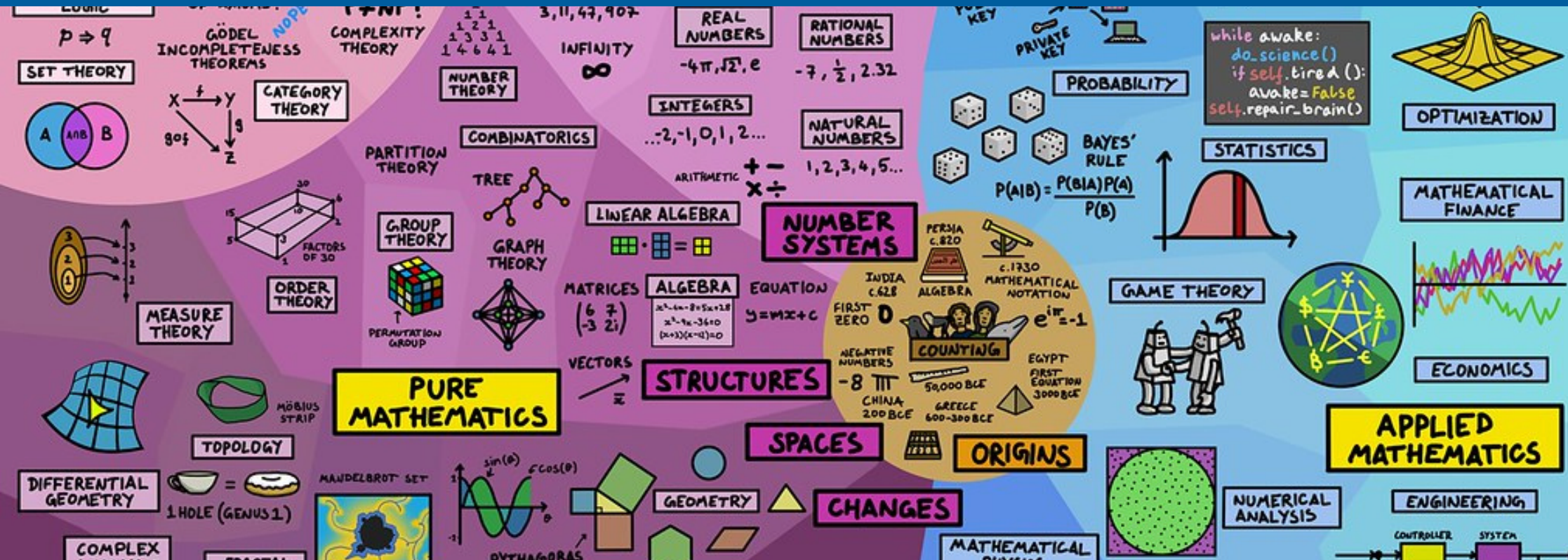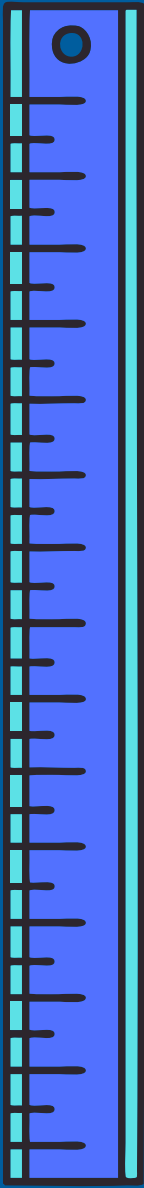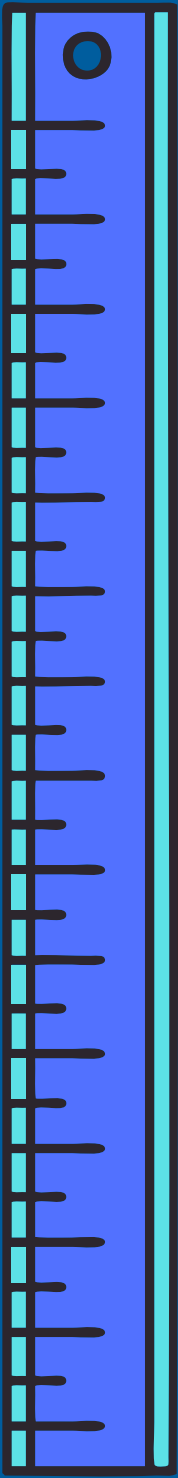# CALCULATIONS POLICY

An overview of Calculation development in the National Curriculum

This document is designed to demonstrate the different strategies children will be taught at each stage of their learning in Maths at the federation. It illustrates what children are exected to be learning in each year group, demonstrating progression as children move through the school. Children who are acheiveing the age related expectations will have their knowledge deepened and challenged by using and applying their skills in different contexts and to solve problems.
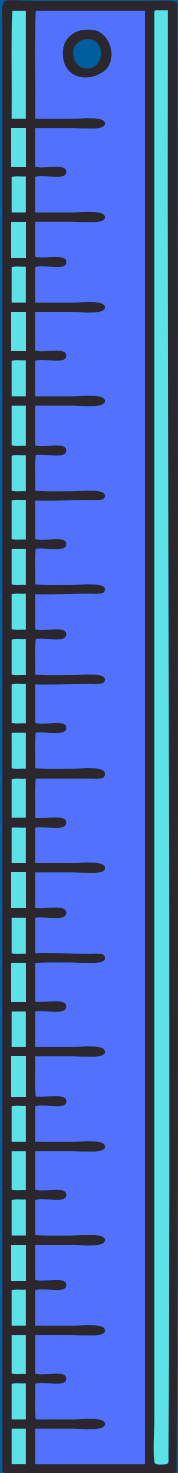
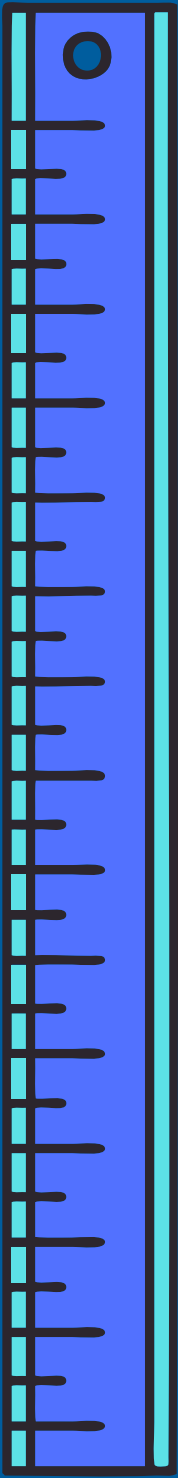| Year Group	addition	subtraction	multiplication	division
EYFS	Using quantities and objects they add and subtract two single-digit numbers and count on or back to find the answer		Children will begin to double, halve and share numbers.	
	Writing numbers introduce the addition sign (+) and the equals sign (=). Reading and writing number sentences	Writing numbers introduce the subtraction sign (-) and the equals sign (=). Reading and writing number sentences	Use concrete objects to share and double.	
Year 1	Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs. Represent and use number bonds and realated subtraction facts within 20 Add and subtract one-digit and two digit numbers to 20, including 0. Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ? - 9		Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. Count in multiples of 2s, 5s, and 10s.	

Year Group	addition	subtraction	multiplication	division
Year 1	Revising + and = signs Reading and writing number sentences Part-part whole model Blank number lines Sticks and dots	Revising - and = signs Reading and writing number sentences Part-part whole model Blank number lines Sticks and dots	Introduce as repeated addition. Introduce multiplication sign (x) reading and then writing. Part- part whole models	Introduce division sign. Part-part whole model
Year 2	A two digit number and 1s A two digit number and 10s 2 two digit numbers 3 one digit number Draw part-part whole models Draw sticks and dots Draw sticks and dots alongside the expanded column method. Draw the expanded column methods with numbers Draw the expanded column method with numbers bridging 10.		Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables Calculate mathematical statements for mutliplication and division within the multiplication tables. Write as repeated addition Draw Part - part whole models. Draw arrays	Draw Part - part whole models (cover sharing and grouping) Draw arrays

Year Group	addition	subtraction	multiplication	division
	Add and subtract numbers up to three digits, using formal written methods of columnar addtion and subtraction.		Write and calculate mathematical statements for division and multiplication using the multiplcation tables that they know.	
Year 3	Children will begin by using and consolidating the expanded column method. Bt the end of the year, they will be moving on to a shortened column method.		Begin by using arrays to multiply consolidating their understanding of commutativity. Begin to move onto the grid method of multiplication by the end of the year.	Children will consolidate sharing and the use of arrays. Begin to divide using number lines mofore moving onto the chunking method.
Year 4	Add and subtract numbers with upto 4 digits using the formal written methods of columnar addition and subtraction where appropriate.		Multiply 2 and 3 digit numbers by a one-digit number using formal witten layout	Write mathematical statements for division using times table knowledge. moving to mental and written methods.

Year Group	addition	subtraction	multiplication	division
Year 4	Children will consolidate their shortened column method with numbers of increasing size.		Develop the use of the grid method. Begin to use the short column method of multiplication. Have a secure knowledge of all the times table facts.	Use chunking to divide increasingly large numbers. Be secure in finding the inverse of their times tables to divide simple numbers.
Year 5	Add and subtract whole numbers with more than 4 digits including using formal written methods.		Multiply numbers up to 4 digits by one or two digit number using formal written methods including long multiplication for 2 digit-numbers.	Divide numbers up to 4 digits by a one digit number using the formal written method of short division and interpret remainders.
	Children will consolidate their shortened column method with numbers of increasing size. They will calculate with whole numbers but also begin to work with decimals numbers		Use the short column method of multiplication for increasingly large numbers. Calculate two-digit numbers using long multiplication.	Use the short "bus-stop" method of division to calculate.

| Year Group	addition	subtraction	multiplication	division
Year 6	Consolidate the use of columnar addition and subtraction with whole and decimal numbers, ensuring they use methods efficiently, choosing a mental method where appropriate.		Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. Secure long multiplication methods with numbers of increasing size.	Divide numbers up to 4 digits by a two-digit whole number using the formal written method of short division where appropriate for the context. Divide numbers up to 4-digits by a two digit whole number using formal written methods. Consolidate short and long division methods finding decimal remainders where appropriate. Learn and secure the long division method.
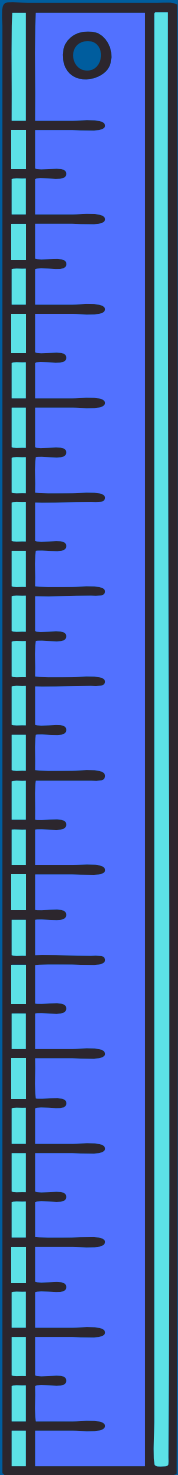
Mathematics in the EYFS

Mathematics in the Early Years Foundation Stage Curriculum comes under two strands,

Number:

"Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing."

