



Calculation Policy



Status	Non-Statutory
Responsible Directors' Committee	Board of Directors
LGB Committee	Local Governing Body
Responsible Persons	Sarah Crampton in conjunction with members of Maths Network
Date Policy Agreed	Spring 22
Last Review Date	September 23
Next Review Date	September 25



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Version Control

<i>Version</i>	<i>Revision Date</i>	<i>Revised by</i>	<i>Section Revised</i>
V2	27.09.23	SC	None all up to date



Introduction

This policy has been largely adapted from the White Rose Maths Hub Calculation Policy with further material added. It is a working document and will be revised and amended as necessary. This is a product of collaboration between all Exceed Maths Leaders and supports, unifies enhances the approaches already in place.

The purpose of a shared approach is to support teacher understanding and pedagogy; ensure there is consistency to support moderation and year group networks and to support more collaborative training/coaching opportunities within Mathematics.

Documents to further support the Teaching and Learning of Maths created/distributed by colleagues within the Maths Network are:

1. Diagnostic Assessment Document
2. Mental Maths & Arithmetic Progression Document
3. Teacher Prompt Document
4. Sentence Stems
5. Knowledge Organisers

Manipulatives

Throughout the policy examples of concrete and pictorial examples are shared. These are not an exhaustive list. Through using the accompanying Teacher Prompt Document individual teachers will be able to consider precisely which manipulatives and models need to be used with each particular group of pupils. Manipulatives and pictorial models should be used in every year group for all abilities when introducing a new concept to ensure children can underpin their knowledge securely.

Everyday objects are also invaluable to support children's learning to keep interest and help them understand that Maths is everywhere for example:

1. Pebbles
2. Marbles
3. Milk tops
4. Bun tins
5. Paper straws
6. Cotton Balls



7. Playdough
8. Lollipop Sticks
9. Dried Beans
10. Toy Cars
11. Fruit
12. Lego

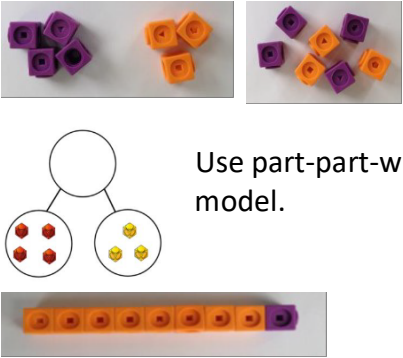
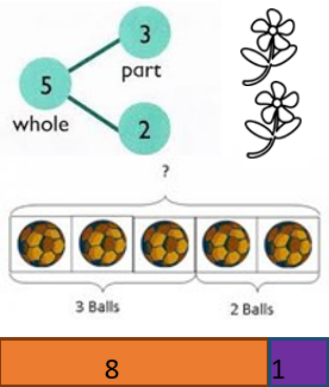
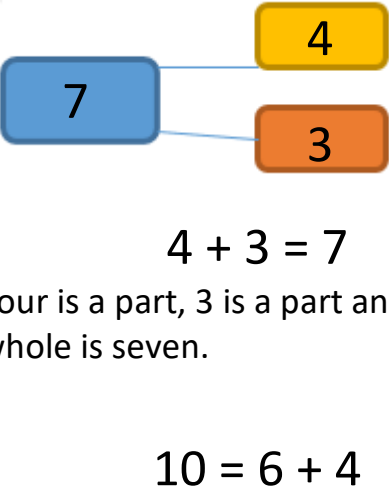

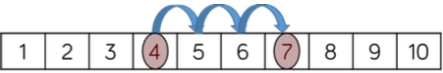
Bar Modelling

The bar model is used to help children to 'see' mathematical structure. It is not a method for solving problems, but a way of revealing the mathematical structure within a problem and gaining insight and clarity to help solve it. It supports the transformation of real-life problems into a mathematical form and can bridge the gap between concrete mathematical experiences and abstract representations. It should be preceded by and used in conjunction with a variety of representations, both concrete and pictorial, all of which contribute to children's developing number sense. It can be used to represent problems involving the four operations, ratio and proportion. It is also useful for representing unknowns in a problem and as such can be a precursor to more symbolic algebra.

It is helpful to introduce children to the bar model as part of a sequence of learning so they can connect their understanding of the real world to this mathematical representation. Bar modelling should be used when introducing problem solving physical or abstract to pupils to see the Maths from Year 1 - Year 6. These can be introduced alongside practical resources and/or acting out the problem. The problem and use of bar models can then be built upon year on year and become more complex through to Year 6.



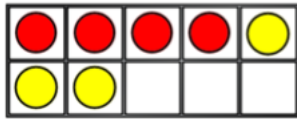
Addition Year 1

Objective & Strategy	Concrete	Pictorial	Abstract
<p>Combining two parts to make a whole: part-part-whole model</p>	 <p>Use cubes to add two numbers together as a group or in a bar.</p> <p>Use part-part-whole model.</p>	 <p>Use pictures to add two numbers together as a group or in a bar.</p>	 <p>Use the part-part-whole diagram as shown above to move into the abstract.</p> $4 + 3 = 7$ <p>Four is a part, 3 is a part and the whole is seven.</p> $10 = 6 + 4$
<p>Starting at the bigger number and counting on</p>	 <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>Start at the larger number on the number line and count on in ones or in one jump to find the answer.</p>	$5 + 12 = 17$ <p>Place the larger number in your head and count on the smaller number to find your answer.</p>



Regrouping to make 10.

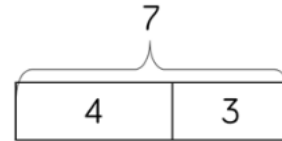
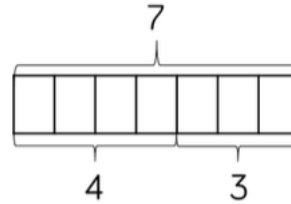
This is an essential skill for column addition later



$$6 + 5 = 11$$



Start with the bigger number and use the smaller number to make 10.
Use ten frames.



Use pictures of a number line. Regroup or partition the smaller number using the part-part-whole model to make 10.

$$7 + 4 = 11$$

If I am seven, how many more do I need to make 10. How many more do I add on now?

$$6 + \square = 11$$

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

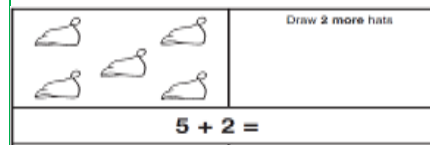
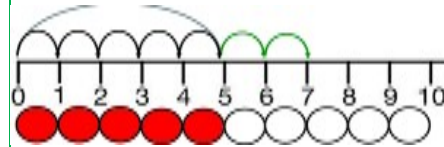
$$6 + 5 = \square + 4$$

Children to develop an understanding of equality.

Represent and use number bonds and related subtraction facts within 20.



2 more than 5.



$$5 + 2 =$$


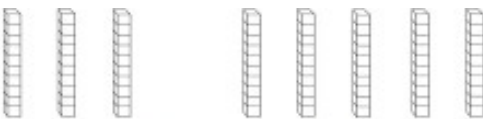
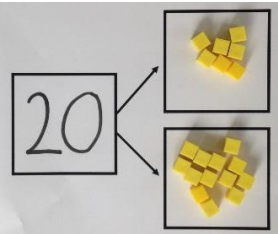
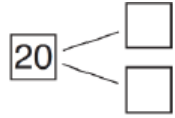
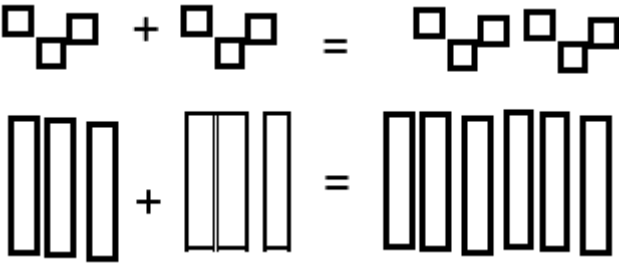
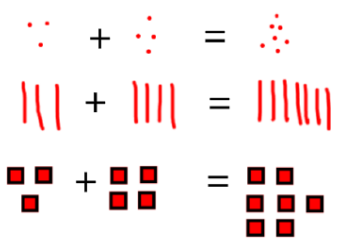
Emphasis should be on language.

“1 more than 5 is equal to 6.”

“2 more than 5 is 7.”

“8 is 3 more than 5.”



Objective & Strategy	Concrete	Pictorial	Abstract
Adding multiples of ten.	<p style="text-align: center;">$50 = 30 + 20$</p>  <p>Model using dienes and bead strings.</p>	 <p style="text-align: center;">3 tens + 5 tens = ____ tens $30 + 50 =$ ____</p> <p>Use representations for base ten.</p>	<p style="text-align: center;">$20 + 30 = 50$ $70 = 50 + 20$ $40 + \square = 60$</p>
Use known number facts	 <p>Children explore ways of making numbers within 20.</p>	 <p style="text-align: center;">$\square + \square = 20$ $20 - \square = \square$ $\square + \square = 20$ $20 - \square = \square$</p>	<p style="text-align: center;">$\square + 1 = 16$ $16 - 1 = \square$ $1 + \square = 16$ $16 - \square = 1$</p>
Using known facts		 <p>Children draw representations of H, T and O</p>	<p style="text-align: center;">$3 + 4 = 7$ <i>Leads to</i> $30 + 40 = 70$ <i>Leads to</i> $300 + 400 = 700$</p>



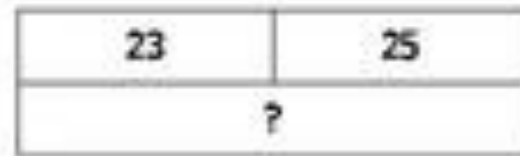
Bar model



$$3 + 4 = 7$$

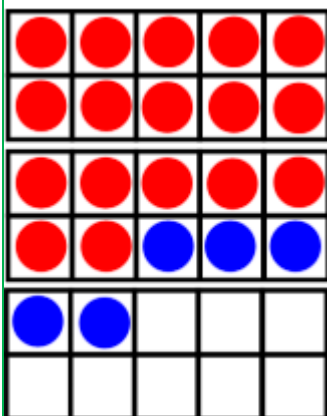


$$7 + 3 = 10$$

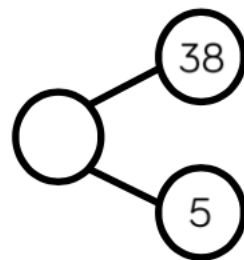
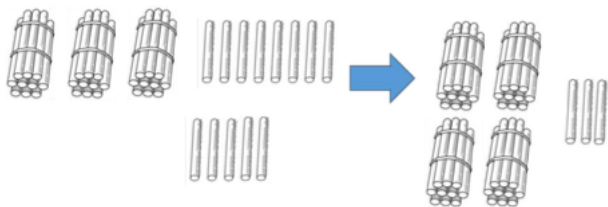


$$23 + 25 = 48$$

Add a two digit number and one.



