



Northchapel Community Primary School

Calculation Policy

Progression through Calculation from Reception to Year 6

Northchapel's written maths calculation policy



This calculation policy was originally developed by a combination of the White Rose Hub and West Park CE Primary. It is also based on the resources produced by the NCETM (National Centre for Excellence in the Teaching of Mathematics).

Progression within each area of calculation follows the programme of study in the 2014 National Curriculum.

It has been adapted for use within Northchapel Community Primary School and includes written strategies, pedagogy and visual representations for each of the operations from years 1-6 developed and agreed on our Inset day January 2018.

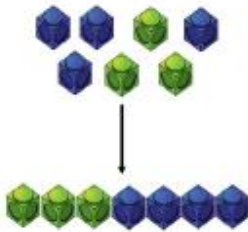
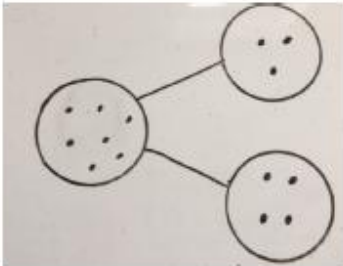
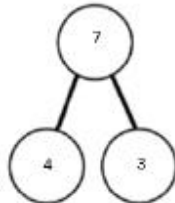
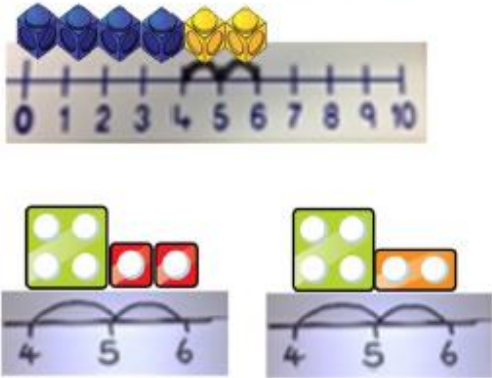
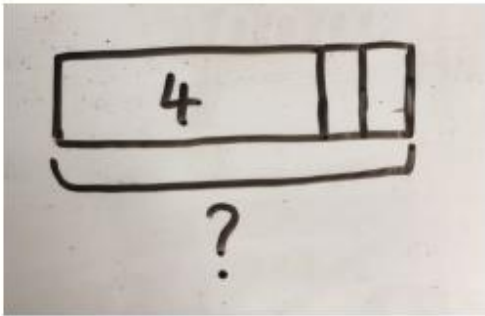

It is used in conjunction with the objectives from the New Maths Programme of Study and the Maths vocabulary glossary:-

<https://www.ncetm.org.uk/resources/42990#glossary>

[National Curriculum Primary Assessment Materials - NCETM](#)

Calculation policy: Addition

Key language: sum, total, parts and wholes, plus, add, altogether, more, 'is equal to' 'is the same as'.

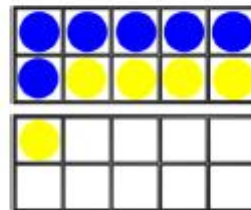
Concrete	Pictorial	Abstract
<p>Combining two parts to make a whole (use other resources too e.g. eggs, shells, teddy bears, cars).</p> 	<p>Children to represent the cubes using dots or crosses. They could put each part on a part whole model too.</p> 	<p>$4 + 3 = 7$ Four is a part, 3 is a part and the whole is seven.</p> 
<p>Counting on using number lines using cubes or Numicon.</p> 	<p>A bar model which encourages the children to count on, rather than count all.</p> 	<p>The abstract number line: What is 2 more than 4? What is the sum of 2 and 4? What is the total of 4 and 2? $4 + 2$</p> 

Regrouping to make 10; using ten frames and counters/cubes or using Numicon.

$$6 + 5$$



Children to draw the ten frame and counters/cubes.



Children to develop an understanding of equality e.g.

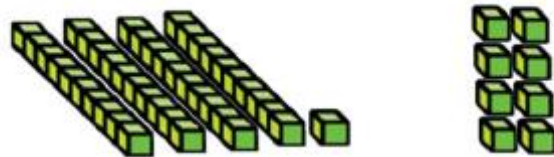
$$6 + \square = 11$$

$$6 + 5 = 5 + \square$$

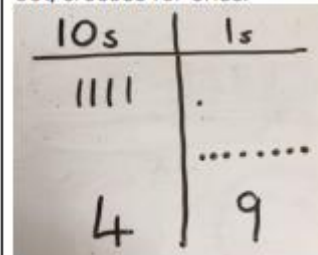
$$6 + 5 = \square + 4$$

TO + O using base 10. Continue to develop understanding of partitioning and place value.

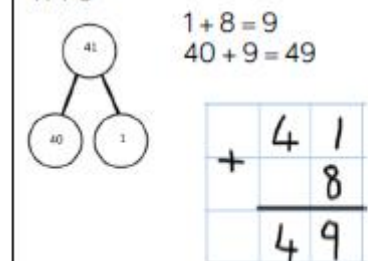
$$41 + 8$$



Children to represent the base 10 e.g. lines for tens and dot/crosses for ones.

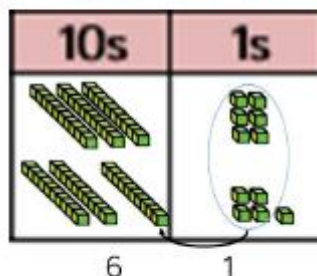


$$41 + 8$$

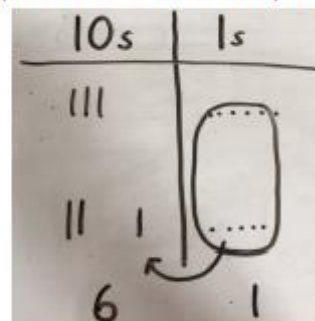


TO + TO using base 10. Continue to develop understanding of partitioning and place value.

$$36 + 25$$



Children to represent the base 10 in a place value chart.



Looking for ways to make 10.

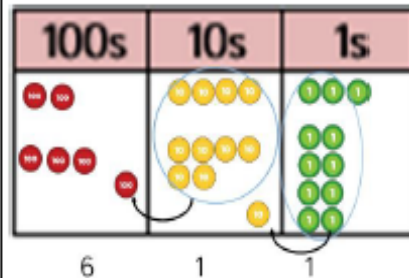
$$36 + 25 =$$

$30 + 20 = 50$
 $5 + 5 = 10$
 $50 + 10 + 1 = 61$

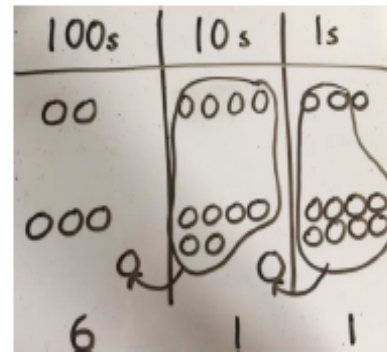
Formal method:

$$\begin{array}{r} 36 \\ + 25 \\ \hline 61 \\ 1 \end{array}$$

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.



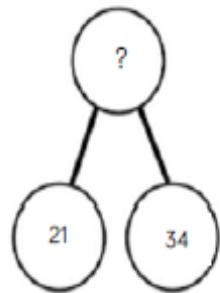
Children to represent the counters in a place value chart, circling when they make an exchange.