Shape, Space and Measures:

"Children use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems. They recognise, create and describe patterns. They explore characteristics of everyday objects and shapes and use mathematical language to describe them."

Resources:

Across the EYFS we encourage counting as part of our every day routines and practice. Children will use a wide range of concrete objects to count. When they can reliably count the number of objects in a set, they will progress to adding two groups of objects together.

Mathematics in the EYFS

"Children will use a broad range of objects to count and total:
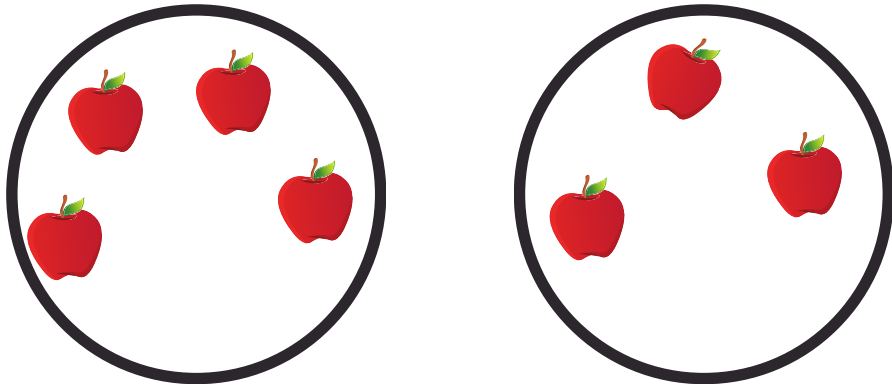
"Children need to be able to count a set of objects, know that there are 4, and count on from that number to find the total of two sets.

They can do this by putting the bigger number in their head and counting on. Children will begin to use pictures and symbols and will begin to be able to use the +. - and = signs.

Subtraction

To subtract from a group of objects, children need to understand that they do not need two groups of objects. They need to move the number of objects they are taking away from the rest of the group. They are encouraged to cross our items, or use their fingers to count back.

"Children need to be able to count a set of objects, know that there are 4, and count on from that number to find the total of two sets.

They can do this by putting the bigger number in their head and counting on. Children will begin to use pictures and symbols and will begin to be able to use the +. - and = signs.

Mathematics in the EYFS
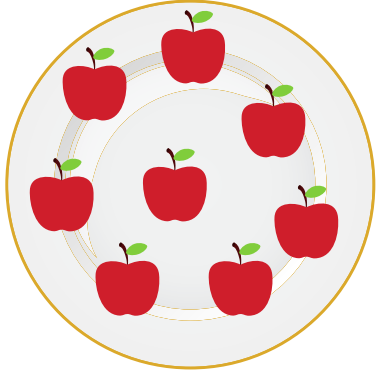
There are 8 apples on a plate. Ned, George, and Shameem each eat an apple. How many apples are left?

Methods:

Cross out one apple for each child and count how many are left.

Move one apple for each child and count the apples that are left

Use your fingers; find 8 fingers and put down one finger for each child. How many are left?

Multiplication and division

In the EYFS, children begin to double, halve and share numbers, using concrete objects.

Double the spots on the lady bird.
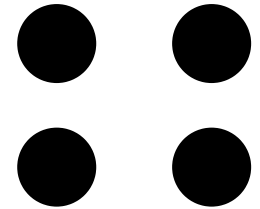
Nuria and Poppy collected plums from the garden. How many plums did they collect?

They need half each. How many will they each have?

Key Vocabulary:

more, less, first, then, next, add, and, plus, subtract, take away, minus. small, smaller, smallest, big, bigger biggest, tall, taller, tallest, numbers 1-20, count, total, altogether.

Mathematics in Year 1

Addition

In Year 1, children represent and use number bonds within 20. They will add one-digit and two-digit numbers to 20 including 0 and will represent these using a range of pictorial and concrete methods. This will culminate in them being able to write addition number sentences. They will use this knowledge to solve simple missing number sentences. They will be able to use part-part whole models, number lines and other resources to support their calculations.
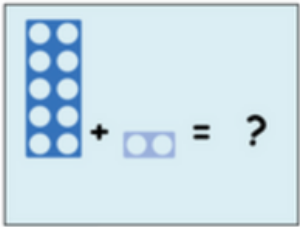
Number line:

$$3 + 1 = 4$$
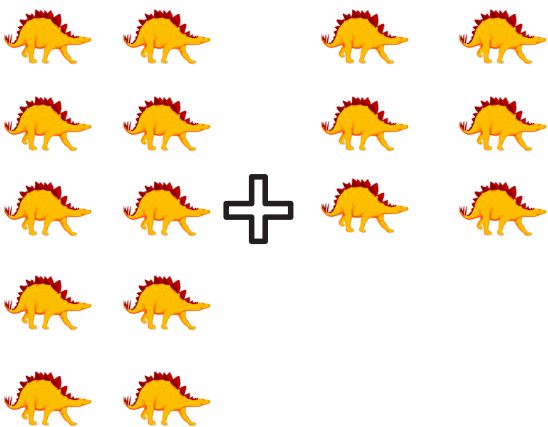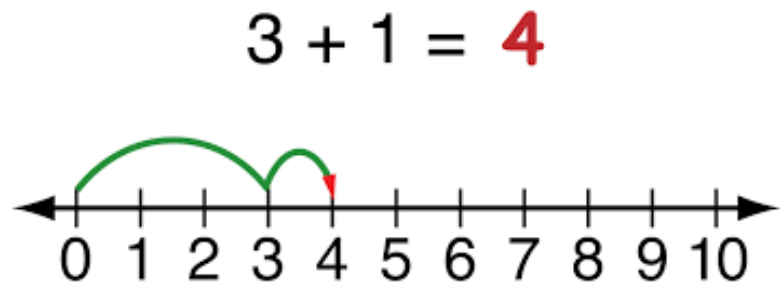
Part-part whole:
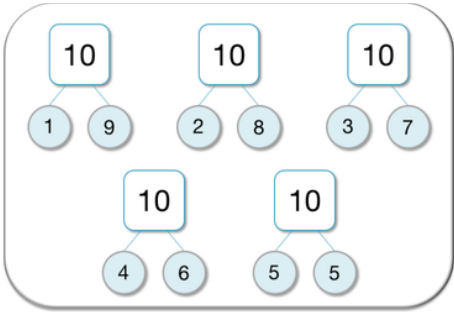
Beadstring
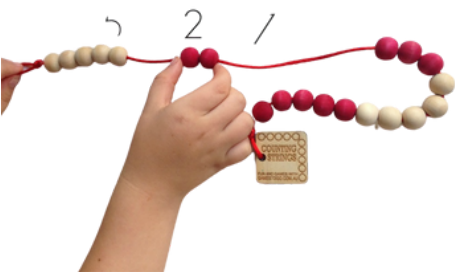
Numicon:
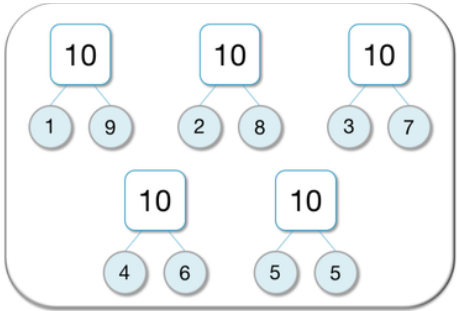
Dienes:
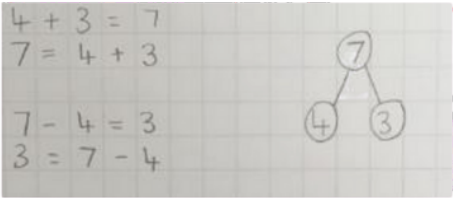
Mathematics in Year 1

Subtraction

In Year 1, children will use their number bond knolwdge to learn subtraction facts to 20. They will be able to subtract one-digit numbers and two-digit numbers to 20. They will be able to write number sentences using the subtraction symbol and relate these to simple one-step problems.

Part-part whole:

Number line:

$$25 - 7 = 18$$

$$- 3$$

0   9 10 11 12   20

$$+ 12$$

10   10   10

1   9   2   8   3   7

10   10

4   6   5   5

```
4 + 3 = 7
7 = 4 + 3

7 - 4 = 3
3 = 7 - 4
```

7

4   3

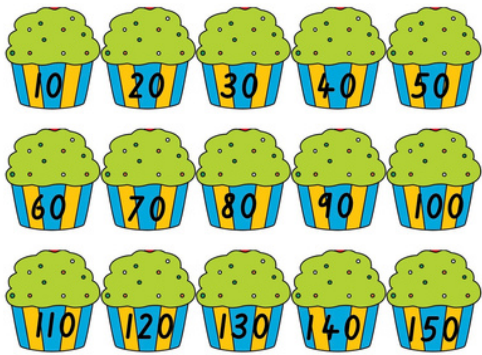| 0	1	2	3	4	5	6	7	8	9	10

$$6 - 2 = 4$$
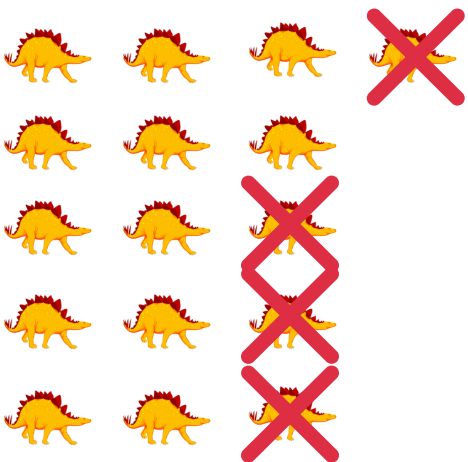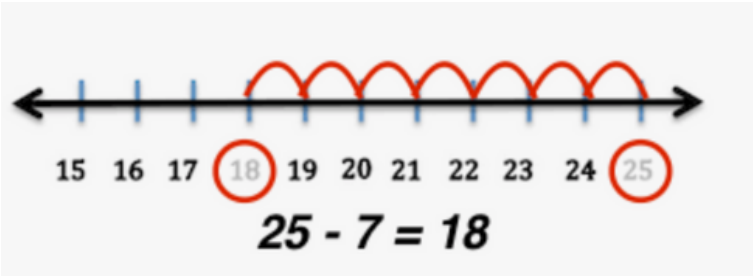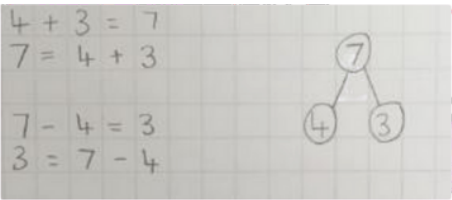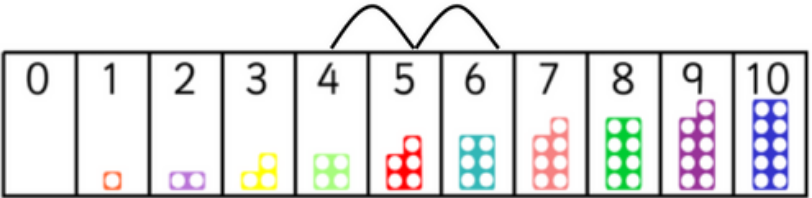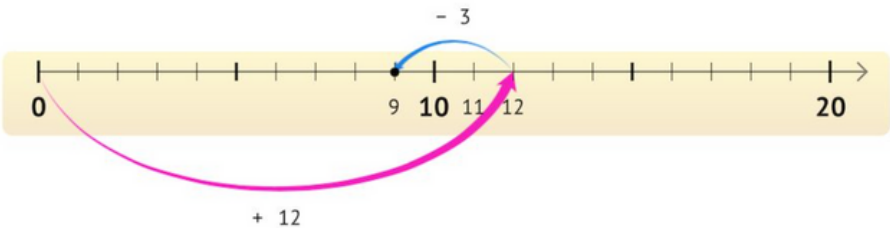
Mathematics in Year 1