$7 + 5 = 22$
Use ten frame to make "magic ten"



$$38 + 5 = 43$$

$$17 + 5 = 22$$

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
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

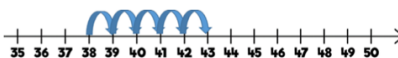
Explore related facts:

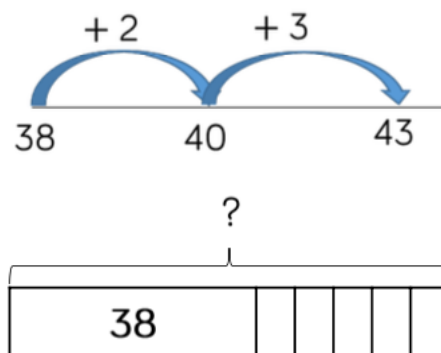
$$17 + 5 = 22$$

$$5 + 17 = 22$$

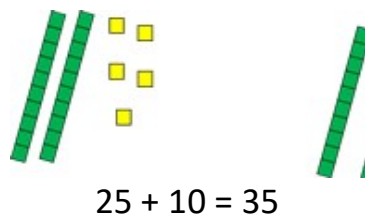
$$22 - 17 = 5$$

$$22 - 5 = 17$$



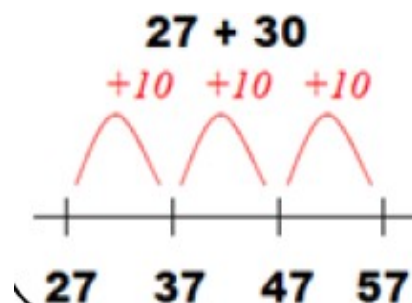


Add a two digit number and tens



$$25 + 10 = 35$$

Explore that the ones digit does not change.

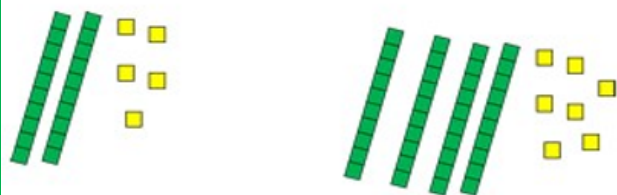


$$27 + 10 = 37$$

$$27 + 20 = 47$$

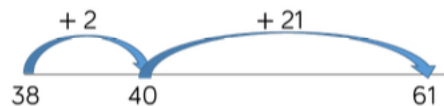
$$27 + \square = 57$$

Add two two-digit numbers

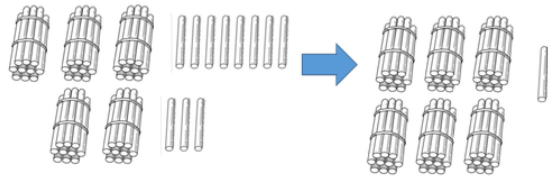


Model using dienes, place value counters and numicon.

Use number line and bridge ten using part-part-whole if necessary



$$\begin{array}{r}
 25 + 47 \\
 \swarrow \quad \downarrow \quad \searrow \\
 20 + 5 \quad 40 + 7 \\
 20 + 40 = 60 \\
 5 + 7 = 12 \\
 60 + 12 = 72
 \end{array}$$



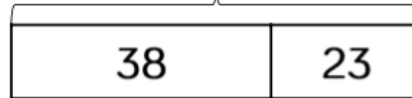
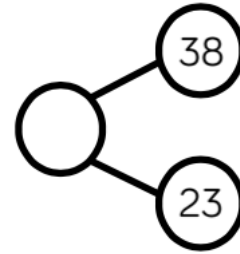
Tens	Ones

	..

A red bracket highlights the 11 ones in the top row. A green arrow points from this bracket to the bottom row, indicating the regrouping process.

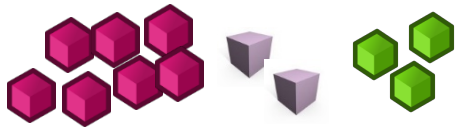
Tens	Ones
10 10 10	1 1 1 1
10 10	1 1 1
10	

A green arrow points from the 11 ones in the top row to the 10 ones in the bottom row, showing the regrouping of ten ones into one ten.



$$38 + 23 = 61$$

Add three one-digit numbers



Combine to make 10 first if possible, or bridge 10 then add third digit.

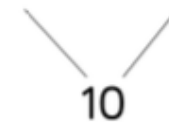


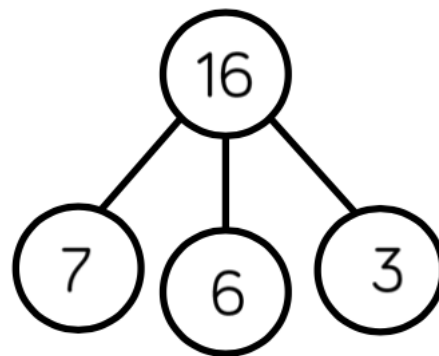
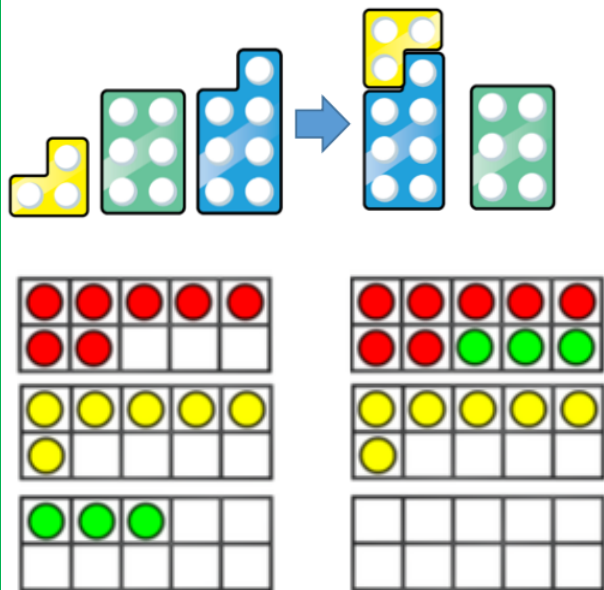
Regroup and draw representation



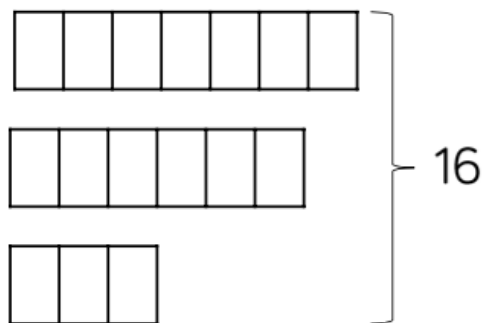
Combine the two number that make/bridge ten then add on the third.

$$7 + 6 + 3 = 16$$

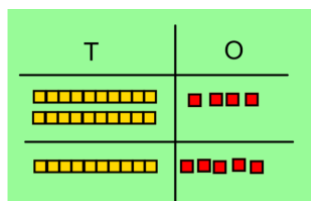




$$7 + 6 + 3 = 16$$



Column Addition – no regrouping (friendly numbers)

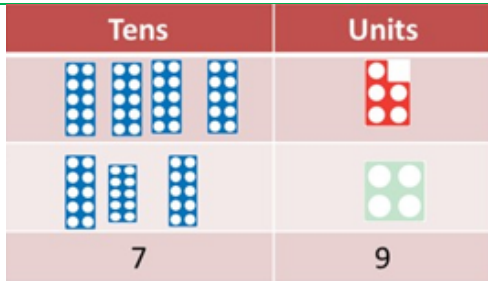


Model using dienes or Numicon.
Add together the ones first, then the tens.



$$\begin{array}{r} 38 \\ + 23 \\ \hline 61 \\ \hline 1 \end{array}$$

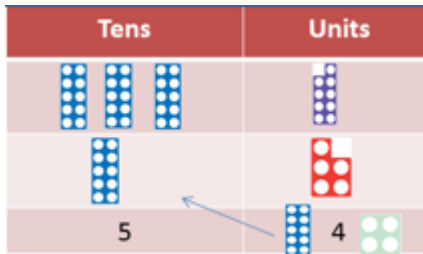
Add the ones first, then the tens, then the hundreds.



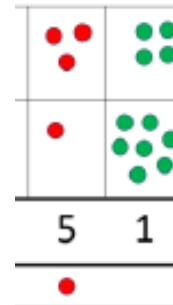
Children move to drawing the counters using a tens and one frame.

Move to using place value counters.

Column Addition – with regrouping



Exchange ten ones for a ten. Model using numicon and place value counters.



Children to draw a representation of the grid to further support their understanding, carrying the ten underneath the line.

$$\begin{array}{r}
 20 + 5 \\
 40 + 8 \\
 \hline
 60 + 13 = 73
 \end{array}
 \qquad
 \begin{array}{r}
 36 \\
 + 85 \\
 \hline
 121 \\
 \hline
 1
 \end{array}$$

Start by partitioning the numbers before formal column to show the exchanging.

