

EARLY YEARS

EYFS Addition

Early learning goals:

- Verbally count beyond 20, recognising the pattern of the counting system.
- Subitise (recognising quantities without counting) up to 5.
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
- Have a deep understanding of numbers to 10, including the composition of each number.
- Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 and some number bonds to 10, including double facts.
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed evenly.

Count objects, actions and sounds
Count beyond 20, recognising the pattern
Subitise
Link number symbol with its cardinal number value.

Count on in ones and say which number is one more/ one less.
Have an understanding of numbers to 5 then 10, including the composition of each number.

Begin to relate addition to combining two groups of objects using practical resources, role play, stories and songs.
Recall number bonds for 0-5 and some to 10, including double facts.

Know that counting on is a strategy for addition. Use numbered number lines/ tracks to 10 (or 20) and tens frames.

1 one (red dot)
 2 two (two yellow stars)
 3 three (three yellow triangles)
 4 four (four green squares)
 5 five (five blue hexagons)
 6 six (six purple hexagons)
 7 seven (seven pink circles)
 8 eight (eight pink circles)
 9 nine (nine grey squares)

Numicon blocks: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Number line: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Two hands showing the number 2.

Children can begin to combine groups of objects using concrete apparatus:



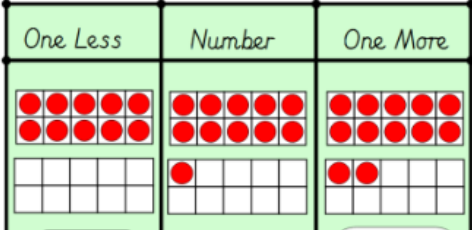
$3 + 2 = 5$

Construct number sentences verbally or using cards/magnetic numbers to go with practical activities.
 Children are encouraged to read number sentences aloud in different ways:

- “Three add two equals 5”
- “5 is equal to three and two”

8 and two more.

Vertical number line with numbers 2, 3, 4, 5, 6.

<p>shapes are introduced straight away and be used to:</p> <ul style="list-style-type: none"> • identify 1 more/less • combine pieces to add • find number bonds • add on without re-counting 	<p>Number tracks can be introduced to count up on and to find one more:</p> <p>What is 1 more than 4? </p> <p>1 more than 13?</p>  <p><i>One more than 4 is 5.</i></p> <p>Moving on to numbers within 20.</p> 	<ul style="list-style-type: none"> • “5 is the same as three and two” <p>Children may a record in pictures, words or symbols of addition activities.</p>	
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EYFS Subtraction

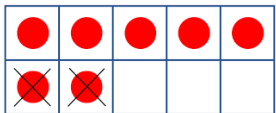
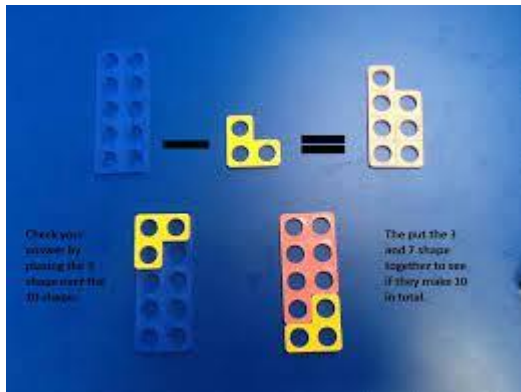
Early learning goals:

- Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed evenly.
- Say which number is one less than a given number.

<p>Say which number is one less than a given number using a number line or number track to 10 (some to 20).</p>	<p>Begin to count backwards in familiar contexts such as number rhymes or stories.</p>	<p>Begin to relate subtraction to ‘taking away’ using concrete objects and role play.</p>	<p>Count backwards along a number line to ‘take away’</p>
<p>Number tracks can be introduced to count back and to find one less: What is 1 less than 9?</p>		<p>Concrete apparatus are used to relate subtraction to taking away and counting how many objects are left.</p>	<p>Physically jump back on a number line.</p>

1 less than 20?

Numicon and tens frames support subtraction.



Children can count abstract things that cannot be touched, moved or seen e.g. claps, drum beats etc.

Concrete apparatus models the subtraction of 2 objects from a set of 5.

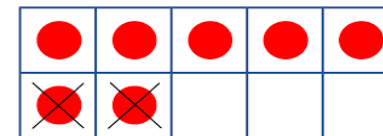


Construct number sentences verbally or using cards to go with practical activities.



