EMMAUS
CATHOLIC MAC
Our journey with Christ

Written Calculation Policy for Mathematics

Key vocabulary for + - X ÷ written calculations

Addition	Subtraction	Multiplication	Division	Equals
Add	Between	Altogether	divide into	Balance
And	difference	Arrays	divide by	Equals to
Addition	decrease	By	divisible by	Equivalent
Altogether	fewer	groups of	division	Same as
Increase	inverse of +	inverse of ÷	half	Same value
inverse of –	minus	lots of	inverse of x	
make	subtract	multiply	remainder	
more	subtraction	multiply by	quotient	
plus	take away	multiple of	share equally	
sum	less than	product		
total		times		
		twice/double etc		

Early Years Foundation Stage (based on statutory framework for the early years foundation stage 2021)			
Addition	**Subtraction**	**Multiplication**	**Division**
Count sets of objects reliably up to twenty. Combining two parts to make a whole. Start at a bigger number and count on. Regrouping to make ten (number bonds)	Taking away ones Counting back Finding a missing part, given a whole and a part. Subtracting within 10	Double a number up to 10 Counting in 2s, 5s and 10s up to 20	Sharing objects up to 10 equally

ELG: Number: Children at the expected level of development will:

- Have a deep understanding of number to 10, including the composition of each number; 14

- Subitise (recognise quantities without counting) up to 5;

- 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.

ELG: Numerical Patterns: Children at the expected level of development will:

- Verbally count beyond 20, recognising the pattern of the counting system;

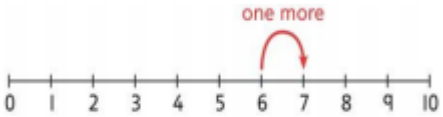
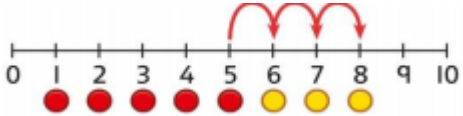
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;

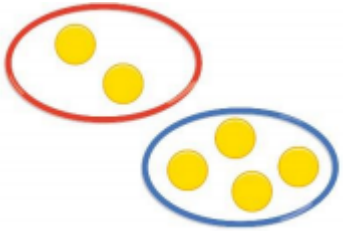
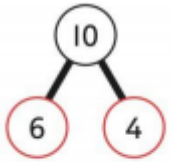
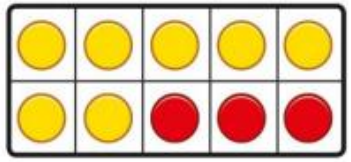
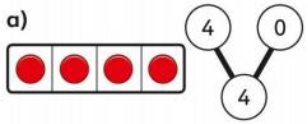
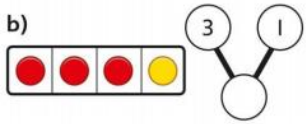
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

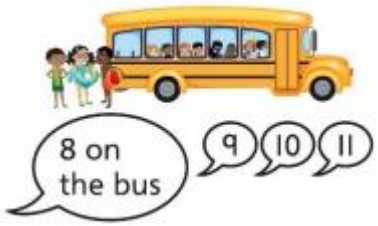
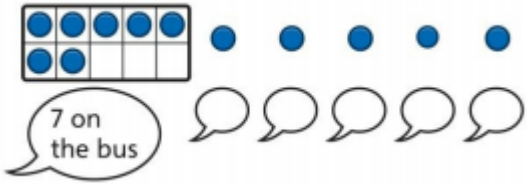
Mathematics

Mathematics Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

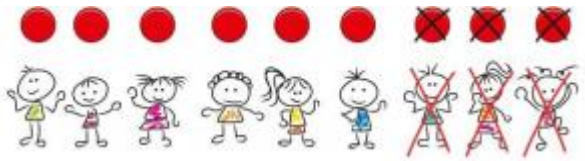
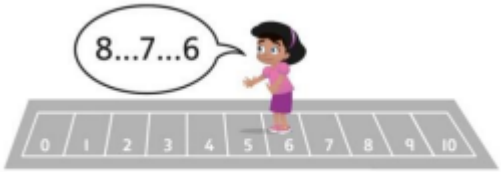
Addition +

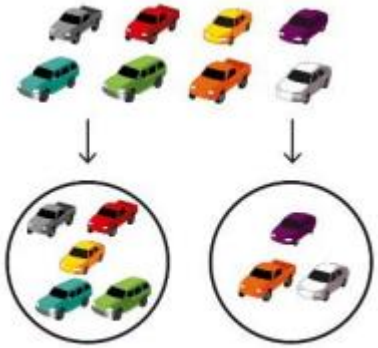
	Concrete	Pictorial	Abstract
	➢ These are visual images of the actual resources to use within the classroom. ➢ Use a range of different practical resources. (e.g.base 10, place value counters, straws)	➢ These are pictorial representations that may appear in pupil's work. ➢ These can also be completed practically when needed.	➢ These can be number lines, bar models, Part-part whole, formal methods
Counting and adding more			
EYFS	Children add one more person or object to a group to find one more.   Use a range of resources e.g. cars, eggs, shells, teddy bears.	Children add one more cube or counter to a group to represent one more  One more than 4 is 5.	Use a number line to understand how to link counting on with finding one more  One more than 6 is 7. 7 is one more than 6. Learn to link counting on with adding more than one.  5 + 3 = 8

Understanding part-part-whole relationship			
EYFS	Sort people and objects into parts and understand the relationship with the whole.  The parts are 2 and 4. The whole is 6.	Children draw to represent the parts and understand the relationship with the whole.  The parts are 1 and 5. The whole is 6.	Use a part-whole model to represent the numbers.   *6 + 4 = 10*
Knowing and finding number bonds within 10			
EYFS	Break apart a group and put back together to find and form number bonds.  3 + 4 = 7  6 = 2 + 4	Knowing and finding number bonds within 10 Use five and ten frames to represent key number bonds.  5 = 4 + 1  10 = 7 + 3	Use a part-whole model alongside other representations to find number bonds. Make sure to include examples where one of the parts is zero.   4 + 0 = 4 3 + 1 = 4

Adding by counting on			
EYFS	Children use knowledge of counting to 20 to find a total by counting on using people or objects 	Children use counters to support and represent their counting on strategy. 	

Subtraction -

	Concrete	Pictorial	Abstract
	➢ These are visual images of the actual resources to use within the classroom. ➢ Use a range of different practical resources. (e.g.base 10, place value counters, straws)	➢ These are pictorial representations that may appear in pupil's work. ➢ These can also be completed practically when needed.	➢ These can be number lines, bar models, Part-part whole, formal methods
Counting back and taking away			
EYFS	Children arrange objects and remove to find how many are left.  1 less than 6 is 5. 6 subtract 1 is 5.	Children draw and cross out or use counters to represent objects from a problem.  9 – ☐ = ☐ There are ☐ children left.	Children count back to take away and use a number line or number track to support the method.  *9 – 3 = 6*

Finding a missing part, given a whole and a part			
EYFS	Children separate a whole into parts and understand how one part can be found by subtraction  8 – 5 = ?		
Subtraction within 10			
EYFS	Understand when and how to subtract 1s efficiently. Use a bead string to subtract 1s efficiently.  5 – 3 = 2	Understand when and how to subtract 1s efficiently.  5 – 3 = 2	Understand how to use knowledge of bonds within 10 to subtract efficiently. 5 – 3 = 2

Multiplication X and Division ÷

Concrete	Pictorial	Abstract
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Grouping

EYFS

Learn to make equal groups from a whole and find how many equal groups of a certain size can be made. Sort a whole set people and objects into equal groups.