243

$$\begin{array}{r} 243 \\ +368 \\ \hline 611 \\ 1 \quad 1 \end{array}$$

Conceptual variation; different ways to ask children to solve $21 + 34$



?	
21	34

Word problems:

In year 3, there are 21 children and in year 4, there are 34 children. How many children in total?

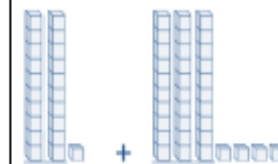
$$21 + 34 = 55. \text{ Prove it}$$

$$\begin{array}{r} 21 \\ +34 \\ \hline \end{array}$$

$$21 + 34 =$$

$$\square = 21 + 34$$







Calculate the sum of twenty-one and thirty-four.



Missing digit problems:

10s	1s
10 10	1
10 10 10	?
?	5

CALCULATION GUIDANCE: Counting

	Objective	Concrete	Pictorial	Abstract
Year R	<p>Counting Cardinal Numbers</p> <p>Children count reliably with numbers from 1-20</p>	<p>Counting cubes, bears, fingers, pegs.</p>  <p>1:1 touching object as you say the number</p> <p>Know that the last number is the biggest e.g</p> <p>1-2-3</p> <p>When counting out from a larger group organise objects in a linear way.</p> 	<p>Matching dots to a given quantity e.g. Dominoes, pegs</p>  	<p>Recognising by sight, not always having to count.</p> <p>Recognising patterns on dominoes or dice.</p>  

Place
numbers in
order

Number Tiles

Number line



Number matching activities

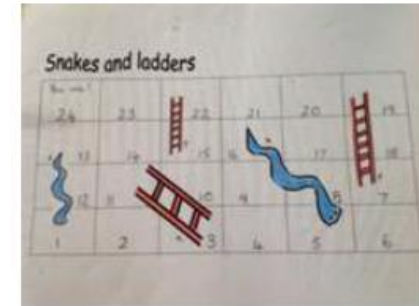


Using fingers

Numicon



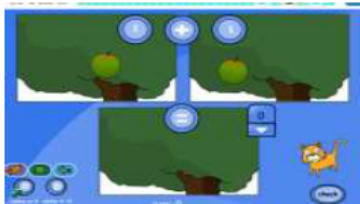
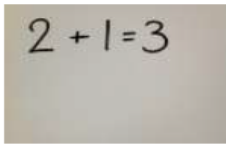
Saying the numbers in order



Number songs

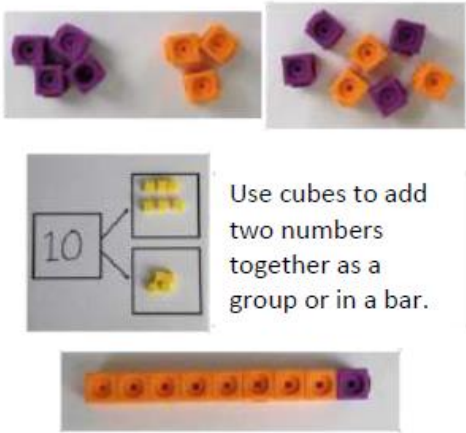
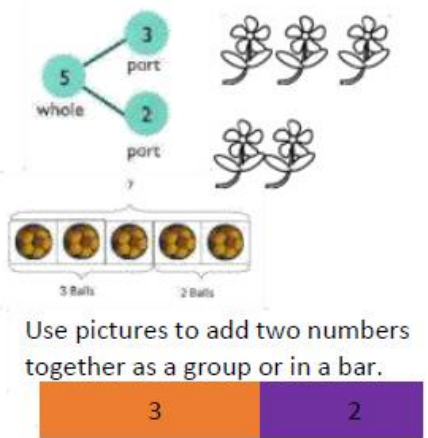
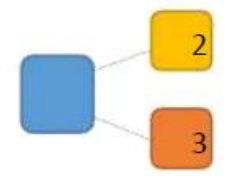
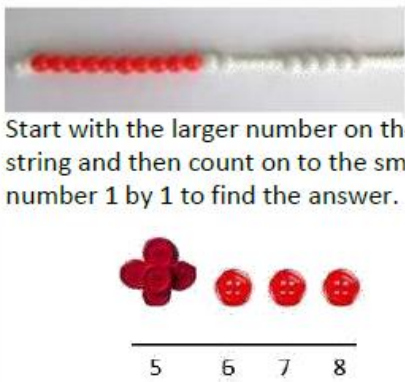

Games-hide and seek-saying numbers

CALCULATION GUIDANCE: Addition

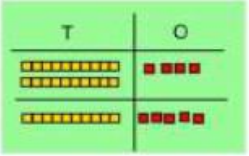
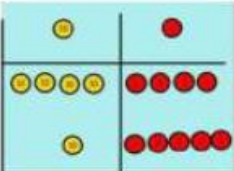
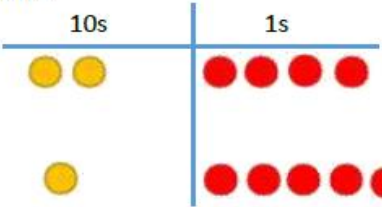
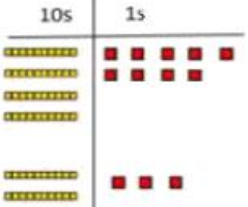
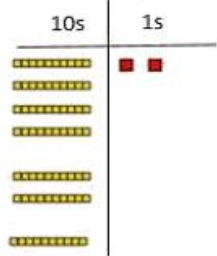
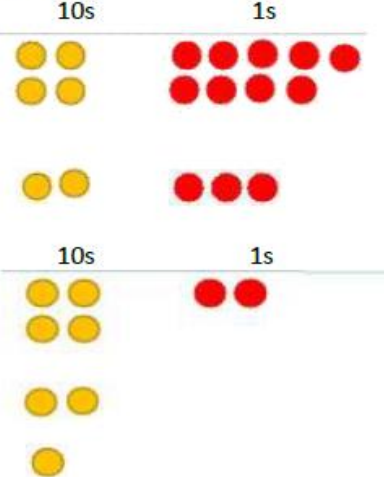
	Objective	Concrete	Pictorial	Abstract
Year R	One more than from a group of up to 5 objects then 10. Building to a given number to 20.	Sorting into 2 groups then combining 2 groups of objects e.g. cubes, bears, fingers, pegs (total, all, together)	IWB resources tesiboard Addition stories 	Using symbols, numerals and their names. 
	Using objects to add two single digit numbers	Sorting into 2 groups then combining 2 groups of objects e.g. cubes, bears, fingers, pegs (total, all, together)	IWB resources tesiboard Addition stories	Using symbols, numerals and their names.
	Count on	Number line and counters Board games	Number line without counters	Put in your head and count on
	Solve problems	Role Play	Picture cards	Is it a sensible answer? Simple estimating.