Multiplication

Children start to develop their understanding of multiplication in Year 1 by counting in multiples of 2s, 5s and 10s. They will begin to understand the concept of multiplication as repeated addition, calculating their answers using objects and pictorial representations such as part-part whole methods.
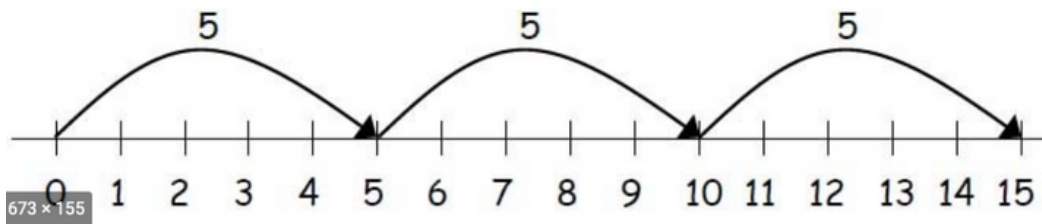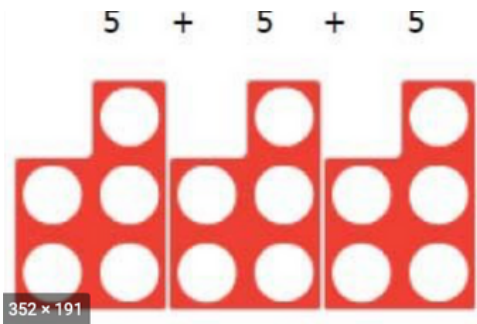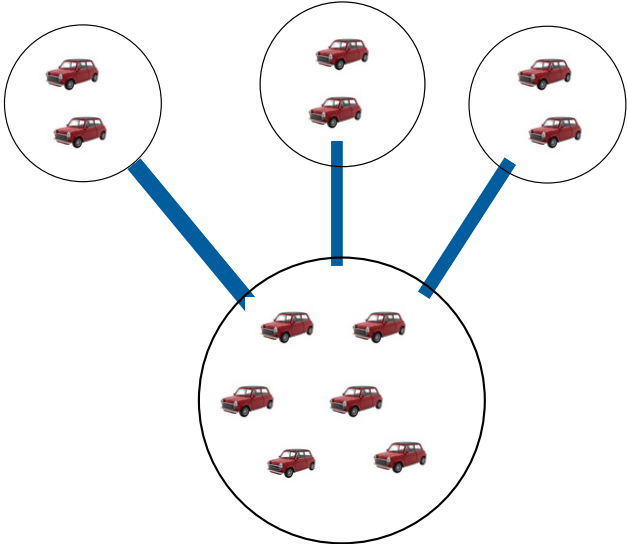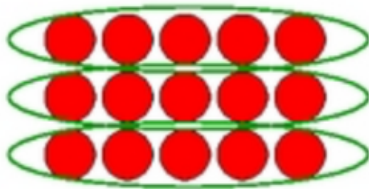
Mathematics in Year 1

Division

Children will begin to use their knowledge of multiplication facts to understand the concept of division. They will use sharing and grouping to solve one step division problems.

Mathematics in Year 2

Addition

In Year 2, children will use concrete objects, pictorial representations and written methods to add numbers. By the end of the year, they should be able to add a two-digit number and ones and a two digit number and tens, two two digit numbers and three one-digit numbers. Children will consolidate their knowledge of number facts and may use a part-part whole diagram to represent this.

Children will use sticks and dots to add ones and then ones to a two digit number.
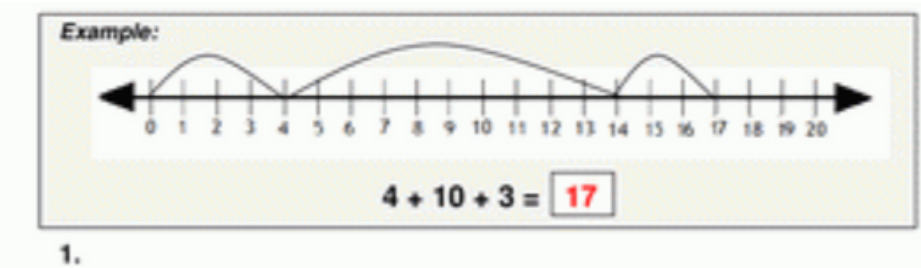
$$4 + 10 + 3 = \boxed{17}$$

1.

Mathematics in Year 2

Addition

Children learn how to identify the constituent parts of numbers and identify how many 10s and ones there are in two digit numbers.

23 =
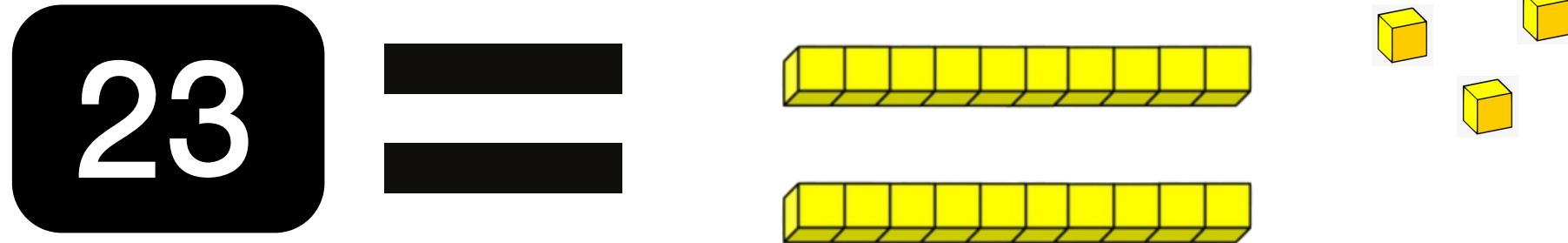
23 + 5 =

TENS	ONES

Mathematics in Year 2

Addition

Children learn how to identify the constituent parts of numbers and identify how many 10s and ones there are in two digit numbers.

23 + **50** =

23

They can then use the method to add tens to a two-digit number, and then add two 2 digit numbers and will use this method to move to the expanded column method.

50

TENS	ONES
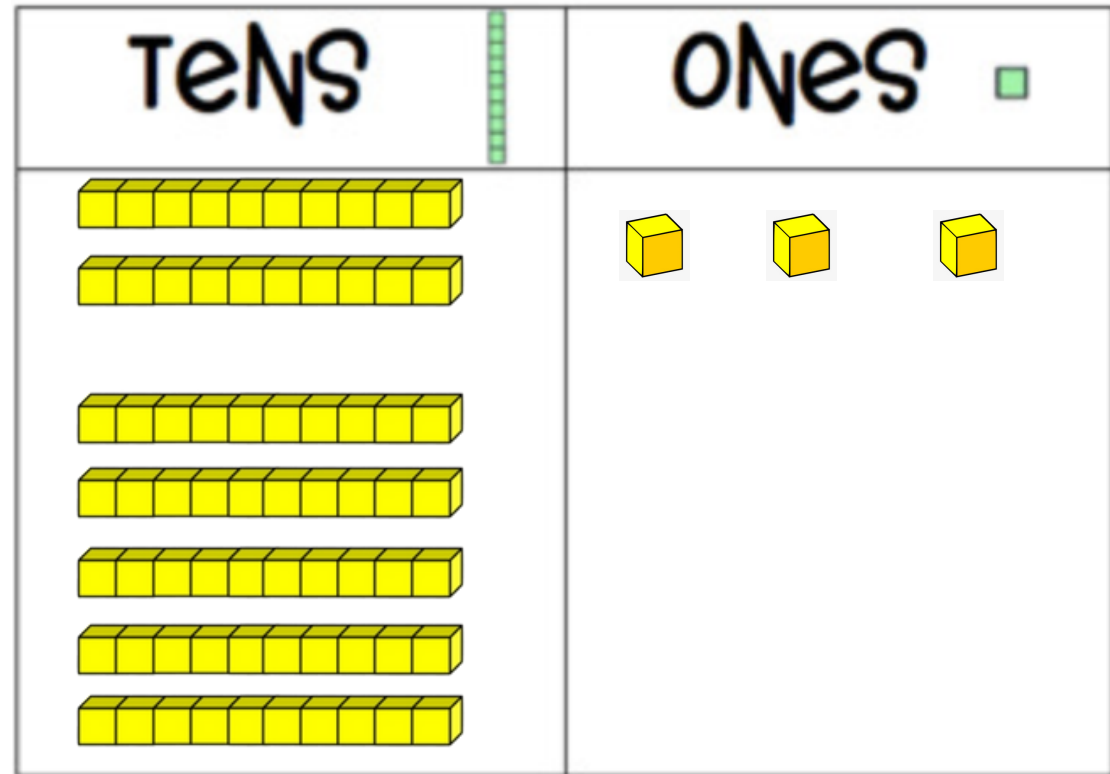
Expanded Column Addition:

31 + **24** =

30 + **1** + **20** + **4**

Partition the numbers into tens and ones.
Add the ones.
Add the tens.
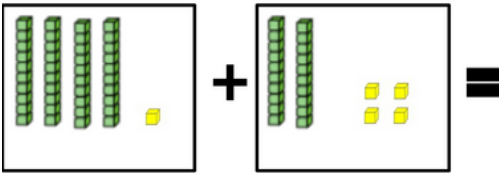Put the tens and ones back togther again

Mathematics in Year 2

Subtraction

Children will use concrete objects, pictorial representations and written methods to subtract numbers. By the end of Year 2, children should be able to subtract ones, tens or a two-digit number from another two digit number or subtract three one digit numbers. Children will use tens and ones to subtract 2-digit numbers and begin to understand the concept of exchange.

