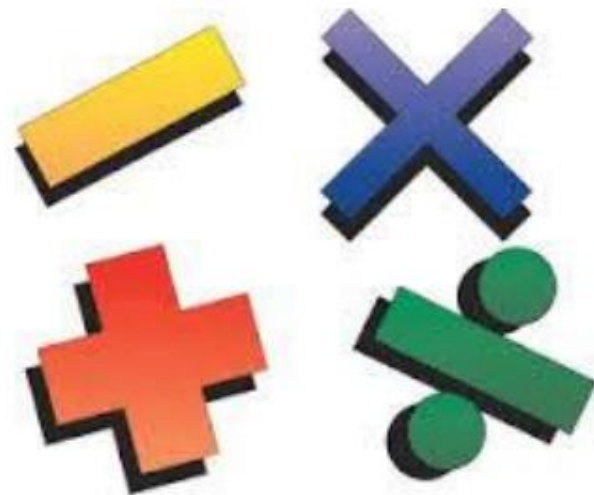


# Broadstone Hall Primary School Calculation Policy



This policy has been developed to show progression in addition/subtraction/multiplication/division in line with a Mastery approach for teaching mathematics, and is based on key models and images from the White Rose Calculation Policy.

# Addition

Addition- EYFS

Objectives

- Knows that a group of things change in quantity when something is added.
- Find the total number of items in two groups by counting all of them.
- Says the number that is one more than a given number.
- Finds one more from a group of up to five objects, then ten objects.
- In practical activities and discussion, beginning to use the vocabulary involved in adding.
- Using quantities and objects, they add two single digit numbers and count on to find the answer.
- Solve problems including doubling.

Concrete



Use toys and general classroom resources for children to physically manipulate, group/regroup.

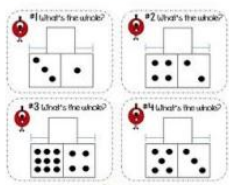
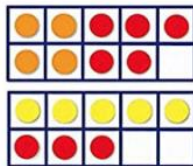
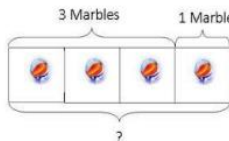
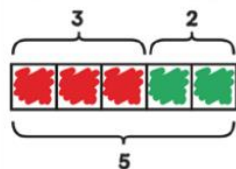
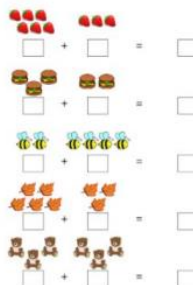


Use specific maths resources such as counters, snap cubes, Numicon etc.



Use visual supports such as ten frames, part part whole and addition mats, with the physical objects and resources that can be manipulated.

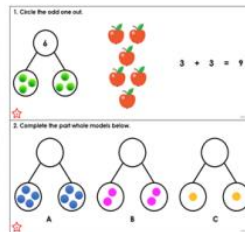
Pictorial



Two groups of pictures so children are able to count the total.

Bar model using visuals, pictures/icons or colours.

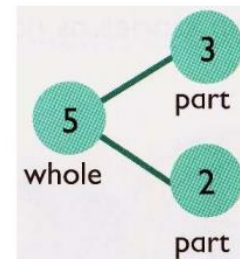
Use visual supports such as ten frames, part part whole and addition mats with pictures/icons.



Abstract

A focus on symbols and numbers to form a calculation.

$$5 + 2 = 7$$



\* No expectation for children to be able to record a number sentence/addition calculation.

# Objective

# Concrete

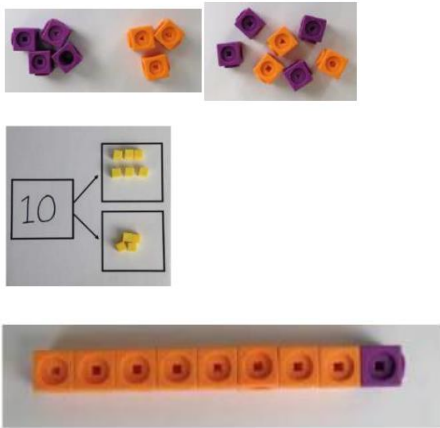
# Pictorial

# Abstract

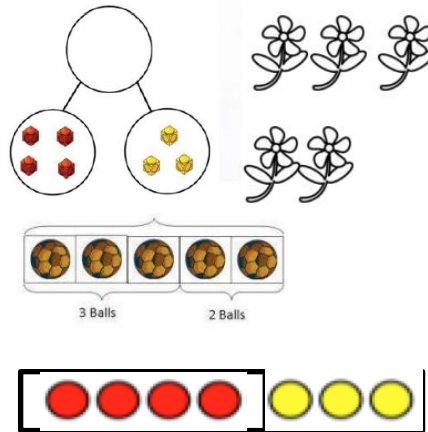
Addition: Year 1

Adding Together (including number bonds)

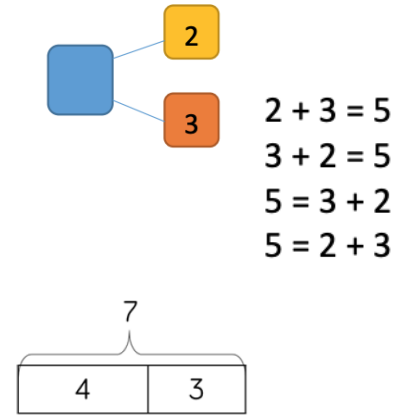
Use counters (or other objects) to add two numbers together in a group or a bar.



Use pictures and part whole/bar models to add together two numbers as a group or in a bar.

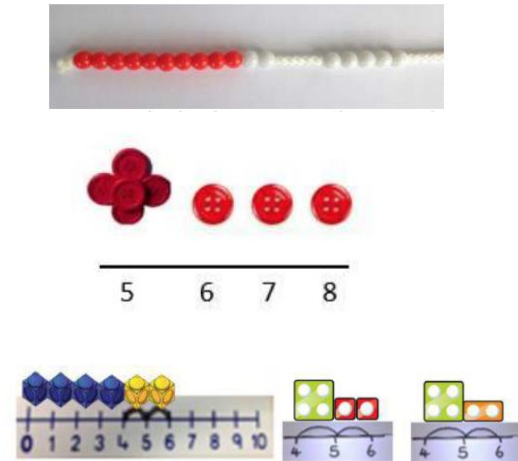


Use part whole models and numbers to move towards the abstract.

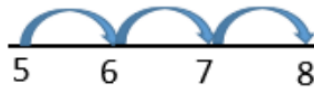


Adding by Counting on

Start with the larger number and then count on 1 by 1. Number lines can be modelled using cubes, counters or numicon.



Use a number line to count in ones



$5 + 3 = 8$

# Objective

# Concrete

# Pictorial

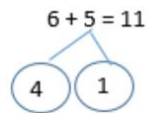
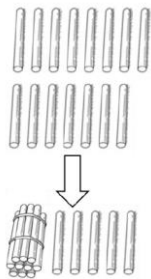
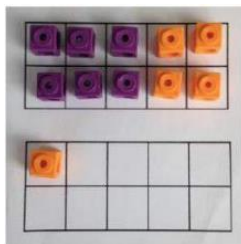
# Abstract

**Addition: Year 1**

Regrouping to make 10

E.g. For  $6 + 5 = 11$

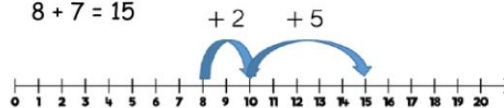
Start with the bigger number and use the smaller number to make 10.



$6 + 4 = 10$

$10 + 1 = 11$

$8 + 7 = 15$



$6 + 5 = 11$

# Objective

# Concrete

# Pictorial

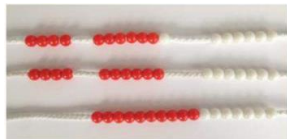
# Abstract

## Addition: Year 2

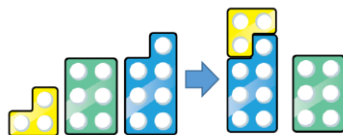
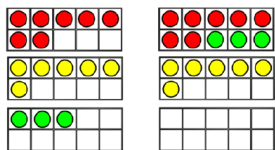
Adding 3 Single digit numbers

Manipulatives which highlight number bonds to 10 are effective for this objective.

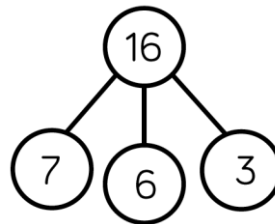
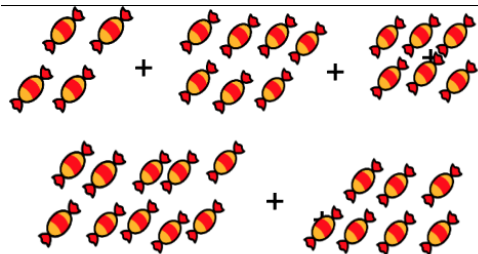
E.g.  $4 + 7 + 6 = 17$   
Add together the 4 and 6 to make 10.  
Add on 7.



$7 + 6 + 3 = 16$



Draw pictures to recombine the objects into a group which makes ten.

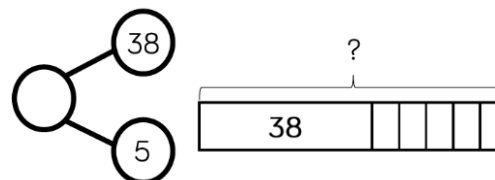
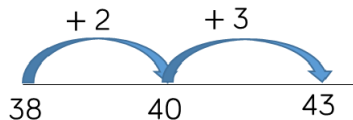
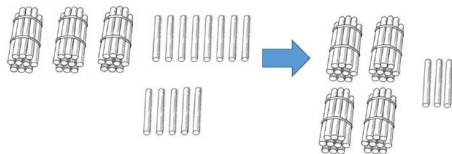


Combine the two numbers which make ten and then add the remainder.

$$\begin{aligned} \textcircled{4} + 7 + \textcircled{6} &= \boxed{10} + \boxed{7} \\ &= \boxed{17} \end{aligned}$$

Adding a single digit to a 2 digit number.

