

## Westfield Maths Written Calculation Policy

This Policy supports the White Rose Maths scheme used throughout Westfield. Progression, within each area of calculation, is in line with the Programme of Study in the 2014 National Curriculum. This calculation policy should be used to support children to develop a deep understanding of Number and Calculation. This Policy has been designed to teach children through the use of concrete, pictorial and abstract representations.

- Concrete representation— a pupil is first introduced to an idea or skill by acting it out with real objects. This is a 'hands on' component using real objects and is a foundation for conceptual understanding.
- Pictorial representation - a pupil has sufficiently understood the 'hands on' experiences performed and can now relate them to representations, such as a diagram or picture of the problem.
- Abstract representation—a pupil is now capable of representing problems by using mathematical notation, for example  $12 \times 2 = 24$ .

It is important that conceptual understanding, supported by the use of representation, is secure for all procedures. Reinforcement is achieved by going back and forth between these representations.

### Mathematics Mastery



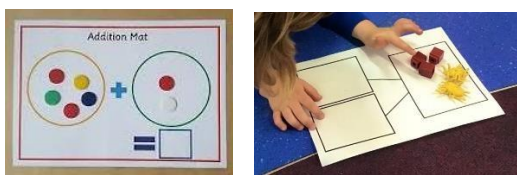

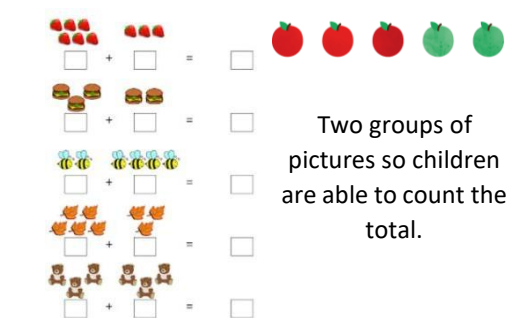
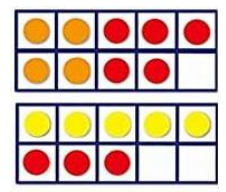
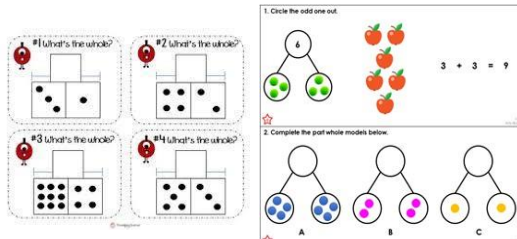
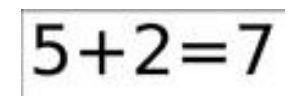
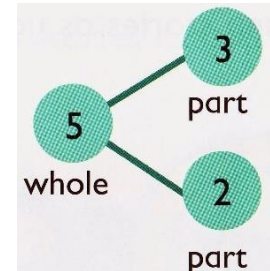
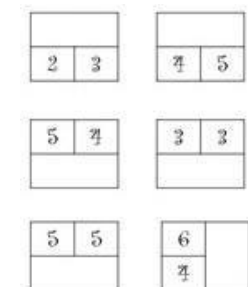
At the centre of the Mastery Approach to the teaching of Mathematics, is the belief that all children have the potential to succeed. They should have access to the same curriculum content and, rather than being extended with new learning, they should deepen their conceptual understanding by tackling challenging and varied problems. Similarly, with calculation strategies, children must not simply rote learn procedures but demonstrate their understanding of these procedures through the use of concrete materials and pictorial representations. This Policy outlines the different calculation strategies that should be taught and used in EYFS, Year 1 and Year 2, in line with the requirements of the EYFS Reforms Curriculum and the 2014 Primary National Curriculum.

### How to use the Policy:

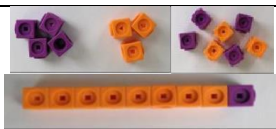
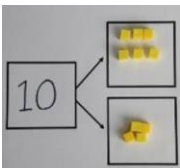
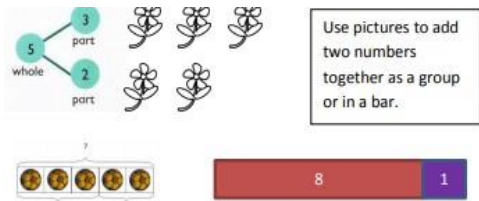
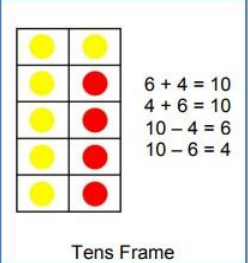

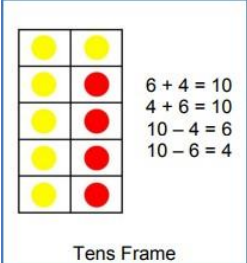
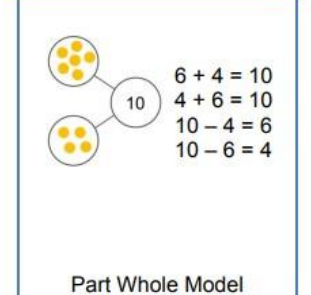
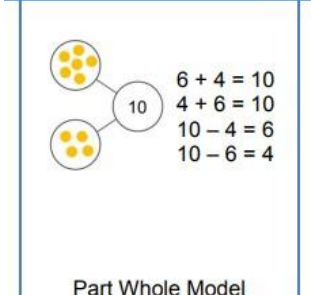

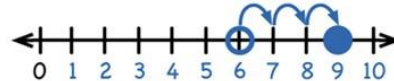
This Mathematics Policy is a guide for all staff at Westfield and has been adapted from work by the NCETM. All teachers have been given the Scheme of Work from the White Rose Maths Hub and are required to base their planning around their year group's modules. These modules use the Singapore Maths Methods and are affiliated to the workings of the 2014 Maths Programme of Study. Teachers can use any teaching resources that they wish to and the policy does not recommend one set of resources over another, rather that, a variety of resources are used. For each of the four rules of number, different strategies are laid out, together with examples of what concrete materials can be used and how, along with suggested pictorial representations. The principle of the concrete-pictorial-abstract (CPA) approach is for children to have a true understanding of a mathematical concept, they need to master all three phases within a year group's Scheme of Work.

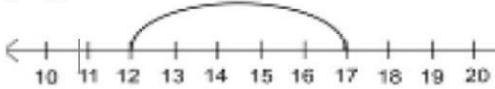


**Addition**

## Addition- EYFS

Objectives	Concrete	Pictorial	Abstract
<ul style="list-style-type: none"> <li>- Knows that a group of things change in quantity when something is added.</li> <li>- Find the total number of items in two groups by counting all of them.</li> <li>- Says the number that is one more than a given number.</li> <li>- Finds one more from a group of up to five objects, then ten objects.</li> <li>- In practical activities and discussion, beginning to use the vocabulary involved in adding.</li> <li>- Using quantities and objects, they add two single digit numbers and count on to find the answer.</li> <li>- Solve problems including doubling.</li> </ul>	<div style="text-align: center;">  <p>Use toys and general classroom resources for children to physically manipulate, group/regroup.</p>  <p>Use specific maths resources such as counters, snap cubes, Numicon etc.</p>   <p>Use visual supports such as ten frames, part part whole and addition mats, with the physical objects and resources that can be manipulated.</p> </div>	<div style="text-align: center;">  <p>Two groups of pictures so children are able to count the total.</p>  <p>Use visual supports such as ten frames, part part whole and addition mats with pictures/icons.</p>  </div>	<p style="text-align: center;">A focus on symbols and numbers to form a calculation.</p> <div style="text-align: center;">    </div> <p style="text-align: center;">* No expectation for children to be able to record a number sentence/addition calculation.</p>
<p>Vocabulary</p>	<p>Altogether, equal double, part, whole, more, less, add, take away, fewer,</p>		

# Addition- Year 1

Objective and Strategy	Concrete	Pictorial	Abstract
<p>Combining two parts to make a whole: part- whole model</p>	 <p>Use cubes to add two numbers together as a group or in a bar. (Some children may still need to use real objects)</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>5 frames and 10 frames.</p>  <p>Tens Frame</p> <p> <math>6 + 4 = 10</math>  <math>4 + 6 = 10</math>  <math>10 - 4 = 6</math>  <math>10 - 6 = 4</math> </p>	 <p>Use the part-part whole diagram as shown above to move into the abstract.</p> <p> <math>4 + 3 = 7</math>  <math>10 = 6 + 4</math> </p>
<p>Represent and use number bonds and related subtraction facts within 20</p>	 <p>Tens Frame</p> <p> <math>6 + 4 = 10</math>  <math>4 + 6 = 10</math>  <math>10 - 4 = 6</math>  <math>10 - 6 = 4</math> </p> <p>(Some children may need to initially use real objects then move onto the representation, egg boxes may also be used to support this)</p>	 <p>Part Whole Model</p> <p> <math>6 + 4 = 10</math>  <math>4 + 6 = 10</math>  <math>10 - 4 = 6</math>  <math>10 - 6 = 4</math> </p>	 <p>Part Whole Model</p> <p>Part-part whole to be used alongside abstract</p> <p> <math>6 + 4 = 10</math>  <math>4 + 6 = 10</math>  <math>10 - 4 = 6</math>  <math>10 - 6 = 4</math> </p>
<p>Addition and subtraction of one-digit and two-digit numbers to 20 including 0.</p>		<p><math>6 + 3 = 9</math></p>  <p>Start at the larger number on the number line and count on in ones.</p>	<p> <math>5 + 12 = 17</math>  <math>17 = 12 + 5</math> </p>

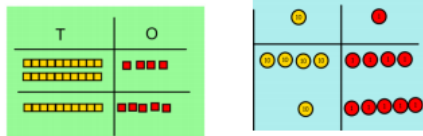
<p>Start at the bigger number and counting on</p>	<p>Start with the larger number on the bead string and then count of to the smaller number 1 by 1 to find the answer.</p>	<p><math>12 + 5 = 17</math></p>  <p>Start at the larger number on the number <u>line</u> and count on in ones or in one jump to find the answer.</p>	<p>Place the larger number in your head and count on the smaller number to find your answer.</p>
<p>Regrouping to make 10 (The 'Make 10' strategy)</p>	<p><math>6 + 5 = 11</math></p>   <p>Start with the bigger number and use the smaller number to make 10. Use ten frames.</p>		
<p>Vocabulary</p>	<p>Altogether, equal double, part, whole, more, less, add, take away, fewer,</p>		



Adding two 2-digit numbers  
(No re-grouping)

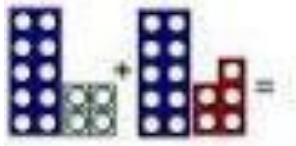
**24 + 15 =**

Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters.