Key Vocabulary
<p>Add, more, and, make, sum, total, altogether, score, double, one more, two more, ten more...</p> <p>How many more make...?</p> <p>How many more is... than ...?</p>

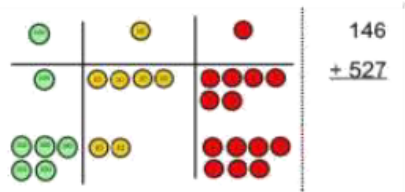
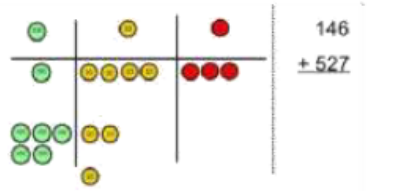
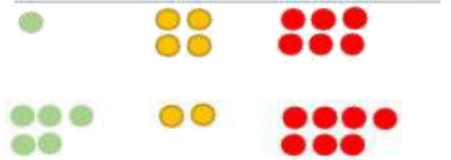
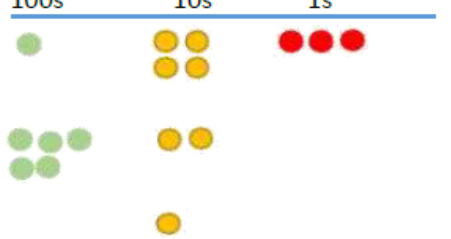
CALCULATION GUIDANCE: Addition

	Objective	Concrete	Pictorial	Abstract
Year 1	Number bonds of 5, 6, 7, 8, 9 and 10	 <p>Use cubes to add two numbers together as a group or in a bar.</p>	 <p>Use pictures to add two numbers together as a group or in a bar.</p>	<p> $2 + 3 = 5$ $3 + 2 = 5$ $5 = 3 + 2$ $5 = 2 + 3$ </p>  <p>Use the part-part-whole diagram as shown above to move into the abstract.</p>
	Counting	 <p>Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.</p>	<p>Use a number line to count on in ones.</p> 	$5 + 3 = 8$

CALCULATION GUIDANCE: Addition

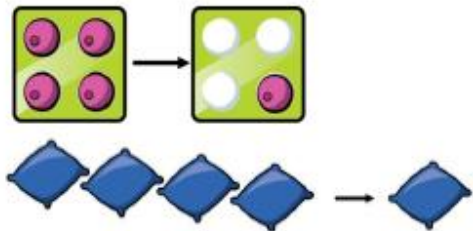
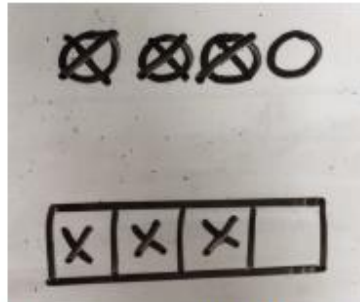
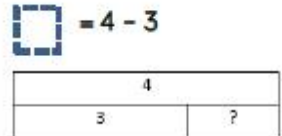
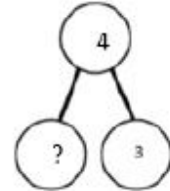

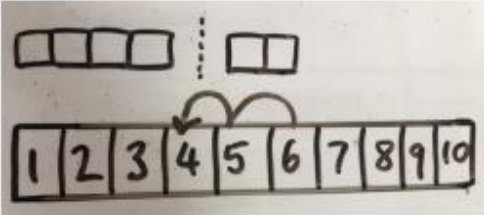
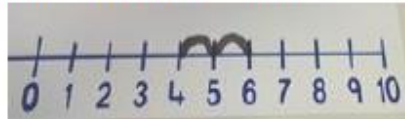
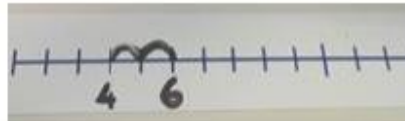
	Objective	Concrete	Pictorial	Abstract
Year 2	Column method without regrouping	<p>Add together the ones first, then add the tens. Use the Base 10 blocks first before moving onto place value counters.</p> <p>$24 + 15 =$</p>  <p>$44 + 15 =$</p> 	<p>After physically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions.</p> 	<p>$24 + 15 = 39$</p> $\begin{array}{r} 24 \\ + 15 \\ \hline 39 \end{array}$
	Column method with regrouping	<p>Make both numbers on a place value grid.</p>  <p>Add up the units and exchange 10 ones for 1 ten.</p> 	<p>Using place value counters, children can draw the counters to help them to solve additions.</p> 	<p>$40 + 9$</p> $\begin{array}{r} 40 \\ + 9 \\ \hline 49 \end{array}$ <p>$60 + 12 = 72$</p>

CALCULATION GUIDANCE: Addition

	Objective	Concrete	Pictorial	Abstract
Year 3/4	Column method with regrouping	<p>Make both numbers on a place value grid.</p>  <p>146 + 527</p> <p>Add up the units and exchange 10 ones for 1 ten.</p>  <p>146 + 527</p> <p>As children move on to decimals, money and decimal place value counters can be used to support learning.</p> <p>NB By Year 4 children will progress on to adding four digit numbers.</p>	<p>100s 10s 1s</p>  <p>100s 10s 1s</p>  <p>Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.</p> <p>NB Addition of money needs to have £ and p added separately.</p>	<p>100 + 40 + 6 500 + 20 + 7 600 + 70 + 3</p> <p>10</p> <p>As the children progress, they will move from the expanded to the compacted method.</p> <p>146 + 527 673 1</p> <p>As the children move on, introduce decimals with the same number of decimal places and different. Money can be used here.</p>
Year 5/6	Column method without regrouping	Consolidate understanding using numbers with more than 4 digits and extend by adding numbers with up to 3 decimal places.		

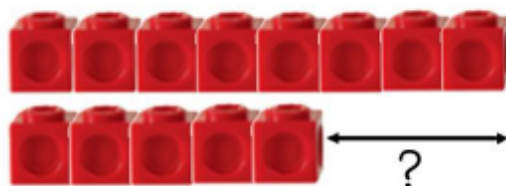
Calculation policy: Subtraction

Key language: take away, less than, the difference, subtract, minus, fewer, decrease.

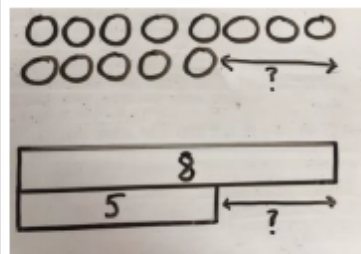
Concrete	Pictorial	Abstract
<p>Physically taking away and removing objects from a whole (ten frames, Numicon, cubes and other items such as beanbags could be used).</p> <p>$4 - 3 = 1$</p> 	<p>Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used.</p> 	<p>$4 - 3 =$</p> <p></p> 
<p>Counting back (using number lines or number tracks) children start with 6 and count back 2.</p> <p>$6 - 2 = 4$</p> 	<p>Children to represent what they see pictorially e.g.</p> 	<p>Children to represent the calculation on a number line or number track and show their jumps. Encourage children to use an empty number line</p>  

Finding the difference (using cubes, Numicon or Cuisenaire rods, other objects can also be used).

Calculate the difference between 8 and 5.



Children to draw the cubes/other concrete objects which they have used or use the bar model to illustrate what they need to calculate.



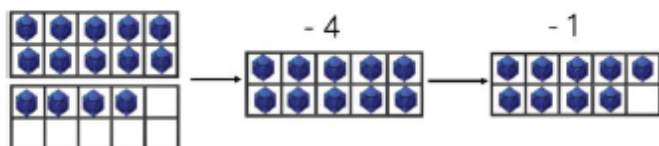
Find the difference between 8 and 5.

8 - 5, the difference is

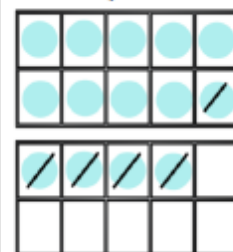
Children to explore why
 $9 - 6 = 8 - 5 = 7 - 4$ have the same difference.

Making 10 using ten frames.

14 - 5



Children to present the ten frame pictorially and discuss what they did to make 10.