Children should be encouraged to count on from the larger number.  
They should also be encouraged to develop their knowledge of number bonds to develop efficiency.



### $38 + 5 = 43$

Objective		Concrete	Pictorial	Abstract
<b>Addition: Year 2</b>  Add two 2-digit numbers (no regrouping)	Make both numbers on a place value grid.  Add together the ones first, then the tens.  Use Base ten blocks before moving on to counters.  $24 + 15 =$	$44 + 15 =$		$24 + 15 = 39$  $\begin{array}{r} 24 \\ + 15 \\ \hline 39 \end{array}$
	$24 + 15 =$	Make both numbers on a place value grid.  Add up the ones and exchange 10 ones for 1 ten.		
<b>Addition: Year 2 and 3</b>  Y2: Add two 2-digit numbers -- including re-grouping	Make both numbers on a place value grid.  Add up the ones and exchange 10 ones for 1 ten.			
		$38 + 23 = 61$	$40 + 9$ $20 + 3$ $60 + 12 = 72$	$\begin{array}{r} 38 \\ + 23 \\ \hline 61 \\ 1 \end{array}$

## Objective

## Concrete

Make both numbers on a place value grid (using base 10 or counters)

Add up the numbers starting with the ones.

Combine 10 ones to make 1 ten. Combine 10 tens to make 1 hundred.

Hundreds	Tens	Ones



Hundreds	Tens	Ones

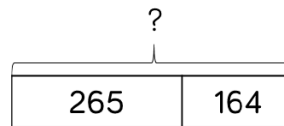
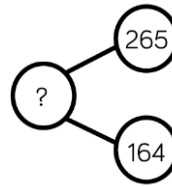
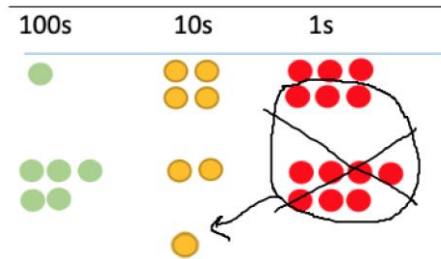


Children begin to write their calculations next to their manipulatives so they can see the link to the written column method.

## Pictorial

After physically moving base 10 blocks and counters, children can move on to drawing the counters.

E.g.  $146 + 527 =$



## Abstract

$$100 + 40 + 6$$

$$\underline{500 + 20 + 7}$$

$$600 + 70 + 3 = 673$$

As children progress, move from the expanded to the compact column method.

$$\begin{array}{r} 265 \\ + 164 \\ \hline 429 \\ \hline 1 \end{array}$$

## Addition: Year 3

Add up to 3 digit numbers-  
column method(with regrouping)



# Objective

# Concrete

# Pictorial

# Abstract

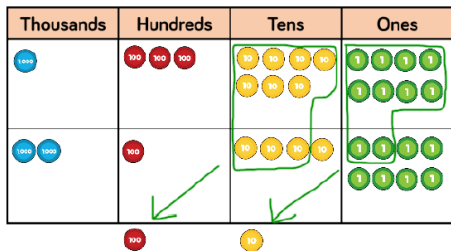
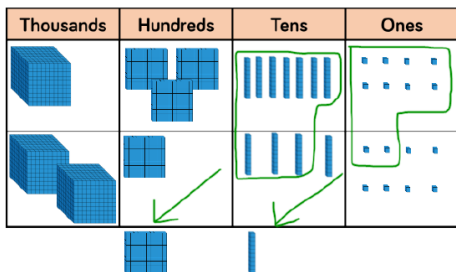
## Addition: Year 4

Add up to 4 digit numbers-  
column method(with regrouping)

Make both numbers on a place value grid (using base 10 or counters)

Add up the numbers starting with the ones.

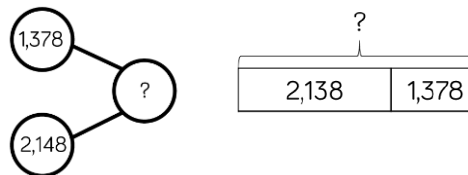
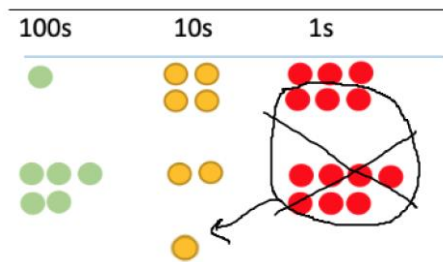
Combine 10 ones to make 1 ten. Combine 10 tens to make 1 hundred.



Children begin to write their calculations next to their manipulatives so they can see the link to the written column method.

After physically moving base 10 blocks and counters, children can move on to drawing the counters.

E.g.  $146 + 527 =$



Written column method with exchanges.

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

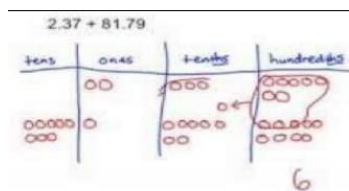
As the children move on, introduce decimals with the same number of decimal places. Money can be used here.

Adding decimals with up  
to 2 decimal places  
(including money)

As children begin to learn about decimals, introduce decimal place value counters to show exchanges in the same way.



As children begin to learn about decimals, tenths and hundredths can be used on the place value chart to add decimals.



Money can be a useful context here.

£	2	3	.	5	9
+	£	7	.	5	5
£	3	1	.	1	4

Objective

Concrete

Pictorial

Abstract

Addition: Year 5 and 6

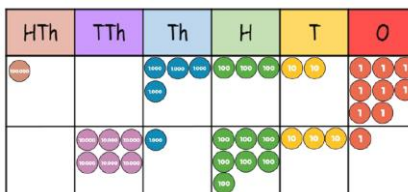
Add numbers with 4 or more digits.

See Year 4

As children move on to adding bigger numbers, encourage them to work in the abstract, using the formal written method.

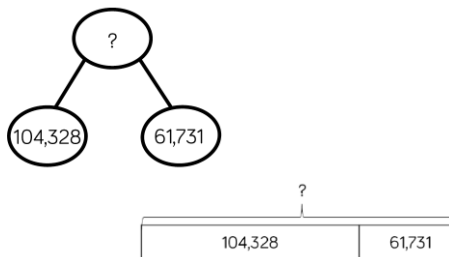
Concrete resources can still be used for support where necessary. Place value counters are the most appropriate for bigger numbers.

See Year 4



A reminder of the pictorial representation of this method may be useful, however by y5/6 children should be encouraged to work in the abstract, using column method to add numbers efficiently.

Part-whole models and bar models are still vital for enabling children to visualise addition/subtraction word problems.



Written column method with exchanges.

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

1	0	4	3	2	8
+	6	1	7	3	1
1	6	6	0	5	9

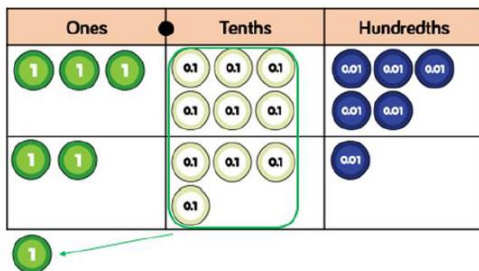
1

Children in Year 5/6 should now be confident enough in this method to move straight on to abstract approach.

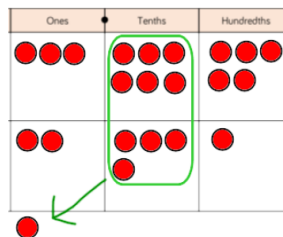
Use concrete/pictorial to support those who need it.

Adding decimals with up to 3 decimal places

Use decimal places value counters to demonstrate that 10 hundredths can be exchanged for 1 tenth, and 10 tenths can be exchanged for 1 one.



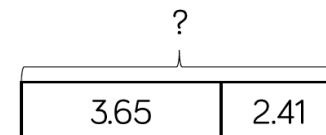
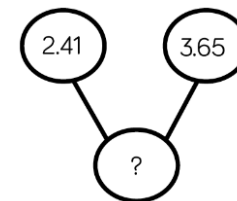
Children can draw the counters to show exchanges.



Children should write the written method alongside to help understand the link.

Money can be a useful context here.

$$\begin{array}{r} 3.65 \\ + 2.41 \\ \hline 6.06 \\ 1 \end{array}$$



# Subtraction

## Subtraction- EYFS

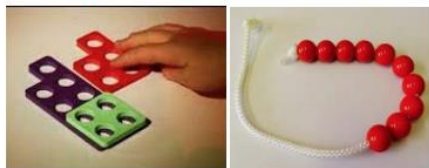
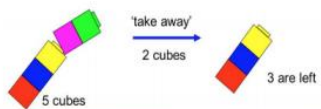
### Objectives

- Knows that a group of things change in quantity when something is taken away
- Find one less from a group of five objects, then ten objects.
- In practical activities and discussion, beginning to use the vocabulary involved in subtracting.
- Using quantities and objects, they subtract two single digit numbers and count back to find the answer.