$24 \ominus 3 =$

TENS   ONES

$12 - 3 = \square$ Type the answer

$- 3$

0   9 10 11 12   20

$+ 12$

82 - 49 =

9 jumps back   10 jumps back

28   29 30 31 32 33 34 35 36 37   47

47 - 19 = 28

+10   +10   +10   +3

49   59   69   79   82

10 + 10 + 10 + 3 = 33
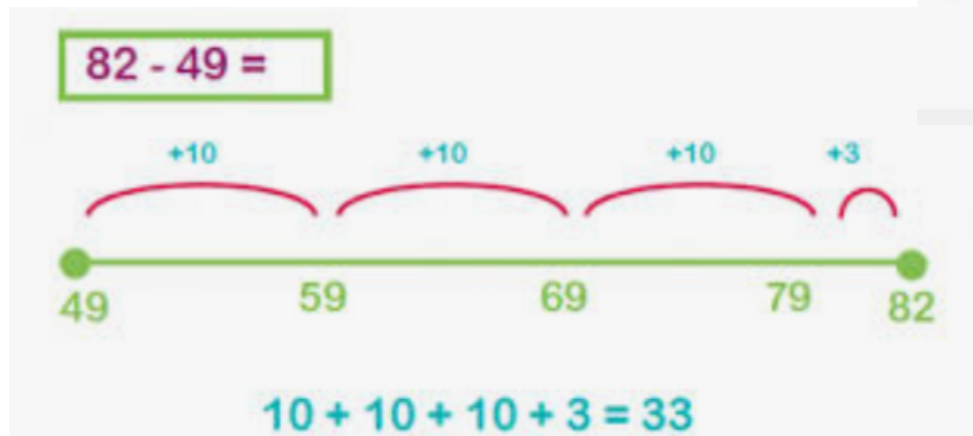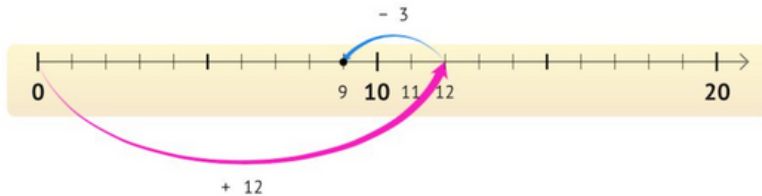
Mathematics in Year 2

Multiplication

Children will recall and use their 2,5 and 10 times table and calculate mathematical statements for these tables using the appropriate mathematical signs. They will develop an understanding of multiplication, commutativity and the inverse by using groupsing before moving onto arrays.

2 + 2 + 2 = 6

3 groups of 2 = 6

$3 \times 2 = 6$

5×3

"5 lots of 3"

"5 equal groups of 3"

$3 + 3 + 3 + 3 + 3$
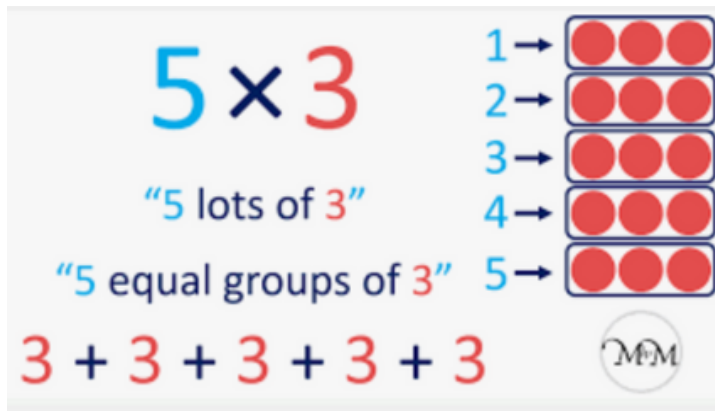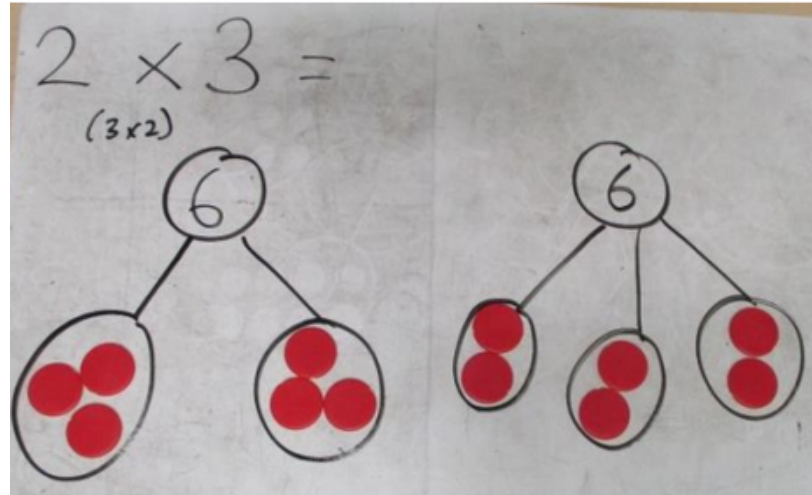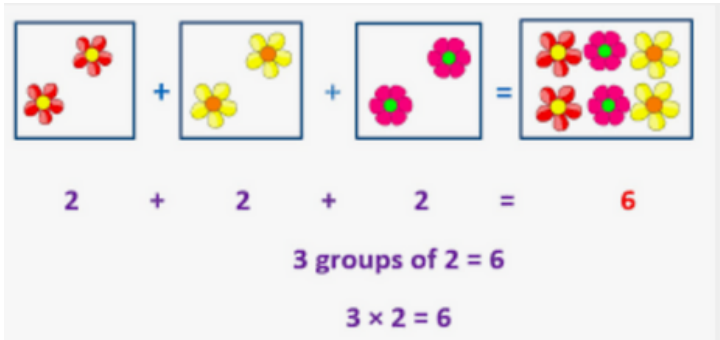
3. How many fingers do 4 children have?

__ + __ + __ + __ = __

$2 \times 3 =$

(3x2)
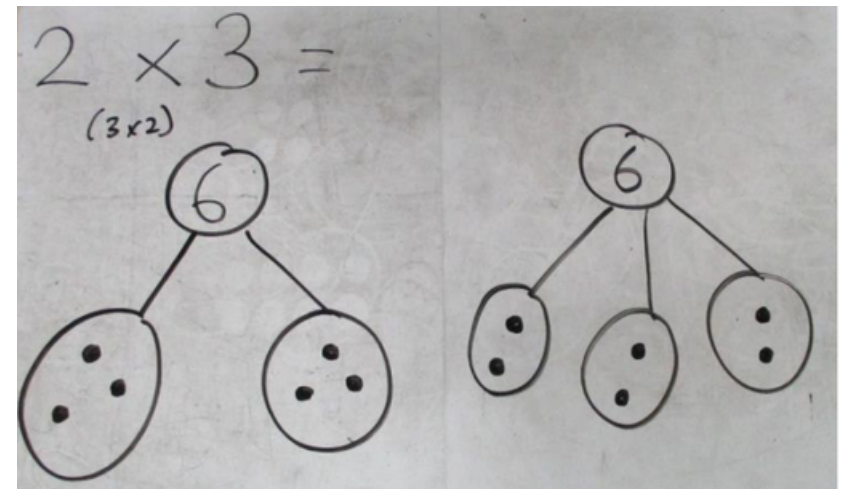
Mathematics in Year 2

Create arrays using counters and cubes and Numicon. Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer.
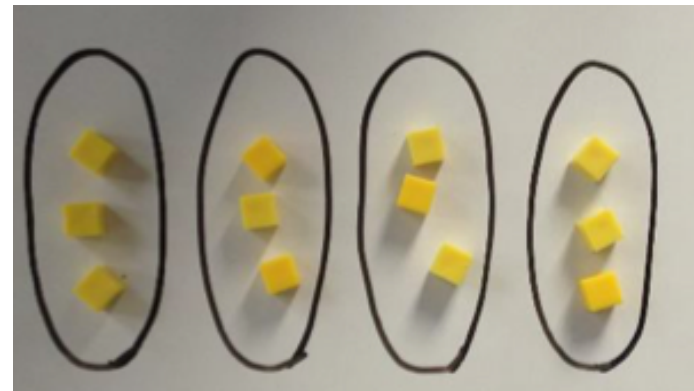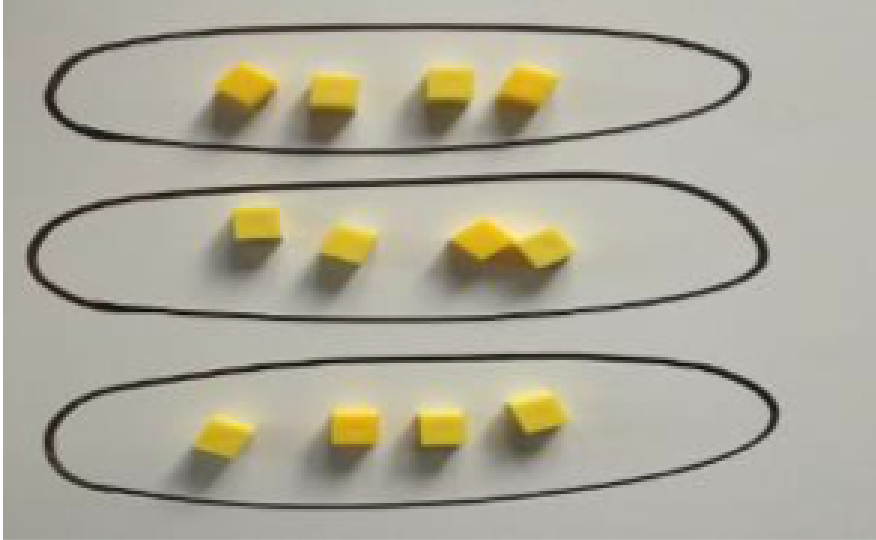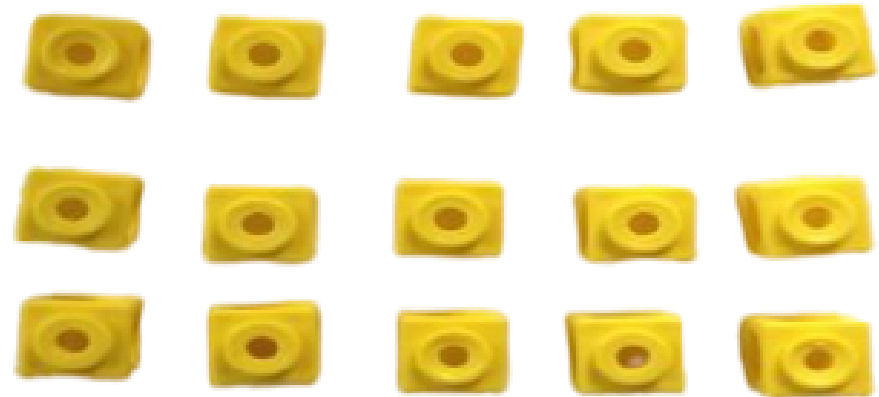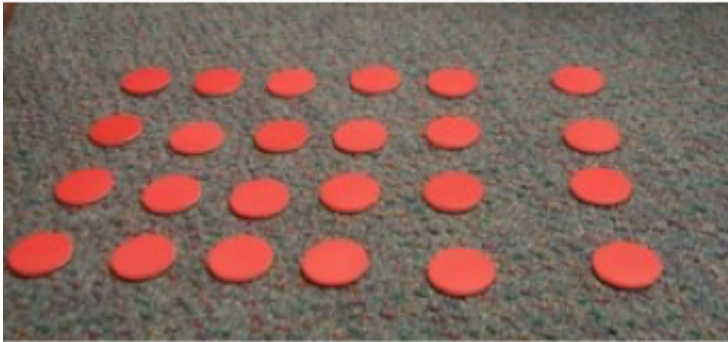
Mathematics in Year 2

Division

Children will use their multiplication tables knowledge to recall division facts in the 2,5 and 10 times tables. They will use sharing and grouping to calculate simple division facts.

Which of these numbers can create 3 equal groups?