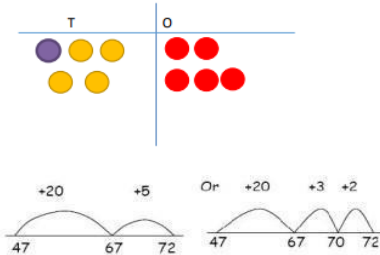


(Some children may not be ready for place value counters in Y2)

Numicon may also be used



After practically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions.



Use number line and bridge ten using part whole if necessary.  
Base 10 may be used above the number line.

The calculation will be shown alongside the number line to see the connection

Model	Calculation

3 steps eg:  
24 + 32  
24 + 30 = 54  
54 + 2 = 56

*Recording addition in columns supports place value and prepares for formal written methods with larger numbers. Toward the end of the year, children move to more formal recording using partitioning method:*

Vocabulary

add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, addition, column, tens boundary

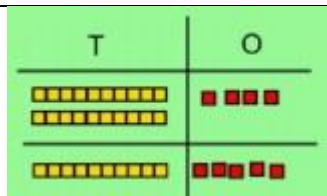
## Addition- Year 3

### Objective and Strategy

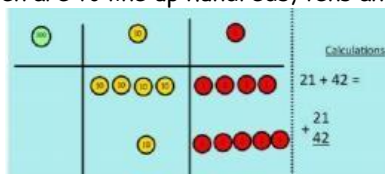
Add and subtract numbers with up to 3-digits, using formal written methods of columnar addition

Column addition (no regrouping)

### Concrete



Using manipulatives (dienes, numicon, counters), children are to line up hundreds, tens and ones.

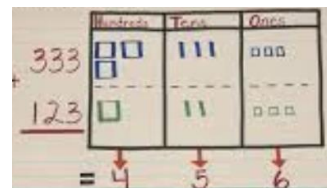


Children should be secure with using PV counters before moving onto pictorial.

The calculation will be shown alongside the model used to see the connection

Model	Calculation

### Pictorial



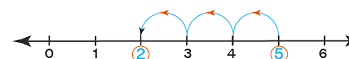
Children are to draw, in a PV frame, the manipulatives, that they are using.

Secure knowledge of representation with the PV columns.

The calculation will be shown alongside the model to see the connection

Model	Calculation

Subtraction on Number Line

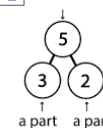


SUBTRACTION

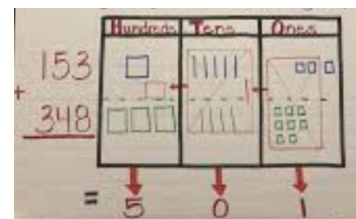
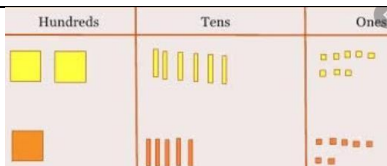
18 - 3 = ?

18	
? - 3	

18 - 3 = 15



Column addition (with regrouping)



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

### Abstract

$$\begin{array}{r} 223 \\ + 114 \\ \hline \end{array}$$

$$337$$

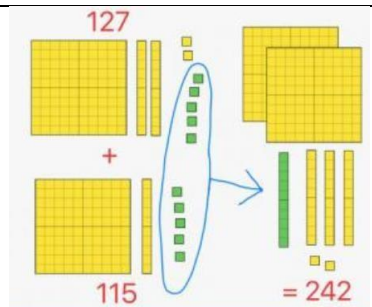
Children to move onto recording more formally.

Some children may need to use the expanded method (see below).

$$\begin{array}{r} 20 + 5 \\ 40 + 8 \\ \hline 60 + 13 = 73 \end{array}$$

Children are to begin with the abstract: expanded form.

For those children, that are confident after AFL, the below method should be used.




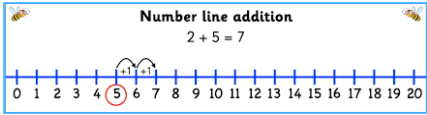

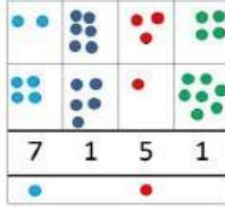
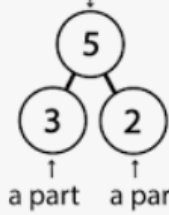
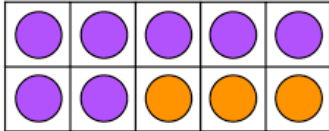
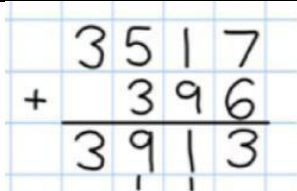
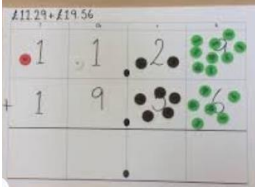
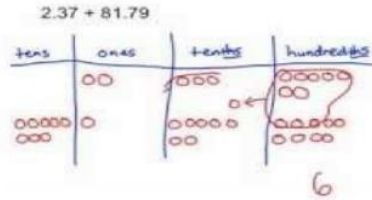
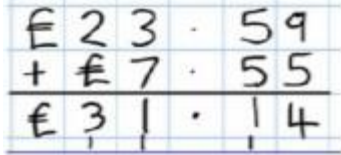
Exchange ten ones for a ten. Model using Dienes, Numicon and place value counters.

$$\begin{array}{r} 536 \\ + 85 \\ \hline 621 \\ 11 \end{array}$$

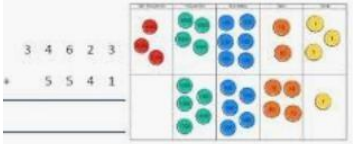
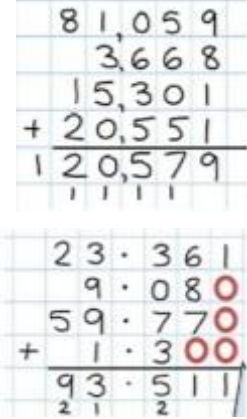
Vocabulary

addition add, more, and make, sum, total, altogether, double, near double, half, halve, tens boundary, hundreds boundary

## Addition- Year 4


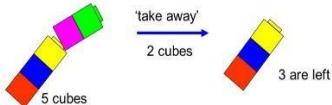


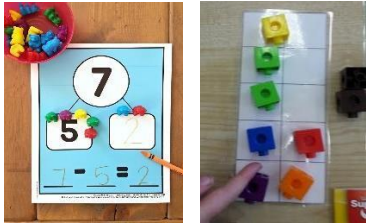
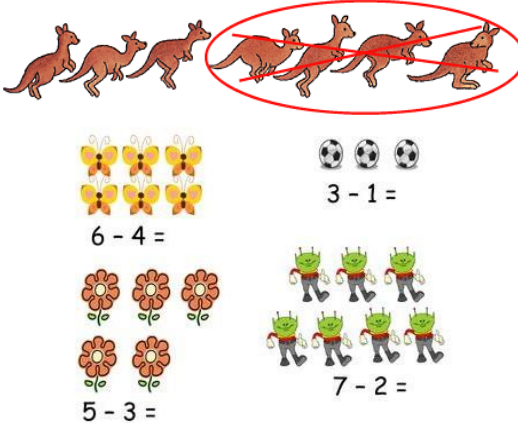
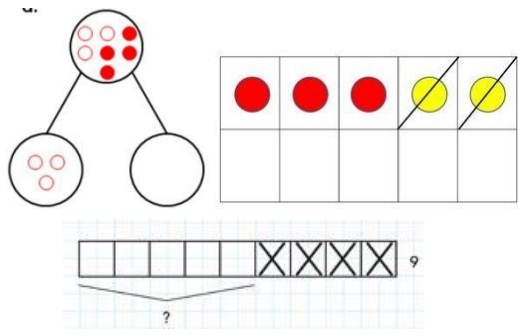