Children are encouraged to read sentences aloud in different ways "five subtract one leaves four" "four is equal to five subtract one" "four is the same as five subtract one".

Solve simple problems using fingers.



EYFS Multiplication and Division

Early learning goals:

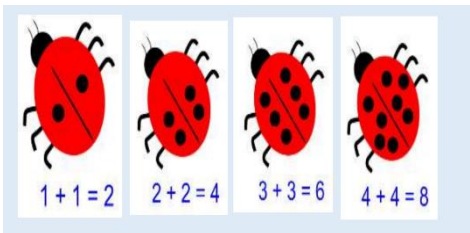
- They solve problems, including doubling, halving and sharing
- They solve problems, including halving and sharing.

Use pictorial representations and concrete resources to double numbers to 10.

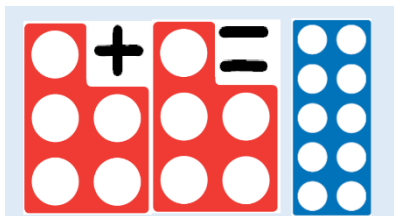
Use concrete sources, role play, stories and songs to begin counting in twos.

Use pictorial representations and concrete resources to halve numbers to 10.

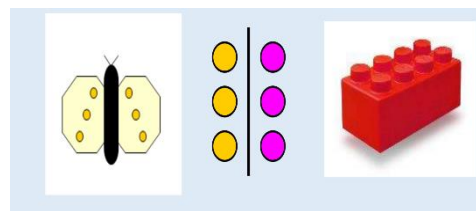
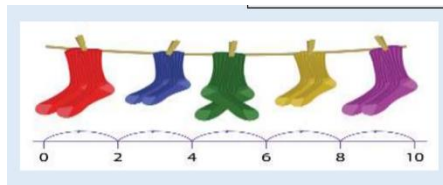
Begin to share quantities using practical resources, role play, stories and songs.



The link between addition and multiplication can be introduced through doubling.



'I have 5 pairs of socks on this line. How many socks do I have altogether?'

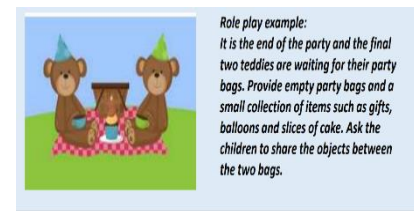


"I have got a sandwich to share between two people.



Can you cut the sandwich in half?"

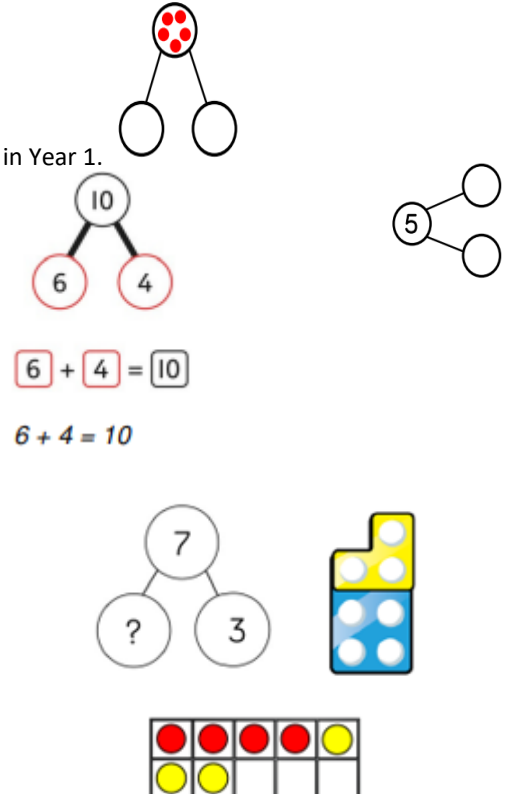
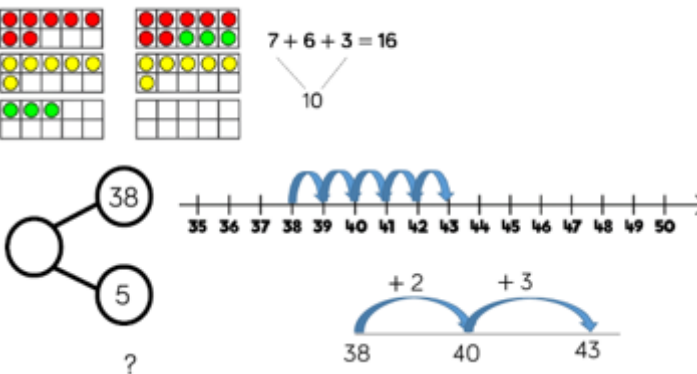


Children have a go at recording the calculation that has been carried out: e.g. by drawing pictures in groups or by arranging concrete apparatus into groups.