There are 10 children altogether.
There are 2 in each group.
There are 5 groups.

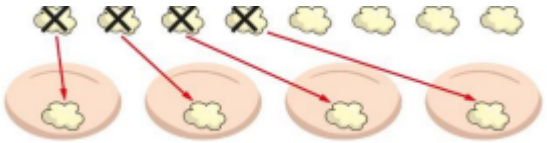
Represent a whole and work out how many equal groups.

There are 10 in total.
There are 5 in each group.
There are 2 groups.

Sharing

EYFS

Share a set of objects into equal parts and work out how many are in each part.



Progression in Maths	National Curriculum Expectations - Addition and Subtraction					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Calculation Methods (formal and informal)	add and subtract one-digit and two-digit numbers to 20, including zero	add and subtract numbers using concrete objects, pictorial representations, and mentally, including: * a two-digit number and ones * a two-digit number and tens * two two-digit numbers * adding three one-digit numbers	add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction	add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate	add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) (extend this to decimals)	
Mental Methods			add and subtract numbers mentally, including: * a three-digit number and ones * a three-digit number and tens * a three-digit number and hundreds			
Understanding addition and subtraction	read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs	show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot				
Addition and subtraction facts	represent and use number bonds and related subtraction facts within 20	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100				
Problem Solving	solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = □ - 9	solve problems with addition and subtraction: * using concrete objects and pictorial representations, including those involving numbers, quantities and measures * applying their increasing knowledge of mental and written methods	solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction	solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Addition +

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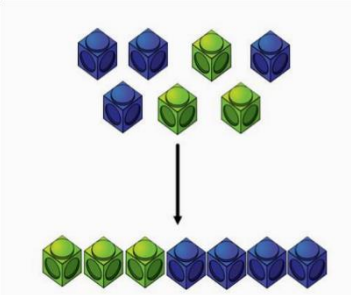
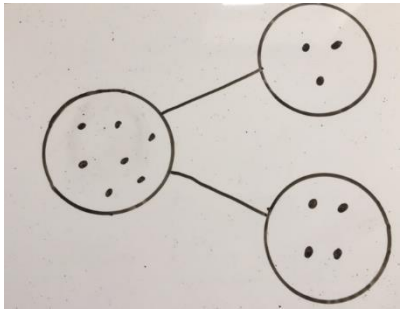
Combining two parts to make a whole

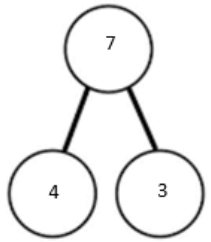
Year 1



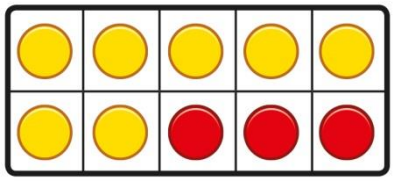
Use a range of resources e.g. cars, eggs, shells, teddy bears.



Pupils to represent the cubes using dots or crosses. They could put each part on a part whole model too.



4 + 3 = 7
Four is a part, 3 is a part and the whole is seven.



Counting on

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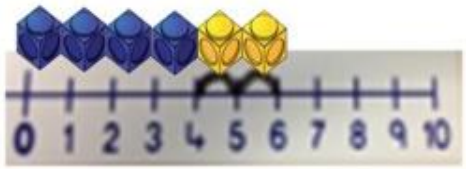
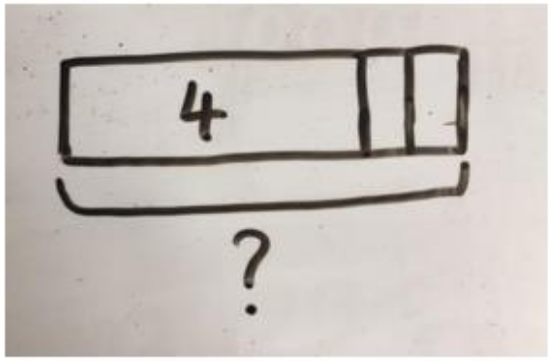
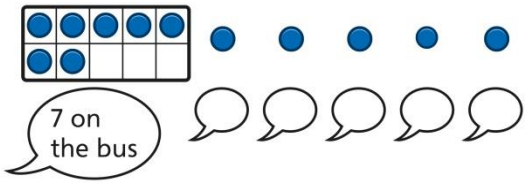
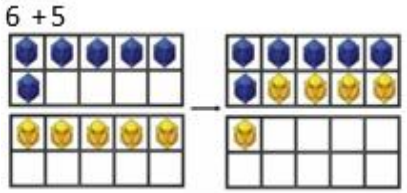
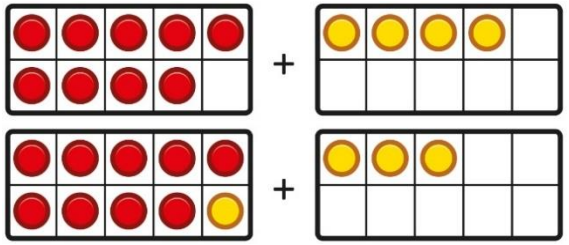
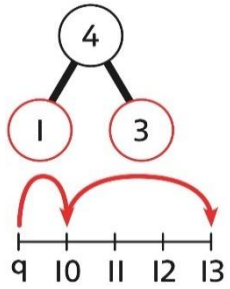
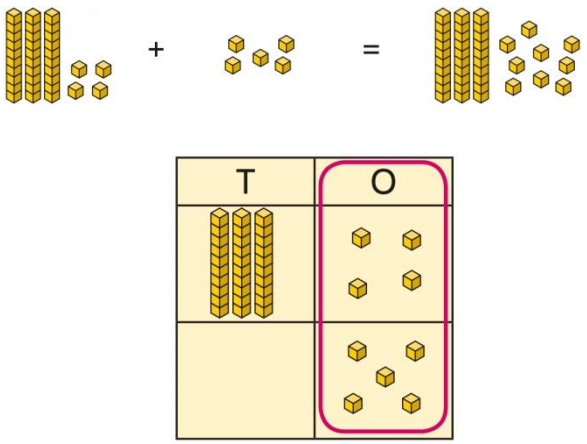
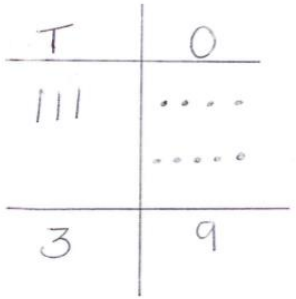
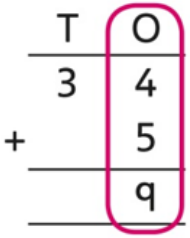
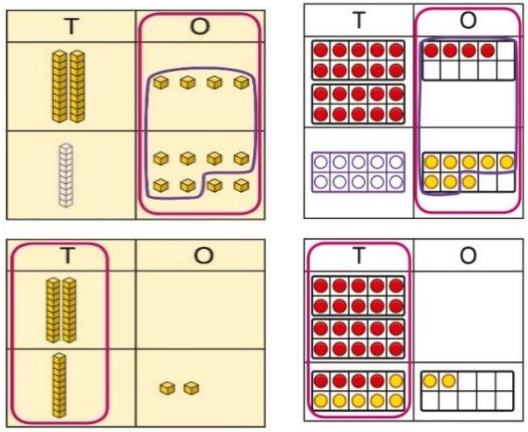
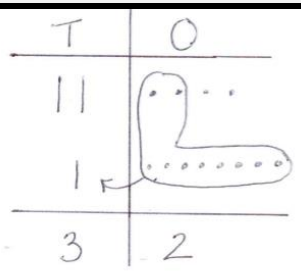
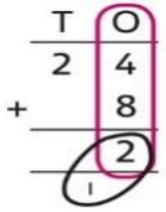
<tr><td rowspan="2">Year 1</td><td> 
</td><td> 