Objective and Strategy	Concrete	Pictorial	Abstract								
<p><i>Using formal written methods of columnar addition where appropriate</i></p> <p>add numbers with up to 4 digits (with exchange)</p>	<p>Children continue to use dienes or place value counters to add, exchanging ten ones for a ten and ten tens for a hundred and ten hundreds for a thousand.</p>  <p style="text-align: center;">The calculation will be shown alongside the manipulative used to see the connection</p> <div style="display: flex; align-items: center; justify-content: center;">   </div> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Model</th> <th style="padding: 5px;">Calculation</th> </tr> </thead> <tbody> <tr> <td style="height: 40px;"></td> <td style="height: 40px;"></td> </tr> </tbody> </table>	Model	Calculation			<p style="text-align: center;">Pictorial</p>  <p style="text-align: center;">Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center;"> <p><b>ADDITION</b></p> <p><math>3 + 4 = ?</math></p> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td style="background-color: #0070c0; color: white;">3</td><td style="background-color: #0070c0; color: white;">4</td></tr> <tr><td colspan="2" style="background-color: #0070c0; color: white;">?</td></tr> </table> <p><math>3 + 4 = 7</math></p> </div> <div style="margin-left: 20px;"> <p>the whole</p>  </div> </div> 	3	4	?		<p style="text-align: center;">Abstract</p>  <p style="text-align: center;">Continue from previous work to carry hundreds as well as tens.</p>
Model	Calculation										
3	4										
?											
<p>Add decimals with 2 decimal places, including money.</p>	 <p style="text-align: center;">Introduce decimal place value counters and model exchange for addition.</p>		 <p style="text-align: center;">As the children move on, introduce decimals with the same number of decimal places and different. Money can be used here.</p>								
Vocabulary	addition add, more, and make, sum, total, altogether, double, near double, half, halve, tens boundary, hundreds boundary, decimal, decimal point										

## Addition- Year 5/6

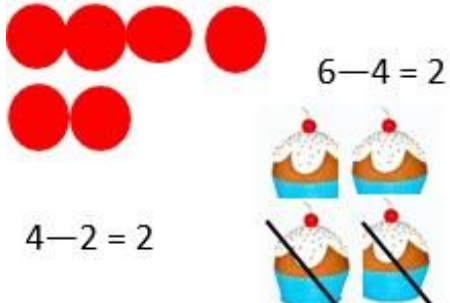
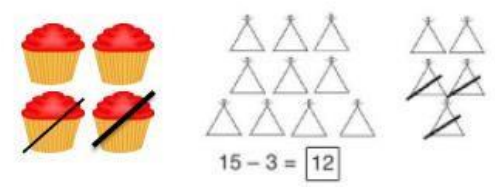


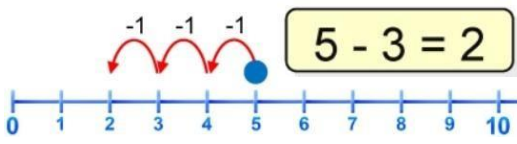
Objective and Strategy	Concrete	Pictorial	Abstract
add numbers with more than 4 digits.	See Year 4	See Year 4	 <p>Children should have abstract supported by a pictorial or concrete if needed.</p>
add several numbers of increasing complexity, including adding money, measure and decimals with different numbers of decimal points.	See Year 4	See Year 4	 <p>Insert zeros for place holders.</p>
Vocabulary	addition add, more, and make, sum, total, altogether, double, near double, half, halve, tens boundary, hundreds boundary, decimal, decimal point		

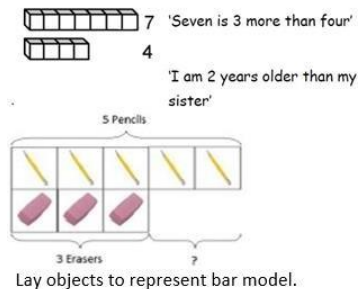
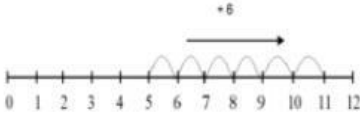
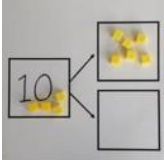
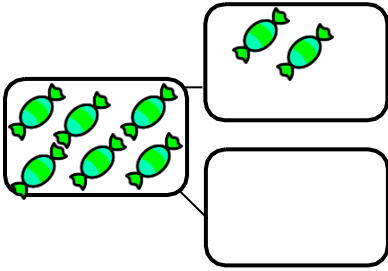


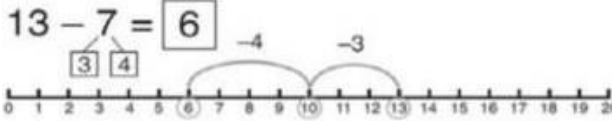
# Subtraction

## Subtraction- EYFS

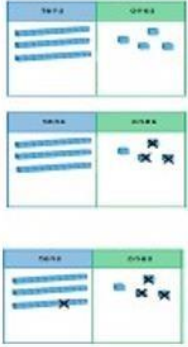

Objectives	Concrete	Pictorial	Abstract
<p>- Knows that a group of things change in quantity when something is taken away</p> <p>- Find one less from a group of five objects, then ten objects.</p> <p>- In practical activities and discussion, beginning to use the vocabulary involved in subtracting.</p> <p>- Using quantities and objects, they subtract two single digit numbers and count back to find the answer.</p>	<p style="text-align: center;"><b>Concrete</b></p>  <p style="text-align: center;">Use toys and general classroom resources for children to physically manipulate, group/regroup.</p>    <p style="text-align: center;">Use specific maths resources such as snap cubes, Numicon, bead strings etc.</p>  <p style="text-align: center;">Use visual supports such as ten frames, part part whole and subtraction mats, with the physical objects and resources that can be manipulated.</p>	<p style="text-align: center;"><b>Pictorial</b></p>  <p style="text-align: center;">A group of pictures for children to cross out or cover quantities to support subtraction.</p>  <p style="text-align: center;">Use visual supports such as ten frames, part part whole and number line with pictures/icons.</p>	<p style="text-align: center;"><b>Abstract</b></p> <p style="text-align: center;">A focus on symbols and numbers to form a calculation.</p>  <div style="border: 2px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <math style="font-size: 2em;">10 - 6 = 4</math> </div> <p style="text-align: center;">* No expectation for children to be able to record a number sentence/addition calculation.</p>
<p>Vocabulary</p>	<p>Less, fewer, take away, subtract</p>		

# Subtraction- Year 1

Objective and Strategy	Concrete	Pictorial	Abstract
<p><i>Subtract one-digit and two-digit numbers to 20, including 0.</i></p> <p>Taking away ones</p>	<p>Use physical objects, <u>counters</u>, <u>cubes</u> etc to show how objects can be taken away.</p>  <p><math>6 - 4 = 2</math></p> <p><math>4 - 2 = 2</math></p> <p><math>6 - 4 = 2</math></p>	<p>Cross out drawn objects to show what has been taken away.</p>  <p><math>15 - 3 = 12</math></p>	<p><math>7 - 4 = 3</math></p> <p><math>16 - 9 = 7</math></p>
<p>Counting back</p>	<p>Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones.</p> <p><math>13 - 4</math></p>  <p>Use counters and move them away from the group as you take then away counting backwards as you go.</p> 	 <p>Count back on a number line or track Start at the bigger number and count back the smaller number showing the jumps on the number line.</p>	<p>Put 13 in your head, count back 4. What number are you at? (Use your fingers to help you)</p>

<p>Find the difference</p>	<p>Compare objects and amounts</p>  <p>'Seven is 3 more than four'</p> <p>4</p> <p>'I am 2 years older than my sister'</p> <p>5 Pencils</p> <p>3 Erasers</p> <p>Lay objects to represent bar model.</p>	 <p>Count on to find the difference.</p> <p>Draw bars to find the difference between 2 numbers.</p>	<p>Hannah has 12 sweets and her sister has 5. How many more does Hannah have than her sister?</p> <p>True or False</p>
<p>Represent and use number bonds and related subtraction facts within 20</p> <p>Part-part whole model</p>	 <p>Link to addition. Use PPW model to model the inverse.</p> <p>If 10 is the whole and 6 is one of the parts, what is the other part?</p> $10 - 6 = 4$	 <p>Use a pictorial representation of objects to show the part-part whole model</p>	 <p>Move to using numbers within the part whole model.</p>
<p>Make 10</p>	<p><math>14 - 9 =</math></p>  <p>Make 14 on the ten frame. Take away the four first to make 10 and then take away one more so you have taken away 5. You are left with the answer of 9.</p>	<p><math>13 - 7 = 6</math></p>  <p>Start at 13. Take away 3 to reach 10. Then take away the remaining 4 so you have taken away 7 altogether. You have reached your answer.</p>	<p><math>16 - 8 =</math></p>
<p>Vocabulary</p>	<p>equal to, take, take-away, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least count back, how many left, how much less is...</p>		

## Subtraction- Year 2

Objective and Strategy	Concrete	Pictorial	Abstract				
<p><i>Subtract a two-digit number and ones, a two-digit number and tens, two two-digit numbers</i></p> <p>Partitioning to subtract without re-</p> <p>Grouping: 'Friendly numbers'</p> <p><i>2digit – 2 digit crossing 10s.</i></p>	<p><math>34 - 13 = 21</math></p>  <p>Use Dienes to show how to partition the number when subtracting without regrouping.</p> <p>The calculation will be shown alongside the manipulative used</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Model</th> <th>Calculation</th> </tr> </thead> <tbody> <tr> <td style="height: 30px;"></td> <td></td> </tr> </tbody> </table>	Model	Calculation			<p>Children draw representations of Dienes and cross off.</p>  <p><math>43 - 21 = 22</math></p>	<p><math>43 - 21 = 22</math></p> <p><i>3 step for 2 digit – 2 digit</i></p> <p><math>43 - 21 =</math>  <math>43 - 20 = 23</math>  <math>23 - 1 = 22</math></p> <p><i>The same process when crossing tens.</i></p>
Model	Calculation						
Vocabulary	<p>equal to, take, take-away, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least count back, how many left, how much less is...difference, count on, strategy, partition, tens units</p>						

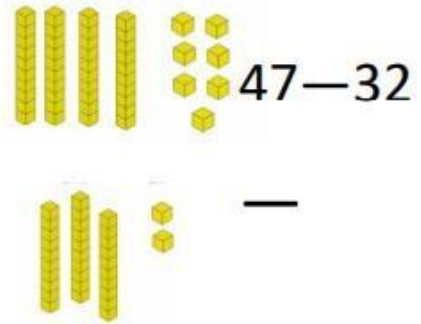
## Subtraction- Year 3

**Objective and Strategy**

To subtract numbers with up to three-digits, using formal written methods of columnar subtraction

Column subtraction (without exchanging)

**Concrete**



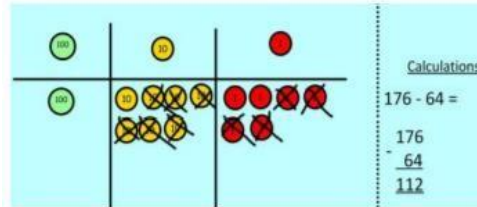
Use base 10 or Numicon to model

The calculation will be shown alongside the model chosen to see the connection

Model	Calculation

**Pictorial**

Children are to be secure with use of PV counters before moving onto abstract.