*Role play example:
It is the end of the party and the final two teddies are waiting for their party bags. Provide empty party bags and a small collection of items such as gifts, balloons and slices of cake. Ask the children to share the objects between the two bags.*

Sharing model:
I have 8 sweets. I want to share them with my friend. How many will we have each?

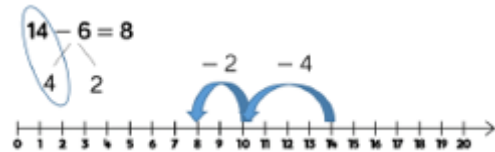
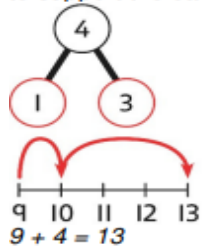
Key Stage 1 and 2

	Year 1	Year 2	Year 3
Addition	<p>Pupils memorise and reason with number bonds to 10 and 20 in several forms.</p>	<p>Practice addition to 20 and become increasing fluent in deriving facts.</p>	<p>I can add numbers with up to three digits using formal written methods.</p>
	<p>Complete the part whole models by using then drawing the counters- finishing with writing the numerals. Linking to bar modelling</p>  <p>in Year 1.</p> <p>$6 + 4 = 10$</p> <p>$6 + 4 = 10$</p>	<p>Methods taught in Year 1 should continue to be used to consolidate learning and understanding in Year 2.</p> <p><u>Continue to use number lines</u> to develop understanding of:</p>  <p>$7 + 6 + 3 = 16$</p> <p>$38 + 5 = ?$</p> <p><u>Partitioning and bridging through 10.</u></p> <p>The steps in addition often bridge through a multiple of 10 e.g. Children should be able to partition the 7 to relate adding the 2 and then the 5.</p> <p>$8 + 7 = 15$</p> <p><u>Adding two two digit numbers.</u></p>	<p>Pupil needing to use number lines from Year 2 into 3 should continue to do so depending on their ability.</p> <p>Using base 10 apparatus for addition: E.g $245 + 7 =$</p>  <p>Using number lines: E.g $346 + 7 =$</p>  <p><u>Towards a Written Method</u></p>

Understanding of counting on with a number track and using concrete resources.

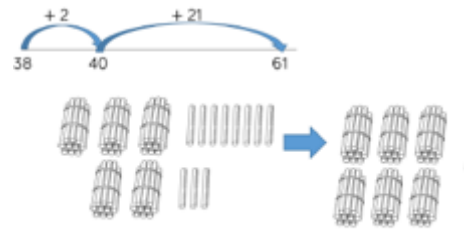
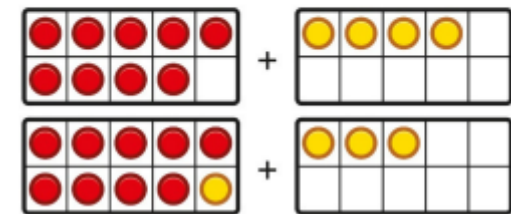
Bridging the 10 using number bonds

Use a part-whole model and a number line to support the calculation.

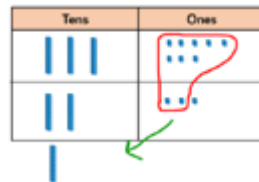


Bridging the 10 using number bonds

Children use counters to complete a ten frame and understand how they can add using knowledge of number bonds to 10.



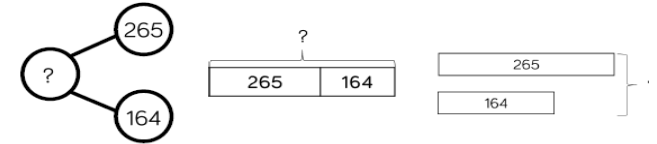
$38 + 23 = 61$



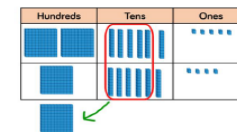
$$\begin{array}{r} 38 \\ + 23 \\ \hline 61 \end{array}$$



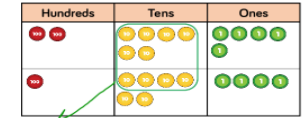
Introduce column addition modelled with place value counters or Dienes.