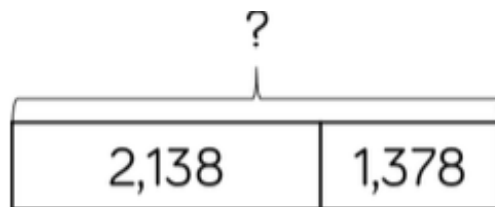
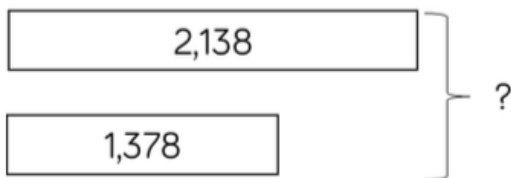
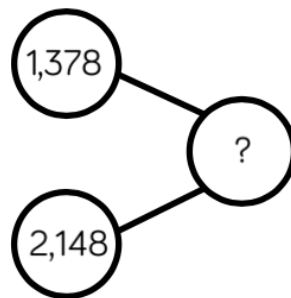
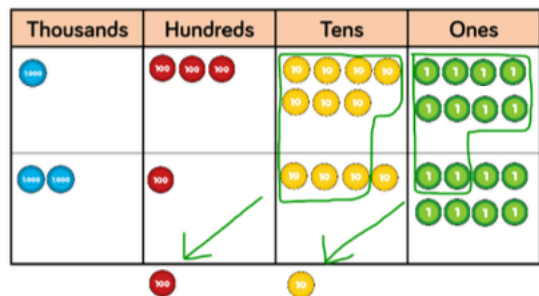
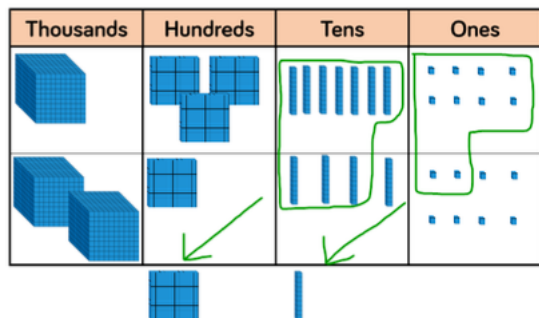


Addition Year 3-6

Objective & Strategy	Concrete	Pictorial	Abstract																		
<p>Year 3 Add numbers with up to 3-digits</p>	<table border="1" data-bbox="409 320 922 560"><thead><tr><th>Hundreds</th><th>Tens</th><th>Ones</th></tr></thead><tbody><tr><td>200 200</td><td>60 60 60 60 60 60</td><td>50 50 50 50 50</td></tr><tr><td>200</td><td>60 60 60 60 60 60</td><td>40 40 40 40 40</td></tr></tbody></table> <p data-bbox="450 566 616 646">←</p> <table border="1" data-bbox="409 703 902 938"><thead><tr><th>Hundreds</th><th>Tens</th><th>Ones</th></tr></thead><tbody><tr><td>200 200</td><td>60 60 60 60 60 60</td><td>40 40 40 40 40</td></tr><tr><td>200</td><td>60 60 60 60 60 60</td><td>40 40 40 40 40</td></tr></tbody></table> <p data-bbox="421 949 504 981">←</p>	Hundreds	Tens	Ones	200 200	60 60 60 60 60 60	50 50 50 50 50	200	60 60 60 60 60 60	40 40 40 40 40	Hundreds	Tens	Ones	200 200	60 60 60 60 60 60	40 40 40 40 40	200	60 60 60 60 60 60	40 40 40 40 40	<p data-bbox="1099 320 1375 603">?</p> <p data-bbox="1003 683 1480 842">265 164</p> <p data-bbox="1021 938 1451 1118">?</p> <p data-bbox="1021 1023 1451 1118">265 164</p>	<div data-bbox="1529 320 2024 411" style="border: 1px solid black; border-radius: 10px; padding: 5px; display: inline-block;">$265 + 164 = 429$</div> $\begin{array}{r} 265 \\ + 164 \\ \hline 429 \\ \hline 1 \end{array}$
Hundreds	Tens	Ones																			
200 200	60 60 60 60 60 60	50 50 50 50 50																			
200	60 60 60 60 60 60	40 40 40 40 40																			
Hundreds	Tens	Ones																			
200 200	60 60 60 60 60 60	40 40 40 40 40																			
200	60 60 60 60 60 60	40 40 40 40 40																			



Year 4
Add
numbers
with up to
four-digits

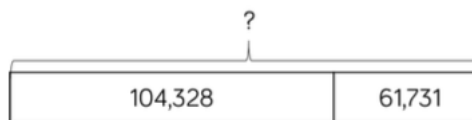
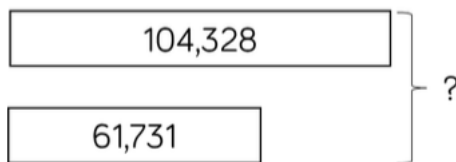
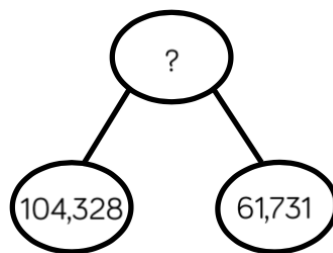
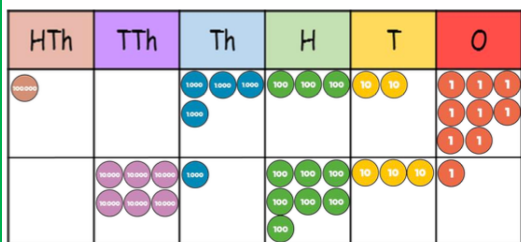


$$1,378 + 2,148 = 3,526$$

	1	3	7	8
+	2	1	4	8
<hr/>				
	3	5	2	6
	1	1		



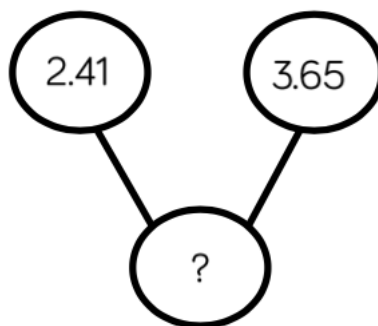
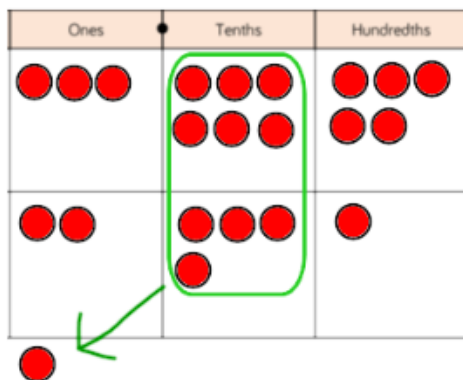
Year 5 and 6
Add
numbers
with more
than 4 digits



$$104,328 + 61,731 = 166,059$$

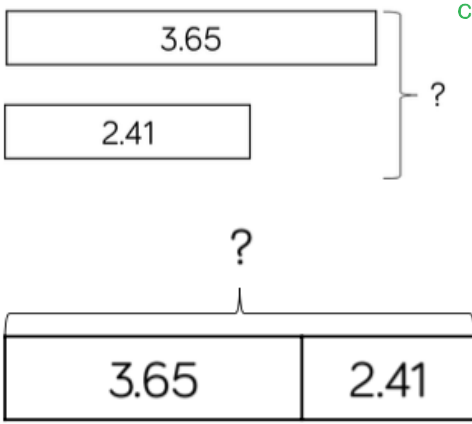
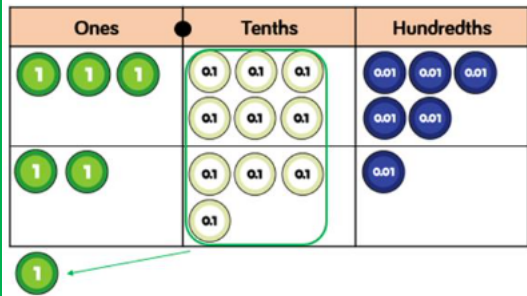
1	0	4	3	2	8
+	6	1	7	3	1
<hr/>					
1	6	6	0	5	9
<hr/>					
					1

Year 5 and 6
Add with up
to 3 decimal
places



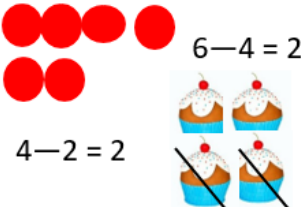
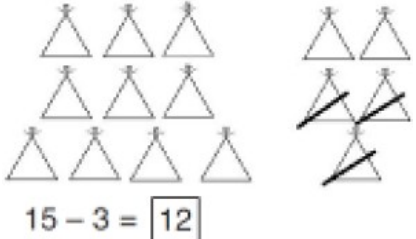
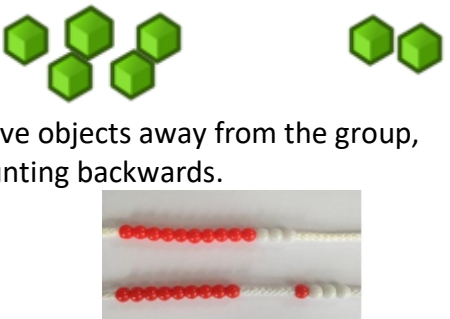
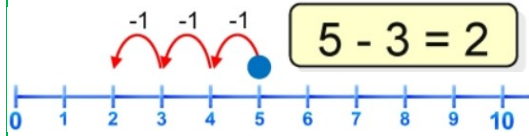
$$3.65 + 2.41 = 6.06$$

3.65
+ 2.41
<hr/>
6.06
<hr/>
1



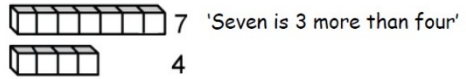


Subtraction Year 1

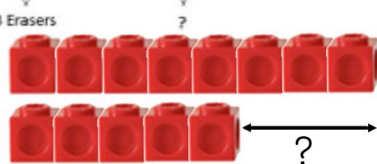
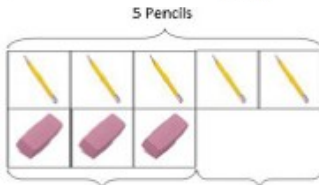
Objective & Strategy	Concrete	Pictorial	Abstract
Taking away ones.	 <p>Use physical objects, counters, cubes etc to show how objects can be taken away.</p>	 <p>Cross out drawn objects to show what has been taken away.</p>	$7 - 4 = 3$ $16 - 9 = 7$
Counting back.	 <p>Move objects away from the group, counting backwards.</p> <p>Move the beads along the bead string as you count backwards.</p>	 <p>Count back in ones using a number line.</p>	Put 13 in your head, count back 4. What number are you at?



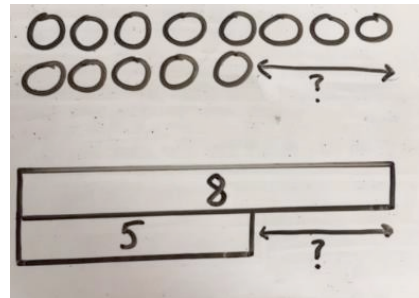
Find the difference.



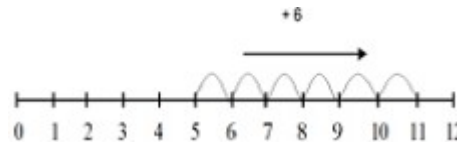
'I am 2 years older than my sister'



Compare objects and amounts.
Lay objects to represent bar model.



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



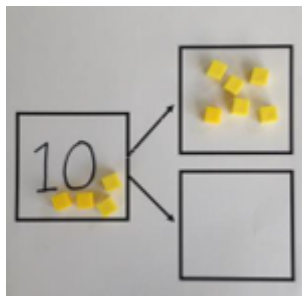
Count on using a number line to find the difference.

Hannah has 12 sweets and her sister has 5. How many more does Hannah have than her sister?