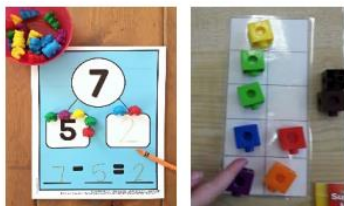
### Concrete



Use toys and general classroom resources for children to physically manipulate, group/regroup.

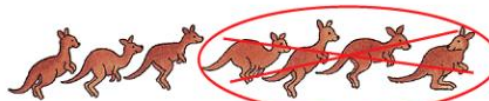


Use specific maths resources such as snap cubes, Numicon, bead strings etc.



Use visual supports such as ten frames, part part whole and subtraction mats, with the physical objects and resources that can be manipulated.

### Pictorial



$$6 - 4 =$$



$$5 - 3 =$$

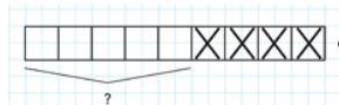
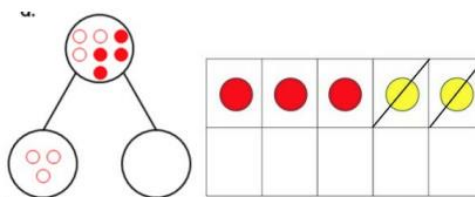


$$3 - 1 =$$



$$7 - 2 =$$

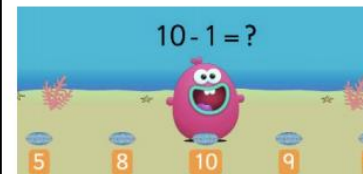
A group of pictures for children to cross out or cover quantities to support subtraction.



Use visual supports such as ten frames, part part whole and bar model with pictures/icons.

### Abstract

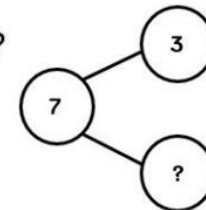
A focus on symbols and numbers to form a calculation.



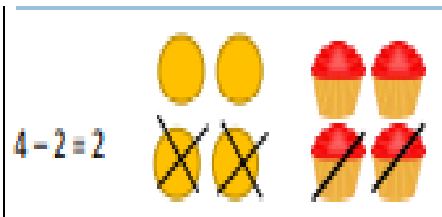
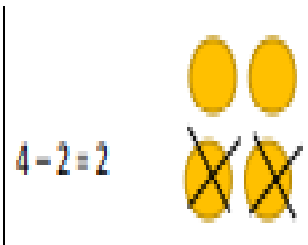


$$10 - 6 = 4$$

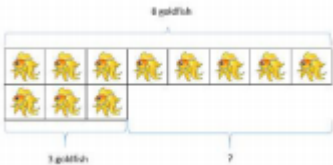
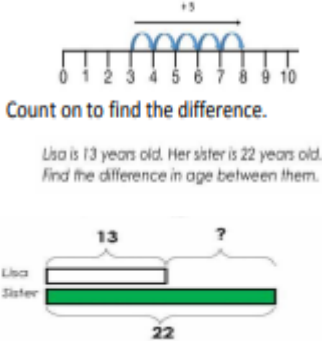
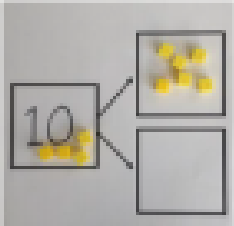
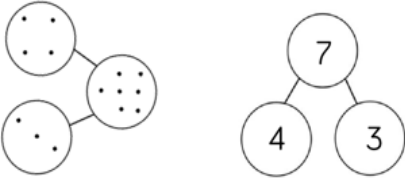
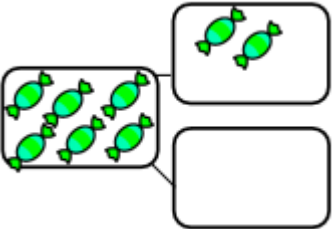

3	?
7	

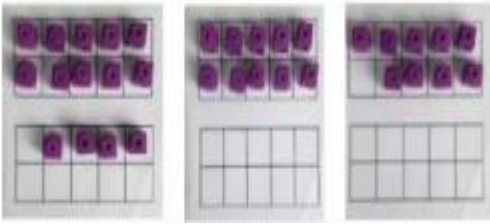
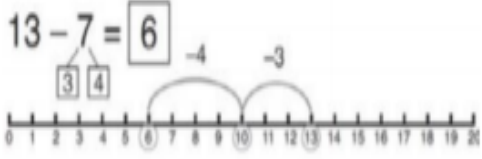
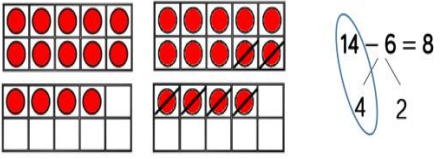
$$7 - 3 = ?$$



\* No expectation for children to be able to record a number sentence/addition calculation.

Objective	Concrete	Pictorial	Abstract
<b>Subtraction: Year 1</b>  Subtract 1-digit numbers within ten – Taking away ones	Use physical objects, counters, cubes etc. to show how objects can be taken away  	Cross out drawn objects to show what has been taken away. $4 - 2 = 2$  	$4 - 2 = 2$
	Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones. $13 - 4 = 9$    $13 - 4 = 9$	Count back on a number line or number track    Start at the bigger number and count back the smaller number, showing the jumps on the number line.	Put 13 in your head, count back 4. What number are you at? Use your fingers to help.

Objective	Concrete	Pictorial	Abstract	
Subtraction: Year 1	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Subtraction - Finding the difference</p>	<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>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>
	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Subtraction – parts and wholes</p>	 <p>Link to addition. Use the PWM to model the inverse.</p> <p>If 10 is the whole and 6 is one of the parts, what is the other part.</p>	 $7 - 3 = 4$ $7 - 4 = 3$ 	 <p>Move to using numbers within the part whole model.</p>

Objective	Concrete	Pictorial	Abstract
<p style="text-align: center;"><b>Subtraction: Year 1</b></p>	<p style="text-align: center;">Subtraction within 20 – making ten</p>	<div style="text-align: center;"> <math>14 - 9 =</math>   </div> <p>Make the 14 on the ten frame. Take away the 4 first to make 10 and then take away 1 more so you have taken away 5. You are left with 9.</p> <div style="text-align: center;"> <math>13 - 7 = 6</math>   </div> <p>Start at 13. Take away 3 to reach 10. Then take away the remaining 4 so you have taken away 7 altogether.</p> <div style="text-align: center;">  </div>	<p style="text-align: center;"><math>16 - 8 =</math></p> <p>How many do we take off to reach the next 10? How many do we have left to take off?</p>

Objective

Subtraction: Year 2

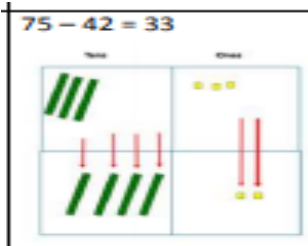
Partitioning to subtract (without regrouping)

Subtraction: Year 2

Partitioning to subtract (with regrouping)

Concrete


Use the base 10 to make the bigger number, then take the smaller number away.



$75 - 42 = 33$

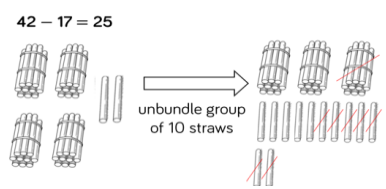
Show how you partition numbers to subtract.

Again make the larger number first



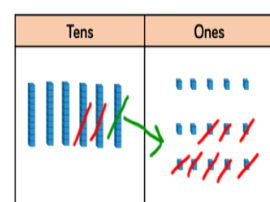
$36 - 14 = 22$

Begin with base 10 or Numicon. Move to pv counters, modelling the exchange of a ten into ten ones.



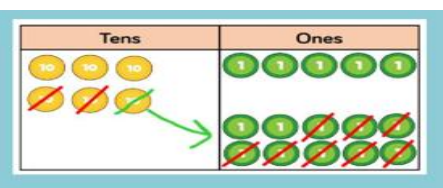
$42 - 17 = 25$

unbundle group of 10 straws



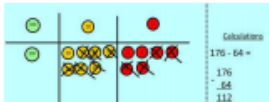
Tens      Ones

$\begin{array}{r} 65 \\ - 28 \\ \hline 37 \end{array}$



Tens      Ones

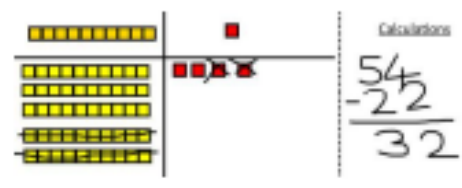
Pictorial



Calculations

$176 - 64 = 112$

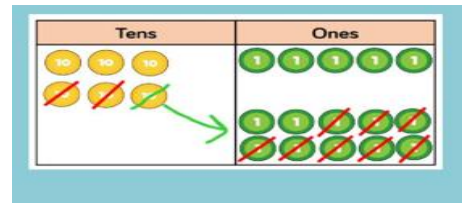
Draw the base 10 or place value counters alongside the written calculation to help to show working.



Calculations

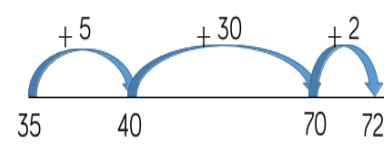
$54 - 22 = 32$

Children could draw counters to show exchange in the same way.