A bar model encourages the pupils to count on rather than count all.</td><td rowspan="2"> 

4 + 2
What is 2 more than 4?
What is the sum of 2 and 4?
What is the total of 4 and 2?</td></tr>
<tr><td>  </td><td> 
</td></tr>
<tr><td colspan="4">Bridging 10 using number bonds</td></tr>
<tr><td rowspan="2">Year 1</td><td> 
</td><td> 
Pupils can draw the ten frame and counters.</td><td rowspan="2"> 

9 + 4 = 13
Use a part whole model to support the calculation.</td></tr>
<tr><td> 
7 and 3 makes 10. So, 7 and 5 is 10 and 2 more.</td></tr>
<tr><td colspan="4">TO + O without exchange</td></tr>
</table>

Year 2	 Continue to develop understanding of partitioning and place value. 34 + 5= 39	 34 + 5= 39 Pupils to represent the base 10 e.g. lines for tens and dot/crosses for ones.	
TO + O with exchange			
Year 2	 24 + 8 = 32	 24 + 8 = 32 Pupils to represent the base 10 in a place value chart, circling when they make an exchange.	 
TO + TO without exchange			

<table>
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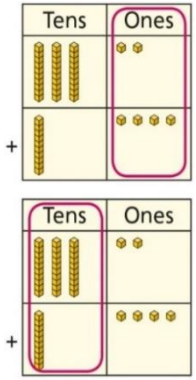
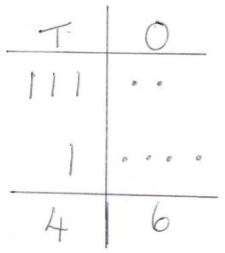
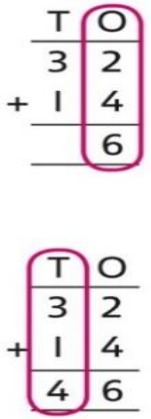
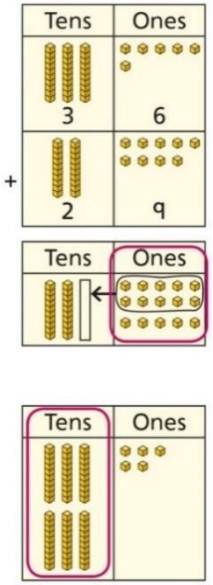
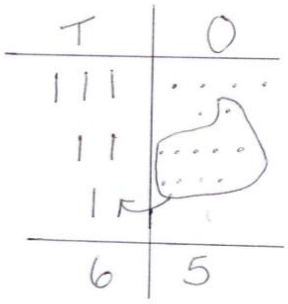
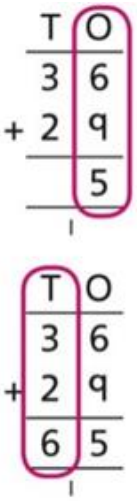
<td> 

32 + 14 = 46
Add the 1s then add the 10s.</td>
<td> 

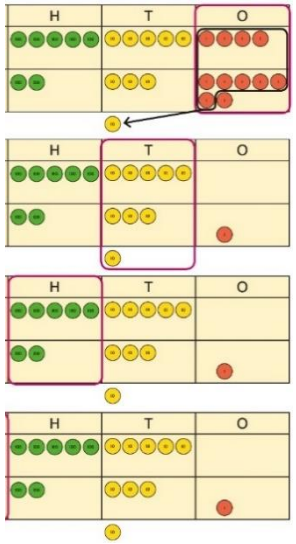
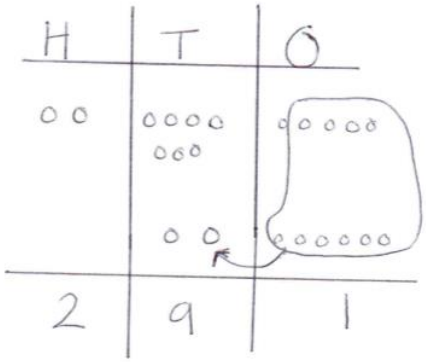
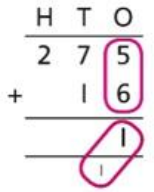
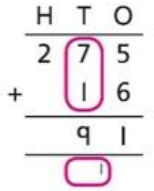
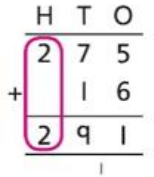
32 + 14 = 46
Pupils to represent the base 10 e.g. lines for tens and dot/crosses for ones.</td>
<td> 

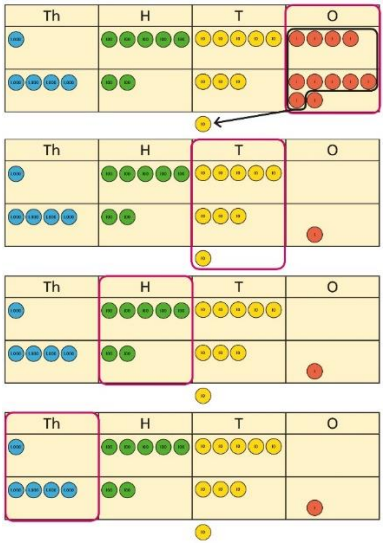
Add the 1s then add the 10s.</td>
</tr>
<tr><td colspan="4">TO + TO with exchange</td></tr>
<tr>
<td>Year 2</td>
<td> 

36 + 29 = 65
• Add the 1s.
• Exchange 10 ones for a ten.
• Add the 10s.</td>
<td> 

36 + 29 = 65
Pupils to represent the base 10 in a place value chart, circling when they make an exchange.</td>
<td> 

• Add the 1s.
• Exchange 10 ones for a ten.
• Add the 10s.</td>
</tr>
<tr><td colspan="4">HTO + TO, HTO + HTO (with and without exchange)</td></tr>
</table>

Year 3	 554 + 237 = 791 Use of place value counters to add HTO + TO, HTO + HTO etc. • When there are 10 ones in the 1s column- we exchange for 1 ten. • When there are 10 tens in the 10s column- we exchange for 1 hundred.	 275 + 16 = 291 Pupils to use place value counters in a place value chart, circling when they make an exchange.	   *275 + 16 = 291*
ThHTO + ThHTO (with and without exchange)			

<table>
<tr>
<td>Year 4</td>
<td> 

1554 + 4237 = 5791

Use of place value counters to add ThHTO + ThHTO
• When there are 10 ones in the 1s column- we exchange for 1 ten.
• When there are 10 tens in the 10s column- we exchange for 1 hundred.
• When there are 10 hundreds in the 100s column- we exchange for 1 thousand.</td>
<td>Pupils to use place value counters in a place value chart, circling when they make an exchange.