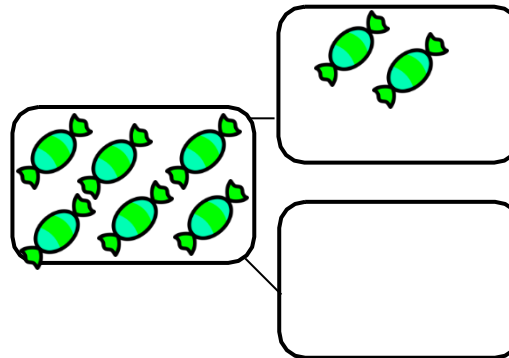
Find the difference between 8 and 5.
 $8 - 5$, the difference is \square

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

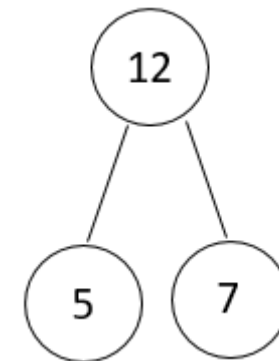
Represent and use number bonds and related subtraction facts within 20. Part-part-whole model.



Link to addition. Use part-part-whole model to model the inverse.
If 10 is the whole and 6 is one of the parts, what is the other part?



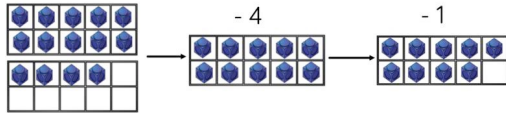
Use pictorial representations to show the part.



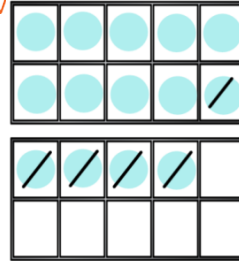
Move to using numbers within the part-part-whole model.

Make 10.

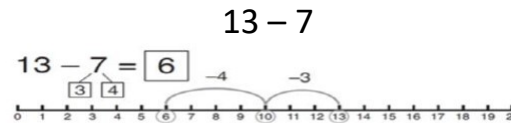
$14 - 5$



Make 14 of the ten frame. Take 4 away to make ten, then take one more away so that you have taken 5.



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



Jump back 3 first, then another 4. Use ten as the stopping point.

$$14 - 5 = 9$$



$$14 - 4 = 10$$

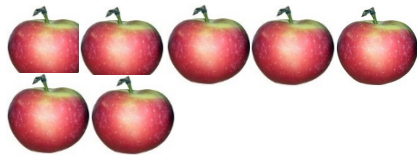
$$10 - 1 = 9$$

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

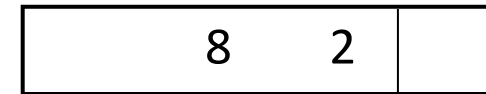
$$16 - 8$$

How many do we take off first to get to 10? How many left to take off?

Bar Model.



$$5 - 2 = 3$$



$$10 = 8 + 2$$

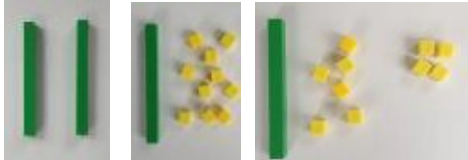
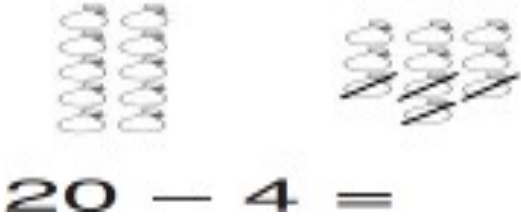
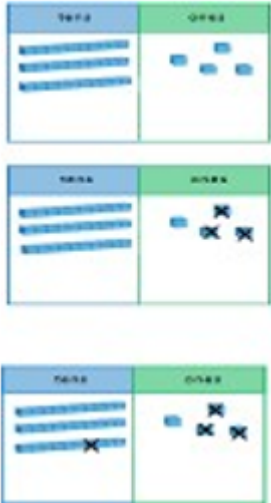

$$10 = 2 + 8$$

$$10 - 2 = 8$$

$$10 - 8 = 2$$

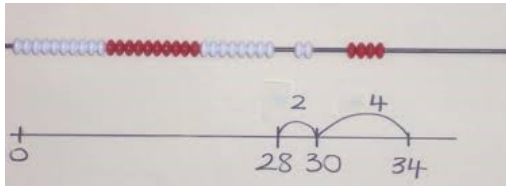


Subtraction Year 2

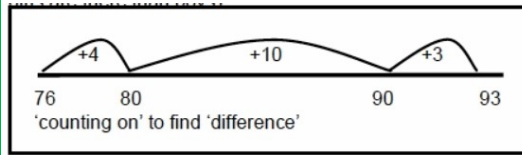
Objective & Strategy	Concrete	Pictorial	Abstract
Regroup a ten into ten ones	 <p>Use a place value chart to show how to change a ten into ten ones, use the term “take and make”.</p>	 <p>$20 - 4 =$</p>	$20 - 4 = 16$
Partition to subtract without regrouping (friendly numbers).	<p>$34 - 13 = 21$</p>  <p>Use dienes to show how to partition the number when subtracting without regrouping.</p>	 <p>$43 - 21 = 22$</p> <p>Children draw representations of dienes and cross off.</p>	$43 - 21 = 22$



Make ten strategies. Progression should be crossing one ten, crossing more than one ten, crossing the hundreds.



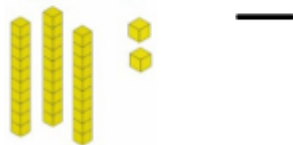
Use a bead bar or bead strings to model counting to next ten and the rest.



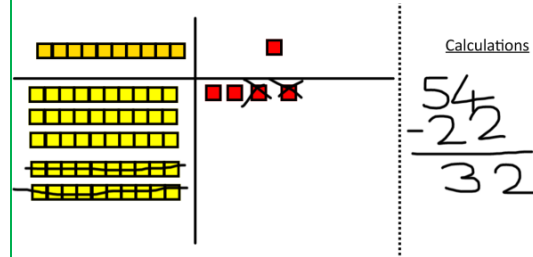
Use a number line to count on to next ten and then the rest.

$$93 - 76 = 17$$

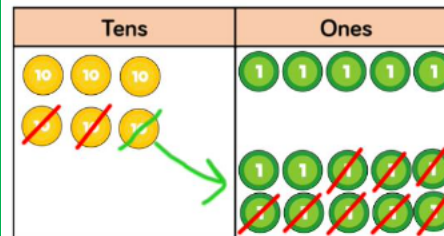
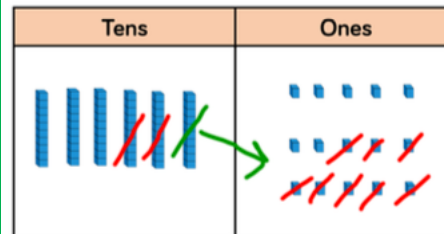
Column subtraction without regrouping (friendly numbers)



Use base 10 or numicon to model.

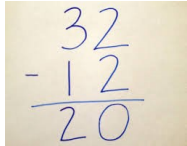


Draw representations to support understanding.



$$47 - 24 = 23$$

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

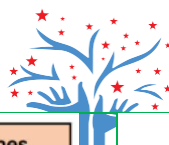


Intermediate step may be needed to lead to clear subtraction understanding.



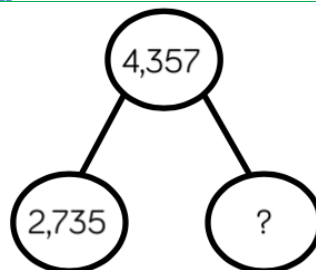
Subtraction Year 3-6

Objective & Strategy	Concrete	Pictorial	Abstract
<p>Year 3 Subtract numbers with up to 3 digits</p>			<div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: 0 auto;"> $435 - 273 = 262$ </div> $ \begin{array}{r} \overset{3}{4} \overset{1}{3} 5 \\ - 273 \\ \hline 262 \\ \hline \end{array} $
<p>Year 4 Subtract numbers with up to 4 digits</p>			<div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: 0 auto;"> $4,357 - 2,735 = 1,622$ </div>



Thousands	Hundreds	Tens	Ones

Thousands	Hundreds	Tens	Ones



4,357

2,735

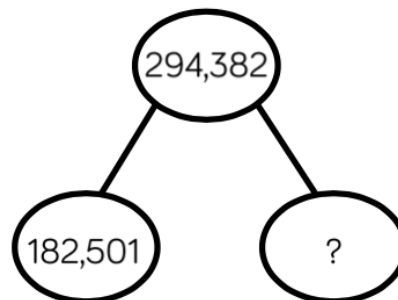
4,357

2,735	?
-------	---

$$\begin{array}{r} 3 \ 1 \\ 4357 \\ - 2735 \\ \hline 1622 \end{array}$$

Year 5 and 6
Subtract numbers
with more than 4-
digits

HTh	TTh	Th	H	T	O



294,382 – 182,501 = 111,881

	2	9	3	13	8	2
-	1	8	2	5	0	1
	1	1	1	8	8	1

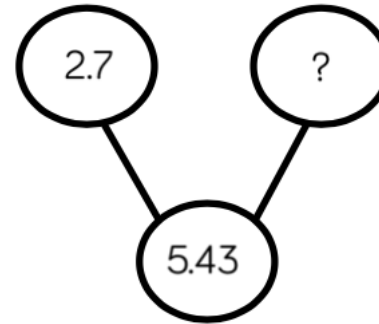
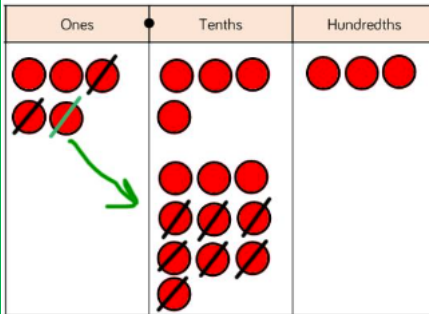
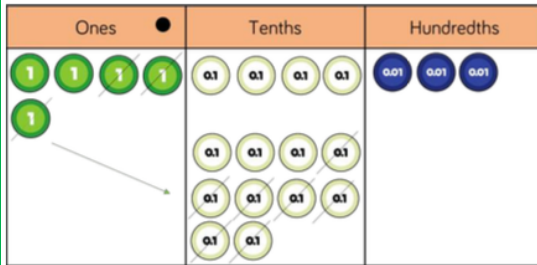


294,382

182,501 ← ?

294,382
 182,501 | ?

Year 5 and 6
 Subtract with up to
 3 decimal places



5.43

2.7 ← ?