15   21   11

10

10
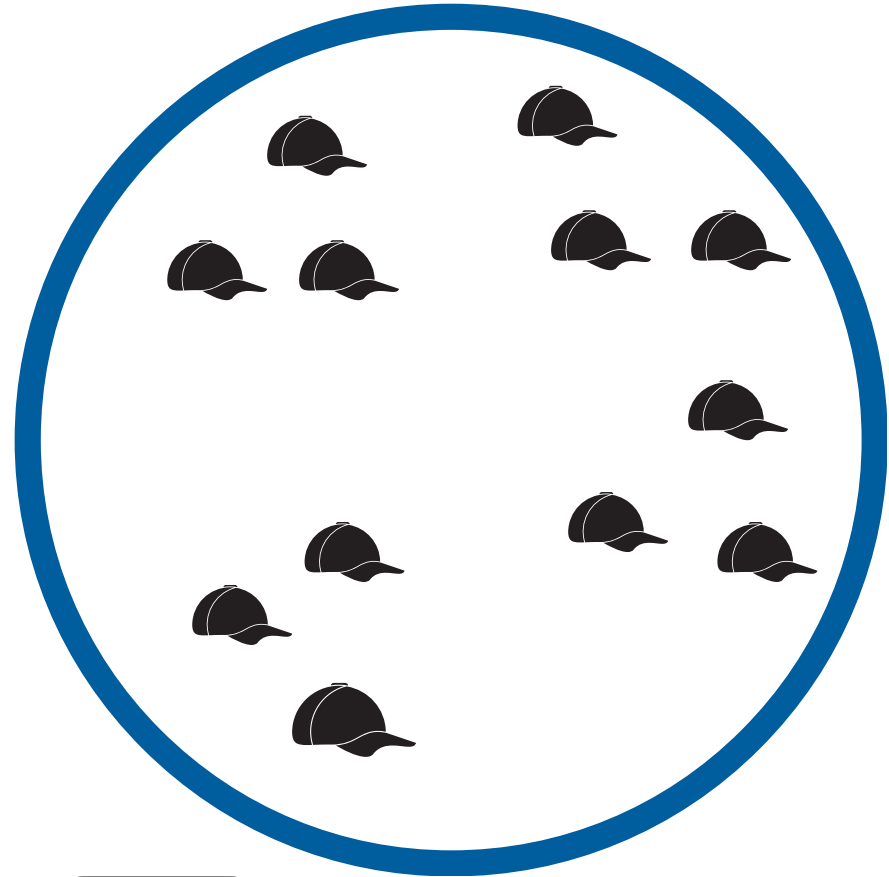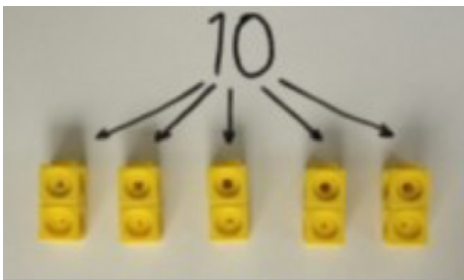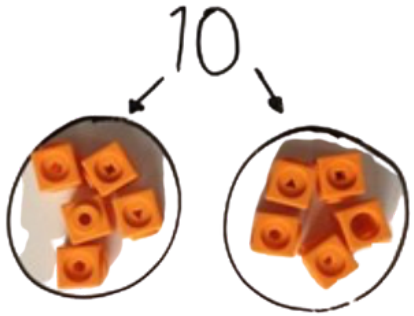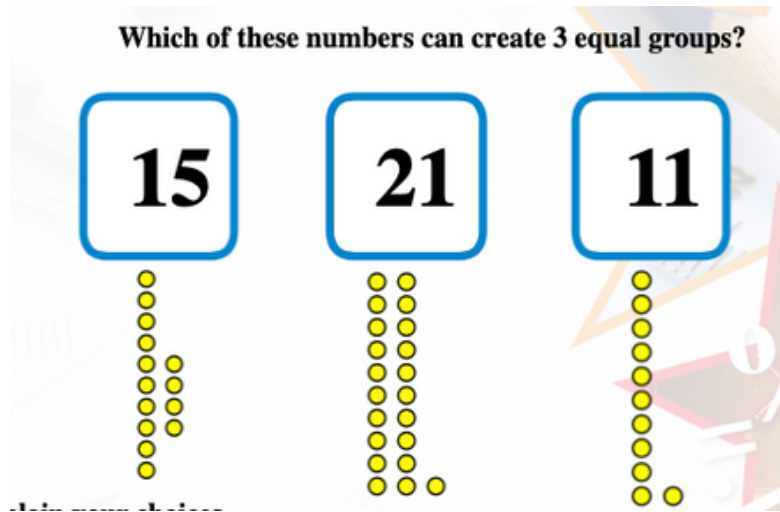
$$12 \div 4 =$$

Mathematics in Year 2

Key Vocabulary:

Number:

number, numeral, zero, one, two, three ... twenty, teens numbers, eleven, twelve ... twenty, twenty-one, twenty-two ... one hundred, two hundred ... one thousand, none, how many ...? count, count (up) to, count on (from, to), count back (from, to), forwards backwards,count in ones, twos, fives, tens, threes, fours and so on, equal to equivalent to is the same as more, less most, least tally, many, odd, even multiple of, sequence, continue, predict, few, pattern, pair, rule > greater than < less than.

Place Value:

Ones, tens hundreds, digit, one, two or three digit number, place, place value, stands for, represents, exchange, the same number as, as many more, larger, bigger, greater, fewer, smaller, less, fewest, smallest, least, most, biggest, largest, greatest, anemone, ten more, one less, ten less, equal to, compare, order, size, first, second, third...twentieth, twenty-first, twenty-second...,last, last but one, before, after, next, between, halfway between, above, below.

Estimating:

Guess, how many..?, estimate, nearly, roughly, close to, about the same as, just over, just under, exact, exactly, too many, too few, enough, not enough.

Addition and subtraction:

Addition, add, more, and, make, sum, total, altogether, double, near double, half, halve, one more, two more....ten more...one hundred more, how many more to make?, how many more is...than...?, how much more is...?, one more, one less, ten less, one hundred less, how many fewer is...than...?, how much less is...? difference between, equals, is the same as, number bonds, pairs, facts, tens boundary.

Multiplication and Division

Multiplication, multiply, multiplied by, multiple, groups of, times, once, twice, three times...ten times, repeated addition, division, dividing, divided by, divided into, grouping, sharing, share, share equally, left, left over, one each, two each, three each...ten each, group in pairs, threes,...tens, equal groups of, doubling, halving array, row, column, number patterns multiplication table, multiplication fact, division fact.

Mathematics in Year 3

Addition

Year 3 children are expected to be able to use increasingly formal written methods to add numbers up to 3 digit numbers. By the end of the year, they should be able to use columnar addition, beginning with the expanded method. Children should be mentally adding a three digit number to ones, tens or hundreds and using these skills to solve missing number problems.

	T	U	
	2	6	
+	2	5	
	1	1	(6 + 5)
	5	0	(20 + 20 + 10)
	5	1	(50 + 1)

$$356 + 213 =$$

	3	5	6	→	3	0	0	+	5	0	+	6
+	2	1	3	→	2	0	0	+	1	0	+	3
	5	6	9	←	5	0	0	+	6	0	+	9
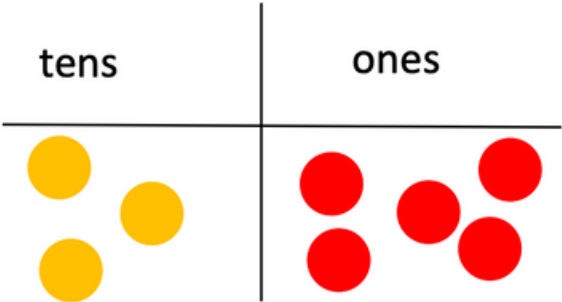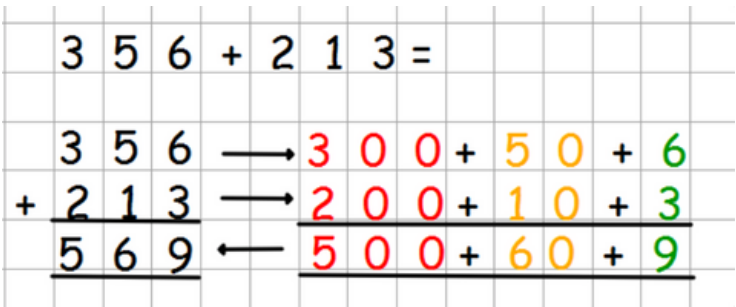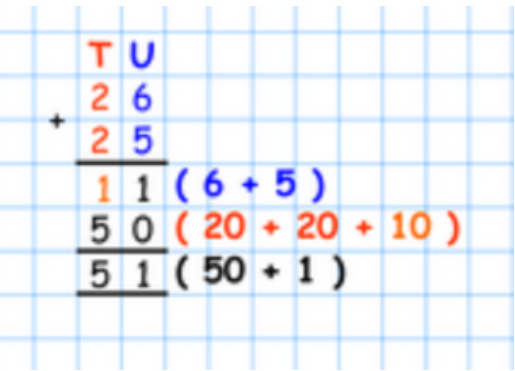
Add together the ones first, then the tens.

	2	2	3
+	1	1	4
	3	3	7
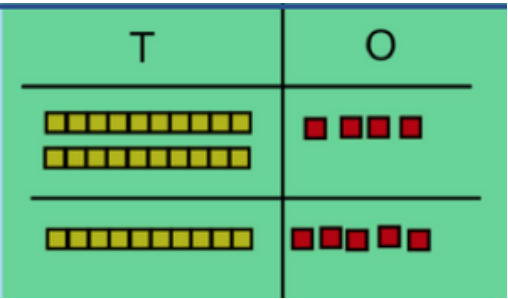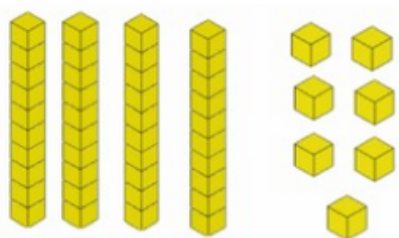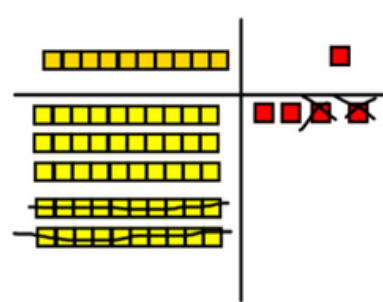
Mathematics in Year 3

Subtraction

Year 3 children are expected to be able to use increasingly formal written methods to subtract numbers up to 3 digit numbers. They should be able to use columnar subtraction beginning with the expanded method. Children should be mentally subtracting ones, tens and one hundreds from a three digit number. They should be able to use these skills to solve missing number problems.