(see above for example)</td>
<td>
<table>
<tr><th></th><th>Th</th><th>H</th><th>T</th><th>O</th></tr>
<tr><td></td><td>1</td><td>5</td><td>5</td><td>4</td></tr>
<tr><td>+</td><td>4</td><td>2</td><td>3</td><td>7</td></tr>
<tr><td></td><td></td><td></td><td></td><td>1</td></tr>
<tr><td></td><td></td><td></td><td>1</td><td></td></tr>
</table>
<table>
<tr><th></th><th>Th</th><th>H</th><th>T</th><th>O</th></tr>
<tr><td></td><td>1</td><td>5</td><td>5</td><td>4</td></tr>
<tr><td>+</td><td>4</td><td>2</td><td>3</td><td>7</td></tr>
<tr><td></td><td></td><td></td><td>9</td><td>1</td></tr>
<tr><td></td><td></td><td></td><td>1</td><td></td></tr>
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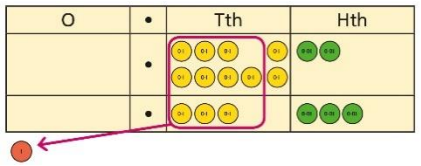
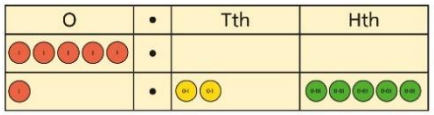
<table>
<tr><th></th><th>Th</th><th>H</th><th>T</th><th>O</th></tr>
<tr><td></td><td>1</td><td>5</td><td>5</td><td>4</td></tr>
<tr><td>+</td><td>4</td><td>2</td><td>3</td><td>7</td></tr>
<tr><td></td><td></td><td>7</td><td>9</td><td>1</td></tr>
<tr><td></td><td></td><td>1</td><td></td><td></td></tr>
</table>
<table>
<tr><th></th><th>Th</th><th>H</th><th>T</th><th>O</th></tr>
<tr><td></td><td>1</td><td>5</td><td>5</td><td>4</td></tr>
<tr><td>+</td><td>4</td><td>2</td><td>3</td><td>7</td></tr>
<tr><td></td><td>5</td><td>7</td><td>9</td><td>1</td></tr>
<tr><td></td><td></td><td>1</td><td></td><td></td></tr>
</table>
</td>
</tr>
<tr><td colspan="4">Addition of more than 4-digit numbers (with and without exchange)</td></tr>
<tr>
<td>Years 5 & 6</td>
<td>Use of place value counters to add more than 4-digit numbers</td>
<td>Pupils to use place value counters in a place value chart, circling when they make an exchange.

(see above for example)</td>
<td>
<table>
<tr><th></th><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr>
<tr><td></td><td>1</td><td>9</td><td>1</td><td>7</td><td>5</td></tr>
<tr><td>+</td><td>1</td><td>8</td><td>4</td><td>1</td><td>7</td></tr>
<tr><td></td><td>3</td><td>7</td><td>5</td><td>9</td><td>2</td></tr>
<tr><td></td><td></td><td>1</td><td></td><td>1</td><td></td></tr>
</table>
</td>
</tr>
<tr><td colspan="4">Adding decimals</td></tr>
</table>

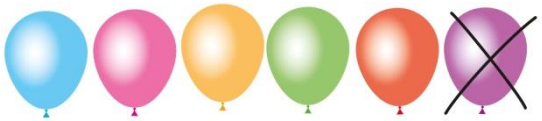
Years 5 & 6	 O · Tth Hth 0 · 9 2 + 0 · 3 3 1 · 2 5 1 Include numbers with differing decimal places  O · Tth Hth 5 · 0 0 + 1 · 2 5 6 · 2 5	Pupils to use place value counters in a place value chart, circling when they make an exchange. (see above for example)	Without exchange O · Tth Hth 0 · 2 3 + 0 · 4 5 0 · 6 8 With exchange O · Tth Hth 0 · 9 2 + 0 · 3 3 1 · 2 5 1 Where numbers of decimal places are different O · Tth Hth 3 · 4 0 + 0 · 6 5 ·

Subtraction -

Concrete	Pictorial	Abstract
➢ These are visual images of the actual resources to use within the classroom. ➢ Use a range of different practical resources. (e.g.base 10, place value counters, straws)	➢ These are pictorial representations that may appear in pupil's work. ➢ These can also be completed practically when needed.	➢ These can be number lines, bar models, Part-part whole, formal methods

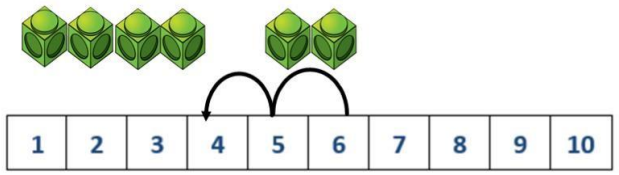
Counting back

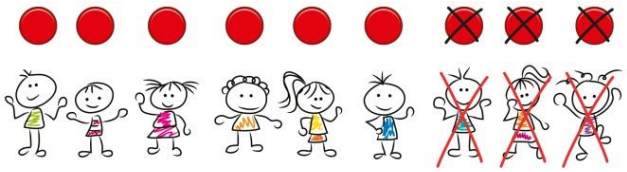
Year 1



Children arrange objects and remove to find how many are left.

1 less than 6 is 5.
6 subtract 1 is 5.



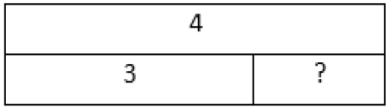


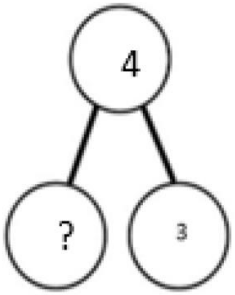
9 – ☐ = ☐

There are ☐ children left.

Pupils draw and cross out or use counters to represent object from a problem.

.

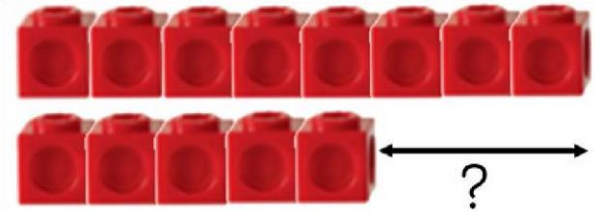
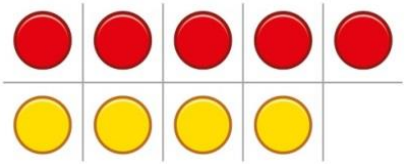
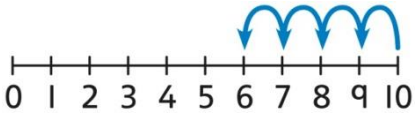
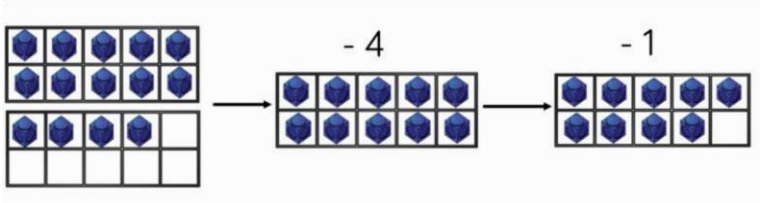
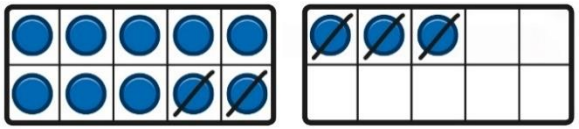
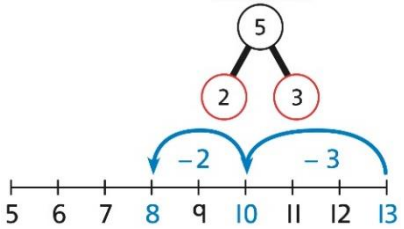