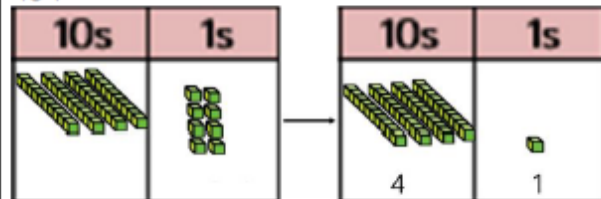
Children to show how they can make 10 by partitioning the subtrahend.

$$\begin{array}{r} 14 - 5 = 9 \\ \swarrow \quad \searrow \\ 4 \quad 1 \end{array}$$

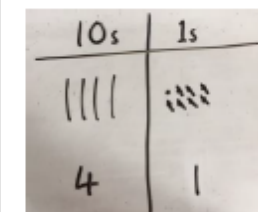
$$\begin{array}{l} 14 - 4 = 10 \\ 10 - 1 = 9 \end{array}$$

Column method using base 10.

48-7



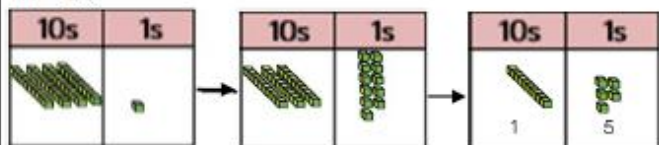
Children to represent the base 10 pictorially.



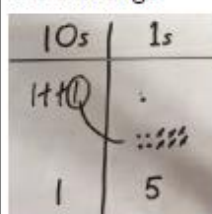
Column method or children could count back 7.

	4	8
-		7
	4	1

Column method using base 10 and having to exchange.
41 - 26



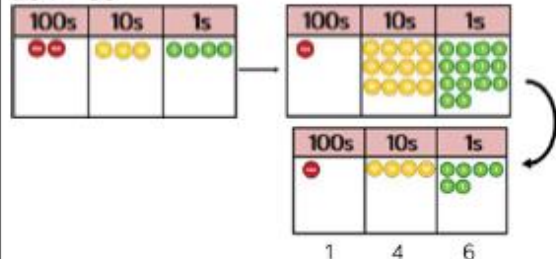
Represent the base 10 pictorially, remembering to show the exchange.



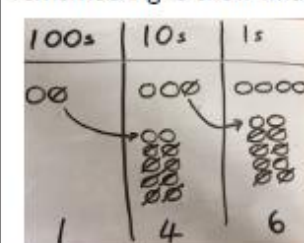
Formal column method. Children must understand that when they have exchanged the 10 they still have 41 because $41 = 30 + 11$.



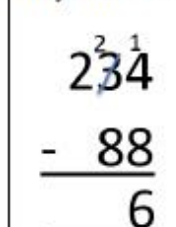
Column method using place value counters.
234 - 88



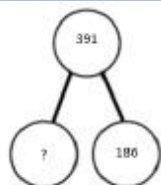
Represent the place value counters pictorially; remembering to show what has been exchanged.



Formal column method. Children must understand what has happened when they have crossed out digits.



Conceptual variation; different ways to ask children to solve $391 - 186$



391	
186	?

Raj spent £391, Timmy spent £186.
How much more did Raj spend?

Calculate the difference between 391 and 186.

$$\square = 391 - 186$$


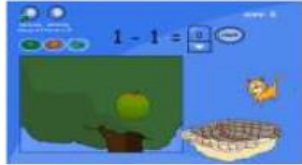

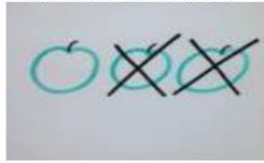
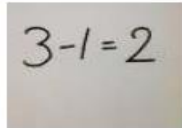

$$\begin{array}{r} 391 \\ -186 \\ \hline \end{array}$$

What is 186 less than 391?

Missing digit calculations

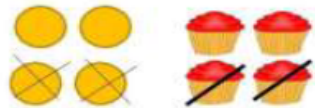
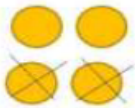

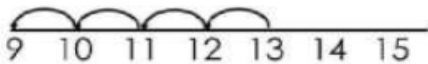
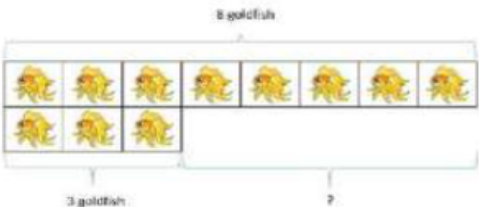
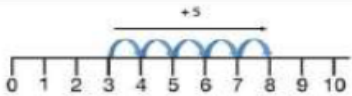
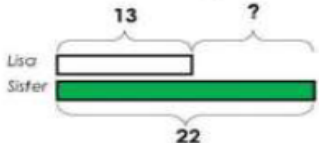
$$\begin{array}{r} 39\square \\ -\square\square6 \\ \hline \square05 \end{array}$$

CALCULATION GUIDANCE: Subtraction

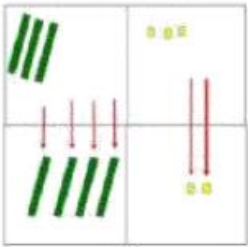

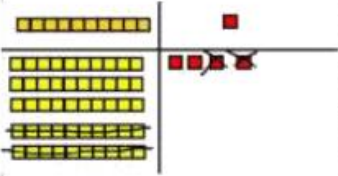
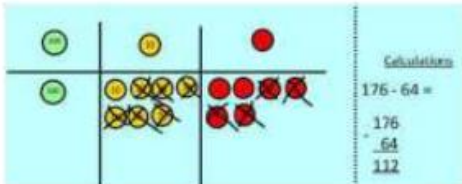
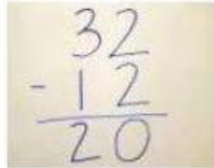
	Objective	Concrete	Pictorial	Abstract
Year R	'One less than' From a group of up to 5 objects then 10, building to a given number to 20.	Practical moving objects from a larger group e.g. eating fruit 	Crossing out pictures. IWB resources e.g. tesiboard subtraction stories. 	Using symbols, numerals and their names. 
	Using objects to subtract 2 single digit numbers (fewer)	Practical moving objects from a larger group e.g. eating fruit	Crossing out pictures. IWB resources e.g. tesiboard subtraction stories. 	Using symbols, numerals and their names 
	Count back	Number line and counter.  Specialist subtraction board games.	Number line without counters.	Put it in your head and count back.