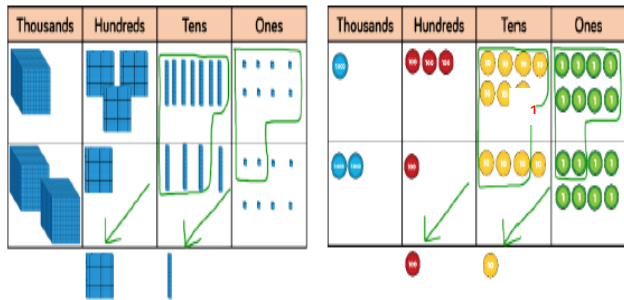
$265 + 164 = 429$



$$\begin{array}{r} 265 \\ + 164 \\ \hline 429 \end{array}$$



	Year 4	Year 5	Year 6
Addition	Pupils continue to practise mental methods with increasingly large numbers using models and images to help them.	Pupils continue to practise mental methods with increasingly large numbers using models and images to help them.	Pupils continue to practise mental methods with increasingly large numbers using models and images to help them.
	Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.	Written methods (progressing to more than 4-digits)	Written methods As year 5, progressing to larger numbers, aiming for both conceptual understanding and procedural fluency with columnar method to be



1	3	7	8	
+	2	1	4	8
3	5	2	6	
		1	1	

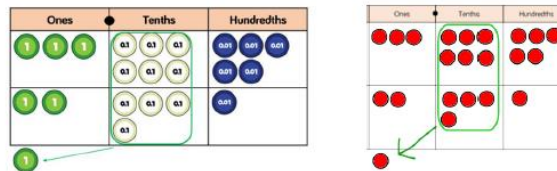
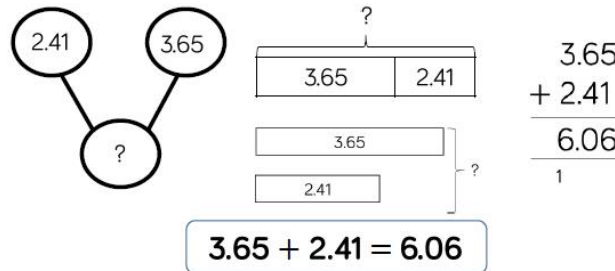
Find the missing numbers.
What methods did you use?

3465	
2980	



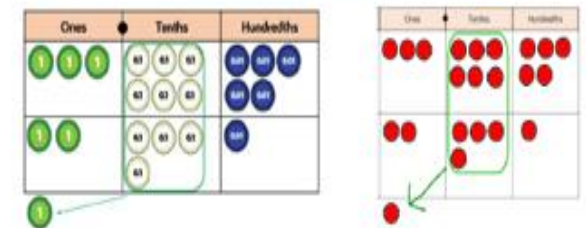
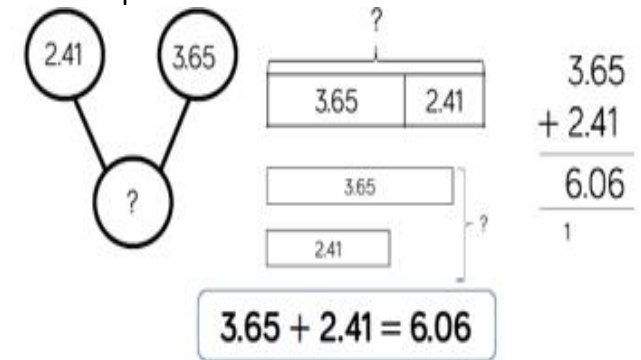
Extend to up to two places of decimals (same number of decimal places) and adding several numbers (with different numbers of digits).

As Year 4, progressing when understanding of the expanded method is secure, children will move on to the formal column method for whole numbers and decimal numbers as an efficient written algorithm.



+

secured. Continue calculating with decimals, including those with different numbers of decimal places



Line up the decimal points

$$\begin{array}{r} 22.3 \\ + 34.1 \\ \hline 56.4 \end{array}$$

Line up the decimal points

$$\begin{array}{r} 1.234 \\ + 4.1 \\ \hline 5.334 \end{array}$$

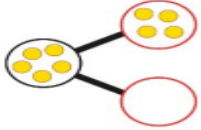
$$\begin{array}{r} 3.452 \\ 9.74 \\ \hline 29.338 + \end{array}$$

Pupils will also learn to add three decimal numbers. Ensure children know when and how to insert a 'place holder' (zero) to ensure the digits are inline.