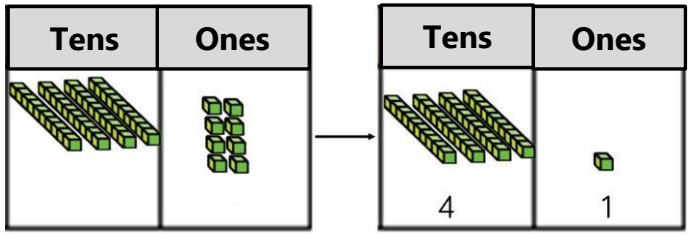
4 – 3= ?

?= 4 – 3

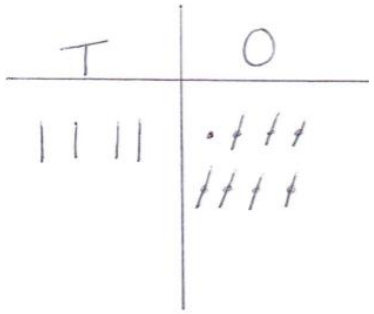
Find the difference

Year 1	 Finding the difference (using cubes other objects can also be used). Calculate the difference between 8 and 5.	 5 – 4 = 1 The difference between 5 and 4 is 1	 10 – 4 = 6 The difference between 10 and 6 is 4.
Subtracting bridging 10			
Year 1	 14 – 5 =	 For 13 – 5, take away 3 to make 10, then take away 2 to make 8	 13 – 5 =
TO – 0 without exchange			

Year 2

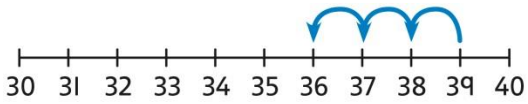


48 – 7 = 41



48 – 7 = 41

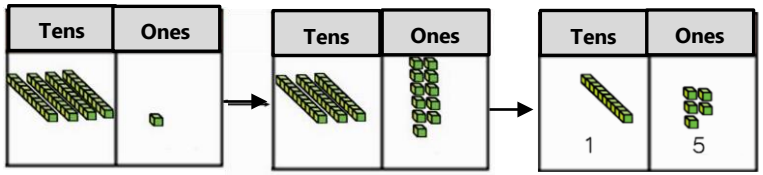
Pupils to represent the base 10 in a place value chart, crossing out the numbers they have taken away.



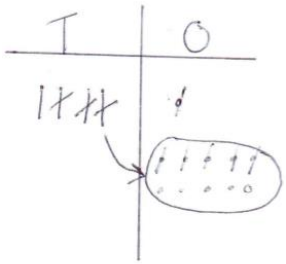
	T	O
	3	9
–		3
	3	6

TO - O with exchange

Year 2



41 – 26 = 15



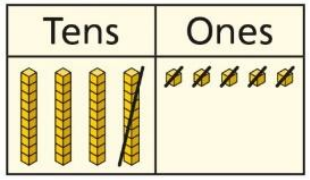
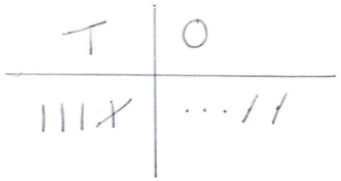
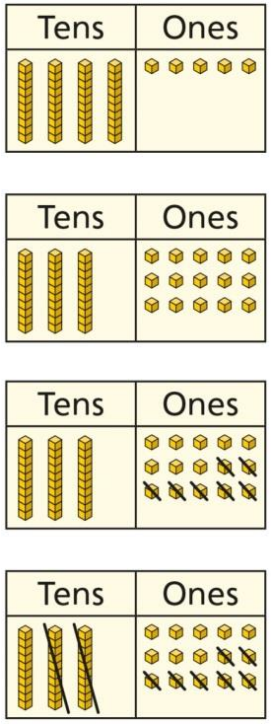
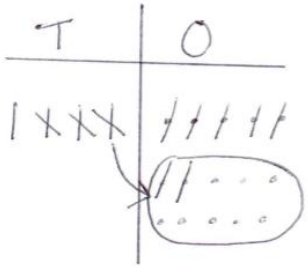
41 – 26 = 15

Pupils to represent the base 10 in a place value chart, showing the exchange.

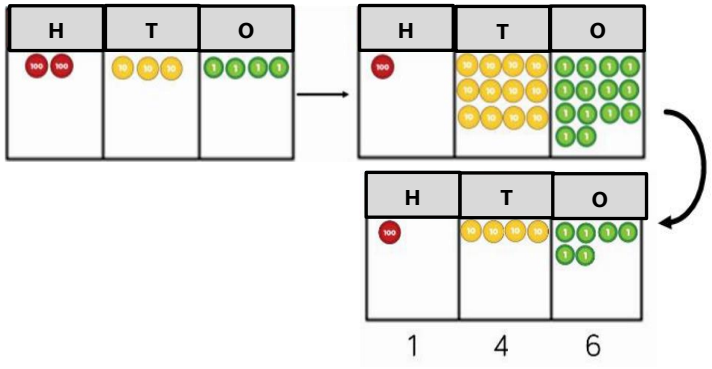
	T	O
	1 2	1 5
–		7
		8

	T	O
	1 2	1 5
–		7
	1	8

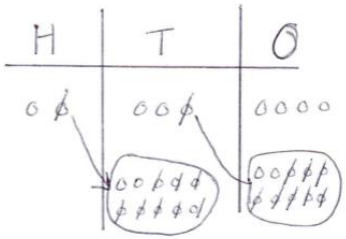
TO – T0 without exchange

Year 2	 45 – 15 = 40	 45 – 12 = 33 Pupils to represent the base 10 in a place value chart, crossing out the numbers they have taken away.	T O 4 5 – 1 2 3 T O 4 5 – 1 2 3 3
TO – T0 with exchange			
Year 2	 45 – 27 = 18	 45 – 27 = 18 Pupils to represent the base 10 in a place value chart, showing the exchange.	T O 4 5 – 2 7 T O 3 4 1 5 – 2 7 T O 3 4 1 5 – 2 7 8 T O 3 4 1 5 – 2 7 1 8
HTO - TO, HTO - HTO (with exchange). Pupils will need to recap on ‘without exchange’ first.			

Year 3



234 – 88 = 146



234 – 88 = 146

Children to use place value counters in a place value chart showing the exchange.

