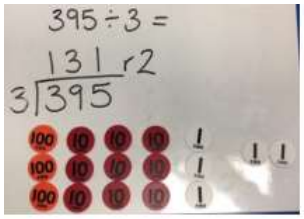
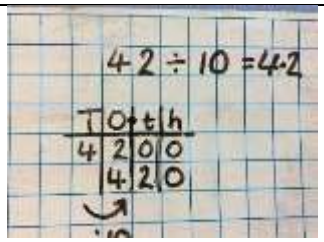
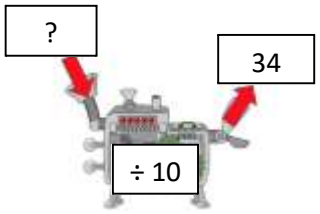
Multiplication	
Year 6	
VOCABULARY: composite numbers, prime numbers, prime factor, cube number, square number, derive, factor pairs, common factor, times, multiply, multiplied by, multiple of, product, partition, scaling, decimal place, distributive law, associative law	
Method	**Representation**
Children learn to multiply numbers up to 4-digits by 2-digit numbers, using formal long multiplication.	
Children multiply 1-digit numbers with up to two decimal places by whole numbers, using the most efficient method.	
Children multiply pairs of fractions of mixed denominator, giving answers in simplest form.	
Children multiply numbers by 10, 100 and 1,000 where the answers can be up to three decimal places.	

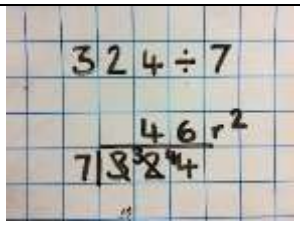
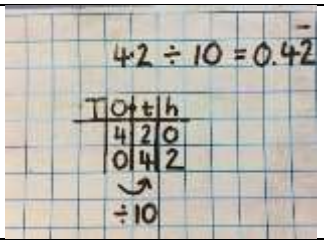
Division	
EYFS	
VOCABULARY: groups, share, half, halve	
Method	**Representation**
Children experience division by sharing objects into equal groups and counting how many in each group.	
Children solve simple problems involving halving an existing amount.	Half of 4 is 2 

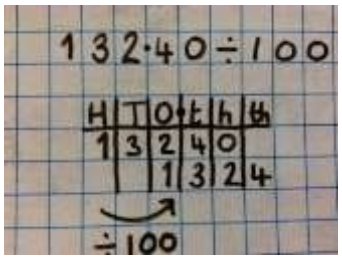
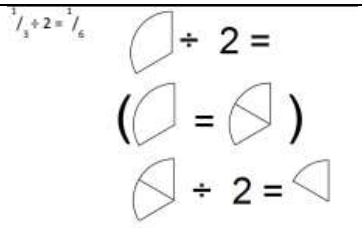
Division	
Year 1	
VOCABULARY: share, group, halve, share equally, divide, divided by	
Method	**Representation**
Children learn to share a number of objects equally into smaller groups.	12 flowers shared into 3 groups  4 4 4
Children to recognise that 'halve' is dividing by 2 and recognise that a half is one of these equal groups.	
Children are given division word problems to solve either pictorially or using objects.	Can you share 6 apples between 3 plates? 

Division	
Year 2	
VOCABULARY: share, group, halve, share equally, divide, divided by, inverse, repeated subtraction	
Method	**Representation**
Children will learn to use arrays and use the division symbol in number sentences to describe the calculation.	12 ÷ 3 = 4 
Children recognise that division is the inverse operation of multiplication.	9 ÷ 3 = 3 → 3 x 3 = 9
Children use repeated subtraction on a number line to recognise the operation of division as grouping.	
Children learn to understand the difference between grouping and sharing, and recognise the link between equal sharing and unit fractions.	SHARING If 12 flowers are shared between 3 gardens, how many will each garden have?  4 4 4 GROUPING If there are 12 flowers, how many gardens will get 3 flowers each?  1 2 3 4

Division	
Year 3	
VOCABULARY: divide, divided by, divided into, divisor, dividend, quotient, inverse, remainder	
Method	**Representation**
Children learn a variety of strategies to solve 2-digit multiplied by 1-digit problems, including written methods such as short division.	
Children can solve simple division exercises involving remainders, initially through the use of concrete resources.	
Children recognise that a tenth is when a number is divided by 10 or a whole is divided into 10 equal parts.	 

Division	
Year 4	
VOCABULARY: divide, divided by, divided into, divisor, dividend, quotient, inverse, remainder, derive, factor, exchange, equivalent	
Method	**Representation**
Children learn a variety of strategies to solve number problems in which 2-digit and 3-digit numbers divided by 1-digit number problems, including exchanges, such as partitioning and formal written methods.	
Children continue to solve division problems involving remainders, using a variety of strategies.	
Children learn the effect of dividing 1-digit and 2-digit numbers by 10 and 100, referring to the products in ones, tenths and hundredths. Recognising that the digits move one place value column to the right each time.	
Using a range of strategies, children solve a variety of problems that use their division skills, such as two-step problems and missing numbers.	

Multiplication	
Year 5	
VOCABULARY: divide, divided by, divided into, divisor, dividend, quotient, inverse, remainder, derive, factor, exchange, equivalent, ones, tenths, hundredths.	
Method	**Representation**
Children learn to divide numbers up to 4-digits by 1- digit numbers, including remainders, by using formal written methods such as short division.	
Children divide whole numbers and decimals by 10, 100 and 1,000, using place value grids. Recognising that the digits move one place value column to the right each time.	
Children will use division facts to solve problems such as missing numbers or two-step problems.	Five lorries get driven for a total of 875 in a week. If the all travel the same distance, how far does each go? How far does each travel per day?

Division	
Year 6	
VOCABULARY: divide, divided by, divided into, divisor, dividend, quotient, inverse, remainder, derive, factor, exchange, equivalent, ones, tenths, hundredths.	
Method	**Representation**
Children learn to divide numbers up to 4-digits by 2-digit numbers, using formal long division.	
Children divide decimal numbers with up to three decimal places by 10, 100 or 1,000, recognising that the digits move one place value column to the right each time.	
Children divide proper fractions by whole numbers.	
Children learn to interpret remainders as whole number remainders, fractions or decimals.