Year 1

Pupils memorise and reason with number bonds in several forms ($16 - 7 = 9$ $7 = 16 - 9$)

Finding a missing part, given a whole and a part
Children represent a whole and a part and understand how to find the missing part by subtraction.



$$\boxed{5} - \boxed{4} = \boxed{}$$

Finding the difference

Arrange two groups so that the difference between the groups can be worked out.



8 is 2 more than 6.
6 is 2 less than 8.
The difference between 8 and 6 is 2.

Subtraction within 20

Understand when and how to subtract 1s efficiently.

Use a bead string to subtract 1s efficiently.



$$5 - 3 = 2$$

$$15 - 3 = 12$$

Subtracting 10s and 1s

For example: $18 - 12$

Subtract 12 by first subtracting the 10, then the remaining 2.



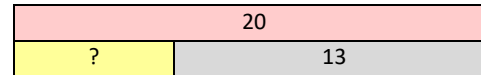
First subtract the 10, then take away 2.

Year 2

Practise subtraction to 20 becoming increasingly fluent in deriving facts (such as; $10 - 7 = 3$ $7 = 10 - 3$ to calculate $100 - 70 = 30$ $70 = 100 - 30$)

Missing number problems e.g. $52 - 8 = \square$; $\square - 20 = 25$; $22 = \square - 21$; $6 + \square + 3 = 11$

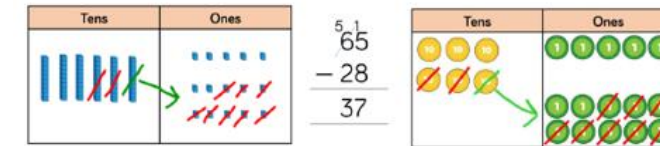
$$20 - ? = 13$$



Use number lines to model take-away and difference. E.g.

Written methods (progressing to 2-digits)

Introduce column subtraction modelled with place value counters or Dienes.



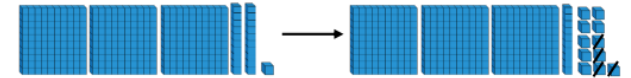
Year 3

Practise solving varied subtraction questions – calculations with two digit numbers, the answers exceed 100.

Pupil needing to use number lines from Year 2 into 3 should continue to do so depending on their ability.

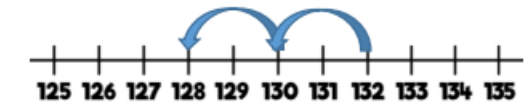
Using base 10 apparatus for subtraction:

E.g. $321 - 4 =$



Using number lines:

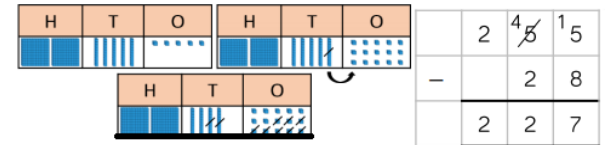
E.g. $132 - 4 =$



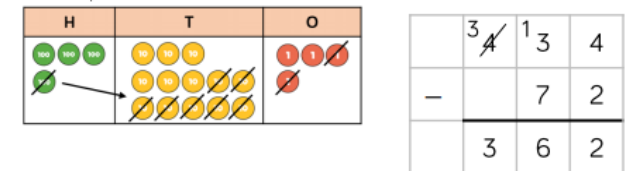
Written methods (progressing to 3-digits)

Introduce column subtraction modelled with place value counters or Dienes.

e.g. $255 - 28 =$



e.g. $434 - 72 =$



Year 4

Pupils continue to practise mental methods with increasingly large numbers using models and images to help them.

Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.

Th	H	T	O

	Th	H	T	O
	3	4	5	4
-	1	2	2	4
	2	2	3	0

874 - 523 becomes

$$\begin{array}{r} 874 \\ - 523 \\ \hline 351 \end{array}$$

Answer: 351

932 - 457 becomes

$$\begin{array}{r} 932 \\ - 457 \\ \hline 475 \end{array}$$

Answer: 475

932 - 457 becomes

$$\begin{array}{r} 932 \\ - 457 \\ \hline 475 \end{array}$$

Answer: 475

Extend to up to two places of decimals (same number of decimal places) and adding several numbers (with different numbers of digits).