**Abstract**

Children should begin with the expanded form. Moving onto a more formal way as below.

$$47 - 24 = 23$$

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

Column  
Subtraction  
(with  
exchanging)

Begin with base 10 or Numicon. Move to pv counters, modelling the exchange of a ten into ten ones. Use the phrase 'take and make' for exchange.

**Column method** (using base 10 and having to exchange)



- 1) Start by partitioning 45
- 2) Exchange one ten for ten more ones
- 3) Subtract the ones, then the tens.

Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtractions with 2 exchanges.

Make the larger number with the place value counters


Calculations

$$\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$$

Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones.


Calculations

$$\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$$

Now I can subtract my ones.


Calculations

$$\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$$

45  
-29  
---  
16

Tens | Ones

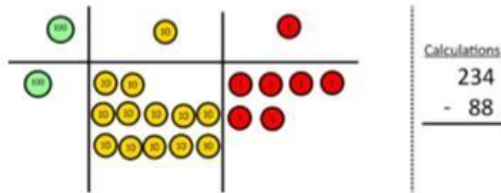
10 + 6 = 16

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

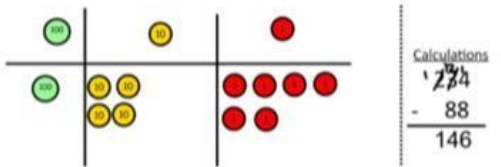
Children should begin with the expanded form. Moving onto a more formal way as below (bottom picture).

$836 - 254 = 582$ $\begin{array}{r} \text{H} \quad \text{T} \quad \text{U} \\ 800 \quad 130 \quad 6 \\ - 200 \quad 50 \quad 4 \\ \hline 500 \quad 80 \quad 2 \end{array}$	$728 - 582 = 146$ $\begin{array}{r} \text{H} \quad \text{T} \quad \text{U} \\ 7 \quad 2 \quad 8 \\ - 5 \quad 8 \quad 2 \\ \hline 1 \quad 4 \quad 6 \end{array}$
---	---

Now look at the tens, can I take away 8 tens easily? I need to exchange one hundred for ten tens.



Now I can take away eight tens and complete my subtraction




Show children how the concrete method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount.

### Vocabulary

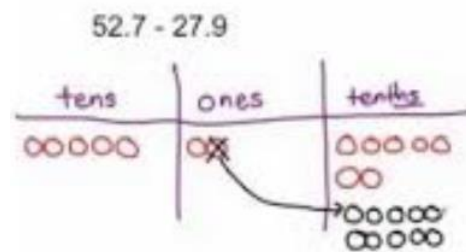
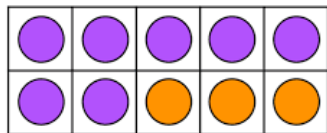
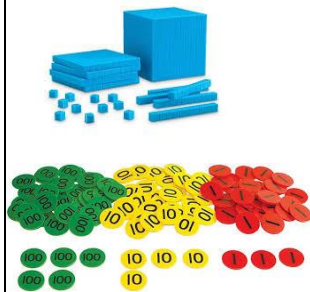
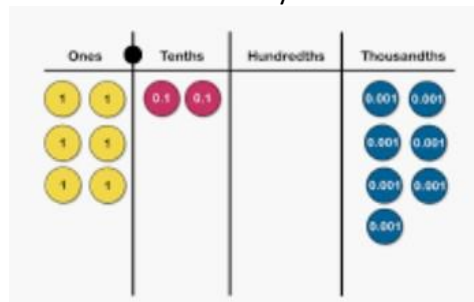
equal to, take, take-away, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least count back, how many left, how much less is...difference, count on, strategy, partition, tens units

## Subtraction- Year 4

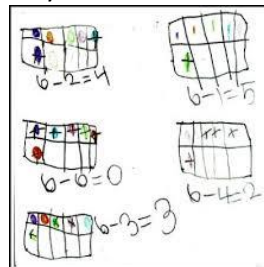
Objective and Strategy	Concrete	Pictorial	Abstract								
<p><i>Subtract numbers with up to 4 digits using the formal written methods appropriate of columnar subtraction where appropriate</i></p> <p>Year 4 subtraction with up to 4 digits.</p>	<p>Model process of exchange using Numicon, base ten and then move to PV counters.</p> <p>Use the phrase 'take and make' for exchange- see Y3</p> <p>The calculation will be shown alongside the model chosen to see the connection</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 50px;">Model</th> <th style="width: 50px;">Calculation</th> </tr> </thead> <tbody> <tr> <td style="height: 20px;"> </td> <td style="height: 20px;"> </td> </tr> </tbody> </table>	Model	Calculation			<p>Children to draw pv counters and show their exchange—see Y3</p> <p>The calculation will be shown alongside the model chosen to see the connection</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 50px;">Model</th> <th style="width: 50px;">Calculation</th> </tr> </thead> <tbody> <tr> <td style="height: 20px;"> </td> <td style="height: 20px;"> </td> </tr> </tbody> </table>	Model	Calculation			<div style="text-align: center;">  </div> <p style="text-align: center;">This will lead to an understanding of subtracting any number including decimals.</p>
Model	Calculation										
Model	Calculation										

Introduce decimal subtraction through context of money

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



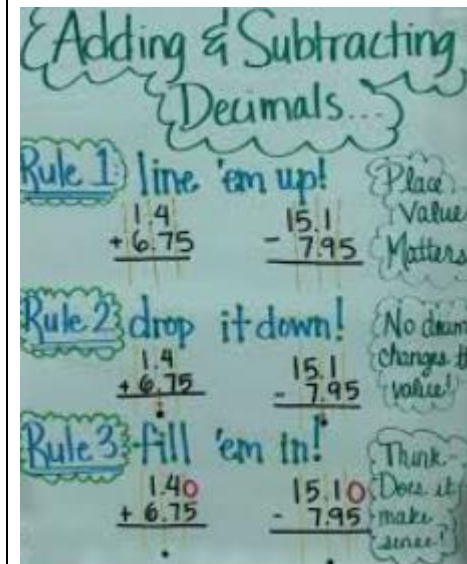
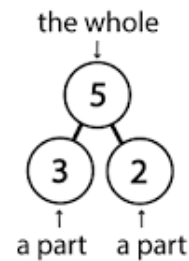
When confident, children can find their own way to record the exchange/regrouping



**SUBTRACTION**  
 $18 - 3 = ?$

18	
?	3


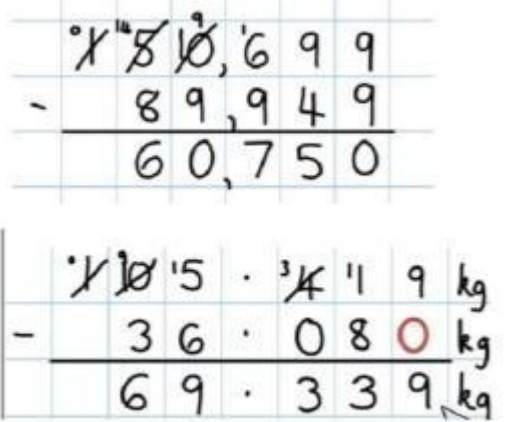
$18 - 3 = 15$



Vocabulary


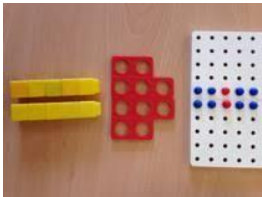
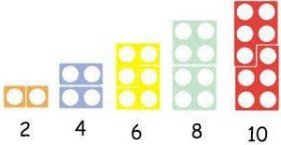
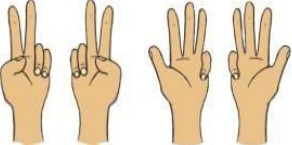

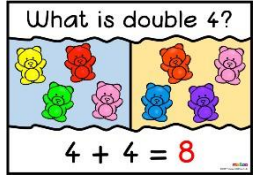
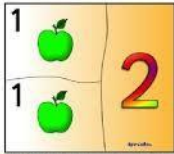
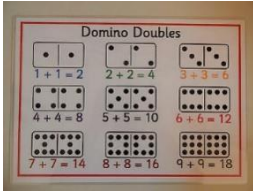

equal to, take, take-away, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least count back, how many left, how much less is...difference, count on, strategy, partition, tens units