	Solve Problems	Role Play with objects, i.e. Little Red riding hood dropping objects from her basket	Picture cards	Is it a sensible answer? Estimating. Numicon
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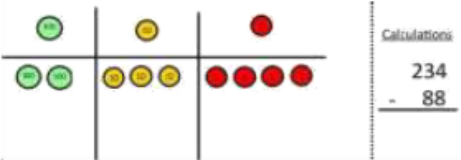
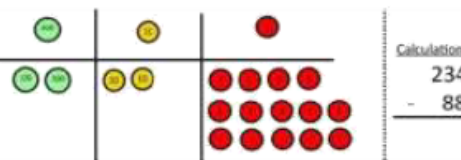
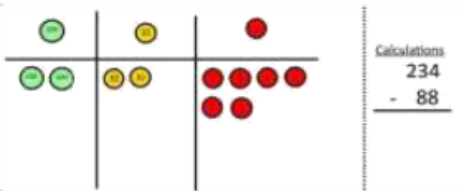
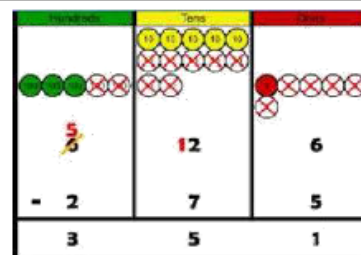

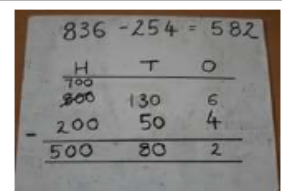

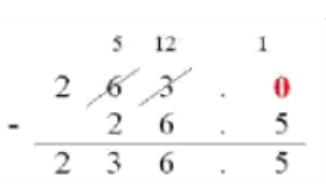
CALCULATION GUIDANCE: Subtraction

	Objective	Concrete	Pictorial	Abstract
Year 1	ones Taking away	<p>Use physical objects, counters, cubes etc. to show how objects can be taken away.</p> <p>$4 - 2 = 2$</p> 	<p>Cross out drawn objects to show what has been taken away.</p> <p>$4 - 2 = 2$</p> 	<p>$4 - 2 = 2$</p>
	Counting back	<p>Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones.</p>  <p>$13 - 4 = 9$</p>	<p>Count back on a number line or number track</p>  <p>Start at the bigger number and count back the smaller number, showing the jumps on the number line.</p>	<p>Put 13 in your head, count back 4. What number are you at? Use your fingers to help.</p>
	Find the difference	<p>Compare amounts and objects to find the difference.</p>  <p>Use cubes to build towers or make bars to find the difference. Use basic bar models with items to find the difference.</p>	 <p>Count on to find the difference.</p> <p>Lisa is 13 years old. Her sister is 22 years old. Find the difference in age between them.</p>  <p>Draw bars to find the difference between 2 numbers.</p>	<p>Hannah has 8 goldfish. Helen has 3 goldfish. Find the difference between the number of goldfish the girls have.</p>

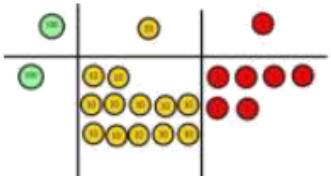
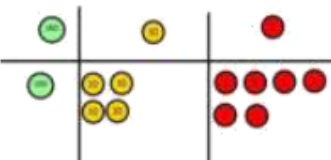
CALCULATION GUIDANCE: Subtraction

	Objective	Concrete	Pictorial	Abstract
Year 2	Column method without regrouping	<p>$75 - 42 = 33$</p>  <p>Use Base 10 to make the bigger number then take the smaller number away.</p> <p>Show how you partition numbers to subtract.</p> <p>Again make the larger number first.</p> 	 <p>Draw the Base 10 or place value counters alongside the written calculation to help to show working.</p> 	<p>$47 - 24 = 23$</p> $\begin{array}{r} 40 + 7 \\ - 20 + 4 \\ \hline 20 + 3 \end{array}$ <p>This will lead to a clear written column subtraction.</p> 

CALCULATION GUIDANCE: Subtraction

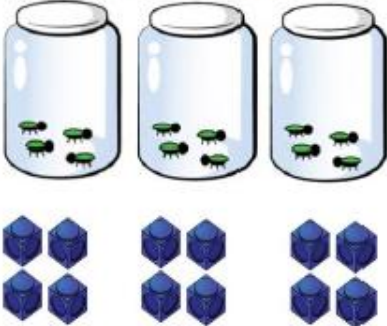
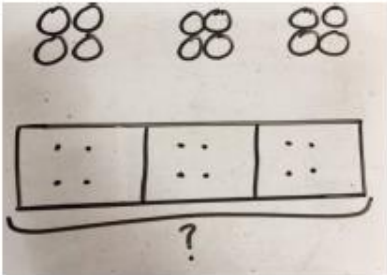
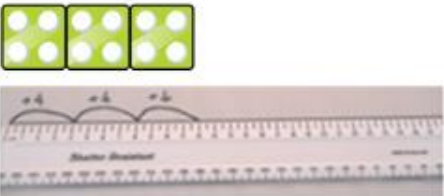
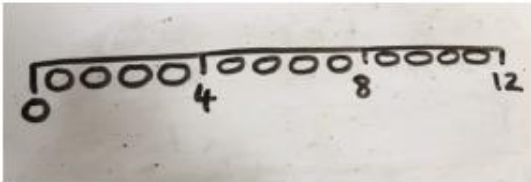
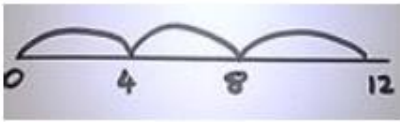
	Objective	Concrete	Pictorial	Abstract
Year 3 onwards	Column method with regrouping	<p>Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtractions with 2 exchanges.</p> <p>Make the larger number with the place value counters</p>  <p>Start with the ones, can I take away 8 from 4 easily? I need to exchange 1 of my tens for 10 ones.</p>  <p>Now I can subtract my ones.</p> 	 <p>Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make.</p> <p>When confident, children can find their own way to record the exchange/regrouping.</p> <p>Just writing the numbers as shown here shows that the child understands the method and knows when to exchange/regroup.</p> 	 <p>Children can start their formal written method by partitioning the number into clear place value columns.</p>  <p>Moving forward the children use a more compact method.</p> <p>This will lead to an understanding of subtracting any number including decimals.</p> 

CALCULATION GUIDANCE: Subtraction

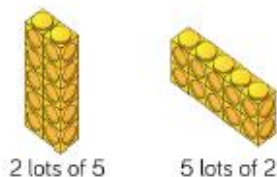
	Objective	Concrete	Pictorial	Abstract
Year 3 up	Column method with regrouping	<p>Now look at the tens, can I take away 8 tens easily? I need to exchange 1 hundred for 10 tens.</p>  <p>Calculations</p> $\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$ <p>Now I can take away 8 tens and complete my subtraction.</p>  <p>Calculations</p> $\begin{array}{r} 234 \\ - 88 \\ \hline 146 \end{array}$ <p>Show children how the concrete method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount.</p>		

Calculation policy: Multiplication

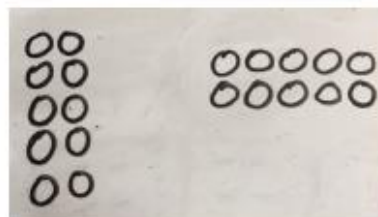
Key language: double, times, multiplied by, the product of, groups of, lots of, equal groups.

Concrete	Pictorial	Abstract
<p>Repeated grouping/repeated addition 3×4 $4 + 4 + 4$ There are 3 equal groups, with 4 in each group.</p> 	<p>Children to represent the practical resources in a picture and use a bar model.</p> 	<p>$3 \times 4 = 12$ $4 + 4 + 4 = 12$</p>
<p>Number lines to show repeated groups- 3×4</p>  <p>Cuisenaire rods can be used too.</p>	<p>Represent this pictorially alongside a number line e.g.:</p> 	<p>Abstract number line showing three jumps of four.</p> <p>$3 \times 4 = 12$</p> 

Use arrays to illustrate commutativity counters and other objects can also be used.
 $2 \times 5 = 5 \times 2$



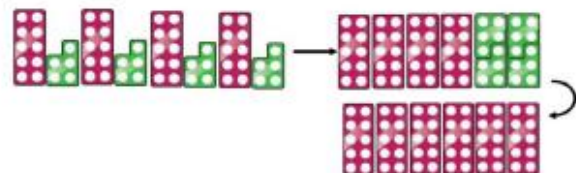
Children to represent the arrays pictorially.