	T	Th	H	T	O
	4	3	5	7	

	T	Th	H	T	O
	2	7	3	5	
-					
	2	7	3	5	

Year 5

Pupils continue to practise mental methods with increasingly large numbers using models and images to help them.

Written methods (progressing to more than 4-digits)

As Year 4, progressing when understanding of the expanded method is secure, children will move on to the formal column method for whole numbers and decimal numbers as an efficient written algorithm.

	T	Th	Th	H	T	O
	7	4	5	1	5	2
-	2	2	6	2	3	
	5	2	9	0	9	

Year 6

Pupils continue to practise mental methods with increasingly large numbers using models and images to help them.

Written methods

As year 5, progressing to larger numbers, aiming for both conceptual understanding and procedural fluency with columnar method to be secured.

Continue calculating with decimals, including those with different numbers of decimal places

HTh	TTh	Th	H	T	O

$$\begin{array}{r}
 \overset{3}{4}\overset{1}{3}57 \\
 - 2735 \\
 \hline
 1622
 \end{array}$$

Ensure children know when and how to insert a 'place holder' (zero) to ensure the digits are inline.

Line up the decimal points

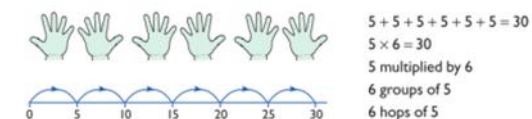
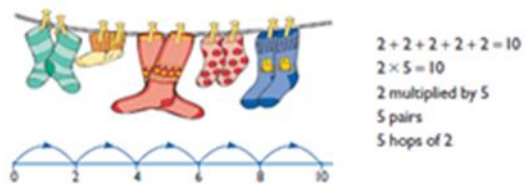
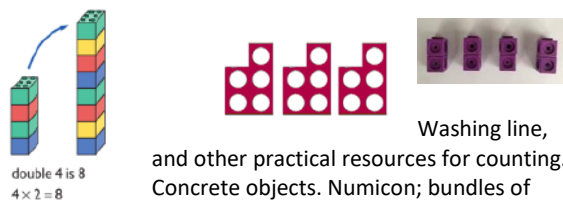
$$\begin{array}{r}
 \downarrow \\
 4.321 \\
 - 4.1 \\
 \hline
 0.221
 \end{array}$$

	2	9	3	¹ 3	8	2
-	1	8	2	5	0	1
	1	1	1	8	8	1

Year 1

Through grouping and sharing small quantities, pupils begin to understand doubling numbers and quantities. The children can count in twos, fives and tens.

Understand multiplication is related to doubling and combing groups of the same size (repeated addition)



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Problem solving with concrete objects (including money and measures. Use cuisenaire rods and numicon to develop the vocabulary relating to 'times'.

Year 2

Children practise and become fluent in the 2, 5 and 10 multiplication tables. They connect the 10 multiplication table to place value.

Expressing multiplication as a number sentence using x
Using understanding of the inverse and practical resources to solve missing number problems.

$7 \times 2 = \square$ $\square = 2 \times 7$
 $7 \times \square = 14$ $14 = \square \times 7$
 $\square \times 2 = 14$ $14 = 2 \times \square$
 $\square \times \square = 14$ $14 = \square \times \square$



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Develop understanding of multiplication using array and number lines (see Year 1). Include multiplications not in the 2, 5 or 10 times tables. Begin to develop understanding of multiplication as scaling (3 times bigger/taller).

$5 + 5 + 5 = 15$
 $3 + 3 + 3 + 3 + 3 = 15$
 $5 \times 3 = 15$
 $3 \times 5 = 15$

Year 3

Practise their recall of multiplication tables and through doubling they connect the 2, 4 and 8 multiplication tables.

Doubling 2 digit numbers using partitioning – using jottings from Year 2.

Written methods (progressing to 2d x 1d)

Developing written methods using understanding of visual images.

	H	T	O	
		3	4	
x			5	
				(5 x 4)
		2	0	
+	1	5	0	(5 x 30)
	1	7	0	

$34 \times 5 = 170$

	H	T	O
		3	4
x			5
	1	7	0

	Hundreds	Tens	Ones
		3	4
x			5
	1	7	0

Year 4

Recall all multiplication facts up to 12×12 . Counting in multiples of 6, 7, 9, 25 and 1000, and steps of $1/100$. Solving practical problems where children need to scale up. Relate to known number facts. (E.g. how tall would a 25cm sunflower be if it grew 6 times taller).

Begin by using counting objects and resources.