## Subtraction- Year 5/6

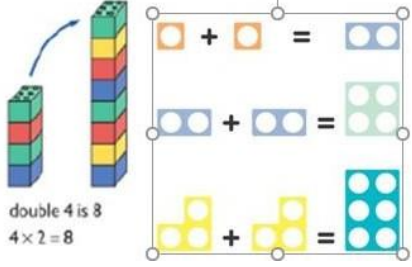
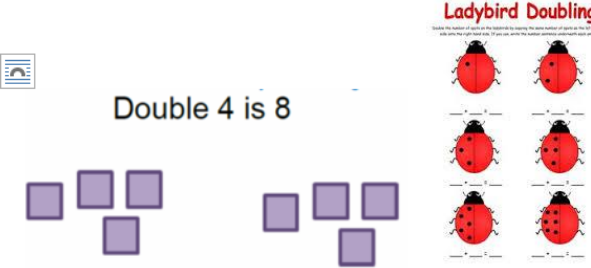

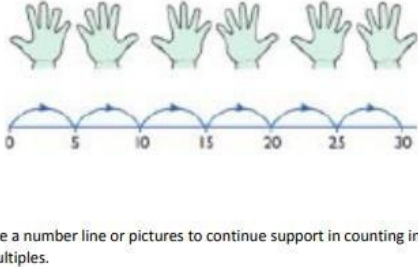

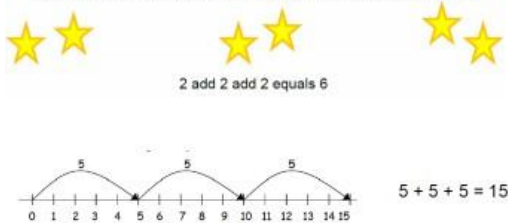

Objective and Strategy	Concrete	Pictorial	Abstract
<p>Subtract with at least 4 digits, including money and measures.</p> <p>Subtract with increasingly large and more complex numbers and decimal values (up to 3 decimal place).</p>	<p>See Year 4</p>	<p>See Year 4</p> 	
<p>Vocabulary</p>	<p>equal to, take, take-away, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least count back, how many left, how much less is...difference, count on, strategy, partition, tens units</p>		

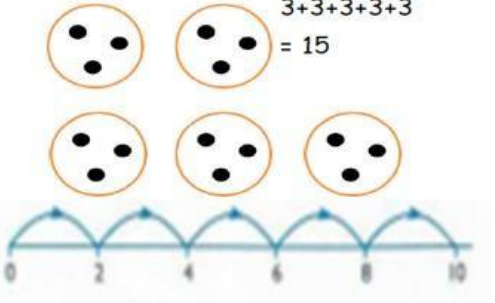
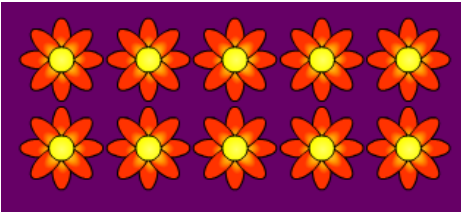

# Multiplication

## Multiplication-EYFS


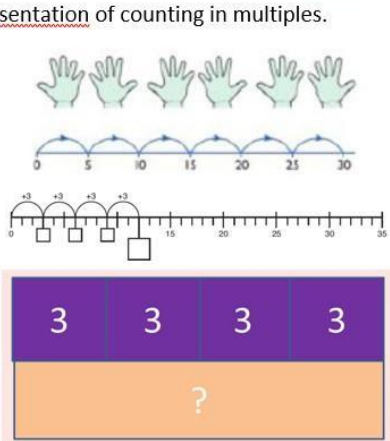
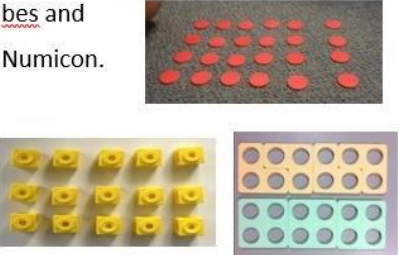
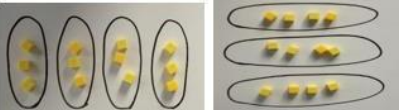

Objectives	Concrete	Pictorial	Abstract												
<p>- Solve problems including doubling, halving and sharing.</p>	<div style="display: flex; justify-content: space-around;">   </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;">  <p style="text-align: center;">Counting and other maths resources for children to make 2 equal groups.</p> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;">  <p style="text-align: center;">Physical and real life examples that encourage children to see concept of doubling as adding two equal groups.</p> </div> <div style="text-align: center; margin-top: 10px;">  </div>	<div style="display: flex; justify-content: space-around; margin-bottom: 10px;">   </div> <div style="display: flex; justify-content: space-around;">   </div> <p style="text-align: center;">Pictures and icons that encourage children to see concept of doubling as adding two equal groups.</p>	<table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr><td style="padding: 5px;">1+1=</td><td style="padding: 5px;">7+7=</td></tr> <tr><td style="padding: 5px;">2+2=</td><td style="padding: 5px;">8+8=</td></tr> <tr><td style="padding: 5px;">3+3=</td><td style="padding: 5px;">9+9=</td></tr> <tr><td style="padding: 5px;">4+4=</td><td style="padding: 5px;">10+10=</td></tr> <tr><td style="padding: 5px;">5+5=</td><td style="padding: 5px;">11+11=</td></tr> <tr><td style="padding: 5px;">6+6=</td><td style="padding: 5px;">12+12=</td></tr> </table> <p style="text-align: center;">Addition calculations to model adding two equal groups.</p>	1+1=	7+7=	2+2=	8+8=	3+3=	9+9=	4+4=	10+10=	5+5=	11+11=	6+6=	12+12=
1+1=	7+7=														
2+2=	8+8=														
3+3=	9+9=														
4+4=	10+10=														
5+5=	11+11=														
6+6=	12+12=														
<p>Vocabulary</p>	<p>equal, double,</p>														


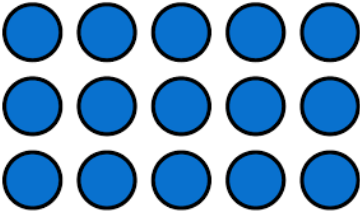
# Multiplication- Year 1

Objective and Strategy	Concrete	Pictorial	Abstract
<p>Doubling</p>	<p>Use practical activities using manipulatives including cubes and Numicon to demonstrate doubling</p>  <p>double 4 is 8 <math>4 \times 2 = 8</math></p>	<p>Draw pictures to show how to double numbers</p>  <p>Double 4 is 8</p> <p>Ladybird Doubling</p>	
<p>Counting in multiples</p>	 <p>Count in multiples supported by concrete objects in equal groups.</p>	 <p>Use a number line or pictures to continue support in counting in multiples.</p>	<p>Count in multiples of a number aloud.</p> <p>Write sequences with multiples of numbers.</p> <p><b>2, 4, 6, 8, 10</b></p> <p><b>5, 10, 15, 20, 25, 30</b></p>
<p>Repeated addition</p>	 <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>2 add 2 add 2 equals 6</p> <p><math>5 + 5 + 5 = 15</math></p>	<p>Write addition sentences to describe objects and pictures.</p>  <p><math>2 + 2 + 2 + 2 + 2 = 10</math></p>

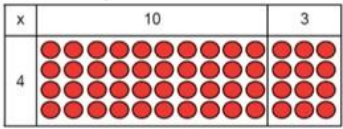
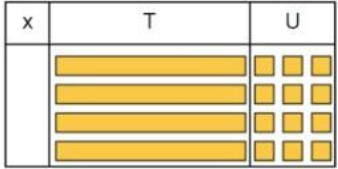
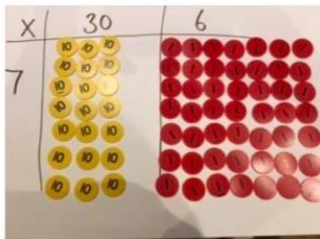






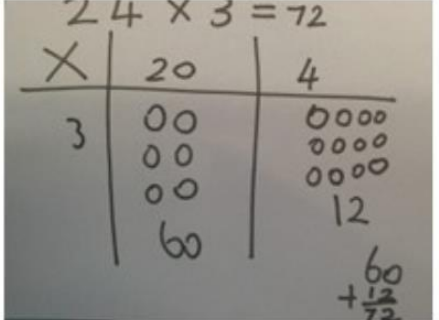
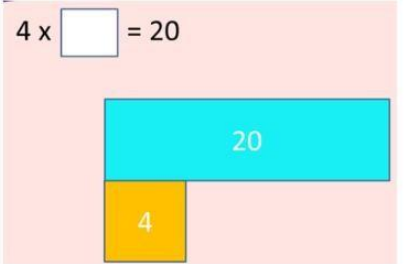
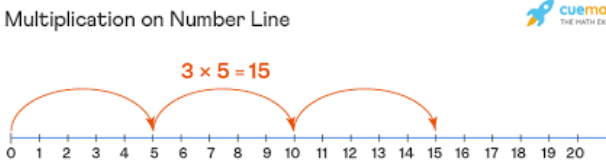
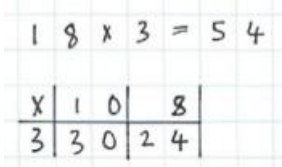



		<p>Use pictorial including number lines to solve problems.</p> <p>There are 3 sweets in one bag. How many sweets are in 5 bags altogether?</p>  <p><math>3+3+3+3+3 = 15</math></p>	
<p>Understanding arrays</p>	<p>Use objects laid out in arrays to find the answers to 2 lots 5, 3 lots of 2 etc.</p> 	 <p>Lego brick printing</p>	
<p>Vocabulary</p>	<p>Groups of, lots of, times, array, altogether, multiply</p>		

