Ditchling (St. Margaret's) CE Primary and Nursery School

Calculation Policy

'Living life in all its fullness' John 10:10

Version	Reviewed by	Approved by	Date Approved	Next Review Date
1	**Jane Sayers**	Head/FGB	June 2025	June 2026

Signed: Chair of Governors

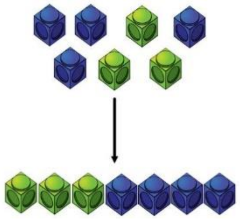
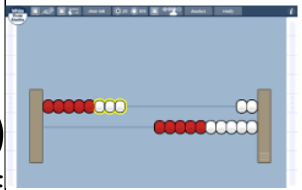
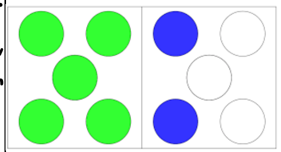
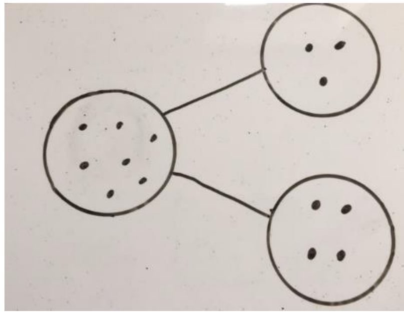
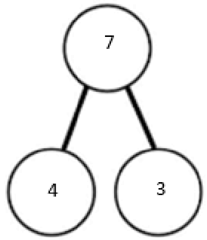
Signed: _Headteacher

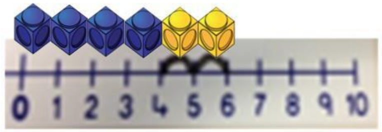
NB. For age-related expectations, this document should be used in conjunction with the Maths Progression of Skills and the NCETM Ready to Progress Materials.

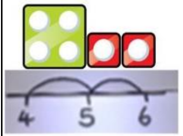
Addition

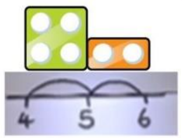
add, plus, more than, sum, total, altogether, greater, increase

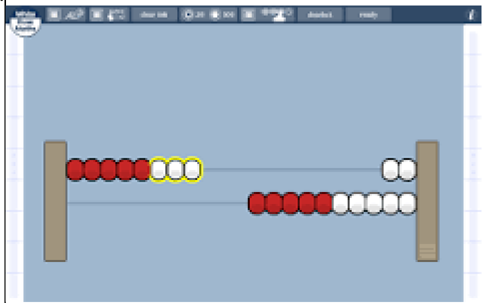
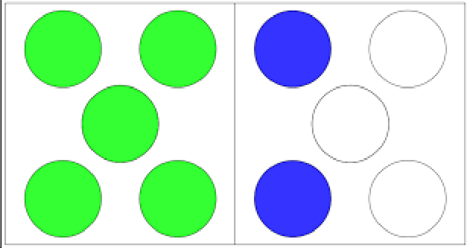
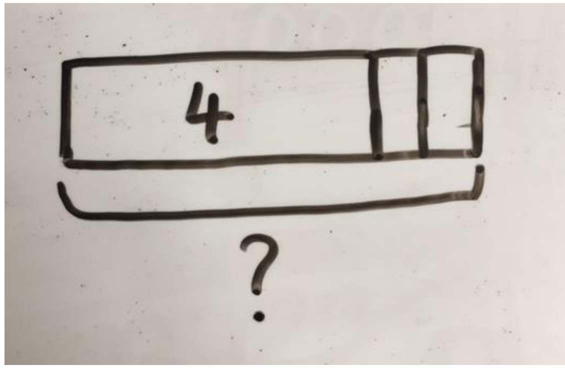
addend (number) + addend (number) = sum

	Concrete	Pictorial	Abstract
Combining two parts to make a whole (part-part-whole model) using a variety of manipulatives eg. multilink, rekenreks, Hungarian number frames	 3 + 4 = 7  5 + 3 = 8  5 + 2 = 7	Children to represent objects using dots or crosses. They could put each part on a part whole model too. 	4 + 3 = 7 Four is a part, 3 is a part and the whole is seven. 

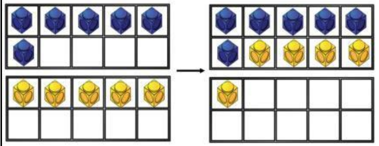
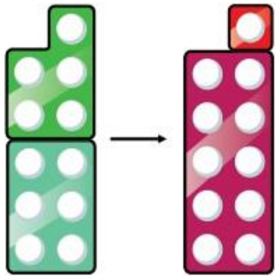
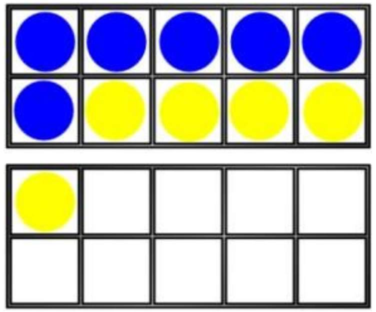
<table>
<tr>
<td>Counting on from the biggest number
using a variety of manipulatives eg. multilink, rekenreks, Hungarian number frames</td>
<td>