$245 \times 4 = 980$

H	T	O
2	4	5
x		
9	8	0
	1	2

$126 \times 3 =$

Hundreds	Tens	Units
100	20	6
100	20	6
100	20	6

Leading to expanded vertical method and then compact vertical method.

126
x 3
18 (3 x 6)
60 (3 x 20)
300 (3 x 100)
378

126
x 3
378
1

It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.

Year 5

Identify multiples and factors and factor pairs of numbers. Know and use prime numbers and prime factors. Recognise squared and cubed numbers (using the correct notation).

$1,826 \times 3 = 5,478$

$1,826 \times 3 = 5,478$

Th	H	T	O
1	8	2	6
x			
			3
5	4	7	8
	2		1

Year 6

Undertake mental multiplications with increasingly hard numbers and decimals. Continue to use all multiplication facts to aid fluency.

Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the efficient written method of long multiplication. Start with long multiplication, reminding the children about lining up their numbers clearly in columns.

Compact Vertical Method

$1,826 \times 3 = 5,478$

	Th	H	T	O
	1	8	2	6
x				3
	5	4	7	8
		2		1

$2,739 \times 28 = 76,692$

TTh	Th	H	T	O
	2	7	3	9
x			2	8
2	1	9	1	2
2	5	3	7	
1	5	4	7	8
		1		
7	6	6	9	2
				1

Year 1

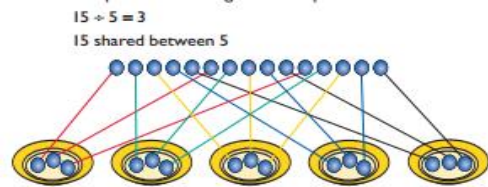
Through sharing small quantities, children begin to understand division, and finding simple fractions of amounts and quantities.

Children must have secure counting skills- being able to confidently count in 2s, 5s and 10s. Children should be given opportunities to reason about what they notice in number patterns.

Group AND share small quantities- understanding the difference between the two concepts.

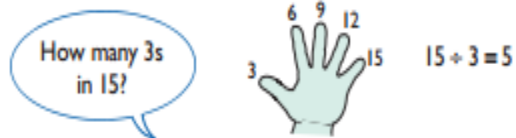
Sharing

Develops importance of one-to-one correspondence.



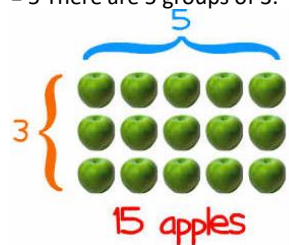
Grouping

Children should apply their counting skills to develop some understanding of grouping.



Arrays

Use of arrays as a pictorial representation for division. 15 ÷ 3 = 5 There are 5 groups of 3.

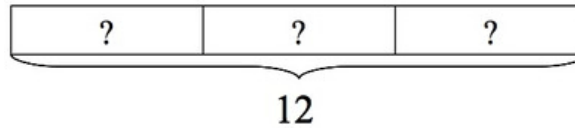


Year 2

Children practise and become fluent in their recall of the 2, 5 and 10 division facts.

Sharing using a bar model

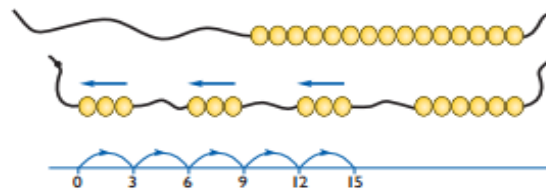
12 ÷ 3 = ?



Grouping on a number line

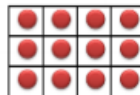
Group from zero in jumps of the divisor to find our 'how many groups of 3 are there in 15?'

15 divided by 3



Arrays

Continue work on arrays. Support children to understand how multiplication and division are inverse. Look at an array – what do you see?



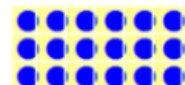
$3 \times 4 = 12$

$12 \div 4 = 3$

Missing number problems.