Column Subtraction without regrouping

$$47 - 32$$

Calculations

$$\begin{array}{r} 54 \\ -22 \\ \hline 32 \end{array}$$

$$47 - 24 = 23$$

$$\begin{array}{r} 40 + 7 \\ - 20 + 4 \\ \hline 20 + 3 \end{array}$$

Draw representations to support understanding.
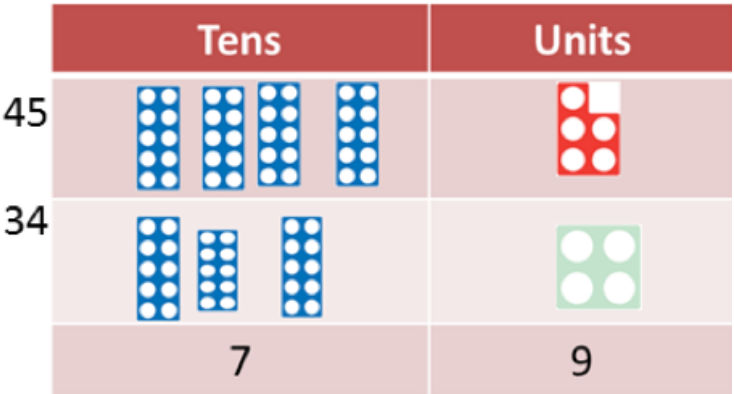
$$836 - 254 = 582$$

$$\begin{array}{r} H \quad T \quad u \\ 7\,0\,0 \\ 800 \quad 130 \quad 6 \\ - \quad 200 \quad 50 \quad 4 \\ \hline 500 \quad 80 \quad 2 \end{array}$$

Column Subtraction with regrouping

Model the exchange of a 10 into 10 ones.

Tens	Units

$$\begin{array}{r} 45 \\ -29 \\ \hline 16 \end{array}$$

Tens | Ones

$$10 + 6 = 16$$

$$728 - 582 = 146$$

$$\begin{array}{r} H \quad T \quad u \\ {}^6 7 \quad {}^1 2 \quad 8 \\ 5 \quad 8 \quad 2 \\ \hline 1 \quad 4 \quad 6 \end{array}$$

Mathematics in Year 3

Multiplication

Year 3 children should know their 2, 5,10, 3, 4 and 8 times tables. They should be able to use this knowledge to multiply a two-digit number by a one-digit number. During the course of year 3, children will progress from using mental methods to more formal methods, beginning with the grid method. They should use this knowledge to solve problems.

Understand the link between the grid method and arrays.
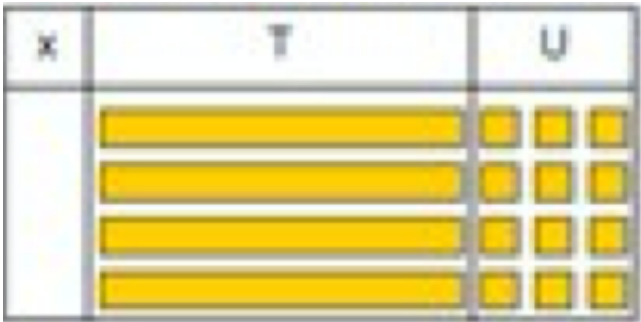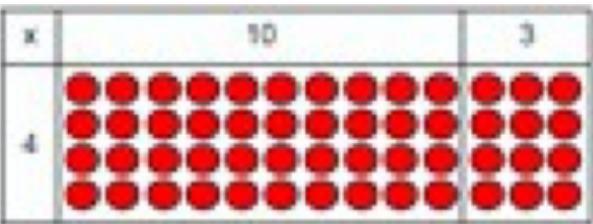
Develop more efficient representations using base 10 or dienes.

Use place value counters to show how we can find groups of a number
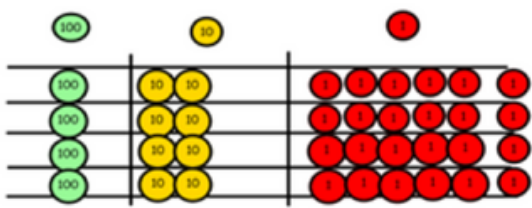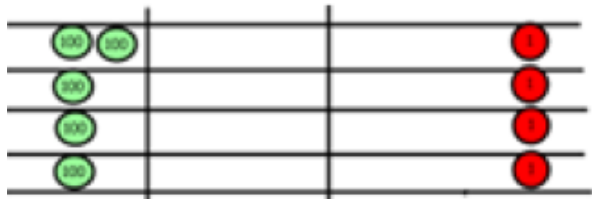
Mathematics in Year 3

Multiplication

Once confident using the concrete and pictorial representations children in Year 3 can move onto the abstract.

Children start by multiplying by one digit numbers and recording the addition alongside the grid

✗	30	5
7	210	35

$$210 + 35 = 245$$

Once children are confident they can start to multiply by a two-digit number.

Use place value counters to show how we can find groups of a number

13 X 18 =234
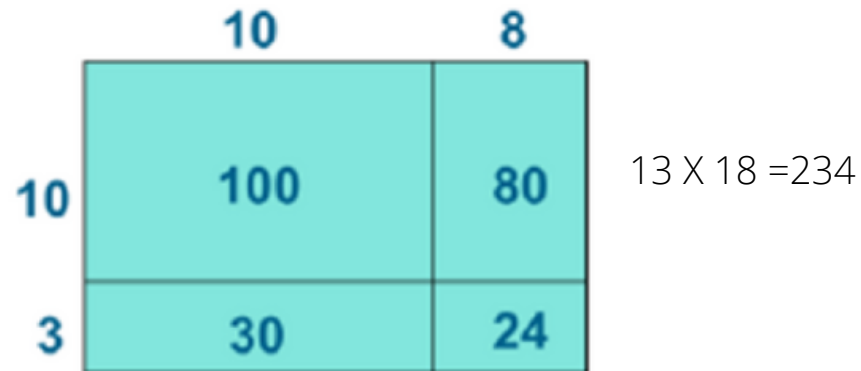
Division

Children should use the inverses of the multiplication tables they know to divide simple numbers. They will begin to use formal written methods, beginning with repeated subtraction on a number line. They should be able to use written and mental methods to solve problems involving missing numbers. Children will move from using sharing strategies into using a number line to divide before learning to chunk.

Repeated subtraction using a number line 24 ÷ 4 = 6

0   4   8   12   16   20   24 25
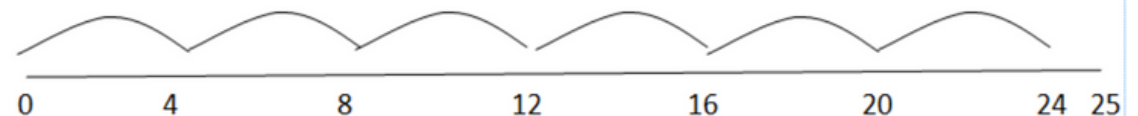
Mathematics in Year 3

Division

Link division to multiplication by creating arrays and thinking about number sentences that can be created.

Draw arrays and use lines to split the arrays into groups to make multiplcation and division facts.

Find the inverse of multiplication and division sentences by creating linking number sentences.

3 X 4 = 12

4 X 3 = 12

12 ÷ 3 = 4

12 ÷ 4 = 3

12 = 3 X 4

12 = 4 X 3

4 = 12 ÷ 3

3 = 12 ÷ 4

Division with remainders

Children learn to divide and share objects between groups and see how much is left over.
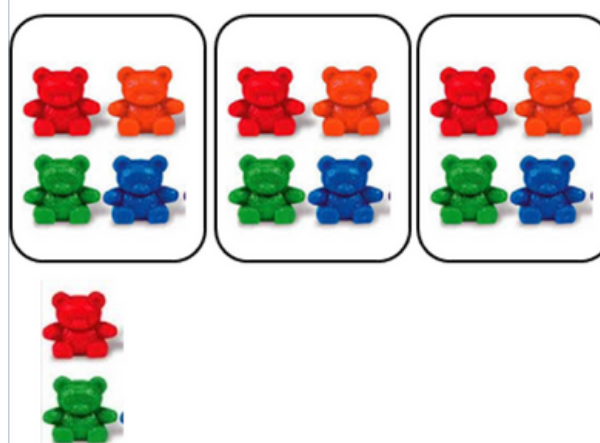
Jump forward in equal jumps on a number line
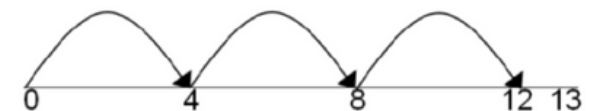
Mathematics in Year 3

Key Vocabulary:

Number:
Number, numeral, zero, one, two, three ... twenty, teens numbers, eleven, twelve ... twenty, twenty-one, twenty-two ... one hundred, two hundred ... one thousand, none, how many ...? count, count (up) to, count on (from, to), count back (from, to), forwards backwards,count in ones, twos, fives, tens, threes, fours eights, fifties and so on to hundreds, equal to equivalent to is the same as more, less most, least tally, many, odd, even multiple of, factor of, sequence, continue, predict, few, pattern, pair, rule, relationship, > greater than < less than. Roman numerals

Place Value:
Ones, tens hundreds, digit, one, two or three digit number, place, place value, stands for, represents, exchange, the same number as, as many more, larger, bigger, greater, fewer, smaller, less, fewest, smallest, least, most, biggest, largest, greatest, one more, ten more, one hundred more, one less, ten less, one hundred less, equal to, compare, order, size, first, second, third...twentieth, twenty-first, twenty-second...,last, last but one, before, after, next, between, halfway between, above, below.

Estimating:
Guess, how many..?, estimate, nearly, roughly, close to, approximate, approximately, about the same as, just over, just under, exact, exactly, too many, too few, enough, not enough, round, nearest, round to the nearest ten, hundred, round up round down.

Addition and subtraction:
Addition, add, more, and, make, sum, total, altogether, double, near double, half, halve, one more, two more....ten more...one hundred more, how many more to make?, how many more is...than...?, how much more is...?, one more, one less, ten less, one hundred less, how many fewer is...than...?, how much less is...? difference between, equals, is the same as, number bonds, pairs, facts, tens boundary, hundreds boundary.

Multiplication and Division
Multiplication, multiply, multiplied by, multiple, factor, groups of, times, product, once, twice, three times...ten times, repeated addition, division, dividing, divided by, divided into, grouping, sharing, share, share equally, left, left over, remainder, one each, two each, three each...ten each, group in pairs, threes,...tens, equal groups of, doubling, halving array, row, column, number patterns multiplication table, multiplication fact, division fact.

Mathematics in Year 4

Addition

Year 4 children are expected to be able to add 4-digit numbers using formal written methods where appropriate. They should be able to estimate their answer before they provide an accurate solution and should be able to check their calculations using the inverse operation. Children should be able to use their written and mental methods to solve two step problems with an emphasis on selecting the appropriate operation and suitable method depending on the question.
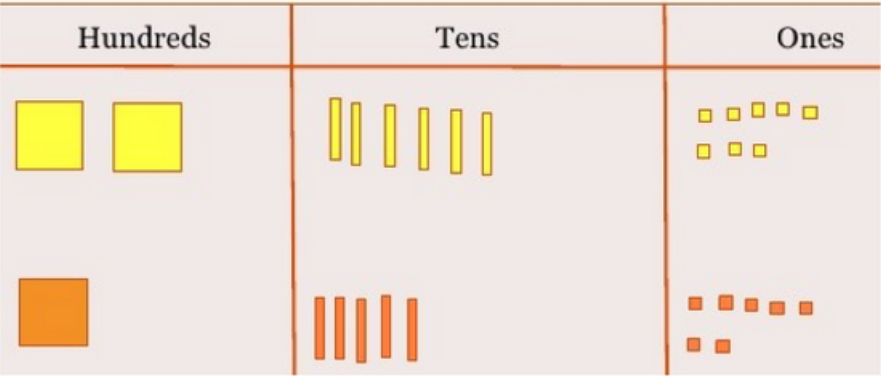
Children continue to use concrete apparatus exchanging ten ones for a ten and ten tens for hundred and ten hundreds for a thousand. They draw representations using grids.
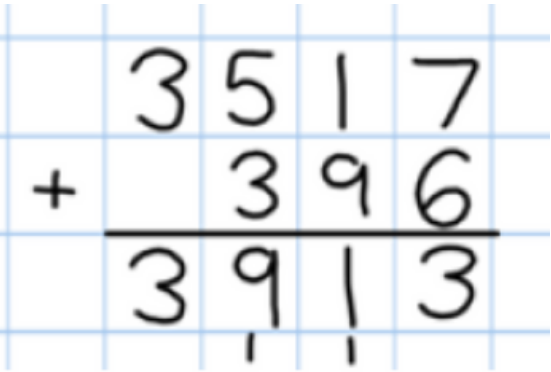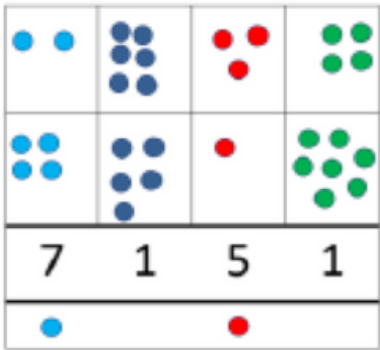
Children use and apply in relation to money and measures.