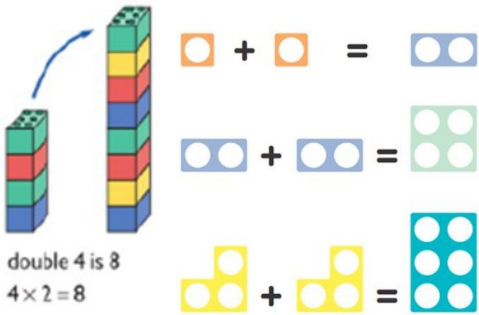
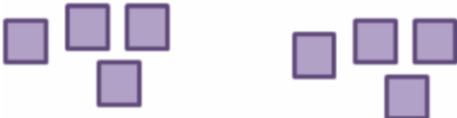
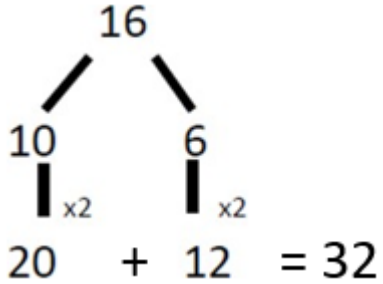
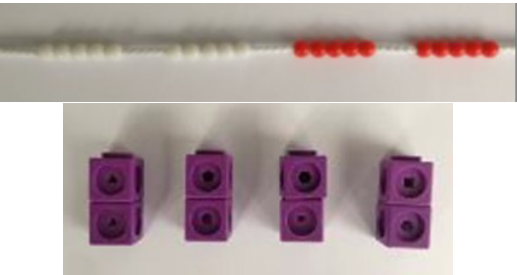
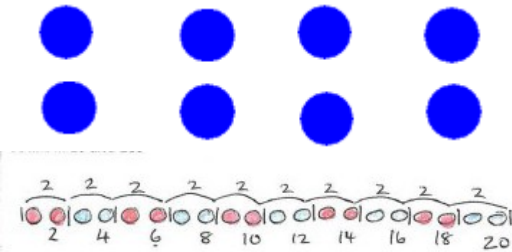

5.43
 2.7 | ?

$$5.43 - 2.7 = 2.73$$

$$\begin{array}{r} 4 \quad 1 \\ 5.43 \\ - 2.7 \\ \hline 2.73 \end{array}$$



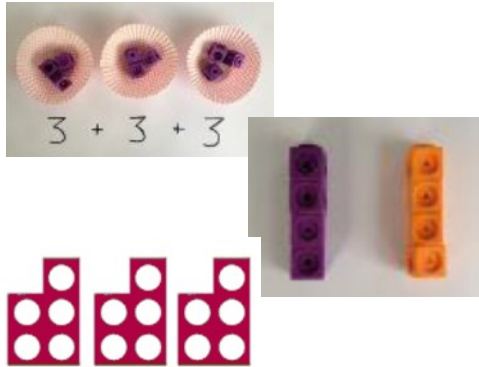
Multiplication Year 1

Objective & Strategy	Concrete	Pictorial	Abstract
Doubling.	 <p>Use practical activities using manipulatives including cubes and numicon to demonstrate doubling.</p>	<p>Double 4 is 8</p>  <p>Draw pictures to show how to double numbers.</p>	 <p>Partition a number and then double each part before recombining it back together.</p>
Counting in multiples.	 <p>Count the groups as children are skip counting, children may use fingers as they are skip counting.</p>	 <p>Children make representations to show counting in multiples.</p>	<p>Count in multiples of a number aloud.</p> <p>Write sequences with multiples of number.</p> <p>2, 4, 6, 8, 10 5, 10, 15, 20, 25, 30</p>
Making equal groups and counting the total		<p>Draw  to show $2 \times 3 = 6$</p> <p>Draw and make representations.</p>	$2 \times 4 = 8$

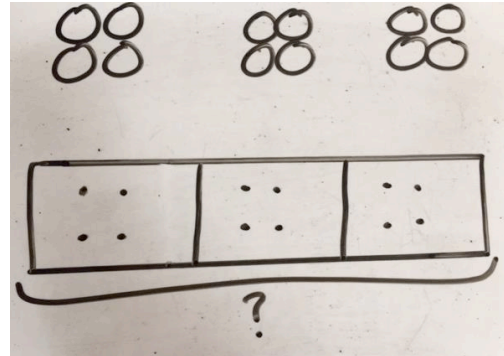


Use manipulatives to create equal groups.

Repeated addition



Use different objects to add equal group.

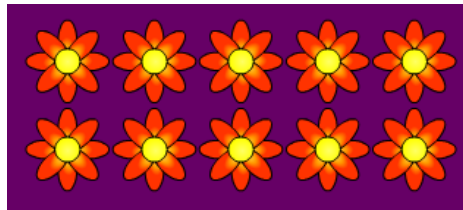


Children to represent the practical resources in a picture and use a bar model.

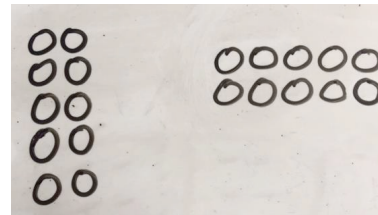


Write addition sentences to describe objects and pictures.

Understanding arrays



Use objects laid out in arrays to find the answers to 2 lots of 5, 3 lots of 2 etc.

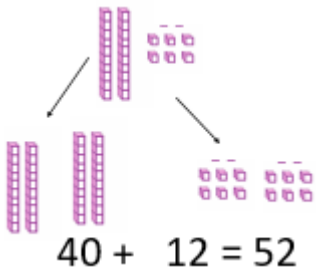
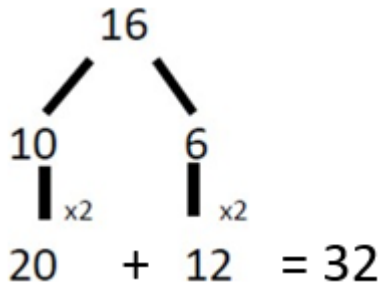
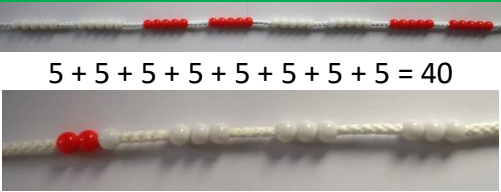

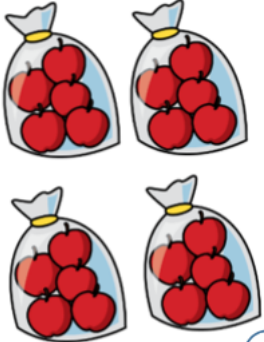
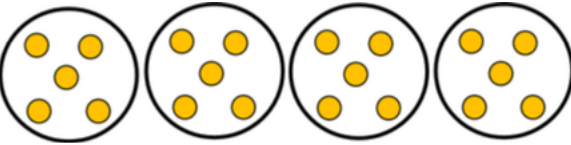


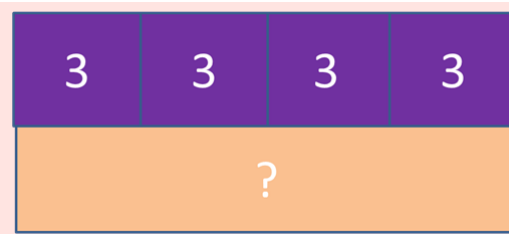
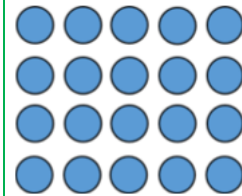
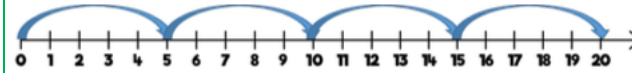
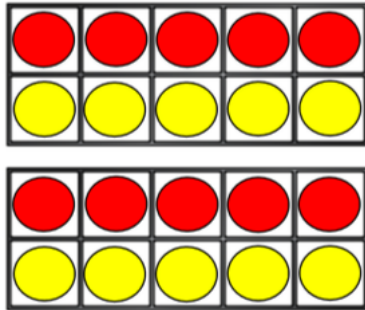
Draw representation of arrays to show understanding.

$$10 = 2 \times 5$$
$$5 \times 2 = 10$$
$$2 + 2 + 2 + 2 + 2 = 10$$
$$10 = 5 + 5$$

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



Objective & Strategy	Concrete	Pictorial	Abstract
Doubling	 <p>40 + 12 = 52</p> <p>Model doubling using dienes and place value counters.</p>	<p>Draw pictures and representations to show how to double numbers.</p>	 <p>16</p> <p>10 6</p> <p>x2 x2</p> <p>20 + 12 = 32</p> <p>Partition a number and then double each part before recombining it back together.</p>
Counting in multiples of 2, 3, 4, 5, 10 from 0 (repeated addition)	 <p>5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 40</p> <p>Count the groups as children are skip counting, children may use their fingers as they are skip counting. Use bar models.</p> 	 	$4 \times 3 = \square$ <p>Count in multiples of a number aloud.</p> <p>Write sequences with multiples of numbers.</p> <p>0, 2, 4, 6, 8, 10 0, 3, 6, 9, 12, 15 0, 5, 10, 15, 20, 25, 30</p>



Number lines, counting sticks and bar models should be used to show representation of counting in multiples.

$$5 + 5 + 5 + 5 = 20$$

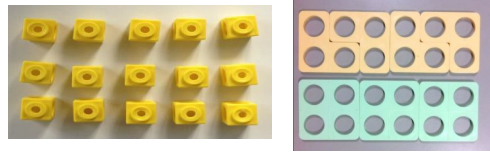
$$4 \times 5 = 20$$

$$5 \times 4 = 20$$

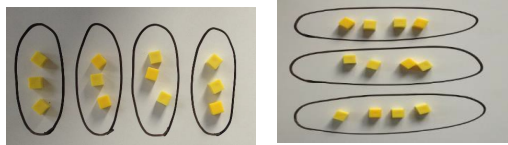
One bag holds 5 apples.
How many apples do 4 bags hold?



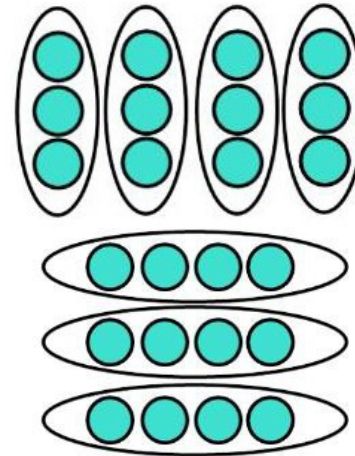
Multiplication is commutative



Create arrays using counters and cubes and numicon.