## Multiplication- Year 2

Objective and Strategy	Concrete	Pictorial	Abstract
<p>Counting in multiples of 2, 3, 4, 5, 10 from 0 (repeated addition)</p>	<p>Count the groups as children are skip counting, children may use their fingers as they are skip counting. Use bar models.</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> $4 \times 3 = \square$
<p>Multiplication is commutative</p>	<p>Create arrays using counters and cubes and Numicon.</p>  <p>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.</p> 	<p>Use representations of arrays to show different calculations and explore commutativity.</p> 	<p><math>12 = 3 \times 4</math></p> <p><math>12 = 4 \times 3</math></p> <p>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>

<p>Using the Inverse</p> <p><i>This should be taught alongside division, so pupils learn how they work alongside each other.</i></p>		 $\square \times \square = \square$ $\square \times \square = \square$ $\square \div \square = \square$ $\square \div \square = \square$	$2 \times 4 = 8$ $4 \times 2 = 8$ $8 \div 2 = 4$ $8 \div 4 = 2$ $8 = 2 \times 4$ $8 = 4 \times 2$ $2 = 8 \div 4$ $4 = 8 \div 2$ Show all 8 related fact family sentences.
<p>Vocabulary</p>	<p>Groups of, lots of, times, array, altogether, multiply, multiplied by, repeated addition, sets of, equal groups, times as big as, commutative.</p>		

# Multiplication- Year 3

Objective and Strategy	Concrete	Pictorial	Abstract								
<p><i>Multiplying two digit number by a one digit number</i></p> <p>Grid method progressing to the formal method.</p> <p>Solving problems including missing number problems, integer scaling problems.</p>	<p>Show the link with arrays to first introduce the grid method.</p>  <p>4 rows of 10 4 rows of 3</p> <p>Move on to using Base 10 to move towards a more compact method.</p>  <p>4 rows of 13</p> <p>Move on to place value counters to show how we are finding groups of a number.</p>  <p>Add up each column, starting with the ones making any exchanges needed.</p> <p>The calculation will be shown alongside the model chosen to see the connection</p> <table border="1" data-bbox="443 1204 716 1316"> <thead> <tr> <th>Model</th> <th>Calculation</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>	Model	Calculation							<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>Bar model are used to explore missing numbers</p>  <p>Multiplication on Number Line</p> 	<p>Start with multiplying by one digit numbers and showing the clear addition alongside the grid.</p> <p>TO x O</p>  <p>Children to add up each column to find the answer.</p>
Model	Calculation										
											
											
											
Vocabulary	Groups of, lots of, times, array, altogether, multiply, multiplied by, repeated addition, sets of, equal groups, times as big as, commutative, product, multiples of, scale up										

# Multiplication- Year 4

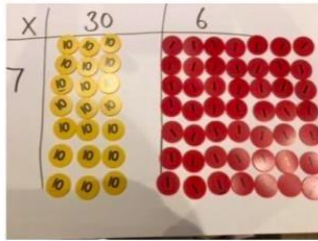
## Objective and Strategy

Multiply two-digit and three-digit numbers by a one-digit number using formal written layout

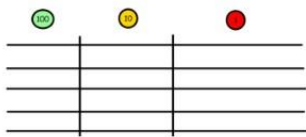
Grid method recap from year 3 for 2 digits x 1 digit

Multiplying numbers by 1 digit (year 4 expectation)

## Concrete

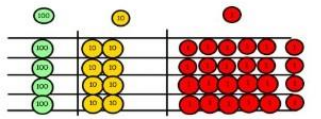


Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows.



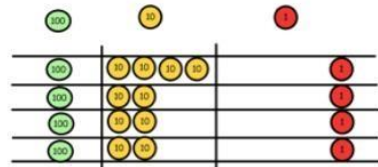
Calculations  
 $4 \times 126$

Fill each row with 126.



Calculations  
 $4 \times 126$

Add up each column, starting with the ones making any exchanges needed.



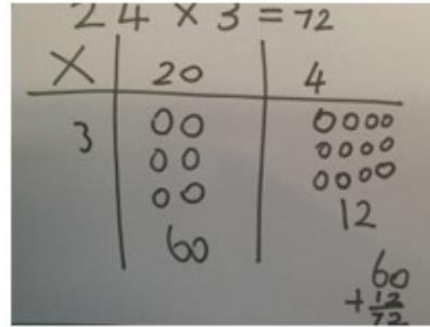
Then you have your answer.



## Pictorial

Children can represent their work with place value counters in a way that they understand.

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.



























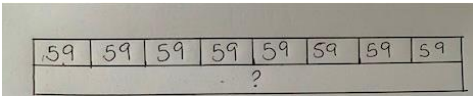
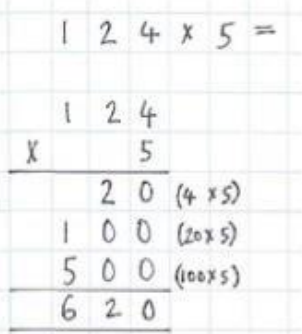
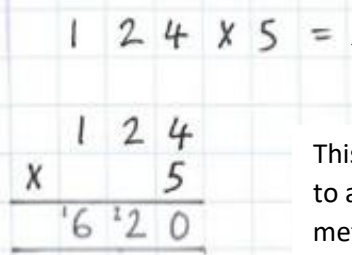












## Abstract

HTO x O

$$135 \times 5 = 675$$

X	1	0	0	3	0	5
	5	5	0	0	1	5
						2
						5

Children to add up each column to find the answer.

<p>Column multiplication</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. <math>321 \times 2 = 642</math></p> <table border="1" data-bbox="302 443 633 836"> <thead> <tr> <th>Hundreds</th> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>It is important at this stage that they always multiply the ones first.</p> <p>The corresponding long multiplication is modelled alongside</p> <table border="1" data-bbox="421 919 692 1038"> <thead> <tr> <th>Model</th> <th>Calculation</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>	Hundreds	Tens	Ones													Model	Calculation			<p>This grid method may be used to show how this relates to a formal written method.</p> <table border="1" data-bbox="840 363 1252 453"> <tr> <td>x</td> <td>100</td> <td>20</td> <td>4</td> </tr> <tr> <td>5</td> <td>500</td> <td>100</td> <td>20</td> </tr> </table>  <p><math>= 8 \times 59</math>  <math>8 \times 60 - 8</math>  <math>8 \times 6 = 48</math>  <math>8 \times 60 = 480</math>  <math>480 - 8 = 472</math></p> <p>Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.</p>	x	100	20	4	5	500	100	20	  <p>This may lead to a compact method.</p>
Hundreds	Tens	Ones																												
																														
																														
																														
																														
Model	Calculation																													
x	100	20	4																											
5	500	100	20																											
<p>Vocabulary</p>	<p>Groups of, lots of, times, array, altogether, multiply, multiplied by, repeated addition, sets of, equal groups, times as big as, commutative, product, multiples of, scale up, inverse, derive</p>																													





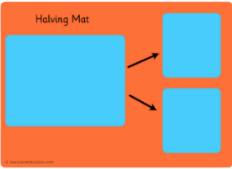


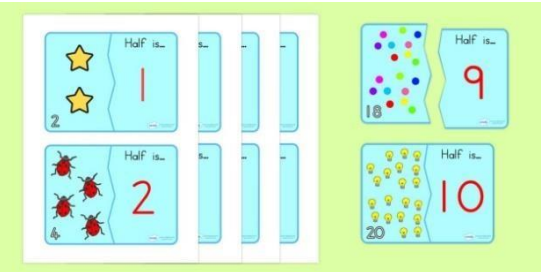
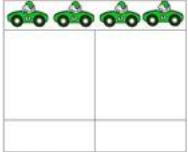
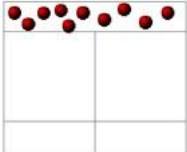
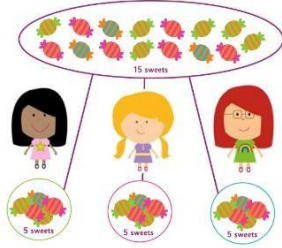


## Multiplication- Year 6

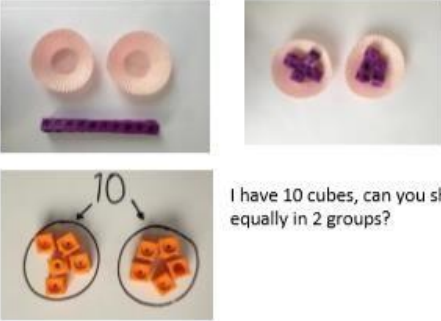

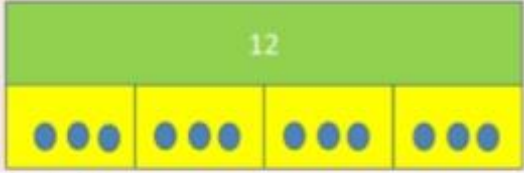
Objective and Strategy	Concrete	Pictorial	Abstract
Multiply decimal up to 2 decimal place by a single digit.			<p>Remind children that the single digit belongs in the units column. Line up the decimal points in the question and the answer.</p> $\begin{array}{r} 3.19 \\ \times 8 \\ \hline 25.52 \end{array}$ $\begin{array}{r} 1234 \\ \times 16 \\ \hline 7404 \quad (1234 \times 6) \\ 12340 \quad (1234 \times 10) \\ \hline 19744 \end{array}$
vocabulary	Groups of, lots of, times, array, altogether, multiply, multiplied by, repeated addition, sets of, equal groups, times as big as, commutative, product, multiples of, scale up, inverse, derive, factor pairs, composite numbers, prime number, factors, squared, cubed		