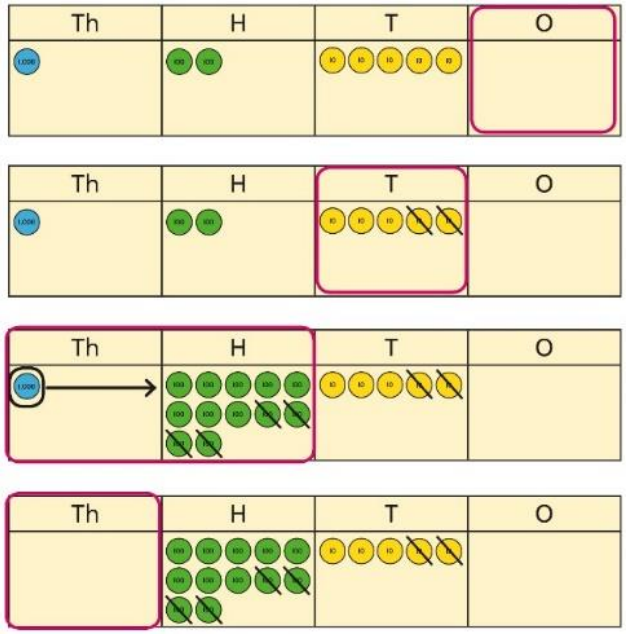
H	T	O
1	6 7	15
–	3	8
1	3	7

175 – 38 = 137

- If the subtraction is a 3-digit number subtract a 2-digit number, pupils should understand how to line up the numbers correctly.
- Pupils should also understand how to exchange in calculations where there is a zero in the 10s column.

ThHTO – HTO, ThHTO – ThHTO (with exchange). Pupils will need to recap on 'without exchange' first.

Year 4



1250 – 420 = 830

Children to use place value counters in a place value chart, circling when they make an exchange.

(see above for example)

With one exchange

	Th	H	T	O
	1	2	5	0
–		4	2	0
				0

	Th	H	T	O
	1	2	5	0
–		4	2	0
			3	0

	Th	H	T	O
	~~1~~	¹2	5	0
–		4	2	0
		8	3	0

	Th	H	T	O
	~~1~~	¹2	5	0
–		4	2	0
		8	3	0

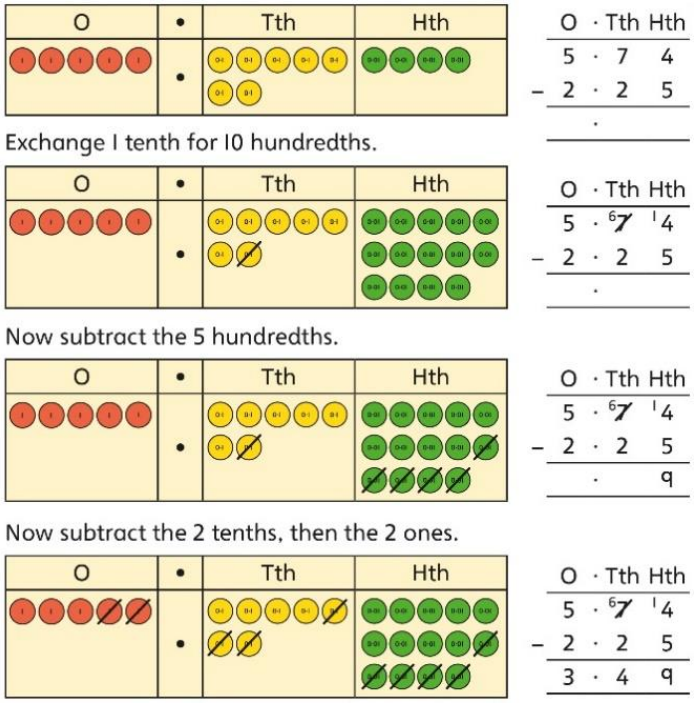
With more than one exchange

	Th	H	T	O
	2	~~4~~ 3	¹0	2
–		2	4	3

	Th	H	T	O
	2	~~4~~ 3	~~9~~ ¹0	¹2
–		2	4	3

	Th	H	T	O
	2	~~4~~ 3	~~9~~ ¹0	¹2
–		2	4	3
	2	2	5	9

Subtraction of more than 4-digit numbers

Years 5 & 6	Use of place value counters to subtract more than 4-digit numbers	Children to use place value counters in a place value chart, circling when they make an exchange. (see above for example)	TTh Th H T O 5 11 1 0 9 7 – 1 8 5 3 4 4 3 5 6 3 • Pupils to subtract numbers of different sizes.
Subtracting decimals			
Years 5 & 6	 O · Tth Hth 5 · 7 4 – 2 · 2 5 · O · Tth Hth 5 · 6 7 1 4 – 2 · 2 5 · O · Tth Hth 5 · 6 7 1 4 – 2 · 2 5 · 9 O · Tth Hth 5 · 6 7 1 4 – 2 · 2 5 3 · 4 9	Children to use place value counters in a place value chart, circling when they make an exchange. (see above for example)	O · Tth Hth 5 · 6 7 1 4 – 2 · 2 5 3 · 4 9 • Pupils subtract numbers with different number of decimal places. 3.921 – 3.75 O · Tth Hth Thth 3 · 9 2 1 – 3 · 7 5 0 ·

Progression in Maths	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Multiplication **(calculation methods formal & informal)**		calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs	write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods	multiply two-digit and three-digit numbers by a one-digit number using formal written layout	multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers	multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication multiply one-digit numbers with up to two decimal places by whole numbers
Division **(calculation methods formal & informal)**					divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context	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 the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
Multiplying and dividing by 10, 100, 1000				find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths		multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places
Multiplication and division facts		recall and use multiplication and division facts for 2, 5, 10 multiplication tables.	recall and use multiplication and division facts for 2, 3, 4, 5, 8, 10 multiplication tables.	recall and use multiplication and division facts for all multiplication tables up to 12 x 12.		
Problem Solving	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	solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts	solve problems, including missing number problems, involving multiplication and division	solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one digit	solve problems involving multiplication and division and a combination of these, including understanding the meaning of the equals sign	solve problems involving multiplication and division

Multiplication X

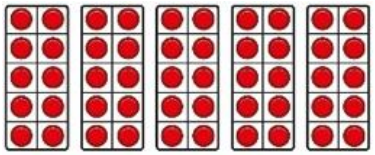
Concrete	Pictorial	Abstract
➢ These are visual images of the actual resources to use within the classroom. ➢ Use a range of different practical resources. (e.g.base 10, place value counters, straws)	➢ These are pictorial representations that may appear in pupil's work. ➢ These can also be completed practically when needed.	These can be number lines, bar models, Part-part whole, formal methods

Find the total of equal groups by counting in 2s, 5s, 10s

Year 1

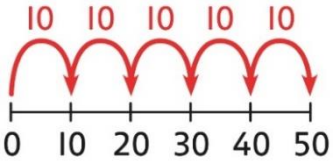
There are 5 pens in each pack …

5…10…15…20…25…30…35…40…



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

100 squares and ten frames support counting in 2s, 5s and 10s.