Pupils should understand that an array can represent different equations and that as multiplication is commutative, the order of the multiplication does not affect the answer.



Use representative of arrays to show different calculations and explore commutativity.

$$12 = 3 \times 4$$

$$12 = 4 \times 3$$

Use an array to write multiplication sentences and reinforce repeated addition.



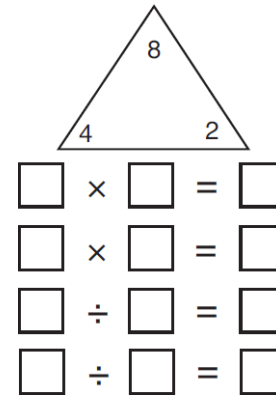
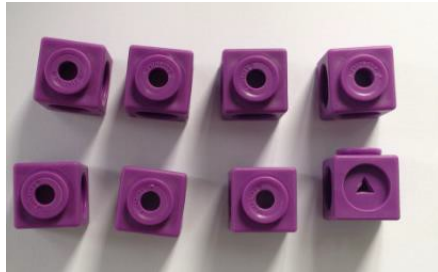
$$5 + 5 + 5 = 15$$

$$3 + 3 + 3 + 3 + 3 = 15$$

$$5 \times 3 = 15$$

$$3 \times 5 = 15$$

Using the Inverse
This should be taught alongside division, so pupils learn how they work alongside each other.



$$2 \times 4 = 8$$

$$4 \times 2 = 8$$

$$8 \div 2 = 4$$

$$8 \div 4 = 2$$

$$8 = 2 \times 4$$


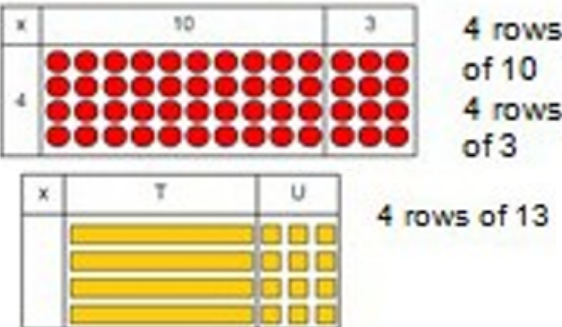
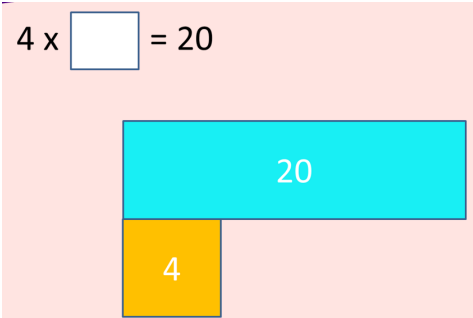
$$8 = 4 \times 2$$

$$2 = 8 \div 4$$

$$4 = 8 \div 2$$


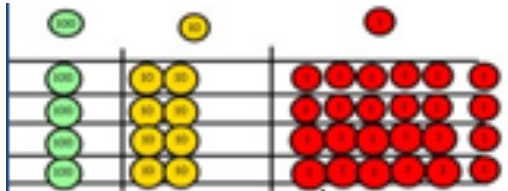

Show all 8 relevant fact family sentences.

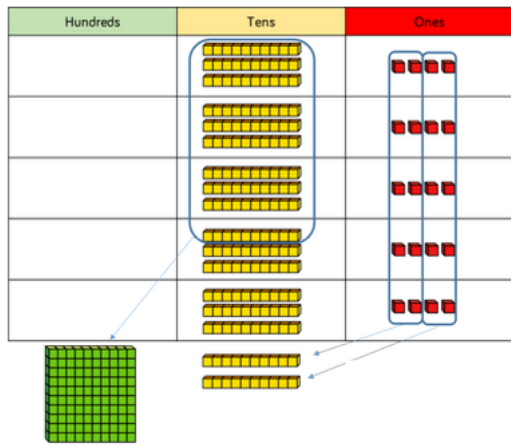


Objective & Strategy	Concrete	Pictorial	Abstract																					
<p>Grid method.</p> <p>Show the links with arrays to first introduce the grid method. Move onto dienes to move towards a more compact method.</p> <p>Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows.</p>  <p>Fill each row with 126. Add up each column, starting with the ones making any exchanges needed. Then you have your answer.</p>	 <p>4 rows of 10 4 rows of 3</p> <p>4 rows of 13</p>	<p>Children can represent their work 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 the circles in the different columns to show their thinking as shown below.</p>  <p>4 x <input type="text"/> = 20</p> <p>Bar models are used to explore missing numbers.</p>	<table border="1" data-bbox="1653 351 1989 454"> <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>Start with multiplying by one digit numbers and showing the clear addition alongside the grid.</p> <table border="1" data-bbox="1657 670 1975 877"> <tr> <td></td> <td>10</td> <td>8</td> </tr> <tr> <td>10</td> <td>100</td> <td>80</td> </tr> <tr> <td>3</td> <td>30</td> <td>24</td> </tr> </table> <table data-bbox="1993 925 2083 1181"> <tr><td>100</td></tr> <tr><td>80</td></tr> <tr><td>30</td></tr> <tr><td>+ 4</td></tr> <tr><td><u>214</u></td></tr> <tr><td>1</td></tr> </table> <p>Moving forward, multiply by a two-digit number showing the different rows within the grid method.</p>	x	30	5	7	210	35		10	8	10	100	80	3	30	24	100	80	30	+ 4	<u>214</u>	1
x	30	5																						
7	210	35																						
	10	8																						
10	100	80																						
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100																								
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+ 4																								
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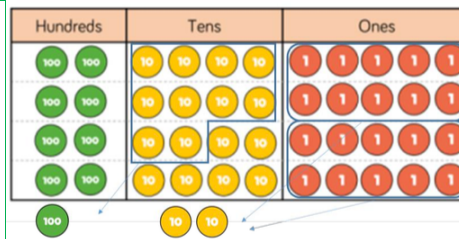
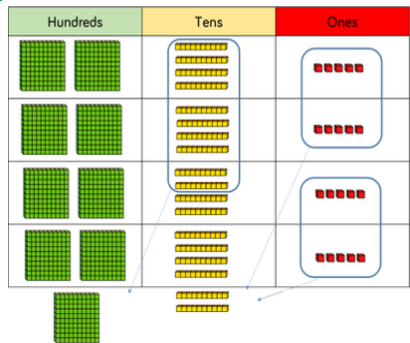
Multiplication Year 4

Objective & Strategy	Concrete	Pictorial	Abstract																														
<p>Grid method recap from Year 3 for two-digit x one-digit</p>	<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>Calculations 4×126</p> <p>Fill each row with 126.</p>  <p>Add up each column, starting with the ones making any exchanges needed. Then you have your answer.</p>	<p>Children can represent their work 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 the circles in the different columns to show their thinking as shown below.</p>	<table border="1" data-bbox="1630 347 1966 443"> <tr> <td>×</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>Start with multiplying by one-digit numbers and showing the clear addition alongside the grid.</p>	×	30	5	7	210	35																								
×	30	5																															
7	210	35																															
<p>Column multiplication (two-digit by one-digit)</p>	<p>Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. $321 \times 6 = 642$</p> <p>It is important at this stage that they always multiply the ones first. The corresponding long multiplication is modelled alongside.</p>		<table border="1" data-bbox="1527 1013 1863 1348"> <tr> <td></td> <td>H</td> <td>T</td> <td>O</td> <td></td> </tr> <tr> <td></td> <td></td> <td>3</td> <td>4</td> <td></td> </tr> <tr> <td>×</td> <td></td> <td></td> <td>5</td> <td></td> </tr> <tr> <td></td> <td></td> <td>2</td> <td>0</td> <td>(5×4)</td> </tr> <tr> <td>+</td> <td>1</td> <td>5</td> <td>0</td> <td>(5×30)</td> </tr> <tr> <td></td> <td>1</td> <td>7</td> <td>0</td> <td></td> </tr> </table>		H	T	O				3	4		×			5				2	0	(5×4)	+	1	5	0	(5×30)		1	7	0	
	H	T	O																														
		3	4																														
×			5																														
		2	0	(5×4)																													
+	1	5	0	(5×30)																													
	1	7	0																														



	H	T	O	
		3	4	
x			5	
	1	7	0	
	1	2		

**Column multiplication
(three-digit by one-digit)**



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



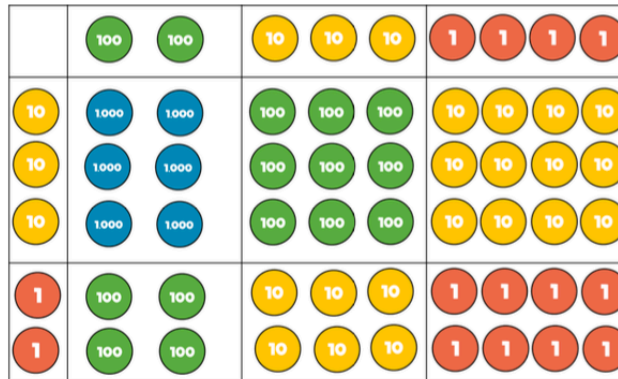
Multiplication Year 5-6

Objective & Strategy	Concrete	Pictorial	Abstract																									
<p>Column multiplication for three and four-digits x one-digit</p>			<table border="1"> <thead> <tr> <th></th> <th>Th</th> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td></td> <td>1</td> <td>8</td> <td>2</td> <td>6</td> </tr> <tr> <td>x</td> <td></td> <td></td> <td></td> <td>3</td> </tr> <tr> <td></td> <td>5</td> <td>4</td> <td>7</td> <td>8</td> </tr> <tr> <td></td> <td>2</td> <td></td> <td>1</td> <td></td> </tr> </tbody> </table>		Th	H	T	O		1	8	2	6	x				3		5	4	7	8		2		1	
	Th	H	T	O																								
	1	8	2	6																								
x				3																								
	5	4	7	8																								
	2		1																									
<p>Column multiplication for two-digit x two-digit</p>			<table border="1"> <tbody> <tr> <td>x</td> <td>20</td> <td>2</td> </tr> <tr> <td>30</td> <td>600</td> <td>60</td> </tr> <tr> <td>1</td> <td>20</td> <td>2</td> </tr> </tbody> </table> $ \begin{array}{r} 600 \\ 60 \\ 20 \\ + 2 \\ \hline 682 \end{array} $	x	20	2	30	600	60	1	20	2																
x	20	2																										
30	600	60																										
1	20	2																										