4245 cms + 1237 cms = 5482 cms

Mathematics in Year 4

Subtraction

Children should be able to subtract 4-digit numbers using formal written methods where appropriate, including exchanging digits. They should then solve problems using this knowledge and be able to use their subtraction calculations in a range of contexts.

234 - 179
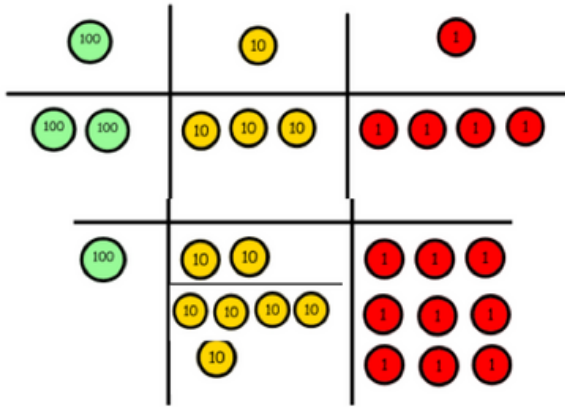
When "exchanging" use the phrase "take and make"

Multiplication

Year 4 children must know all their multiplication times tables facts up to 12 X 12, and their associated division facts, confidently and efficiently. They will work on developing their mental multiplication, using the rule of commutativity (3 X 6 = 6 X 3) and their understanding and knowledge of factor pairs. Children should be able to use this knowledge to multiply 3 numbers together. They will use formal written methods of multiplication to multiply 2 and 3-digit numbers by a one-digit number. They will begin this be developing their use of the grid method before moving onto the expanded and then the shortened column method.

Mathematics in Year 4

Multiplication

Year 4 children must know all their multiplication times tables facts up to 12 X 12, and their associated division facts, confidently and efficiently. They will work on developing their mental multiplication, using the rule of commutativity e.g. (3 X 6 = 6 X 3) and their understanding and knowledge of factor pairs. Children should be able to use this knowledge to multiply 3 numbers together. They will use formal written methods of multiplication to multiply 2 and 3-digit numbers by a one-digit number. They will begin this be developing their use of the grid method before moving onto the expanded and then the shortened column method.

Children in Year 4 will revisit using counters to represent pictorially the calculation. They will be encouraged to represent their work in ways they understand. They will be introduced to bar models and then confidently use the grid method to multiply by one and two-digit numbers. Once children are confident using the grid method they will move onto the expanded and then the shortened column method.

✗	30	5
7	210	35

210 + 35 = 245

Mathematics in Year 4

Division

Children in Year 4 should know all the associated division factsup to 12 X 12 confidently using the inverse to solve a range of problems mentally. They will also use their multiplication facts to multiply 2 and 3-digit numbers using multiples of 10 and times table facts in their formal written methods.

$96 \div 3$

Tens   Units

3   2

Children should be encouraged to use the bus stop method and use place value counters using the bust stop method alongside.

3

Calculations

$42 \div 3$

$42 \div 3 =$

Children exchange the 10 for ones and then share the ones equally among the groups.
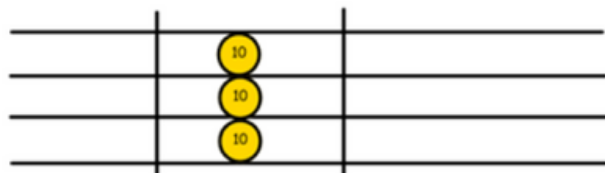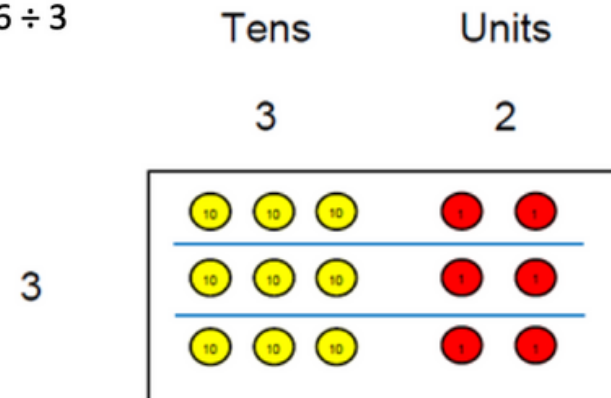
Once confident children should move into working in the abstract, beginning wth divisions with no remainder.

$$2 \; 1 \; 8$$
$$3$$
$$4 \, | \, 8 \; 7 \; 2$$

$$8 \; 6 \; r \; 2$$
$$3$$
$$5 \, | \, 4 \; 3 \; 2$$

$86 \div 3 = 28 \, r \, 2$

$20 \times 3 = 60$

$8 \times 3 = 24$

84 - 2 left over

Mathematics in Year 4

Key Vocabulary:
Number:
Number, numeral, zero, one, two, three … twenty, teens numbers, eleven, twelve … twenty, twenty-one, twenty-two … one hundred, two hundred … one thousand, ten thousand, hundred thousand, million, none, how many …? count, count (up) to, count on (from, to), count back (from, to), forwards backwards, count in ones, twos, fives, tens, threes, fours eights, fifties, sixes, sevens, nines, twenty-fives and so on to hundreds, equal to equivalent to is the same as more, less most, least tally, many, odd, even multiple of, factor of, sequence, continue, predict, few, pattern, pair, rule, relationship, > greater than < less than. Roman numerals, integer, positive, negative, above/below zero, minus, negative numbers.

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Estimating:
Guess, how many..?, estimate, nearly, roughly, close to, approximate, approximately, about the same as, just over, just under, exact, exactly, too many, too few, enough, not enough, round, nearest, round to the nearest ten, hundred, round up round down.

Addition and subtraction:
Addition, add, more, and, make, sum, total, altogether, double, near double, half, halve, one more, two more….ten more…one hundred more, how many more to make?, how many more is…than…?, how much more is…?, one more, one less, ten less, one hundred less, how many fewer is…than…?, how much less is…? difference between, equals, is the same as, number bonds, pairs, facts, tens boundary, hundreds boundary, inverse.

Multiplication and Division
Multiplication, multiply, multiplied by, multiple, factor, groups of, times, product, once, twice, three times…ten times, repeated addition, division, dividing, divided by, divided into, grouping, sharing, share, share equally, left, left over, remainder, one each, two each, three each…ten each, group in pairs, threes,…tens, equal groups of, doubling, halving array, row, column, number patterns multiplication table, multiplication fact, division fact, inverse, square, squared, cube, cubed.

Mathematics in Year 5

Addition

In Year 5, children should be taught to use formal methods (columnar addition) to add numbers with more than 4 digits. These numbers may be decimals and may include different numbers of digits after the decimal place. They should be able to add increasingly large numbers mentally and use their addition skills to solve complex multi-step problems and use rounding to check the answers to their calculations.
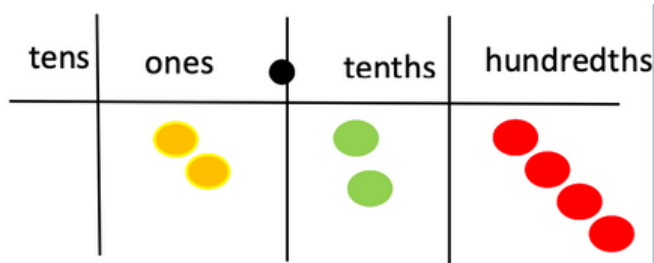
Children should be introduced to decimal place counters and model exchange for addition. They should then develop into working in the abstract.
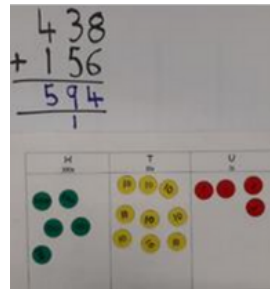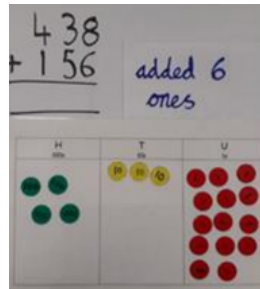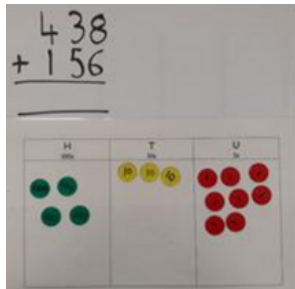
$$72.8$$
$$+\ 54.6$$
$$\overline{127.4}$$
$$1\ 1$$

Mathematics in Year 5

Subtraction

In Year 5, children should be able to use formal methods e.g. columnar subtraction to subtract numbers with more than 4 digits. These numbers may include decimals of differing sizes. They should be able to subtract increasingly large numbers mentally and use these skills to solve complex multi-step problems and use rounding to check answers to calculations.

Children can use counters as a visual representation to support them in developing their understanding of exchange within addition.
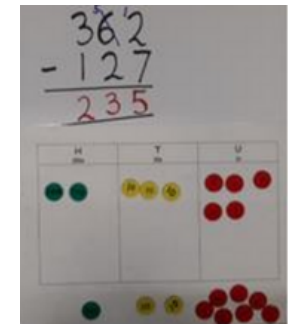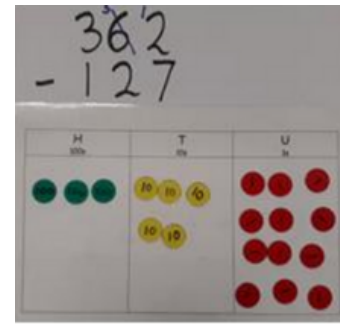
Children should then use formal written methods.

Children should become increasingly confident using the inverse and the rule of commutativity to solve missing number problems.

Mathematics in Year 5

Multiplication

In Year 5, children should be able to multiply numbers up to 4 digits by a one or two-digit number using a formal written method. They will be introduced to using long multiplication for two digit numbers. Children should be able to mentally multiple numbers drawing upon known facts.