**Division**

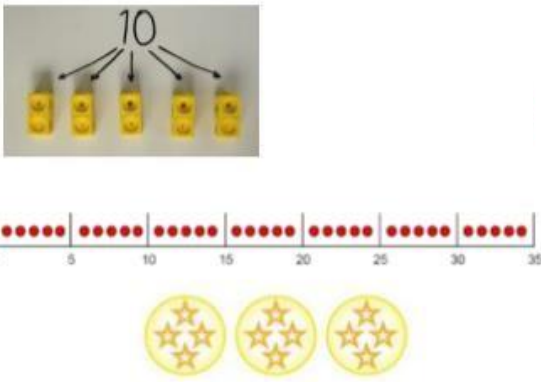
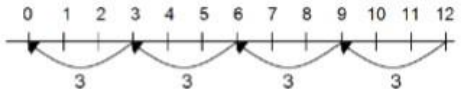
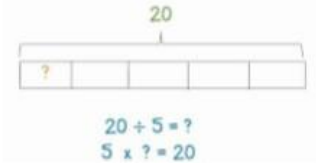

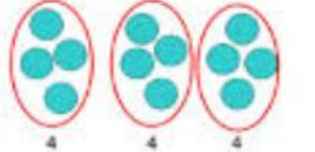
# Division- EYFS

Objectives	Concrete	Pictorial	Abstract
<p>Solve problems including halving and sharing.</p> <ul style="list-style-type: none"> <li>• Halving a whole, halving a quantity of objects.</li> <li>• Sharing a quantity of objects.</li> </ul>	<div style="display: flex; justify-content: space-around;">   </div> <div style="text-align: center; margin-top: 10px;">  </div> <p style="text-align: center;">Children have the opportunity to physically cut objects, food or shapes in half.</p> <div style="display: flex; justify-content: space-around; margin-top: 20px;">  <div style="text-align: left;"> <p>Counting and other maths resources for children to share into two equal groups.</p> </div> </div> <div style="text-align: center; margin-top: 10px;">  </div> <div style="text-align: center; margin-top: 10px;">  </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;">  <div style="text-align: left;"> <p>Counting and other maths resources for children to explore sharing between 2 or more.</p> </div> </div>	<div style="background-color: #e0ffe0; padding: 10px; margin-bottom: 10px;">  </div> <p>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.</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div> <p>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.</p> <div style="text-align: center; margin-top: 20px;">  </div> <p style="text-align: right;">Pictures for children to create and visualise 3 or more equal groups.</p>	


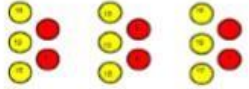


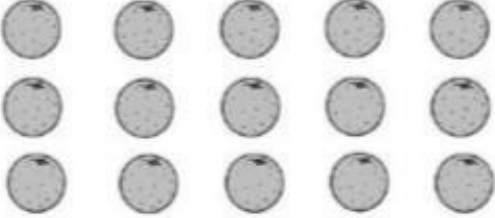
## Division- Year 1

Objective and Strategy	Concrete	Pictorial	Abstract
<p>Division as sharing (sharing objects into groups)</p> <p>Division by grouping</p>	 <p>I have 10 cubes, can you share them equally in 2 groups?</p>	<p>Children use pictures or shapes to share quantities.</p>  <p>Children use bar modelling to show and support understanding.</p>  <p><math>12 \div 4 = 3</math></p>	<p>Share 9 buns between three people.</p>
Vocabulary	share, share equally, one each, two each..., group, groups of, lots of, array		

## Division- Year 2

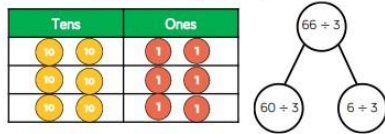
Objective and Strategy	Concrete	Pictorial	Abstract
<p>Division as grouping and sharing.</p> <p>Sharing real objects and counters.</p>	<p>Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.</p> 	<p>Use a number line to show jumps in groups. The number of jumps equals the number of groups.</p>  <p>Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.</p>  <p>Grouping:</p>  <p>Sharing:</p> 	<p style="text-align: center;"><math>28 \div 7 = 4</math></p> <p style="text-align: center;"><b>Divide 28 into 7 groups. How many are in each group?</b></p>
<p>Vocabulary</p>	<p>share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over</p>		

## Division- Year 3

Objective and Strategy	Concrete	Pictorial	Abstract
<p>Division as grouping</p>	<p>Use cubes, counters, objects or place value counters to aid understanding.</p>  <p>24 divided into groups of 6 = 4</p> $96 \div 3 = 32$ 	<p>Continue to use bar modelling to aid solving division problems.</p>  <p style="text-align: center;">20</p> $20 \div 5 = ?$ $5 \times ? = 20$	<p>How many groups of 6 in 24?</p> $24 \div 6 = 4$
<p>Division with arrays</p>	 <p>Link division to multiplication by creating an array and thinking about the number sentences that can be created.</p> <p>Eg <math>15 \div 3 = 5</math>    <math>5 \times 3 = 15</math>  <math>15 \div 5 = 3</math>    <math>3 \times 5 = 15</math></p>	<p>Draw an array and use lines to split the array into groups to make multiplication and division sentences</p> 	<p>Find the inverse of multiplication and division sentences by creating eight linking number sentences.</p> $7 \times 4 = 28$ $4 \times 7 = 28$ $28 \div 7 = 4$ $28 \div 4 = 7$ $28 = 7 \times 4$ $28 = 4 \times 7$ $4 = 28 \div 7$ $7 = 28 \div 4$

Divide 2-digit numbers by a 1-digit number by partitioning into tens and ones using a pv grid

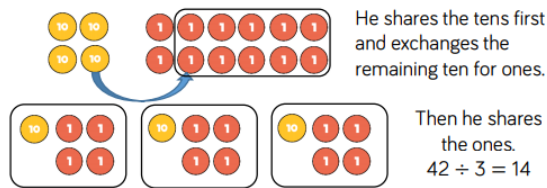
Eva uses a place value grid and part-whole model to solve  $66 \div 3$



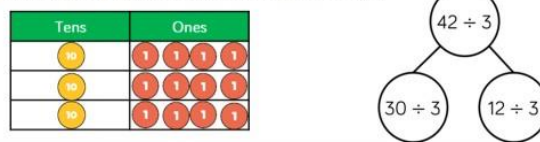
See part- whole model

Divide numbers that involve exchanging between the tens and ones. The answers do not have remainders.

Ron uses place value counters to divide 42 into three equal groups



Annie uses a similar method to divide 42 by 3



Children may use pictorial representation for the pv counters, alongside the part-whole model

Children use their times-tables to partition the number into multiples of the divisor.

- $96 \div 8$
- $96 \div 4$
- $96 \div 3$
- $96 \div 6$

Compare the statements using  $<$ ,  $>$  or  $=$

$48 \div 4$  ○  $36 \div 3$

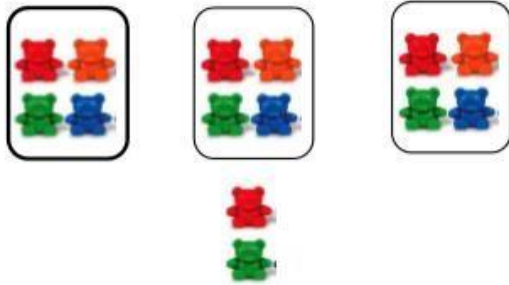
$52 \div 4$  ○  $42 \div 3$

$60 \div 3$  ○  $60 \div 4$

Division with a remainder

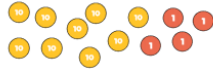
$$14 \div 3 =$$

Divide objects between groups and see how much is left over



Moving on to:

- Use place value counters to work out  $94 \div 4$
- Did you need to exchange any tens for ones?
- Is there a remainder?



Tens	Ones

29

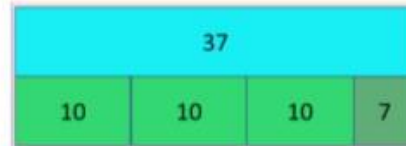
Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.



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



Use bar models to show division with remainders.



Complete written divisions and show the remainder using r.


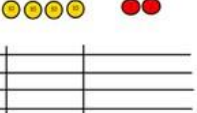
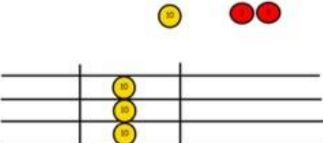
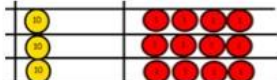
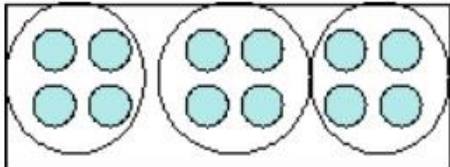
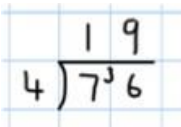
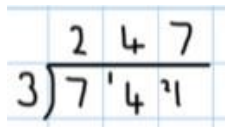
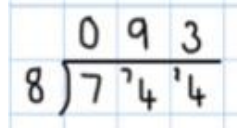
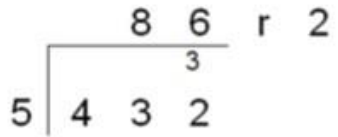
$$29 \div 8 = 3 \text{ REMAINDER } 5$$

↑    ↑    ↑                    ↑  
 dividend    divisor    quotient                    remainder