Tens      Ones

$72 - 35 = 37$



$35 \quad 40 \quad 70 \quad 72$

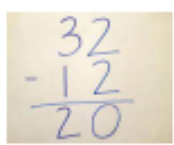
+5      +30      +2

Abstract

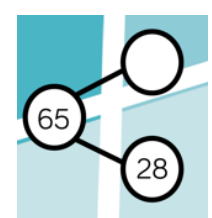
Expanded written method can help bridge to the formal written method.

$$\begin{array}{r} 47 - 24 = 23 \\ \underline{40 + 7} \\ - \underline{20 + 4} \\ 20 + 3 \end{array}$$

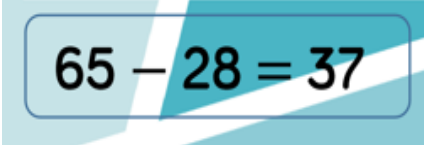
This will lead to a clear written column subtraction.



$32 - 12 = 20$

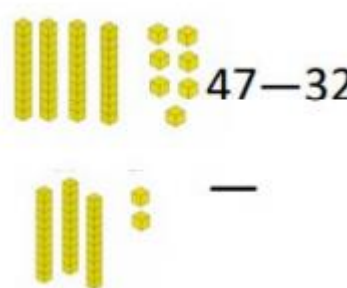
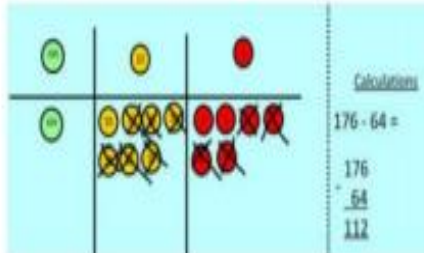

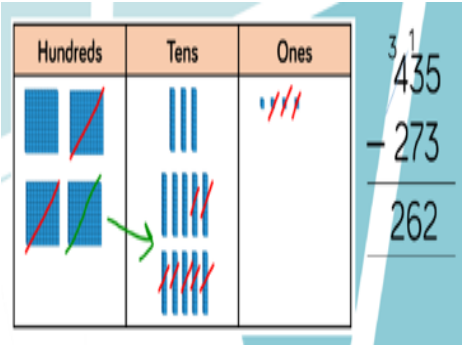
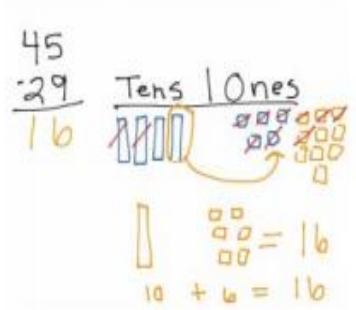




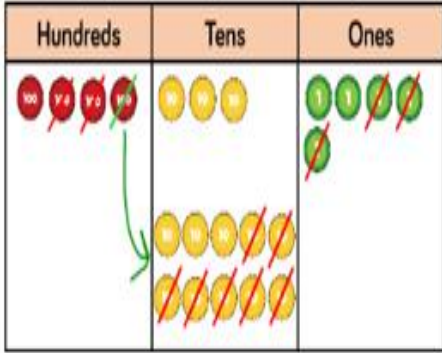
65      28



$65 - 28 = 37$



Objective	Concrete	Pictorial	Abstract				
<p><b>Subtraction: Year 3</b></p> <p>Subtract 3 digit numbers using column method (without regrouping)</p>	<p>Use base 10 or numicom to modell</p>  <p><math>47 - 32</math></p> <p>The calculation should be shown alongside the concrete resource.</p> <table border="1" data-bbox="415 564 685 664"> <thead> <tr> <th>Model</th> <th>Calculation</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	Model	Calculation			<p>Children are to be secure with use of PV counters before moving onto abstract.</p>  <p>Calculations</p> $176 - 64 =$ $\begin{array}{r} 176 \\ - 64 \\ \hline 112 \end{array}$	<p>It maybe useful to begin with the expanded form. Moving onto a more formal way as below.</p> $47 - 24 = 23$ $\begin{array}{r} 40 + 7 \\ - 20 + 4 \\ \hline 20 + 3 \end{array}$ 
Model	Calculation						
<p><b>Subtraction: Year 3</b></p> <p>Subtract 3 digit numbers using column method (with regrouping)</p>	<p>Begin with base 10 or Numicon. Move to pv counters, modelling the exchange of a ten into ten ones.</p>  $\begin{array}{r} 435 \\ - 273 \\ \hline 162 \end{array}$	<p>When confident, children can find their own way to the exchange/ regrouping.</p> 	<p>It may be useful to begin with the expanded form. Moving onto a more formal way as below (bottom picture)</p>  				

Objective		Concrete	Pictorial	Abstract
<b>Subtraction: Year 3</b>	Subtract 3 digit numbers using column method (with regrouping)	 <p>The diagram shows a place value chart with three columns: Hundreds, Tens, and Ones. In the Hundreds column, there are four red blocks, each labeled '100'. In the Tens column, there are four yellow blocks, each labeled '10'. In the Ones column, there are four green blocks, each labeled '1'. A green arrow points from the top-left red block to the top-left yellow block, indicating a regrouping operation. Below the top row of blocks, there are two rows of blocks. The first row has four yellow blocks in the Tens column and three green blocks in the Ones column. The second row has four yellow blocks in the Tens column and three green blocks in the Ones column. Red diagonal lines are drawn through the top-right yellow block and the top-right green block in the second row, and through the top-right yellow block and the top-right green block in the third row, representing the subtraction process.</p>		

Objective

Concrete

Pictorial

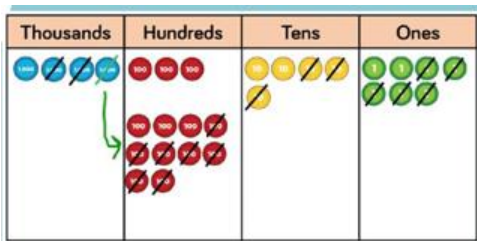
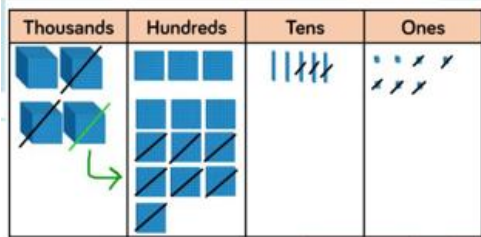
Abstract

**Subtraction: Year 4**

Subtract 4 digit numbers using column method  
(with regrouping)

Model process of exchange using Numicon, base ten and then move to PV counters. See Y3 The calculation will be shown alongside the model chosen to see the connection

Model	Calculation



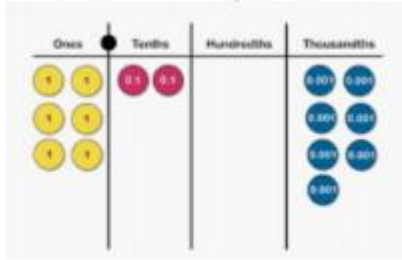
Children to draw pv counters and show their exchange—see Y3 The calculation will be shown alongside the model chosen to see the connection



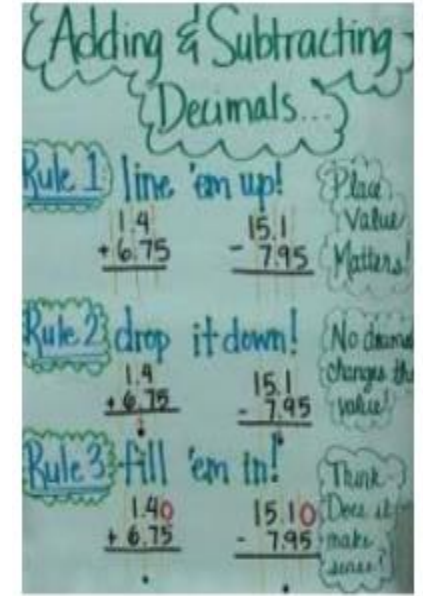
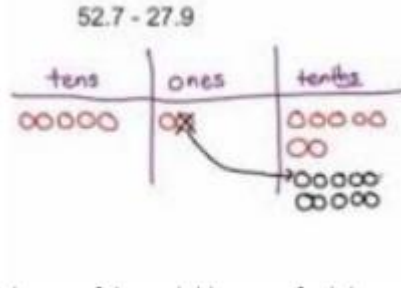
This will lead to an understanding of subtracting any number including decimals.

Introduce decimal subtraction

Children to be encouraged to use counters to represent numbers and take counters away to subtract.



When confident, children can find their own way to record the exchange/regrouping



Objective

Concrete

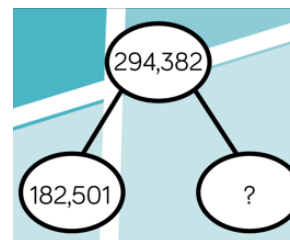
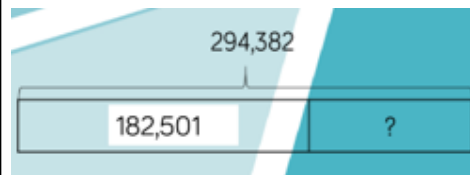
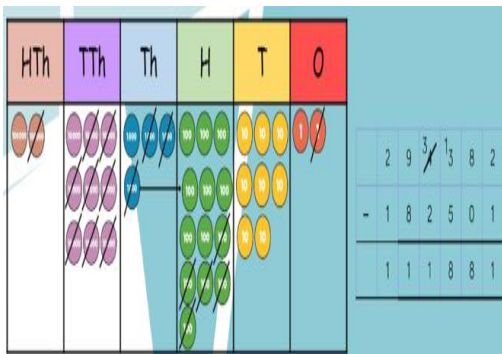
Pictorial

Abstract

Subtraction: Year 5/6

Subtract numbers with 4 or more digits  
Column method (with regrouping)

Place value counters or plain counters on a place value grid are the most effective concrete resource when subtracting numbers with more than 4 digits