Manipulatives may still be used with the corresponding long multiplication modelled alongside.
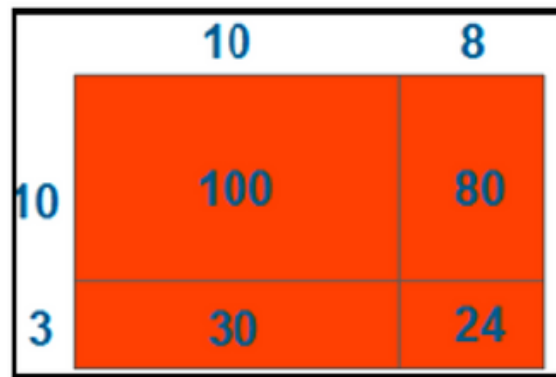
Children should then use formal written methods.

Children should be contining to learn to multiply and divide by 10 and 100. They can use a place value grid to support them in these calculations.

$$(1234 \times 6)$$
$$(1234 \times 10)$$

Mathematics in Year 5

Division

In Year 5 children should be able to divide numbers up to 4 digits by a one digit number using the formal written method of short division. They need to be able to interpret remainders depending on the context, either rounding up including the remainder or rounding down depending on the problem. They should be able to divide mentally using known facts.

$$\begin{array}{r} 0\ 9\ 4\ 8 \\ 4\overline{)\ 3^37\ ^19\ ^32\ } \end{array}$$

$$\begin{array}{r} 0\ 6\ 6\ 4\ r3 \\ 6\overline{)\ 3^39^37\ ^27\ } \end{array}$$

$$\begin{array}{r} 0\ 6\ 6\ 3\ r\ 5 \\ 8\overline{)\ 5^53\ ^50^29\ } \end{array}$$

Mathematics in Year 5

Number:
Number, numeral, zero, one, two, three ... twenty, teens numbers, eleven, twelve ... twenty, twenty-one, twenty-two ... one hundred, two hundred ... one thousand, ten thousand, hundred thousand, million, none, how many ...? count, count (up) to, count on (from, to), count back (from, to), forwards backwards, count in ones, twos, fives, tens, threes, fours eights, fifties, sixes, sevens, nines, twenty-fives and so on to hundreds, equal to equivalent to is the same as more, less most, least tally, many, odd, even multiple of, factor of, factor pair, sequence, continue, predict, few, pattern, pair, rule, relationship, > greater than < less than. Roman numerals, integer, positive, negative, above/below zero, minus, negative numbers, formula, divisibility, square number, prime number, ascending/descending order.

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Addition, add, more, and, make, sum, total, altogether, double, near double, half, halve, one more, two more....ten more...one hundred more, how many more to make?, how many more is...than...?, how much more is...?, one more, one less, ten less, one hundred less, how many fewer is...than...?, how much less is...? difference between, equals, is the same as, number bonds, pairs, facts, tens boundary, hundreds boundary, ones boundary, tenths boundary, inverse.

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Multiplication, multiply, multiplied by, multiple, factor, groups of, times, product, once, twice, three times...ten times, repeated addition, division, dividing, divided by, divided into, grouping, sharing, share, share equally, left, left over, remainder, one each, two each, three each...ten each, group in pairs, threes,...tens, equal groups of, doubling, halving array, row, column, number patterns multiplication table, multiplication fact, division fact, inverse, square, squared, cube, cubed.

Mathematics in Year 6

In Year 6, children will be consolidating their calculation methods from previous years. They will need to be able to accurately use all four operations with whole numbers and with fractions, quickly and accurately. They will need a clear understanding of when mental or written method is most appropriate, be able to interpret calculations in a range of challenging contexts and show mathematical fluency in their approach to problems. Children in Year 6 are also introduced to the idea of BODMAS (Brackets, Order, Division, Multiplication, Addition, Subtraction.)

Addition

In Year 6 children are expected to apply their column addition methods to a range of contexts and problems. They should be confident calculating different size whole numbers and decimals.

$$
\begin{array}{r}
3\ 4\ 8\ \cdot\ 5\ 6 \\
+\quad 2\ 8\ \cdot\ 9\ 8 \\
\hline
3\ 7\ 7\ \cdot\ 5\ 4 \\
\end{array}
$$

$$
\begin{array}{r}
8\ 1{,}0\ 5\ 9 \\
3{,}6\ 6\ 8 \\
1\ 5{,}3\ 0\ 1 \\
+\ 2\ 0{,}5\ 5\ 1 \\
\hline
1\ 2\ 0{,}5\ 7\ 9 \\
\end{array}
$$

$$
\begin{array}{r}
2\ 3\ \cdot\ 3\ 6\ 1 \\
9\ \cdot\ 0\ 8\ 0 \\
5\ 9\ \cdot\ 7\ 7\ 0 \\
+\quad 1\ \cdot\ 3\ 0\ 0 \\
\hline
9\ 3\ \cdot\ 5\ 1\ 1 \\
\end{array}
$$

They should be confident using zeros as place holders.

Mathematics in Year 6

Subtraction

In Year 6, children should be able to subtract whole numbers and decimal numbers efficiently using these skills confidently in a range of contexts.

$$
\begin{array}{r}
\cancel{1}\,\cancel{5}\,\cancel{0},6\,9\,9 \\
-\quad 8\,9,9\,4\,9 \\
\hline
6\,0,7\,5\,0
\end{array}
$$

$$
\begin{array}{r}
4\,\cancel{8}\,\cancel{3}\cdot\cancel{0}\,0 \\
-\quad\quad 4\,7\cdot 3\,2 \\
\hline
4\,3\,5\cdot 6\,8
\end{array}
$$

$$
\begin{array}{r}
\cancel{1}\,\cancel{0}\,5\cdot\cancel{4}\,1\,9\ \text{kg} \\
-\quad 3\,6\cdot 0\,8\,0\ \text{kg} \\
\hline
6\,9\cdot 3\,3\,9\ \text{kg}
\end{array}
$$

They should be confident using zeros as place holders.

Mathematics in Year 6

Multiplication

In Year 6, children will build upon their short and long multiplication skills they have encountered previously. They are expected to be able to multiply a 4-digit by a 2-digit number accurately. They should be able to use mental methods efficiently (for example to multiply multiples of 10 or multiply by a whole number by 10 or 100) and should use efficient methods to multiply decimals.

```
   3 2 8
     3 8
 ─────────
   2 6 2 4
   2 2 6
   9 8 4 0
     2
 ─────────
 1 2 4 6 4
```

```
    1 2 8 · 3
 x          7
 ──────────────
    8 9 8 · 1
    1 5 2
```

```
      3 · 1 9
 x    8
 ──────────────
    2 5 · 5 2
       1   7
```

Children need to remember that the single digits belong in the units column and line up the decimal points in the question and then calculate.

Mathematics in Year 6

Division

In Year 6, children will consolidate their understanding of the short written method of division. They will be introduced to and expected to use accurately, written long division, to divide a 4-digit number by a 2-digit number. They will continue to be encouraged to use mental methods using times tables or place value, where appropriate. Children will also need to use division to find decimal remainders and to support them in fiinding a decimal equivalent for a fraction.

```
   h  t  o
   0 4 1 R1
4 ) 1 6 5
```

4 does not go into 1 (hundred) so combine the 1 hundred and the 6 tens (160). 4 goes into 16 four times. 4 goes into 5 once, leaving a remainder

```
   th h t  o
   0 4 0 0 R7
8 ) 3 2 0 7
```

8 does not go into 3 of the thousands. (So combine the 3 thousands with the 2 hundreds (3200).
 8 goes into 32 4 times (3200÷8=400)
8 goes into 0 zero times (tens)
9 goes into 7 zero times and leaves a remainder of 7

Mathematics in Year 6

Long division:

1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
h t o 1 2)2 7 8	h t o 1 2)2 7 8 - 2 0	h t o 1 8 2)2 7 8 - 2 ↓ 0 7
Two goes into 2 one time, or 2 hundreds ÷ 2 = 1 hundred.	Multiply 1 × 2 = 2, write that 2 under the two, and subtract to find the remainder of zero.	Next, drop down the 7 of the tens next to the zero.

1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
h t o 1 3 9 2)2 7 8 - 2 0 7 - 6 1 8	h t o 1 3 9 2)2 7 8 - 2 0 7 - 6 1 8 - 1 8 0	h t o 1 3 9 2)2 7 8 - 2 0 7 - 6 1 8 - 1 8 0
Divide 2 into 18. Place 9 into the quotient.	Multiply 9 × 2 = 18, write that 18 under the 18, and subtract to find the remainder of zero.	There are no more digits to drop down. The quotient is 139.

Divide.	Multiply & subtract.	Drop down the next digit.
h t o 1 3 2)2 7 8 - 2 0 7	h t o 1 3 2)2 7 8 - 2 0 7 - 6 1	h t o 1 3 2)2 7 8 - 2 0 7 - 6 1 8
Divide 2 into 7. Place 3 into the quotient.	Multiply 3 × 2 = 6, write that 6 under the 7, and subtract to find the remainder of 1 ten.	Next, drop down the 8 of the ones next to the 1 leftover ten.

Mathematics in Year 6

Number:
Number, numeral, zero, one, two, three … twenty, teens numbers, eleven, twelve … twenty, twenty-one, twenty-two … one hundred, two hundred … one thousand, ten thousand, hundred thousand, million, none, how many …? count, count (up) to, count on (from, to), count back (from, to), forwards backwards, count in ones, twos, fives, tens, threes, fours eights, fifties, sixes, sevens, nines, twenty-fives and so on to hundreds, equal to equivalent to is the same as more, less most, least tally, many, odd, even multiple of, factor of, factor pair, sequence, continue, predict, few, pattern, pair, rule, relationship, > greater than < less than. Roman numerals, integer, positive, negative, above/below zero, minus, negative numbers, formula, divisibility, square number, prime number, ascending/descending order.

Place Value:
Ones, tens hundreds, digit, one, two or three digit number, place, place value, stands for, represents, exchange, the same number as, as many more, larger, bigger, greater, fewer, smaller, less, fewest, smallest, least, most, biggest, largest, greatest, one more, ten more, one hundred more, one thousand more, one less, ten less, one hundred less, one thousand less, equal to, compare, order, size, first, second, third… twentieth, twenty-first, twenty-second…,last, before, after, next, between, halfway between, above, below.

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Guess, how many..?, estimate, nearly, roughly, close to, approximate, approximately, about the same as, just over, just under, exact, exactly, too many, too few, enough, not enough, round, nearest, round to the nearest ten, hundred ,thousand, ten thousand, round up round down.

Addition and subtraction:
Addition, add, more, and, make, sum, total, altogether, double, near double, half, halve, one more, two more….ten more…one hundred more, how many more to make?, how many more is…than…?, how much more is…?, one more, one less, ten less, one hundred less, how many fewer is…than…?, how much less is…? difference between, equals, is the same as, number bonds, pairs, facts, tens boundary, hundreds boundary, ones boundary, tenths boundary, inverse.

Multiplication and Division
Multiplication, multiply, multiplied by, multiple, factor, groups of, times, product, once, twice, three times…ten times, repeated addition, division, dividing, divided by, divided into, grouping, sharing, share, share equally, left, left over, remainder, one each, two each, three each…ten each, group in pairs, threes,…tens, equal groups of, doubling, halving array, row, column, number patterns multiplication table, multiplication fact, division fact, inverse, square, squared, cube, cubed.

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