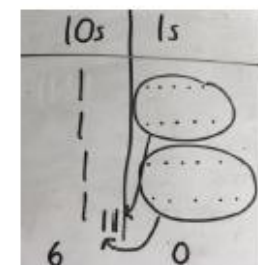
Children to be able to use an array to write a range of calculations e.g.

$$\begin{aligned} 10 &= 2 \times 5 \\ 5 \times 2 &= 10 \\ 2 + 2 + 2 + 2 + 2 &= 10 \\ 10 &= 5 + 5 \end{aligned}$$

Partition to multiply using Numicon, base 10 or Cuisenaire rods.
 4×15



Children to represent the concrete manipulatives pictorially.



Children to be encouraged to show the steps they have taken.

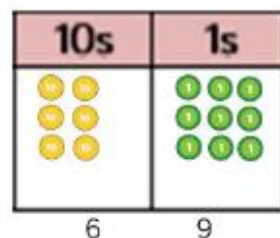
$$\begin{array}{r} 4 \times 15 \\ \swarrow \searrow \\ 10 \quad 5 \end{array}$$

$$\begin{aligned} 10 \times 4 &= 40 \\ 5 \times 4 &= 20 \\ 40 + 20 &= 60 \end{aligned}$$

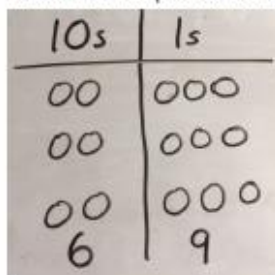
A number line can also be used



Formal column method with place value counters (base 10 can also be used.) 3×23



Children to represent the counters pictorially.

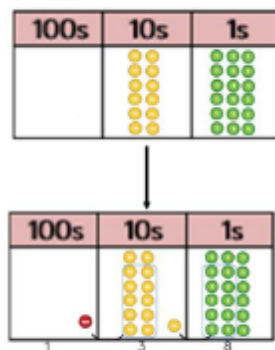


Children to record what it is they are doing to show understanding.

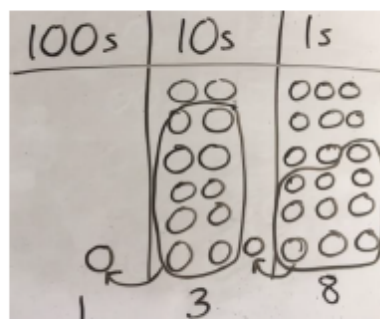
$$\begin{array}{r} 3 \times 23 \\ \swarrow \searrow \\ 20 \quad 3 \end{array} \quad \begin{array}{l} 3 \times 20 = 60 \\ 3 \times 3 = 9 \\ 60 + 9 = 69 \end{array}$$

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

Formal column method with place value counters.
 6×23



Children to represent the counters/base 10, pictorially
 e.g. the image below.



Formal written method

$$6 \times 23 =$$

$$\begin{array}{r} 23 \\ \times 6 \\ \hline 138 \\ 11 \end{array}$$

$$\begin{array}{r} 124 \\ \times 26 \\ \hline 744 \\ 2480 \\ \hline 3224 \\ 11 \end{array}$$

Answer: 3224

When children start to multiply $3d \times 3d$ and $4d \times 2d$ etc., they should be confident with the abstract:

To get 744 children have solved 6×124 .

To get 2480 they have solved 20×124 .

Conceptual variation; different ways to ask children to solve 6×23

23	23	23	23	23	23
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?

Mai had to swim 23 lengths, 6 times a week.
 How many lengths did she swim in one week?

With the counters, prove that $6 \times 23 = 138$

Find the product of 6 and 23

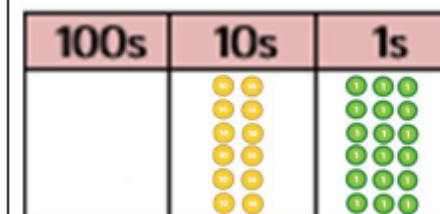
$$6 \times 23 =$$

$$\square = 6 \times 23$$







$$\begin{array}{r} 6 \quad 23 \\ \times 23 \quad \times 6 \\ \hline \quad \quad \end{array}$$

What is the calculation?












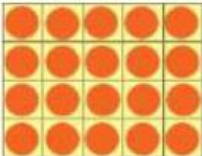

What is the product?





























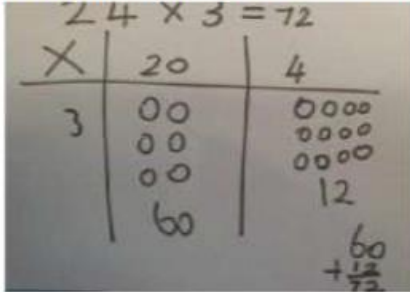













CALCULATION GUIDANCE: Multiplication

	Objective	Concrete	Pictorial	Abstract
Year R	Solve problems including doubling	<p>Multilink</p>  <p>Counting bears</p>  <p>Pegs</p> 	<p>Number pictures</p> <p>Fingers</p> <p>Counting in 2s 5s 10s with Numicon</p>   	<p>Using symbols, numerals and their names.</p> <p>$2+2=4$</p> <p>$4+4=8$</p> <p>Counting in 2s, 5s, 10s</p> <p>Rhymes and stories</p>

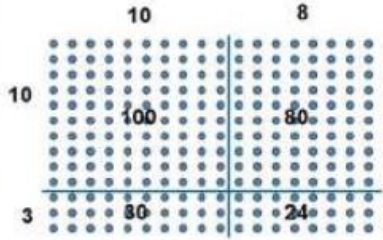
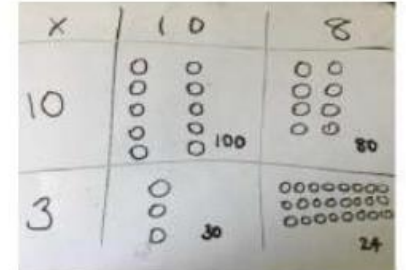
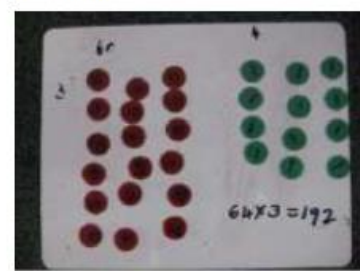
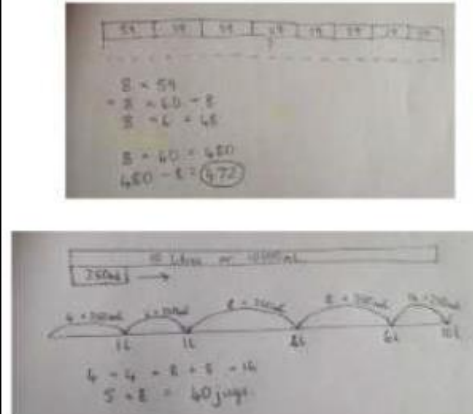
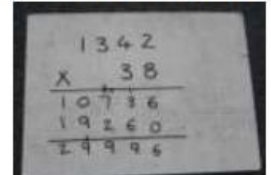
CALCULATION GUIDANCE: Multiplication