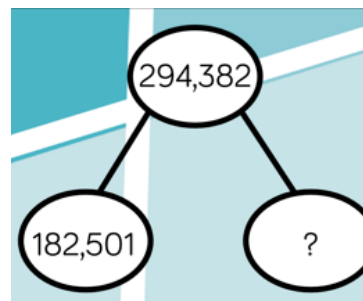
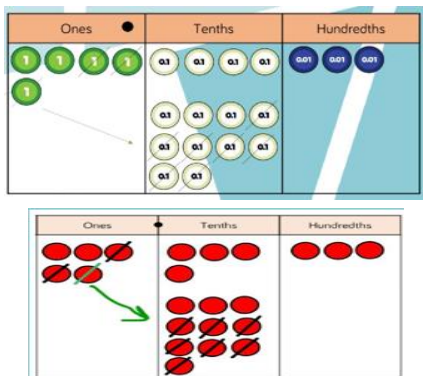
At this stage children should be encouraged to work in the abstract, using the column method.

$$\begin{array}{r} \cancel{2} \cancel{9} \cancel{4} \cancel{3} \cancel{8} \cancel{2} \\ - \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \hline 60,750 \end{array}$$

$$\begin{array}{r} \cancel{2} \cancel{9} \cancel{4} \cancel{3} \cancel{8} \cancel{2} \text{ kg} \\ - \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \hline 69.339 \text{ kg} \end{array}$$

Subtract decimals with up to 3 decimal places

Place value counters or plain counters on a place value grid are the most effective concrete resource when subtracting decimals with 1, 2 and then 3 decimal places



Ensure children have experience of subtracting decimals with a variety of decimal places. This includes putting this into context when subtracting money and other measures.

$$\begin{array}{r} \cancel{2} \cancel{9} \cancel{4} \cancel{3} \cancel{8} \cancel{2} \\ - \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \hline 60,750 \end{array}$$

$$\begin{array}{r} \cancel{2} \cancel{9} \cancel{4} \cancel{3} \cancel{8} \cancel{2} \text{ kg} \\ - \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \hline 69.339 \text{ kg} \end{array}$$

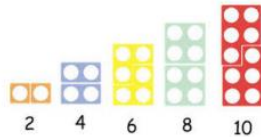
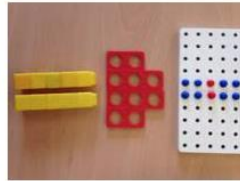
# Multiplication

# Multiplication-EYFS

## Objectives

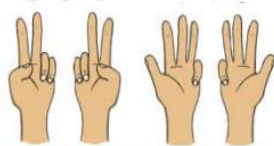
- Solve problems including doubling

## Concrete



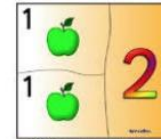
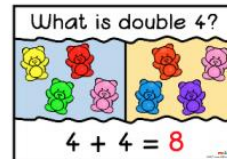
2 4 6 8 10

Counting and other maths resources for children to make 2 equal groups.



Physical and real life examples that encourage children to see concept of doubling as adding two equal groups.

## Pictorial

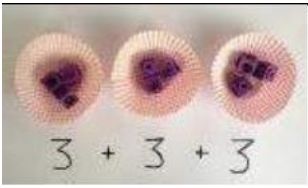


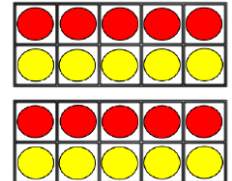

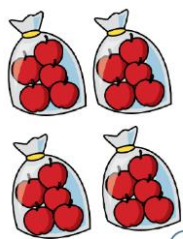
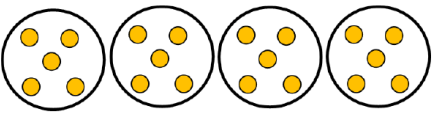

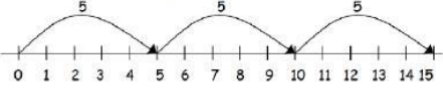







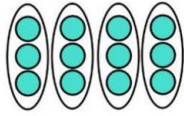
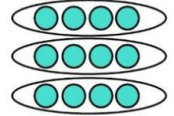



Pictures and icons that encourage children to see concept of doubling as adding two equal groups.

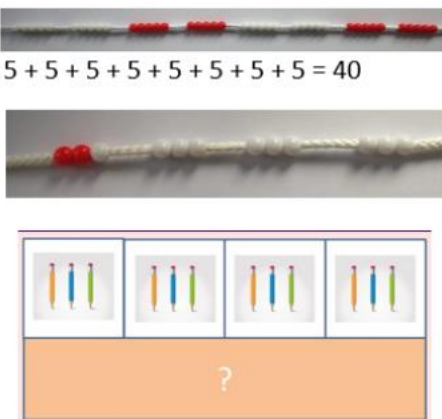
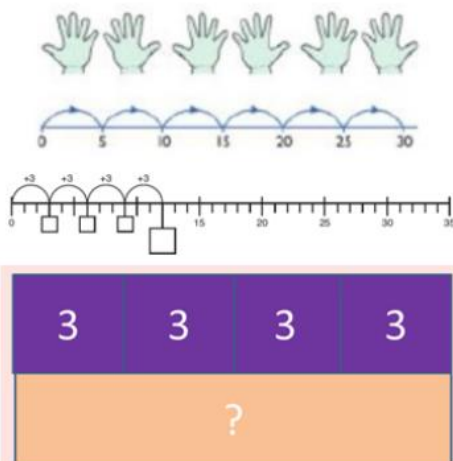

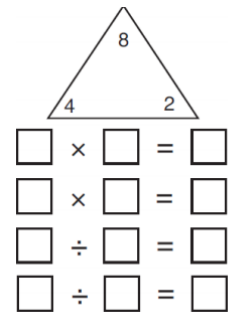
## Abstract

1+1=	7+7=
2+2=	8+8=
3+3=	9+9=
4+4=	10+10=
5+5=	11+11=
6+6=	12+12=

Addition calculations to model adding two equal groups.

Objective	Concrete	Pictorial	Abstract
<b>Multiplication: Year 1 and 2</b>  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><math>5 + 5 + 5 = 15</math></p>	<p>In Year 1, children use concrete and pictorial representations to solve problems. They are not expected to record multiplication formally.</p> <p>In Year 2, children are introduced to the multiplication symbol.</p>  <p><math>2 + 2 + 2 + 2 + 2 = 10</math></p> <p><math>5 + 5 + 5 + 5 = 20</math></p> <p><math>4 \times 5 = 20</math></p> <p><math>5 \times 4 = 20</math></p>
	<p>Create arrays using counters/cubes to show multiplication sentences.</p>  	<p>Draw arrays in different rotations to show commutative multiplication.</p>  <p><math>2 \times 4 = 8</math></p>  <p><math>4 \times 2 = 8</math></p>  <p><math>2 \times 4 = 8</math></p>   	<p>Y2: Use an array to write multiplication sentences and reinforce repeated addition.</p>  <p><math>5 + 5 + 5 = 15</math></p> <p><math>3 + 3 + 3 + 3 + 3 = 15</math></p> <p><math>5 \times 3 = 15</math></p> <p><math>3 \times 5 = 15</math></p>



Objective	Concrete	Pictorial	Abstract								
<b>Multiplication: Year 2</b>  Counting in multiples	<p>Count the groups as children are skip counting. Children may use their fingers to skip count. Use bar models. Also use objects in groups.</p>  <p><math>5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 40</math></p>	<p>Number lines, counting sticks and bar models should be used to show representation of counting in multiples.</p> 	<p>Count in multiples of a number aloud.</p> <p>Write sequences with multiples of numbers.</p> <p>0, 2, 4, 6, 8, 10</p> <p>0, 3, 6, 9, 12, 15</p> <p>0, 5, 10, 15, 20, 25, 30</p> <p><math>4 \times 3 = \square</math></p>								
	<p>This should be taught alongside division, so the children understand how they work alongside each other.</p> 	 <p><math>\square \times \square = \square</math></p> <p><math>\square \times \square = \square</math></p> <p><math>\square \div \square = \square</math></p> <p><math>\square \div \square = \square</math></p>	<table border="1"> <tbody> <tr><td><math>2 \times 4 = 8</math></td></tr> <tr><td><math>4 \times 2 = 8</math></td></tr> <tr><td><math>8 \div 2 = 4</math></td></tr> <tr><td><math>8 \div 4 = 2</math></td></tr> <tr><td><math>8 = 2 \times 4</math></td></tr> <tr><td><math>8 = 4 \times 2</math></td></tr> <tr><td><math>2 = 8 \div 4</math></td></tr> <tr><td><math>4 = 8 \div 2</math></td></tr> <tr><td>Show all 8 related fact family sentences.</td></tr> </tbody> </table>	$2 \times 4 = 8$	$4 \times 2 = 8$	$8 \div 2 = 4$	$8 \div 4 = 2$	$8 = 2 \times 4$	$8 = 4 \times 2$	$2 = 8 \div 4$	$4 = 8 \div 2$
$2 \times 4 = 8$											
$4 \times 2 = 8$											
$8 \div 2 = 4$											
$8 \div 4 = 2$											
$8 = 2 \times 4$											
$8 = 4 \times 2$											
$2 = 8 \div 4$											
$4 = 8 \div 2$											
Show all 8 related fact family sentences.											

Objective

Concrete

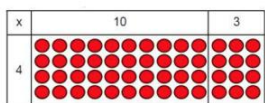
Pictorial

Abstract

# Multiplication: Year 3 and 4

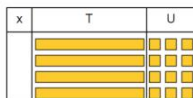
Multiply 2 digit numbers by 1 digit numbers

Show the link with arrays to first introduce the grid method.