	H	T	O
		2	2
x		3	1
		2	2
	6	6	0
	6	8	2

Multiply three-digit numbers by two-digit numbers



x	200	30	4
30	6,000	900	120
2	400	60	8

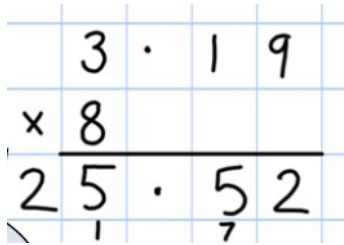
$$\begin{array}{r}
 6000 \\
 900 \\
 120 \\
 400 \\
 60 \\
 + \quad 8 \\
 \hline
 7488
 \end{array}$$



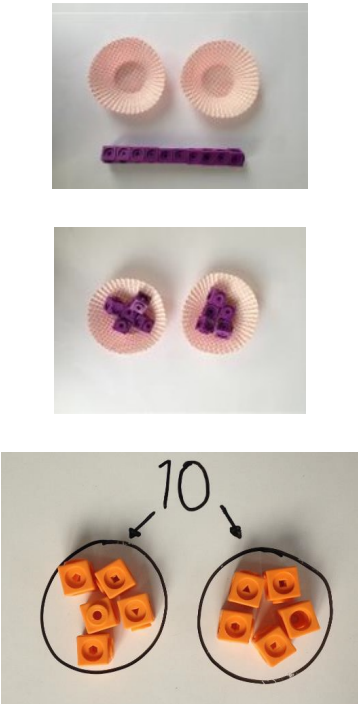
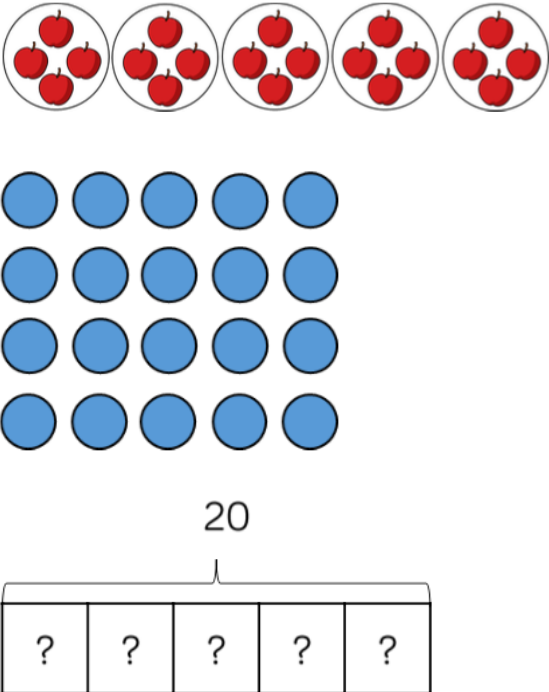
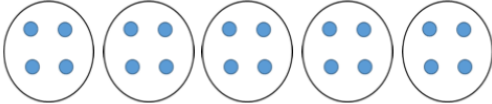
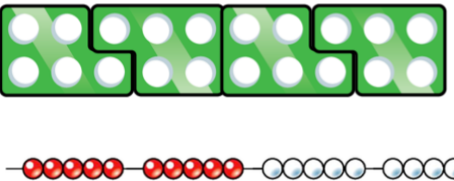
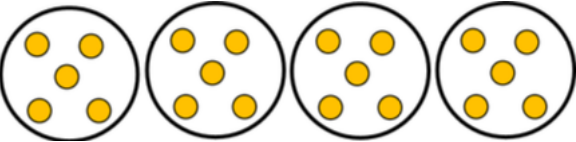
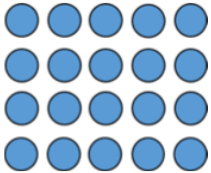
			<table border="1"><thead><tr><th>Th</th><th>H</th><th>T</th><th>O</th></tr></thead><tbody><tr><td></td><td>2</td><td>3</td><td>4</td></tr><tr><td>x</td><td></td><td>3</td><td>2</td></tr><tr><td colspan="4"><hr/></td></tr><tr><td></td><td>4</td><td>6</td><td>8</td></tr><tr><td>₁7</td><td>₁0</td><td>2</td><td>0</td></tr><tr><td colspan="4"><hr/></td></tr><tr><td>7</td><td>4</td><td>8</td><td>8</td></tr></tbody></table>	Th	H	T	O		2	3	4	x		3	2	<hr/>					4	6	8	₁ 7	₁ 0	2	0	<hr/>				7	4	8	8																		
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x		3	2																																																		
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₁ 7	₁ 0	2	0																																																		
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7	4	8	8																																																		
Multiply four-digit numbers by two-digit numbers			<table border="1"><thead><tr><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr></thead><tbody><tr><td></td><td>2</td><td>7</td><td>3</td><td>9</td></tr><tr><td>x</td><td></td><td></td><td>2</td><td>8</td></tr><tr><td colspan="5"><hr/></td></tr><tr><td>₂2</td><td>₅1</td><td>₃9</td><td>₇1</td><td>2</td></tr><tr><td>₁5</td><td>4</td><td>₁7</td><td>8</td><td>0</td></tr><tr><td colspan="5"><hr/></td></tr><tr><td>7</td><td>6</td><td>6</td><td>9</td><td>2</td></tr><tr><td colspan="5"><hr/></td></tr><tr><td colspan="5">1</td></tr></tbody></table>	TTh	Th	H	T	O		2	7	3	9	x			2	8	<hr/>					₂ 2	₅ 1	₃ 9	₇ 1	2	₁ 5	4	₁ 7	8	0	<hr/>					7	6	6	9	2	<hr/>					1				
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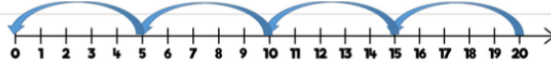
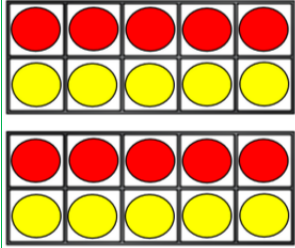


Multiplication Year 6

Objective & Strategy	Concrete	Pictorial	Abstract
Multiplying decimals up to two decimal places by a single digit.			 <p>Remind children that the single digit belongs to the ones column. Line up the decimal point in the question and the answer.</p>

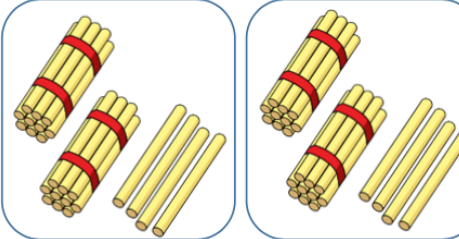
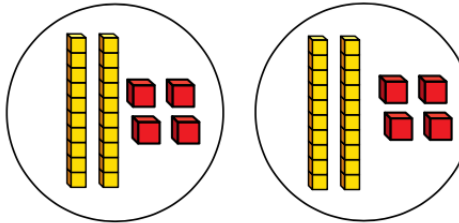
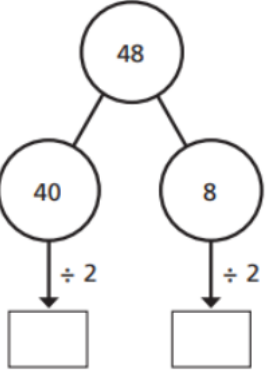


Objective & Strategy	Concrete	Pictorial	Abstract
Division as sharing	 <p>I have 10 cubes; can you share them equally in 2 groups?</p>	 <p>20</p>	 $20 \div 5 = 4$ <div style="border: 1px solid black; border-radius: 10px; padding: 10px; width: fit-content; margin: 10px auto;"><p>There are 20 apples altogether. They are shared equally between 5 bags. How many apples are in each bag?</p></div>
Division as grouping			 $20 \div 5 = 4$



There are 20 apples altogether.
They are put in bags of 5.
How many bags are there?



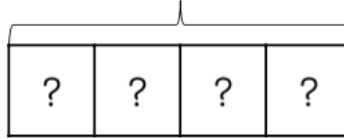
Objective & Strategy	Concrete	Pictorial	Abstract						
Divide two-digit by one-digit (sharing with no exchange)	 	<table border="1" data-bbox="786 343 1279 550"><thead><tr><th data-bbox="786 343 1010 406">Tens</th><th data-bbox="1010 343 1279 406">Ones</th></tr></thead><tbody><tr><td data-bbox="786 406 1010 478">10 10</td><td data-bbox="1010 406 1279 478">1 1 1 1</td></tr><tr><td data-bbox="786 478 1010 550">10 10</td><td data-bbox="1010 478 1279 550">1 1 1 1</td></tr></tbody></table> 	Tens	Ones	10 10	1 1 1 1	10 10	1 1 1 1	<div data-bbox="1576 347 1982 443" style="border: 1px solid black; border-radius: 15px; padding: 10px; text-align: center;">$48 \div 2 = 24$</div>
Tens	Ones								
10 10	1 1 1 1								
10 10	1 1 1 1								



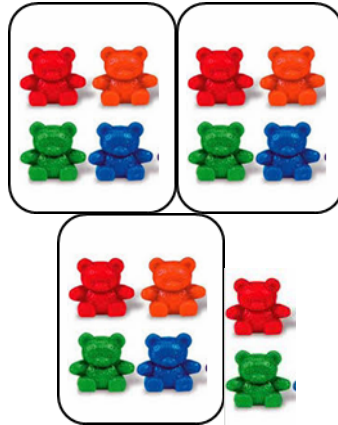
Objective & Strategy	Concrete	Pictorial	Abstract																				
Divide two-digit by 1-digit (share with exchange)	<table border="1" data-bbox="324 422 763 711"><thead><tr><th>Tens</th><th>Ones</th></tr></thead><tbody><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></tbody></table>	Tens	Ones									<table border="1" data-bbox="788 422 1227 671"><thead><tr><th>Tens</th><th>Ones</th></tr></thead><tbody><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></tbody></table> <p data-bbox="788 726 1131 1133">$\begin{array}{c} 52 \\ \swarrow \quad \searrow \\ 40 \quad 12 \\ \div 4 \downarrow \quad \downarrow \div 4 \\ 10 \quad 3 \\ 10 + 3 = 13 \end{array}$</p>	Tens	Ones									<div data-bbox="1579 347 1982 443" style="border: 1px solid black; border-radius: 15px; padding: 10px; text-align: center;">$52 \div 4 = 13$</div>
Tens	Ones																						
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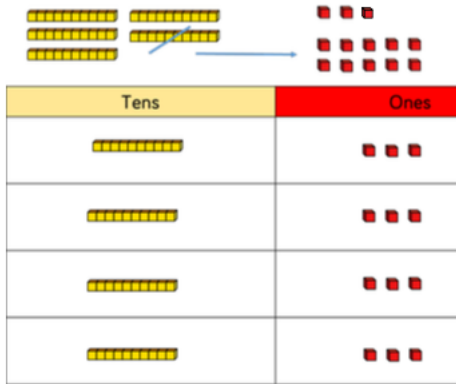
52



Divide two-digit by one-digit (sharing with remainders)



Divide objects between groups and see how much is left over.