	Objective	Concrete	Pictorial	Abstract
Year 1 / 2	Repeated addition	   <p>Use different objects to add equal groups.</p>	<p>There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?</p>  	<p>Write addition sentences to describe objects and pictures.</p> 
	Arrays- showing commutative multiplication	<p>Create arrays using counters/cubes to show multiplication sentences.</p>  	<p>Draw arrays in different rotations to find commutative multiplication sentences.</p>  <p>$4 \times 2 = 8$</p>  <p>$2 \times 4 = 8$</p>  <p>$4 \times 2 = 8$</p> <p>Link arrays to area of rectangles.</p> 	<p>Use an array to write multiplication sentences and reinforce repeated addition.</p>  <p>$5 + 5 + 5 = 15$</p> <p>$3 + 3 + 3 + 3 + 3 = 15$</p> <p>$5 \times 3 = 15$</p> <p>$3 \times 5 = 15$</p>

CALCULATION GUIDANCE: Multiplication

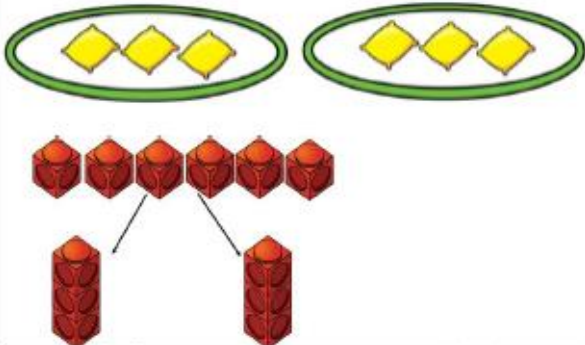
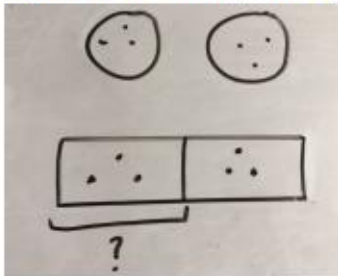
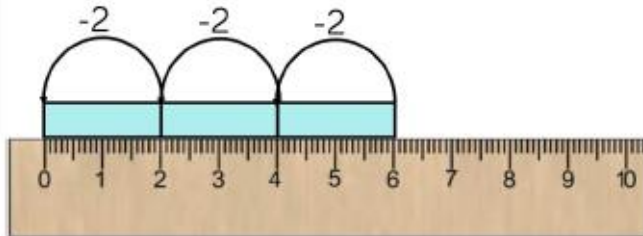
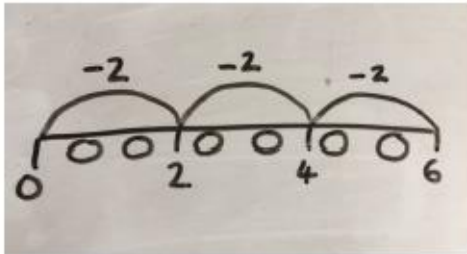
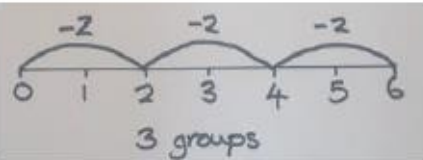
	Objective	Concrete	Pictorial	Abstract																																				
Year 3 / 4	Grid method	<p>Show the link with arrays to first introduce the grid method.</p> <table border="1"><tr><td>x</td><td>10</td><td>3</td></tr><tr><td>4</td><td></td><td></td></tr></table> <p>4 rows of 10 4 rows of 3</p> <p>Move on to using Base 10 to move towards a more compact method.</p> <p>4 rows of 13</p> <table border="1"><tr><td>x</td><td>T</td><td>U</td></tr><tr><td>4</td><td></td><td></td></tr></table> <p>Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows.</p> <p>Fill each row with 126.</p> <table border="1"><tr><td>100</td><td>20</td><td>6</td></tr><tr><td></td><td></td><td></td></tr></table> <p>Calculations 4 x 126</p> <p>Add up each column, starting with the ones making any exchanges needed.</p> <table border="1"><tr><td>100</td><td>20</td><td>6</td></tr><tr><td></td><td></td><td></td></tr></table> <table border="1"><tr><td>100</td><td>20</td><td>6</td></tr><tr><td></td><td></td><td></td></tr></table> <p>4 x 126 = 504</p>	x	10	3	4			x	T	U	4			100	20	6				100	20	6				100	20	6				<p>Children can represent the work they have done with place value counters in a way that they understand.</p> <p>They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as shown below.</p> 	<p>Start with multiplying by one digit numbers and showing the clear addition alongside the grid.</p> <table border="1"><tr><td>x</td><td>30</td><td>5</td></tr><tr><td>7</td><td>210</td><td>35</td></tr></table> <p>210 + 35 = 245</p> <p>Moving forward, multiply by a 2 digit number showing the different rows within the grid method.</p> $\begin{array}{r} 35 \\ \times 7 \\ \hline 245 \\ 3 \end{array}$	x	30	5	7	210	35
		x	10	3																																				
4																																								
x	T	U																																						
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CALCULATION GUIDANCE: Multiplication

	Objective	Concrete	Pictorial	Abstract
Year 5/6	Expanded method	<p>Show the link with arrays to first introduce the expanded method.</p> 		<p>Start with long multiplication, reminding the children about lining up their numbers clearly in columns.</p> $\begin{array}{r} 18 \\ \times 13 \\ \hline 24 \quad (3 \times 8) \\ 30 \quad (3 \times 10) \\ \hline 80 \quad (10 \times 8) \\ 100 \quad (10 \times 10) \\ \hline 234 \end{array}$
	Compact method	<p>Children can continue to be supported by place value counters at the stage of multiplication.</p>  <p>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.</p>	<p>Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.</p> 	<p>Start with long multiplication, reminding the children about lining up their numbers clearly in columns.</p> <p>If it helps, children can write out what they are solving next to their answer.</p> $\begin{array}{r} 7 \quad 4 \\ \times 6 \quad 3 \\ \hline 1 \quad 2 \\ 2 \quad 1 \quad 0 \\ 2 \quad 4 \quad 0 \\ + 4 \quad 2 \quad 0 \quad 0 \\ \hline 4 \quad 6 \quad 6 \quad 2 \end{array}$ <p>This moves to the more compact method.</p> 

Calculation policy: Division

Key language: share, group, divide, divided by, half.

Concrete	Pictorial	Abstract		
<p>Sharing using a range of objects. $6 \div 2$</p> 	<p>Represent the sharing pictorially.</p> 	<p>$6 \div 2 = 3$</p> <table border="1" data-bbox="1505 614 1886 673"><tr><td>3</td><td>3</td></tr></table> <p>Children should also be encouraged to use their 2 times tables facts.</p>	3	3
3	3			
<p>Repeated subtraction using Cuisenaire rods above a ruler. $6 \div 2$</p>  <p>3 groups of 2</p>	<p>Children to represent repeated subtraction pictorially.</p> 	<p>Abstract number line to represent the equal groups that have been subtracted.</p> 		

2d + 1d with remainders using lollipop sticks. Cuisenaire rods, above a ruler can also be used.

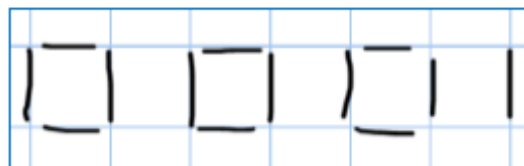
$$13 \div 4$$

Use of lollipop sticks to form wholes- squares are made because we are dividing by 4.



There are 3 whole squares, with 1 left over.