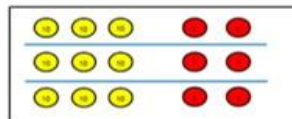

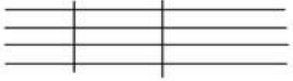

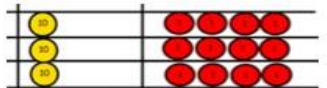
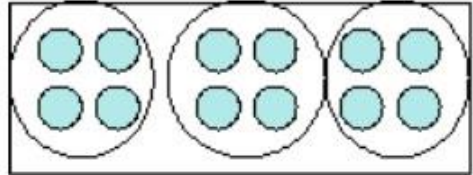
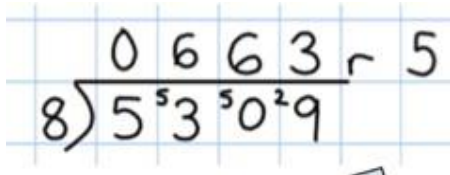
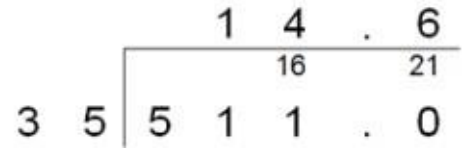
Vocabulary

share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, product

## Division- Year 4

Objective and Strategy	Concrete	Pictorial	Abstract
<p>Divide up to 3 digit numbers by 1 digit.</p> <p>Short Division</p>	<p><math>96 \div 3</math></p> <p style="text-align: center;">Tens      Units</p> <p style="text-align: center;">3            2</p>  <p>Use place value counters to divide using the bus stop method alongside</p>  <p style="text-align: right;">Calculations <math>42 \div 3</math></p> <p><math>42 \div 3 =</math></p> <p>Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.</p>  <p>We exchange this ten for ten ones and then share the ones equally among the groups.</p>  <p>We look how much in 1 group so the answer is 14.</p>	<p>Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.</p>  <p>Encourage them to move towards counting in multiples to divide more efficiently.</p>	<p>Begin with divisions that divide equally with no remainder</p>   <p>Children should be aware that a 0 is used to keep place value, if the number is not divisible.</p>  <p>Move onto divisions with a remainder.</p> 
<p>Vocabulary</p>	<p>share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, product, division facts, inverse, derive</p>		

## Division- Year 5

Objective and Strategy	Concrete	Pictorial	Abstract				
<p><i>Divide at least 4 digit numbers by 1 digit.</i>  <i>Interpret remainders appropriately for the context</i></p> <p>Short Division</p>	<p><math>96 \div 3</math></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">Tens</td> <td style="text-align: center;">Units</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">2</td> </tr> </table>  <p>Use place value counters to divide using the bus stop method alongside</p>  <p style="text-align: right; font-size: small;">Calculations <math>42 \div 3</math></p>  <p><math>42 \div 3 =</math></p> <p>Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.</p>  <p>We exchange this ten for ten ones and then share the ones equally among the groups.</p>  <p>We look how much in 1 group so the answer is 14.</p>	Tens	Units	3	2	<p>Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.</p>  <p>Encourage them to move towards counting in multiples to divide more efficiently.</p>	 <p>Finally move into decimal places to divide the total accurately.</p> 
Tens	Units						
3	2						
<p>Vocabulary</p>	<p>share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, product, division facts, inverse, derive, formal written method.</p>						

## Division-Year 6

Objective and Strategy	Abstract
Long Division	<p>Step 1 – a remainder in the ones</p> $  \begin{array}{r}  \text{h t o} \\  041\text{R}1 \\  \hline  4 \overline{) 165}  \end{array}  $ <p>4 does not go into 1 (hundred). So combine the 1 hundred with the 6 tens (160).</p> <p>4 goes into 16 four times.</p> <p>4 goes into 5 once, leaving a remainder of 1.</p> $  \begin{array}{r}  \text{th h t o} \\  0400\text{R}7 \\  \hline  8 \overline{) 3207}  \end{array}  $ <p>8 does not go into 3 of the thousands. So combine the 3 thousands with the 2 hundreds (3,200).</p> <p>8 goes into 32 four times (<math>3,200 \div 8 = 400</math>)</p> <p>8 goes into 0 zero times (tens).</p> <p>8 goes into 7 zero times, and leaves a remainder of 7.</p> $  \begin{array}{r}  \text{h t o} \\  061 \\  \hline  4 \overline{) 247} \\  \underline{-4} \\  3  \end{array}  $ <p>When dividing the ones, 4 goes into 7 one time. Multiply <math>1 \times 4 = 4</math>, write that four under the 7, and subtract. This finds us the remainder of 3.</p> <p>Check: <math>4 \times 61 + 3 = 247</math></p> $  \begin{array}{r}  \text{th h t o} \\  0402 \\  \hline  4 \overline{) 1609} \\  \underline{-8} \\  1  \end{array}  $ <p>When dividing the ones, 4 goes into 9 two times. Multiply <math>2 \times 4 = 8</math>, write that eight under the 9, and subtract. This finds us the remainder of 1.</p> <p>Check: <math>4 \times 402 + 1 = 1,609</math></p> <p>Step 2 – a remainder in the tens</p>

1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
$\begin{array}{r} \text{t o} \\ 2 \overline{)58} \\ \underline{4} \phantom{0} \\ 18 \end{array}$ <p>Two goes into 5 two times, or 5 tens <math>\div 2 = 2</math> whole tens -- but there is a remainder!</p>	$\begin{array}{r} \text{t o} \\ 2 \overline{)58} \\ \underline{-4} \phantom{0} \\ 1 \phantom{0} \end{array}$ <p>To find it, multiply <math>2 \times 2 = 4</math>, write that 4 under the five, and subtract to find the remainder of 1 ten.</p>	$\begin{array}{r} \text{t o} \\ 29 \\ 2 \overline{)58} \\ \underline{-4} \phantom{0} \\ 18 \end{array}$ <p>Next, drop down the 8 of the ones next to the leftover 1 ten. You combine the remainder ten with 8 ones, and get 18.</p>

1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
$\begin{array}{r} \text{t o} \\ 29 \\ 2 \overline{)58} \\ \underline{-4} \phantom{0} \\ 18 \end{array}$ <p>Divide 2 into 18. Place 9 into the quotient.</p>	$\begin{array}{r} \text{t o} \\ 29 \\ 2 \overline{)58} \\ \underline{-4} \phantom{0} \\ 18 \\ \underline{-18} \\ 0 \end{array}$ <p>Multiply <math>9 \times 2 = 18</math>, write that 18 under the 18, and subtract.</p>	$\begin{array}{r} \text{t o} \\ 29 \\ 2 \overline{)58} \\ \underline{-4} \phantom{0} \\ 18 \\ \underline{-18} \\ 0 \end{array}$ <p>The division is over since there are no more digits in the dividend. The quotient is 29.</p>

Step 3 – a remainder in any of the place values

<p><b>1. Divide.</b></p> $\begin{array}{r} \text{h t o} \\ 1 \\ 2 \overline{)278} \end{array}$ <p>Two goes into 2 one time, or 2 hundreds <math>\div</math> 2 = 1 hundred.</p>	<p><b>2. Multiply &amp; subtract.</b></p> $\begin{array}{r} \text{h t o} \\ 1 \\ 2 \overline{)278} \\ -2 \\ \hline 0 \end{array}$ <p>Multiply <math>1 \times 2 = 2</math>, write that 2 under the two, and subtract to find the remainder of zero.</p>	<p><b>3. Drop down the next digit.</b></p> $\begin{array}{r} \text{h t o} \\ 18 \\ 2 \overline{)278} \\ -2 \downarrow \\ \hline 07 \end{array}$ <p>Next, drop down the 7 of the tens next to the zero.</p>
<p><b>Divide.</b></p> $\begin{array}{r} \text{h t o} \\ 13 \\ 2 \overline{)278} \\ -2 \\ \hline 07 \end{array}$ <p>Divide 2 into 7. Place 3 into the quotient.</p>	<p><b>Multiply &amp; subtract.</b></p> $\begin{array}{r} \text{h t o} \\ 13 \\ 2 \overline{)278} \\ -2 \\ \hline 07 \\ -6 \\ \hline 1 \end{array}$ <p>Multiply <math>3 \times 2 = 6</math>, write that 6 under the 7, and subtract to find the remainder of 1 ten.</p>	<p><b>Drop down the next digit.</b></p> $\begin{array}{r} \text{h t o} \\ 13 \\ 2 \overline{)278} \\ -2 \\ \hline 07 \\ -6 \\ \hline 18 \end{array}$ <p>Next, drop down the 8 of the ones next to the 1 leftover ten.</p>
<p><b>1. Divide.</b></p> $\begin{array}{r} \text{h t o} \\ 139 \\ 2 \overline{)278} \\ -2 \\ \hline 07 \\ -6 \\ \hline 18 \end{array}$ <p>Divide 2 into 18. Place 9 into the quotient.</p>	<p><b>2. Multiply &amp; subtract.</b></p> $\begin{array}{r} \text{h t o} \\ 139 \\ 2 \overline{)278} \\ -2 \\ \hline 07 \\ -6 \\ \hline 18 \\ -18 \\ \hline 0 \end{array}$ <p>Multiply <math>9 \times 2 = 18</math>, write that 18 under the 18, and subtract to find the remainder of zero.</p>	<p><b>3. Drop down the next digit.</b></p> $\begin{array}{r} \text{h t o} \\ 139 \\ 2 \overline{)278} \\ -2 \\ \hline 07 \\ -6 \\ \hline 18 \\ -18 \\ \hline 0 \end{array}$ <p>There are no more digits to drop down. The quotient is 139.</p>

Vocabulary

share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, product, division facts, inverse, derive, formal written method.

## **Minimal Resources required to support the CPA approach (depending on year group):**

- 10 frames (including egg boxes)
- Straws/pipe cleaners
- Bead strings (to 20 and 100)
- Rekenrek frames
- Base 10/Dienes (including magnetic to model on flip chart)
- Place value grids
- Double-sided counters
- Part-part whole templates
- Place value counters (KS2)
- Multi-link cubes