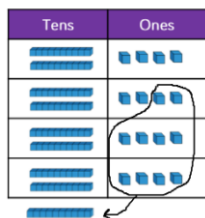
4 rows of 10  
4 rows of 3

Move on to using Base 10 to move towards a more compact method.



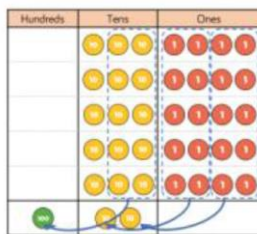
4 rows of 13

Move on to show base ten/place value counters in columns and demonstrate exchanging groups of ten.



	T	O
	2	4
x		4
	9	6
	1	

E.g.  $34 \times 5 = 170$

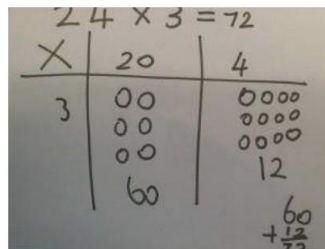


\*\*Show the written method alongside so children can begin to see the link.

\*\*\*The place value counters should be used to support the understanding of the method, rather than supporting the multiplication facts, as children should use their times tables knowledge.

Images of place value counters (as seen in the 'Concrete' section) may be displayed alongside the written methods.

Children may choose to draw/represent place value counters in a similar way to help show their thinking.



Teachers may choose to look at the expanded method first:

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

Moving on to the compact written method of multiplication:

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

# Objective

# Concrete

# Pictorial

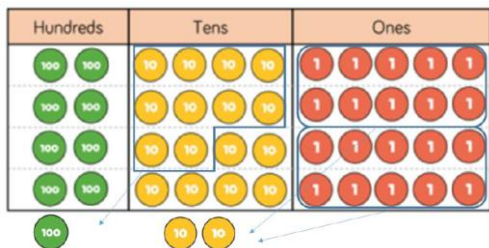
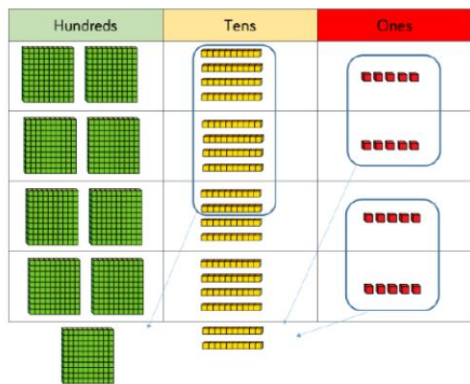
# Abstract

## Multiplication: Year 3 and 4

### Multiply 3-digit numbers by 1-digit numbers

See Previous section (2-digit by 1-digit)

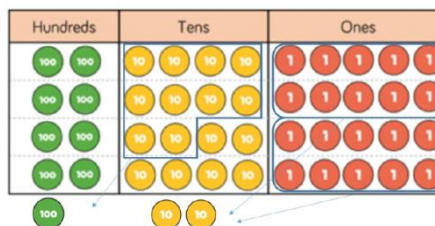
When moving to 3-digit by 1-digit multiplication, encourage the children to move towards the short, formal written method. Concrete manipulatives may still be used for support where needed.



See Previous section (2-digit by 1-digit)

When moving to 3-digit by 1-digit multiplication, encourage the children to move towards the short, formal written method.

Images of Base 10/place value counters may still be used to support understanding of the written method. Limit the number of exchanges, and encourage children to move away from the resources when multiplying bigger numbers.



When moving to 3-digit by 1-digit multiplication, encourage the children to move towards the short, formal written method.

	H	T	O
	2	4	5
x			4
<hr/>			
	9	8	0
	1	2	

Objective

Concrete

Pictorial

Abstract

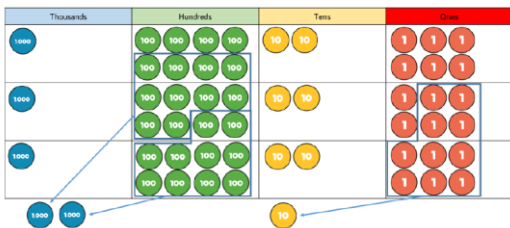
Multiplication: Year 5

Multiply 4-digit numbers by 1-digit numbers

See Previous section (year 3) for more detail.

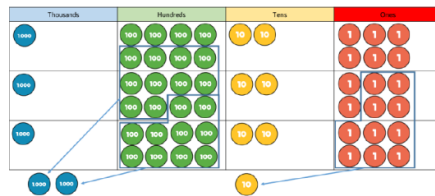
When moving to 4-digit by 1-digit multiplication, encourage the children to move towards the short, formal written method. Concrete manipulatives may still be used for support where needed.

Place value counters are the most appropriate concrete manipulative for multiplying with 4-digit numbers.



When moving to 4-digit by 1-digit multiplication, encourage the children to move towards the short, formal written method.

Teachers should show images of the place value counters to introduce this objective and link to previous learning.



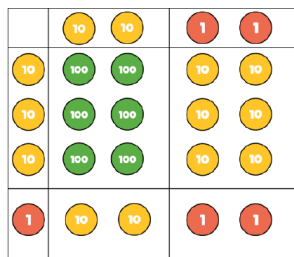
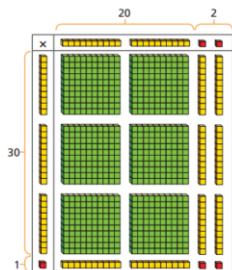
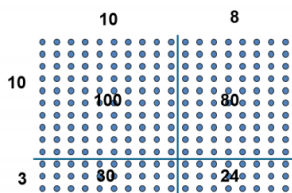
	Th	H	T	O
	1	8	2	6
x				3
	5	4	7	8
	2		1	

If children are struggling with multiplying larger numbers due to insufficient times table knowledge, encourage the use of a times tables grid to enable them to focus on the understanding of the method.

Time will need to spent separately on developing these children's times table fluency.

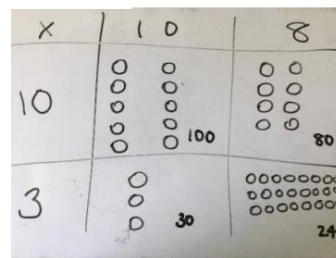
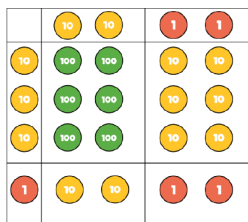
Multiply 2-digits by 2-digits

Show the link with arrays first to introduce the expanded method.



Place value counters can be used on screen alongside the written expanded method.

Children can draw similar representations to aid their understanding/calculation.



The grid method matches the expanded model as an introduction to the more formal method.

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

Objective

Concrete

Pictorial

Abstract

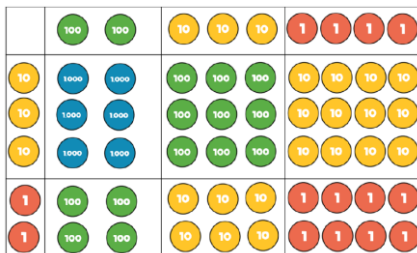
Multiplication: Year 5 and 6

Multiply 3 digits by 2 digits

By this point in their learning, children should be encouraged to work in the abstract, using the formal written method of multiplication.

Where manipulatives are used, place value counters are the most efficient, but base ten can be useful for showing the relative size of the resulting numbers.

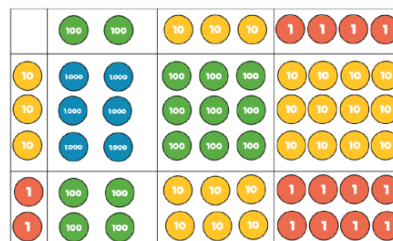
234 x 32 = 7,488



By this point in their learning, children should be encouraged to work in the abstract, using the formal written method of multiplication.

Images may be used to make links with previous learning.

234 x 32 = 7,488



Formal written method of multiplication:

Formal written method of multiplication grid for 234 x 32.

Formal written method of multiplication grid for 234 x 32 with carry values.

Grid method can be used for those children who find it beneficial.

Grid method for 234 x 32.

# Division

# Division- EYFS

## Objectives

## Concrete

## Pictorial

## Abstract

Solve problems including halving and sharing.

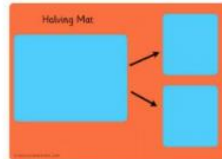
- Halving a whole, halving a quantity of objects.
- Sharing a quantity of objects.



Children have the opportunity to physically cut objects, food or shapes in half.



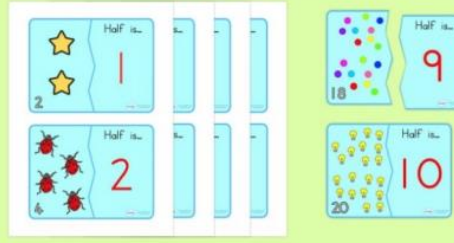
Counting and other maths resources for children to share into two equal groups.



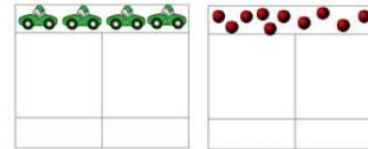
Use visual supports such as halving mats and part part whole, with the physical objects and resources that can be manipulated.



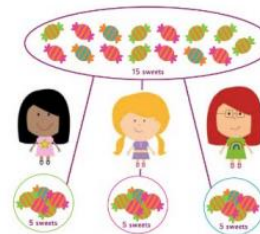
Counting and other maths resources for children to explore sharing between 3 or more.



Pictures and icons that encourage children to see concept of halving in relation to subitising, addition and subtraction knowledge. i.e. Knowing 4 is made of 2 groups of 2, so half of 4 is 2.