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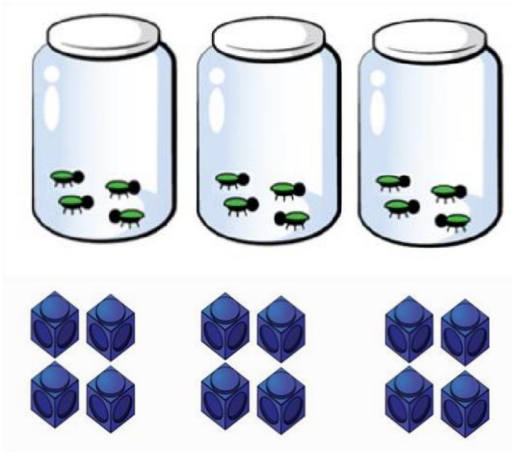
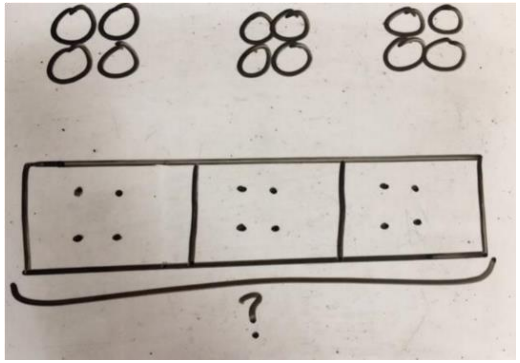
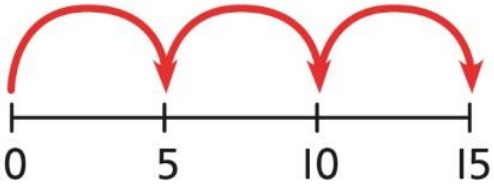
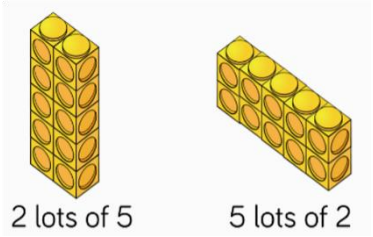
Equal groups/Repeated Addition			
Year 2	 4 x 3 = 12 3 x 4 = 12 4 + 4 + 4 = 12 There are 3 equal groups with 4 in each group.	 4 x 3 = 12 3 x 4 = 12 4 + 4 + 4 = 12	 5 x 3 = 15 3 x 5 = 15 5 + 5 + 5 = 15

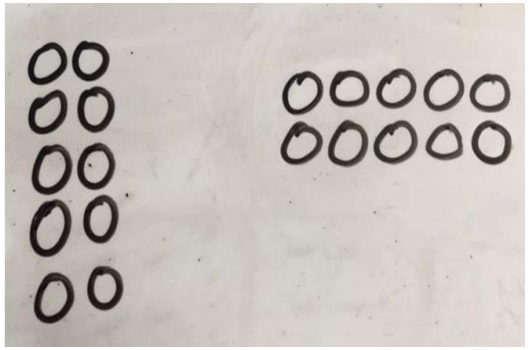
Use arrays to understand commutativity

Year 2

I can see 6 groups of 3
I can see 3 groups of 6



2 × 5 = 5 × 2



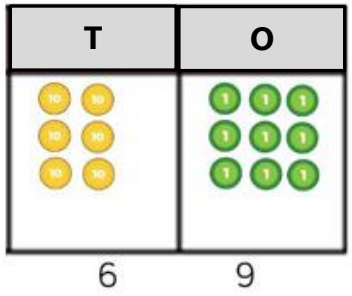
Pupils to rotate the array, to show that orientation does not change the multiplication.

Pupils to be able to use an array to write a range of calculations e.g.

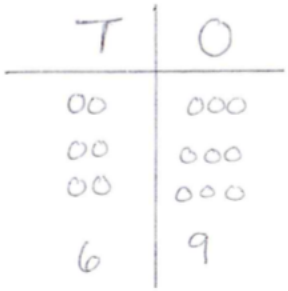
10 = 2 × 5
5 × 2 = 10
2 + 2 + 2 + 2 + 2 = 10
10 = 5 + 5

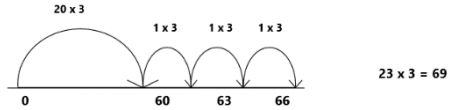
Short multiplication TO x O No exchange

Year 3



23 x 3 = 69



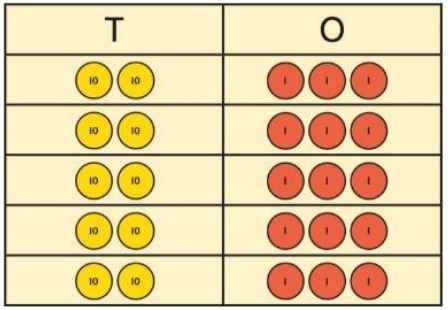


Leading to …

$$\begin{array}{r} 23 \\ \times\ 3 \\ \hline 69 \\ \hline \end{array}$$

Short multiplication TO x O - Expanded Column Method

Year 3

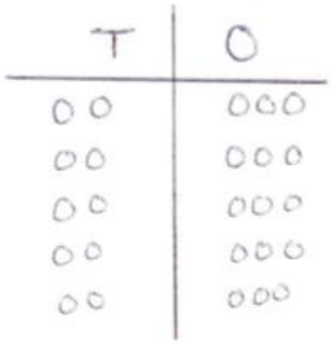


23 × 5 = **?**

3 × 5 = 15

20 × 5 = 100

23 × 5 = 115



TO

23

x 5

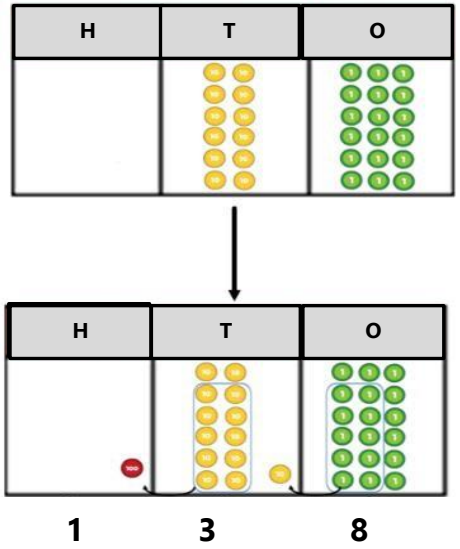
15 3 x 5

100 20 x 5

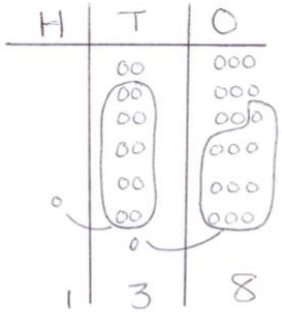
115

Short multiplication TO x O, HTO x O- Column Method

Years 3 & 4



23 x 6 = 138



23 x 6 = 138

23

× 6

138

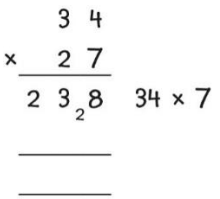
1 1

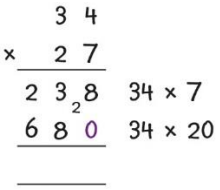
Pupils to understand how the expanded column method is related to the formal column method.

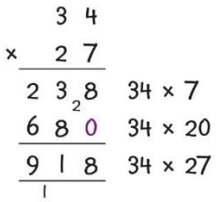
Long multiplication - multi-digit numbers up to 4 digits x TO - Column Method

Year 5 & 6

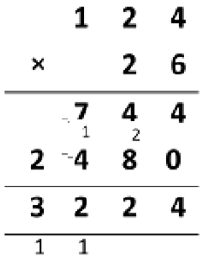
As pupils start to multiply multi-digit numbers up to 4 digits by a two-digit whole number, they should be confident with the abstract.







Ensure understanding of place value at each stage.