$20 = \square \times 5$



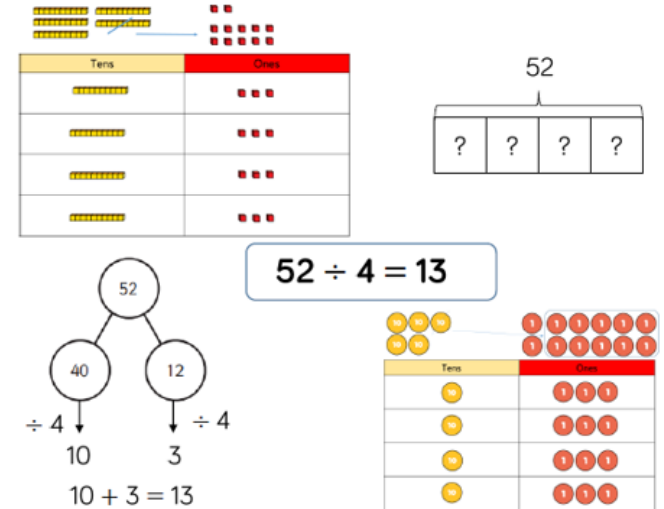
$3 = \square \div 6$

Year 3

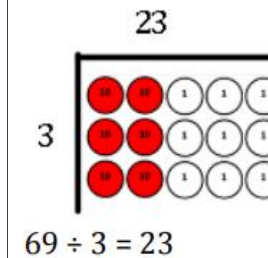
Children practise and become fluent in the recall of the 2, 3, 4 and 8 division facts.

Becoming more efficient using a numberline

Children need to be able to partition the dividend in different ways eg. Dividing the tens and exchanging the remainder into ones.



Extending divisions to resemble written method of short division.



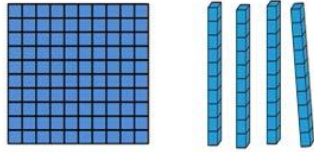
Progressing to the formal written method of short division:

$$\begin{array}{r} 23 \\ 3 \overline{)69} \end{array}$$

Year 4

Children should know all the division facts up to 12 x 12

Use base 10 blocks to divide by 10
 $140 \div 10 = 14$



Grouping/sharing PV counters are used to make the link with short division.

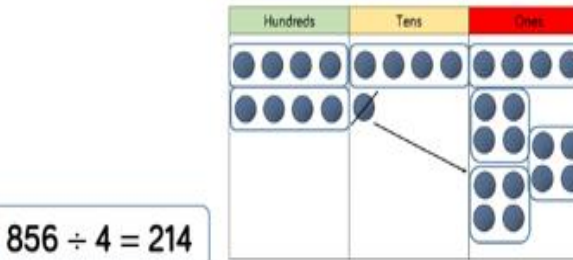
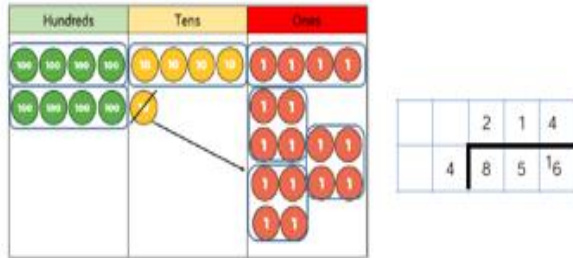
Leads directly onto:

$$\begin{array}{r} 023 \\ 6 \overline{)138} \\ \underline{6} \\ 13 \\ \underline{12} \\ 18 \\ \underline{18} \\ 0 \end{array}$$

$138 \div 6 = 23$

Year 5

Undertake mental divisions with increasingly larger numbers and decimals.



$856 \div 4 = 214$

Showing remainder as a whole number:

$$\begin{array}{r} 858 \text{ r } 2 \\ 3 \overline{)2576} \\ \underline{9} \\ 15 \\ \underline{15} \\ 7 \\ \underline{6} \\ 16 \\ \underline{15} \\ 1 \end{array}$$

Answer: 858 remainder 2

Showing remainder as a fraction:

$$\begin{array}{r} 858 \text{ r } 2 \\ 3 \overline{)2576} \\ \underline{9} \\ 15 \\ \underline{15} \\ 7 \\ \underline{6} \\ 16 \\ \underline{15} \\ 1 \end{array}$$

Answer: $858 \frac{2}{3}$
 (remainder as fraction optional).

Year 6

Undertake mental divisions with increasingly hard numbers and decimals.

\div = signs and missing numbers

Continue using a range of equations but with appropriate numbers

Sharing and Grouping and using a number line

Children will continue to explore division as sharing and grouping, and to represent calculations on a number line as appropriate.

Remainders should be expressed as decimals and fractions.

	0	3	6
12	4	4	7
		3	2

$432 \div 12 = 36$

Long Division

$7,335 \div 15 = 489$

	0	4	8	9
15	7	7	13	13
		3	3	5

15	30	45	60	75	90	105	120	135	150
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