Children to represent the lollipop sticks pictorially.

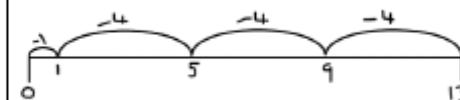


There are 3 whole squares, with 1 left over.

$$13 \div 4 = 3 \text{ remainder } 1$$

Children should be encouraged to use their times table facts; they could also represent repeated addition on a number line.

'3 groups of 4, with 1 left over'



Sharing using place value counters.

$$42 \div 3 = 14$$



10s	1s

→

10s	1s
●	
●	
●	

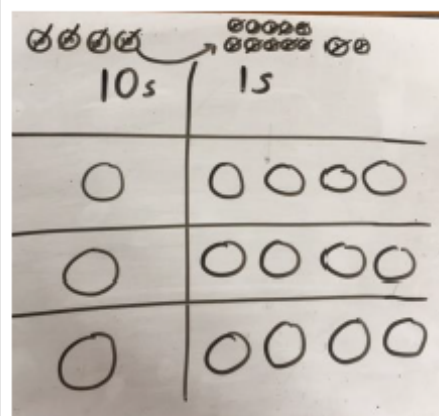


10s	1s
●	●●●●
●	●●●●
●	●●●●

= 14

10s	1s
●	
●	
●	

Children to represent the place value counters pictorially.







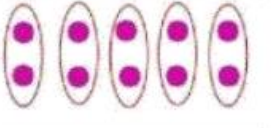
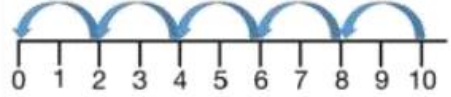
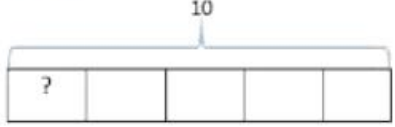
Children to be able to make sense of the place value counters and write calculations to show the process.

$$\begin{aligned} 42 \div 3 \\ 42 &= 30 + 12 \\ 30 \div 3 &= 10 \\ 12 \div 3 &= 4 \\ 10 + 4 &= 14 \end{aligned}$$


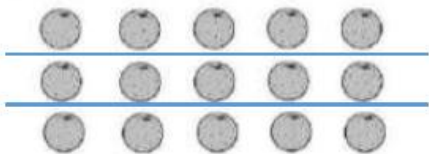
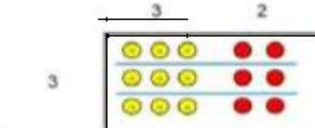

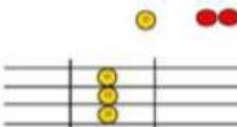

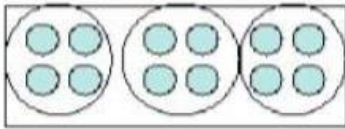
CALCULATION GUIDANCE: Division

	Objective	Concrete	Pictorial	Abstract
Year R/1	Sharing	<p>I have 8 cubes, can you share them equally between two people?</p>  	<p>Children use picture or shapes to share quantities.</p> 	<p>Share 8 buns between two people. $8 \div 2 = 4$</p>

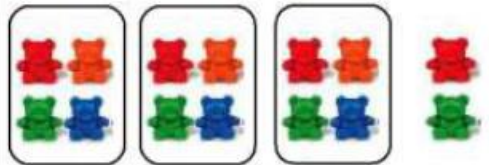
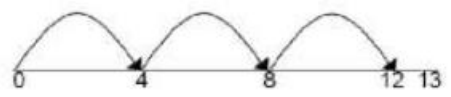

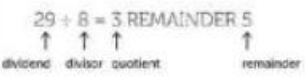
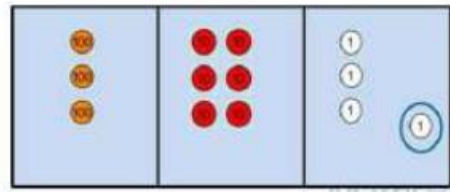
CALCULATION GUIDANCE: Division

	Objective	Concrete	Pictorial	Abstract
Year 1/2	Sharing	<p>I have 8 cubes, can you share them equally between two people?</p>  $8 \div 2 = 4$	<p>Children use pictures or shapes to share quantities.</p>  $8 \div 2 = 4$	<p>Share 8 buns between two people.</p> $8 \div 2 = 4$ 
	Grouping	<p>Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.</p>  	<p>Use a number line to show jumps in groups. The number of jumps equals the number of groups.</p>  <p>Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.</p>  $10 \div 5 = ?$ $5 \times ? = 10$	<p>$10 \div 5 = 2$</p> <p>Divide 10 into 5 groups. How many are in each group?</p>

CALCULATION GUIDANCE: Division

	Objective	Concrete	Pictorial	Abstract
Year 3/4	Division with arrays	<p>Link division to multiplication by creating an array and thinking about the number sentences that can be created.</p> <p>Eg $15 \div 3 = 5$ $5 \times 3 = 15$ $15 \div 5 = 3$ $3 \times 5 = 15$</p> 	 <p>Draw an array and use lines to split the array into groups to make multiplication and division sentences.</p>	<p>Find the inverse of multiplication and division sentences by creating four linking number sentences.</p> <p>$5 \times 3 = 15$ $3 \times 5 = 15$ $15 \div 5 = 3$ $15 \div 3 = 5$</p>
	Short division	<p>Use place value counters to divide using the short division method alongside.</p> <p>$96 \div 3$</p>  <p>$42 \div 3$</p> <p>Start with the biggest place value. We are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over. We exchange this ten for 10 ones and then share the ones equally among the groups.</p>   <p>We look at how many are in each group.</p> 	<p>Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.</p>  <p>Encourage them to move towards counting in multiples to divide more efficiently.</p>	<p>Begin with divisions that divide equally with no remainder.</p> $\begin{array}{r} 218 \\ 3 \overline{) 654} \end{array}$

CALCULATION GUIDANCE: Division

	Objective	Concrete	Pictorial	Abstract
Year 5/6	Division with remainders	$14 \div 3 =$ Divide objects between groups and see how much is left over 	Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.  Draw dots and group them to divide an amount and clearly show a remainder. 	Complete written divisions and show the remainder using r. $29 \div 8 = 3 \text{ REMAINDER } 5$  List table facts to support division. E.g. 5, 10, 15, 20, 25
	Short division with remainders	$364 \div 3 =$ 		Move onto divisions with a remainder. Once children understand remainders, begin to express as a fraction or decimal according to the context. $\begin{array}{r} 86 \text{ r } 2 \\ 3 \overline{) 432} \\ 5 \end{array}$ $\begin{array}{r} 186 \frac{1}{5} \\ 5 \overline{) 931} \end{array}$ $\begin{array}{r} 14.6 \\ 35 \overline{) 511.0} \end{array}$

CALCULATION GUIDANCE: Division

	Objective	Concrete	Pictorial	Abstract
Year 6	Long division			<p>Children will use long division to divide numbers with up to 4 digits by 2 digit numbers.</p> $ \begin{array}{r} 015 \\ 32 \overline{) 487} \\ \underline{-0} \\ 48 \\ \underline{-32} \\ 167 \\ \underline{-160} \\ 7 \end{array} $ $ \begin{array}{r} 17 \text{ r } 19 \\ 31 \overline{) 546} \\ \underline{31} \downarrow \\ 236 \\ \underline{217} \\ 19 \end{array} $