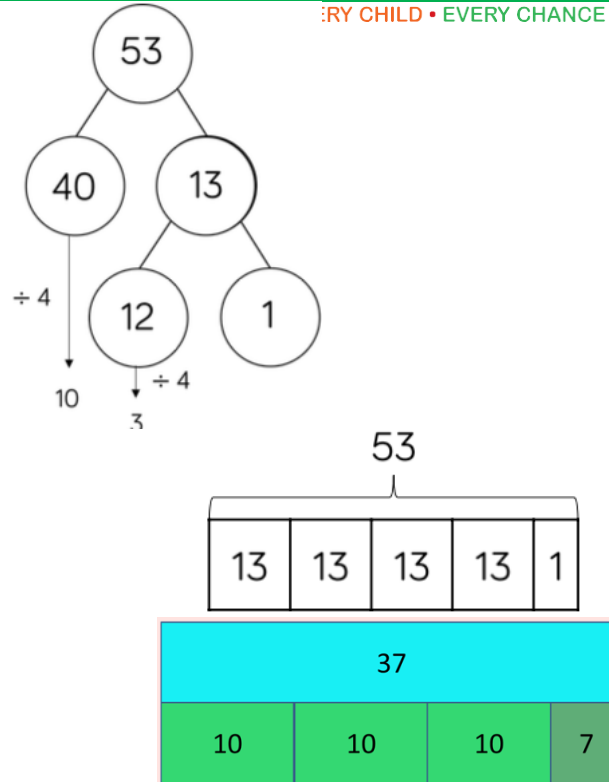


Draw dots and group them to divide an amount and clearly show a remainder



Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.

$53 \div 4 = 13 \text{ r}1$



Use bar models to show division with remainders.

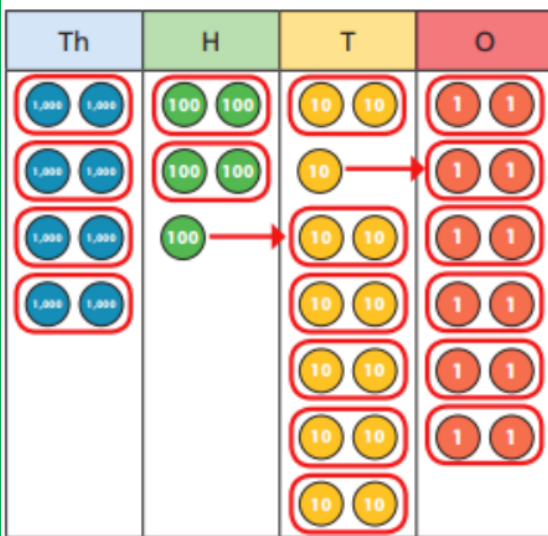
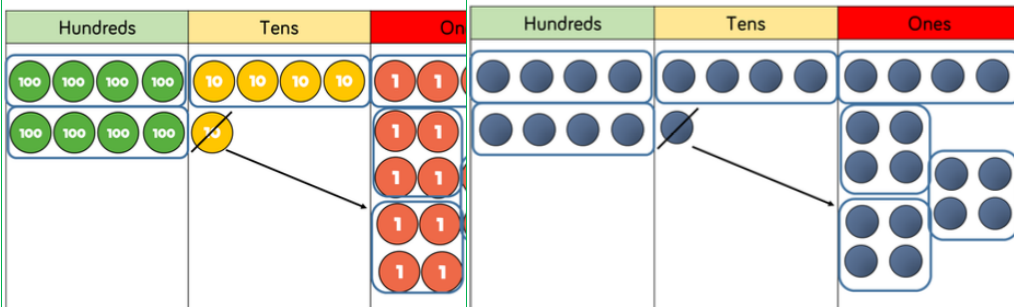


Objective & Strategy	Concrete	Pictorial	Abstract																			
<p>Year 4</p> <p>Divide two-digit by one-digit (grouping)</p>			<table border="1" style="border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;">1</td> <td style="width: 20px; height: 20px;">3</td> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;">4</td> <td style="width: 20px; height: 20px;">5</td> <td style="width: 20px; height: 20px;">12</td> <td style="width: 20px; height: 20px;"></td> </tr> </table>			1	3			4	5	12										
		1	3																			
	4	5	12																			
<p>Year 4 and 5</p> <p>Divide three-digits by one-digit (sharing)</p>	<table border="1" style="border-collapse: collapse; text-align: center; margin-top: 10px;"> <thead> <tr> <th style="background-color: #d9ead3;">Hundreds</th> <th style="background-color: #d9ead3;">Tens</th> <th style="background-color: #d9ead3;">Ones</th> </tr> </thead> <tbody> <tr> <td>100 100</td> <td>10</td> <td>1 1</td> </tr> <tr> <td>100 100</td> <td>10</td> <td>1 1</td> </tr> <tr> <td>100 100</td> <td>10</td> <td>1 1</td> </tr> <tr> <td>100 100</td> <td>10</td> <td>1 1</td> </tr> </tbody> </table>	Hundreds	Tens	Ones	100 100	10	1 1	100 100	10	1 1	100 100	10	1 1	100 100	10	1 1	<div style="text-align: center; margin-top: 20px;"> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px; height: 20px;">?</td> <td style="width: 20px; height: 20px;">?</td> <td style="width: 20px; height: 20px;">?</td> <td style="width: 20px; height: 20px;">?</td> </tr> </table> </div>	?	?	?	?	<div style="border: 1px solid black; border-radius: 15px; padding: 10px; text-align: center; font-size: 24px; font-weight: bold;"> $844 \div 4 = 211$ </div>
Hundreds	Tens	Ones																				
100 100	10	1 1																				
100 100	10	1 1																				
100 100	10	1 1																				
100 100	10	1 1																				
?	?	?	?																			



Year 5 and 6
Divide three-digit by one-digit (grouping)

Divide four-digits by one-digit



		2	1	4
	4	8	5	16

	4	2	6	6
2	8	5	13	12

Year 6
Division with remainders

Begin with divisions that divide equally with no remainder.

$$\begin{array}{r} 218 \\ 3 \overline{) 654} \\ \underline{6} \\ 5 \\ \underline{6} \\ 4 \\ \underline{3} \\ 1 \\ \underline{3} \\ 2 \\ \underline{3} \\ 0 \end{array}$$

Move onto divisions with a remainder.



$$\begin{array}{r} 86 \text{ r } 2 \\ \underline{3} \\ 5 \overline{) 432} \end{array}$$

Finally move into decimal places to divide the total accurately.

$$\begin{array}{r} 14.6 \\ \underline{16} \quad \underline{21} \\ 35 \overline{) 511.0} \end{array}$$

$$\begin{array}{r} 0663 \text{ r } 5 \\ \underline{8) 5309} \end{array}$$



Objective & Strategy	Concrete	Pictorial	Abstract																														
<p>Divide multi-digits by 2-digits (short division)</p>		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> $7,335 \div 15 = 489$ </div> <table border="1" style="margin-top: 10px; text-align: center;"> <tr> <td></td><td>0</td><td>4</td><td>8</td><td>9</td></tr> <tr> <td>15</td><td>7</td><td>7₃</td><td>13₃</td><td>13₅</td></tr> </table> <table border="1" style="margin-top: 10px; text-align: center;"> <tr> <td>15</td><td>30</td><td>45</td><td>60</td><td>75</td><td>90</td><td>105</td><td>120</td><td>135</td><td>150</td></tr> </table>		0	4	8	9	15	7	7 ₃	13 ₃	13 ₅	15	30	45	60	75	90	105	120	135	150	<table border="1" style="text-align: center;"> <tr> <td></td><td></td><td>0</td><td>3</td><td>6</td></tr> <tr> <td></td><td>12</td><td>4</td><td>4₃</td><td>7₂</td></tr> </table>			0	3	6		12	4	4 ₃	7 ₂
	0	4	8	9																													
15	7	7 ₃	13 ₃	13 ₅																													
15	30	45	60	75	90	105	120	135	150																								
		0	3	6																													
	12	4	4 ₃	7 ₂																													
<p>Divide multi-digits by two-digits (long division)</p>			<table border="1" style="text-align: center;"> <tr> <td></td><td></td><td>0</td><td>3</td><td>6</td></tr> <tr> <td>1</td><td>2</td><td>4</td><td>3</td><td>2</td></tr> <tr> <td></td><td>-</td><td>3</td><td>6</td><td>0</td></tr> <tr> <td></td><td></td><td></td><td>7</td><td>2</td></tr> <tr> <td></td><td>-</td><td></td><td>7</td><td>2</td></tr> <tr> <td></td><td></td><td></td><td></td><td>0</td></tr> </table> <div style="margin-left: 20px;"> <p>(x30)</p> <ul style="list-style-type: none"> - 12 × 1 = 12 12 × 2 = 24 12 × 3 = 36 12 × 4 = 48 12 × 5 = 60 <p>(x6)</p> <ul style="list-style-type: none"> 12 × 6 = 72 12 × 7 = 84 12 × 8 = 96 12 × 7 = 108 12 × 10 = 120 </div>			0	3	6	1	2	4	3	2		-	3	6	0				7	2		-		7	2					0
		0	3	6																													
1	2	4	3	2																													
	-	3	6	0																													
			7	2																													
	-		7	2																													
				0																													



	0	4	8	9	
15	7	3	3	5	
-	6	0	0	0	(x400)
	1	3	3	5	
-	1	2	0	0	(x80)
		1	3	5	
-		1	3	5	(x9)
				0	

$1 \times 15 = 15$
 $2 \times 15 = 30$
 $3 \times 15 = 45$
 $4 \times 15 = 60$
 $5 \times 15 = 75$
 $10 \times 15 = 150$

Alternative “chunking” method to be used to only support with pupils needing identified as needing additional support/ alternative strategy.

			2	4	r	1	2	
1	5	3	7	2				
-		3	0	0				
			7	2				
-			6	0				
			1	2				

$1 \times 15 =$
 $2 \times 15 =$
 $3 \times 15 =$
 $4 \times 15 =$
 $5 \times 15 =$
 $10 \times 15 =$



Exceed Learning Partnership

• EVERY CHILD • EVERY CHANCE • EVERY DAY •

Signed CEO:

Signed Chair of Directors:

Policy to be reviewed: CXXXXXXXXXXXXX