Bar model with pictures or icons to support understanding of finding 2 equal parts of a number, to further understand how two halves make a whole.



Pictures for children to create and visualise 3 or more equal groups.

Objective

Concrete

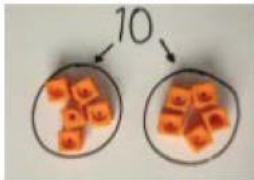
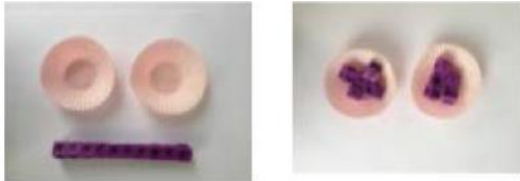
Pictorial

Abstract

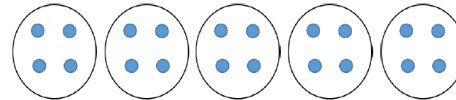
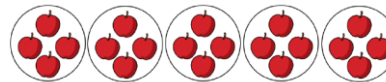
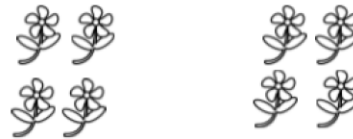
Division: Year 1 and 2

Sharing

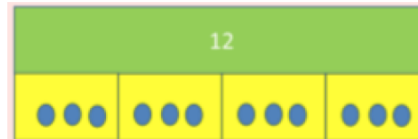
I have 10 cubes. Can you share them equally between the 2 plates?



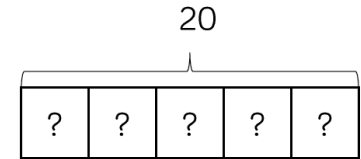
Children use pictures or shapes to share quantities.



Use bar models to show and support understanding.

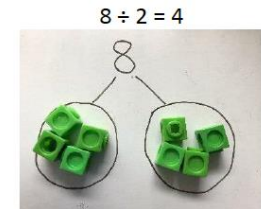


There are 20 apples altogether. They are shared equally between 5 bags. How many apples are in each bag?



In year 1, children use concrete and pictorial representations to solve problems. They are not expected to record division formally.

The number sentence could be shown alongside the concrete for familiarisation.



In Year 2, children are introduced to the division symbol.

$$20 \div 5 = 4$$



## Objective

## Concrete

## Pictorial

## Abstract

### Division: Year 2

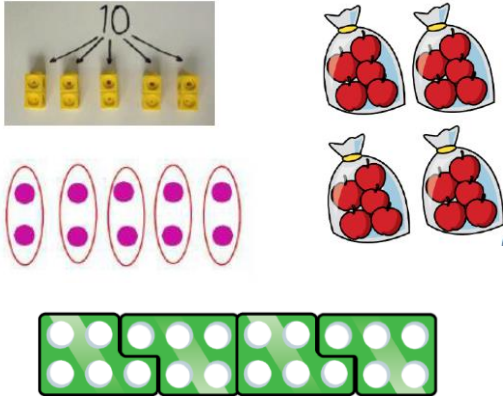
#### Grouping

Children solve problems by dividing quantities into equal groups, and counting the number of groups.

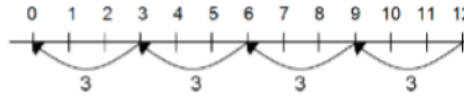
Grouping encourages children to count in multiples and links to repeated subtraction on the number line.

Use cubes, counters, objects or place value counters to aid understanding.

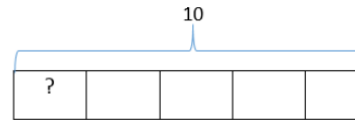
Representations in fixed groups such as numicon can be used to show the link with multiplication.



Use a number line to show jumps in equal groups. The number of jumps equals the number of groups. (Counting either forward and backwards can be useful)



Think of the bar model as a whole. Split into the number of groups you are dividing by and draw how many would be within each group.



$$10 \div 5 = ?$$

$$5 \times ? = 10$$

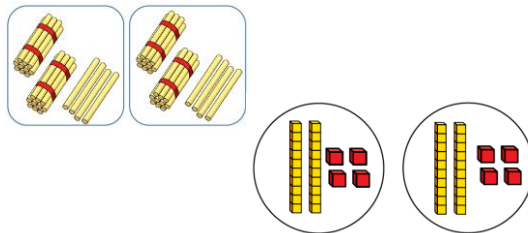
There are 20 apples altogether.  
They are put in bags of 5.  
How many bags are there?

$$20 \div 5 = 4$$

#### Divide 2 digits by 1-digit (sharing with no exchange)

Children begin to divide bigger numbers, using manipulatives to partition into tens and ones. Straws, base 10 and place values counters can all be used.

$$48 \div 2 = 24$$

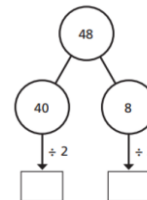


Tens		Ones			
10	10	1	1	1	1
10	10	1	1	1	1

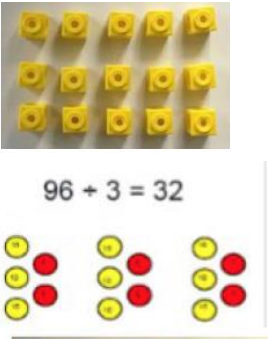
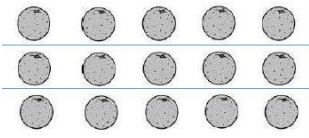
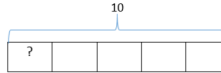
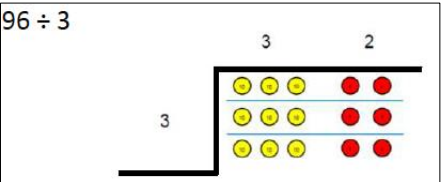
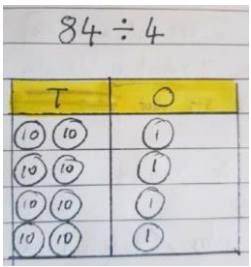
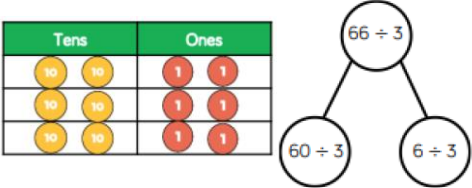
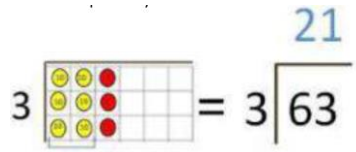
Children could draw place value counters to help them divide.

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

Part-whole models can provide children with a clear method that matches the concrete representation.



$$48 \div 2 = 24$$

Objective	Concrete	Pictorial	Abstract
<b>Division: Year 3</b>  Division as Grouping	<p>Use cubes, counters or place value counters to aid understanding.</p> <p>Link to multiplication by making arrays</p>  <p><math>96 \div 3 = 32</math></p>	<p>Draw arrays and use lines to split the array into groups to make multiplication and division sentences.</p>  <p>Continue to use bar modelling as an aid to solving division problems. Split into the number of groups you are dividing by and work out how many would be within each group.</p>  <p><math>10 \div 5 = ?</math> <math>5 \times ? = 10</math></p>	<p>How many groups of 6 in 24?</p> <p><math>24 \div 6 = 4</math></p> <p>Show that division is the inverse of multiplication by creating four linking number sentences.</p> <p><math>5 \times 3 = 15</math> <math>3 \times 5 = 15</math> <math>15 \div 5 = 3</math> <math>15 \div 3 = 5</math></p>
	<p>Use Place value counters to divide by sharing.</p>  <p>Children should write the short division method next to the concrete representation to see the link.</p>	<p>Children can draw counters to show their division method.</p>  <p>Part Whole model can be used to show how the numbers are partitioned.</p> 	<p><math>66 \div 3 = 22</math></p> <p>The children may start to use the short division method alongside the concrete representation.</p> 

Objective

Concrete

Pictorial

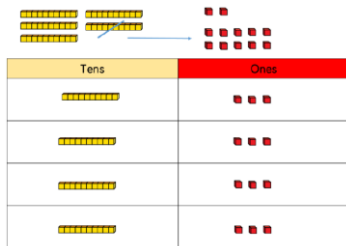
Abstract

Division: Year 3 and 4

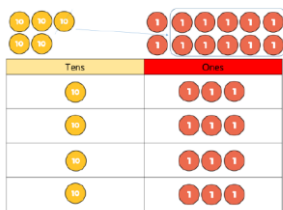
Divide 2-digit numbers by 1-digit numbers (including exchanging)

Children use Base 10 or place value counters to exchange 1 ten for 10 ones.

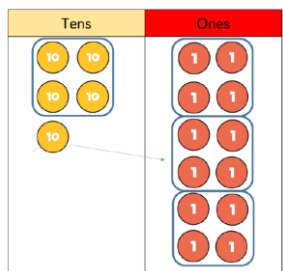
Children should start by sharing the equipment outside the place value grid before they use the place value grid in rows.



Start with the biggest place value. We are sharing 50 into 4 groups. We have 1 ten in each group and one left over. We exchange this ten for 10 ones and then share the ones equally between the groups. We then look to see how many are in each group.



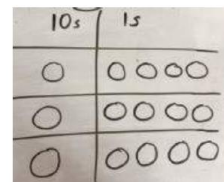
Alternatively, grouping can be used.



When grouping, language is important. 'How many groups of 4 tens can we make?' 'How many groups of 4 ones can we make?'

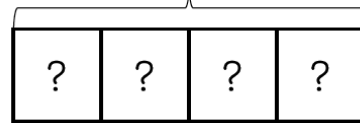
Children may draw counters to help them with their calculations.