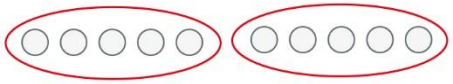
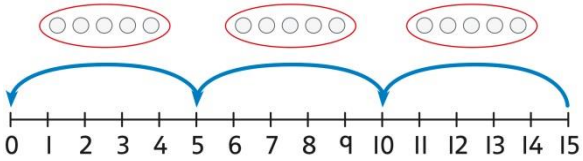
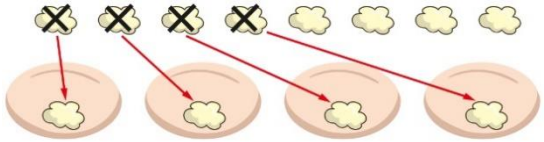
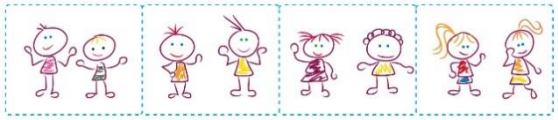


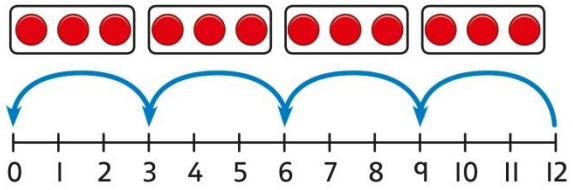
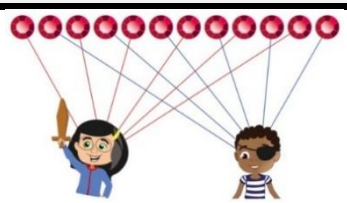
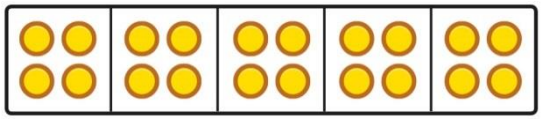
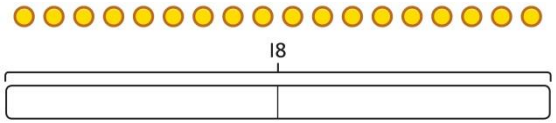
Answer: 3224

Multiplying decimals by whole number

Year 6	As pupils start to multiply one-digit numbers with up to two decimal places by whole numbers, they should be confident with the abstract.	4.72 x 3 14.16 2

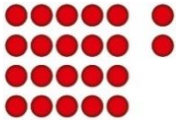
Division ÷

Concrete	Pictorial	Abstract
➢ These are visual images of the actual resources to use within the classroom. ➢ Use a range of different practical resources. (e.g.base 10, place value counters, straws)	➢ These are pictorial representations that may appear in pupil's work. ➢ These can also be completed practically when needed.	➢ These can be number lines, bar models, Part-part whole, formal methods
Grouping		
Year 1  Sort a whole set people and objects into equal groups. There are 10 children altogether. There are 2 in each group. There are 5 groups	 Represent a whole and work out how many equal groups. There are 10 in total. There are 5 in each group. There are 2 groups.	 Children may relate this to counting back in steps of 2, 5 or 10.
Sharing		
Year 1  Share a set of objects into equal parts and work out how many are in each part**.**	 Sketch or draw to represent sharing into equal parts.	10 shared into 2 equal groups gives 5 in each group.
Grouping equally		

Year 2	 8 divided into 4 equal groups. There are 2 in each group.	12 ÷ 3 = 4  12 ÷ 4 = 3  12 ÷ 6 = 2  12 ÷ 2 = 6 	 There are 4 groups now. 12 divided into groups of 3. 12 ÷ 3 = 4 There are 4 groups.
Sharing equally			
Year 2	 12 shared equally between 2. They get 6 each.	 20 shared into 5 equal parts. There are 4 in each part.	 18 ÷ 2 = 9
Understand remainders			

Year 3

There are 13 sticks in total.
There are 3 groups of 4, with 1 remainder.



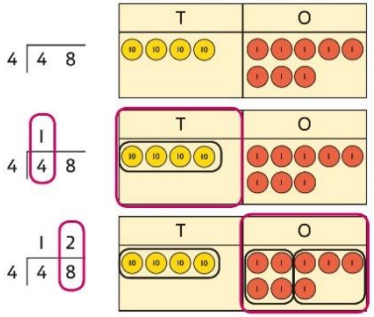
22 ÷ 5 = 4 remainder 2

22 ÷ 5 = ?

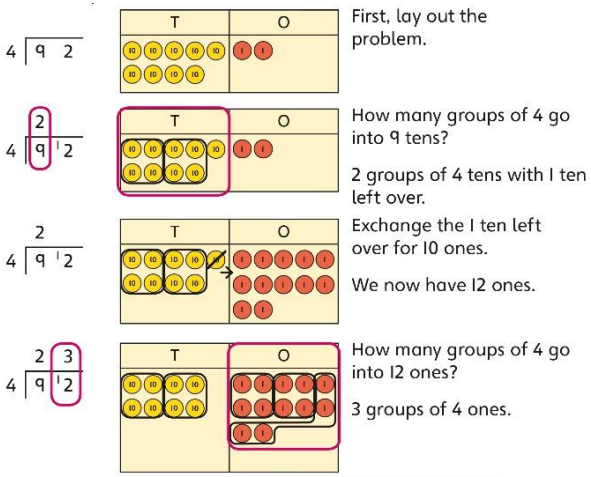
3 × 5 = 15
4 × 5 = 20
5 × 5 = 25 … this is larger than 22
So, 22 ÷ 5 = 4 remainder 2

Short Division – TO ÷ O, HTO ÷ 0, ThHTO ÷ O

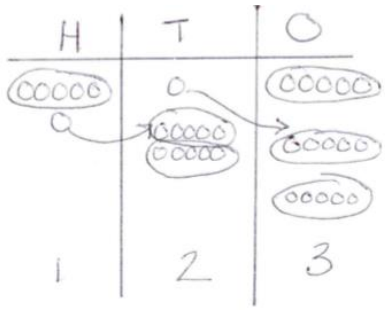
Years, 4, 5



With exchange



With exchange and remainders

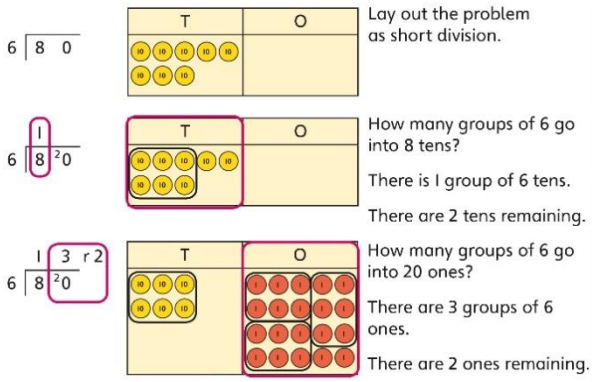


615 ÷ 5 = 123

$$5\overline{)615} = 123$$

$$7\overline{)3\,{}^{3}8\,{}^{3}9\,{}^{4}2} = 0556$$

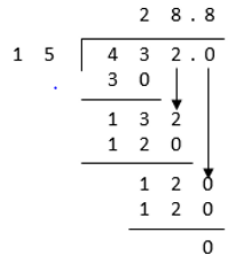
432 ÷ 5 = 86 r2



Pupils to represent remainder as 'r' or a fraction

Year 6

As pupils start to divide numbers up to 4-digits by a two-digit whole number they should be confident with the abstract.



432 ÷ 15 = 28.8