42 ÷ 3 = 14

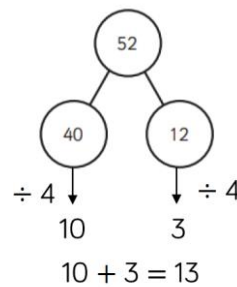


Continue to use bar modelling to show how the answer relates to the whole.

52

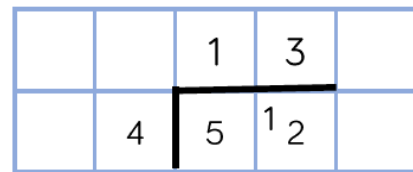


Flexible partitioning in a part-whole model may also be useful to help with this method.



52 ÷ 4 = 13

Children may begin to use the short division method alongside the concrete to see the link.



Objective

Concrete

Pictorial

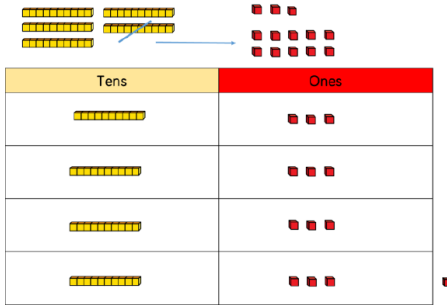
Abstract

Division: Year 3 and 4

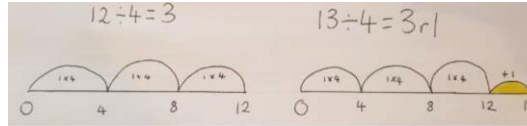
Divide 2-digit numbers by 1-digit numbers (including exchanging) with remainders

See previous section for more detail.

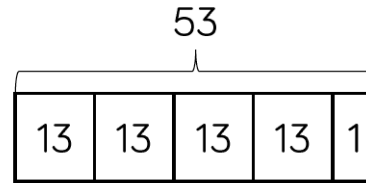
Children use same method, but the answer may include a remainder.



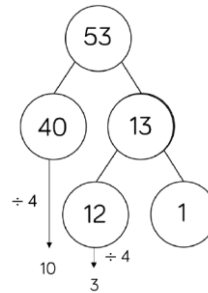
Number lines can be used to show division both with and without remainders.



Continue to use bar modelling to show how the answer relates to the whole.



Flexible partitioning in a part-whole model may also be useful to help with this method.



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

Children may begin to use the short division method alongside the concrete to see the link.

$$\begin{array}{r}
 13 \text{ r}1 \\
 4 \overline{) 53} \\
 \underline{40} \phantom{0} \\
 13 \phantom{0} \\
 \underline{12} \phantom{0} \\
 1
 \end{array}$$

Objective

Concrete

Pictorial

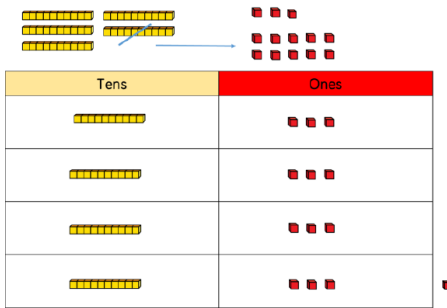
Abstract

Division: Year 3 and 4

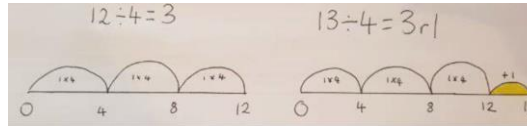
Divide 2-digit numbers by 1-digit numbers (including exchanging) with remainders

See previous section for more detail.

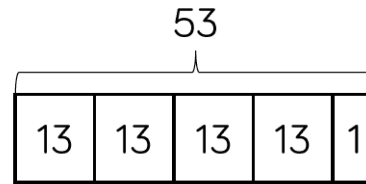
Children use same method, but the answer may include a remainder.



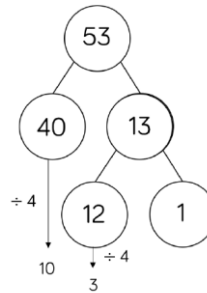
Number lines can be used to show division both with and without remainders.



Continue to use bar modelling to show how the answer relates to the whole.



Flexible partitioning in a part-whole model may also be useful to help with this method.



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

Children may begin to use the short division method **alongside the concrete** to see the link.

$$\begin{array}{r}
 13 \text{ r}1 \\
 4 \overline{) 53} \\
 \underline{40} \phantom{0} \\
 13 \phantom{0} \\
 \underline{12} \phantom{0} \\
 1 \phantom{0}
 \end{array}$$

Objective

Concrete

Pictorial

Abstract

Division: Year 4

Divide 3 digits by 1 digit

See Year 3 for more detail.

Children can continue to place value counters to share 3-digit numbers into equal groups.

**856 ÷ 4 = 214**

Hundreds	Tens	Ones
100 100	10	1 1 1 1
100 100	10	1 1 1 1
100 100	10	1 1 1 1
100 100	10	1 1 1 1

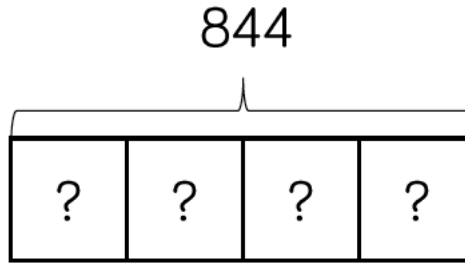
Alternatively, children can use grouping to divide place value counters.

**856 ÷ 4 = 214**

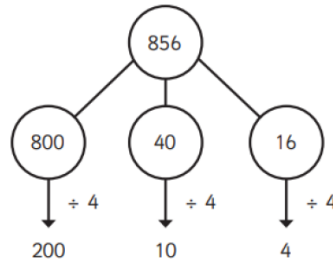
Hundreds	Tens	Ones
100 100 100 100	10 10 10 10	1 1 1 1 1 1
100 100 100 100	10	1 1 1 1 1 1

Children should use the short division method alongside the concrete representation to show the link.

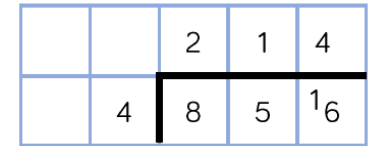
Continue to use bar modelling to show how the answer relates to the whole.



Flexible partitioning in a part-whole model may also be useful to help with this method.



Begin using the abstract short division method alongside the concrete representation at first.



Objective

Concrete

Pictorial

Abstract

Division: Year 5

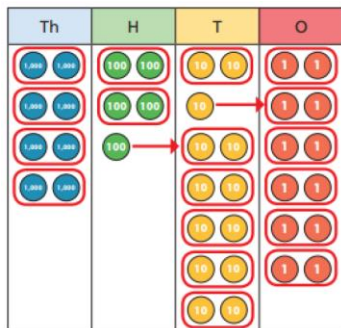
Divide 4-digits by 1-digit

See Year 3 for more detail.

By this stage, children should be encouraged towards working in the abstract using the formal short method of division.

Concrete representations may be useful as an introduction/recap, or for support, with the short division method written alongside.

$$8,532 \div 2 = 4,266$$



See Year 3 for more detail.

By this stage, children should be encouraged towards working in the abstract using the formal short method of division.

Pictorial representations may be displayed as an introduction/recap, or for support, with the short division method written alongside.

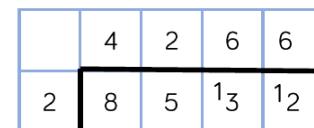
If beneficial, children could also draw their own counters and

Continue to use bar modelling to show how the answer relates to the whole.

Flexible partitioning in a part-whole model may also be useful to help with this method.

Begin using the abstract short division method alongside the concrete representation at first.

$$8,532 \div 2 = 4,266$$



Objective

Concrete

Pictorial

Abstract

Division: Year 5 and 6

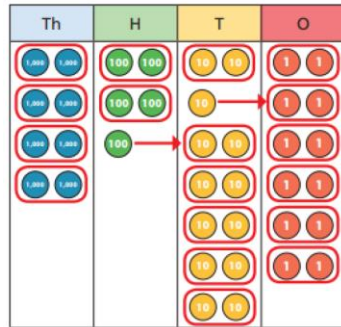
Divide 4-digits by 1-digit

See Year 3 for more detail.

By this stage, children should be encouraged towards working in the abstract using the formal short method of division.

Concrete representations may be useful as an introduction/recap, or for support, with the short division method written alongside.

$$8,532 \div 2 = 4,266$$



See Year 3 for more detail.

By this stage, children should be encouraged towards working in the abstract using the formal short method of division.

Pictorial representations may be displayed as an introduction/recap, or for support, with the short division method written alongside.

If beneficial, children could also draw their own counters and

Continue to use bar modelling to show how the answer relates to the whole.

Flexible partitioning in a part-whole model may also be useful to help with this method.

Short division method:

	4	2	6	6
2	8	5	13	12



Objective	Concrete	Pictorial	Abstract
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**Division: Year 6**

Divide 3 or 4 digits by 2-digits.

By this stage, children should be encouraged towards working in the abstract using the formal short method of division.

When children begin to divide by 2 digits, written methods become the most accurate as concrete and pictorial representations become less accurate.

See Concrete

At Broadstone Hall, we use the short division method to divide by 2-digit numbers.

Children are encouraged to create a track of multiples before carrying out the short division.

$7,335 \div 15 = 489$

15	30	45	60	75	90	105	120	135	150
----	----	----	----	----	----	-----	-----	-----	-----

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

\*There may be some children for whom the chunking method/long division method is considered appropriate.