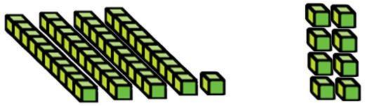
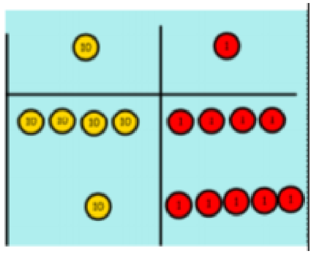
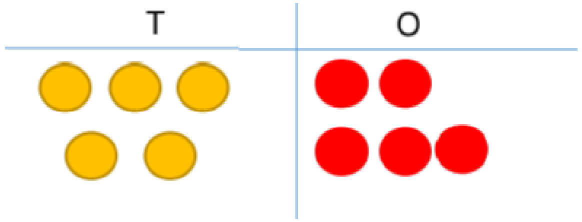
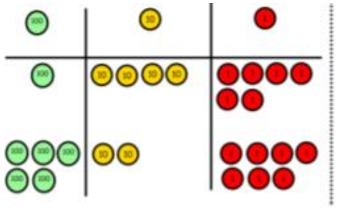
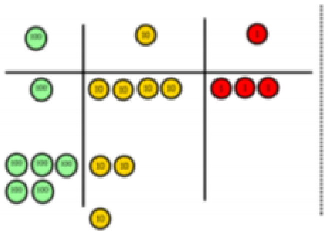
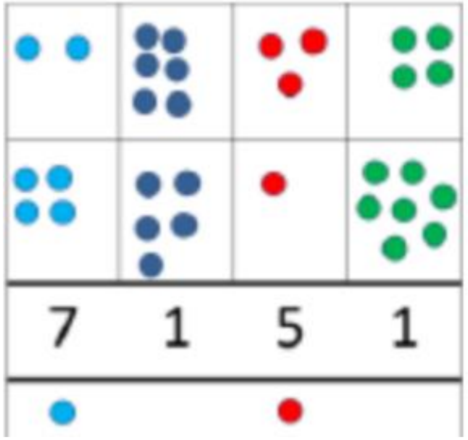





</td>
<td>A bar model which encourages the children to count on, rather than count all.

</td>
<td>The abstract number line: What is 2 more than 4? What is the sum of 2 and 4? What is the total of 4 and 2? 4 + 2

</td>
</tr>
</table>

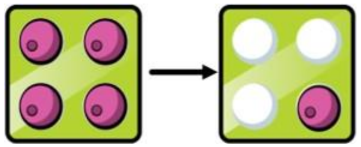
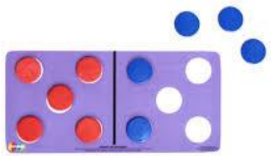
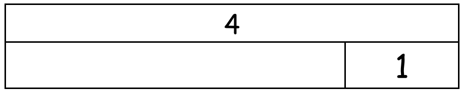
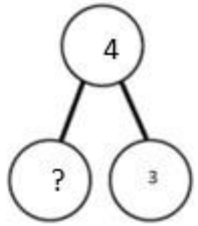
Making 10 using tens frames, rekenreks, counters/cubes, Hungarian number frames or Numicon	   	Children to draw the ten frame and counters/cubes. 	Children to develop an understanding of equality e.g. $6 + \square = 11$ $6 + 5 = 5 + \square$ $6 + 5 = \square + 4$

Addition - no exchanging The column method is introduced in Year 3 (3-digit numbers); Year 4 and up progress to 4-digit numbers)	 	After using concrete resources, children should be able to draw these or symbolise them to help reach the answer.  	418 + 61 418 + 61 479 6473 +1 512 7985
Addition - exchanging The column method is introduced in Year 3 (3-digit numbers); Year 4 and up progress to 4-digit numbers)	Make both numbers with resources.  Add the ones. Exchange every 10 ones for 1 ten. Add the tens. Exchange every 10 tens for 1 hundred. Add the hundreds. Exchange 10 hundreds for 1 thousand. 	Children can also draw a pictorial representation of the columns and place value customers.  	Start by using extended addition to help understanding. 2 6 3 4 + 4 5 1 7 4 + 7 = 11 30 + 10 = 40 600 + 500 = 1100 2000 + 4000 = 6000 6000 + 1100 + 40 + 11 = 7151 Then move onto using a shorter written method. 2 6 3 4 + 4 5 1 7 7 1 5 1 1 1

Subtraction

take away, less than, the difference, subtract, minus, fewer, decrease

minuend (number) – subtrahend (number) = difference

	Concrete	Pictorial	Abstract
Physically taking away from ones using a variety of manipulatives eg. tens frames, Numicon, cubes, rekenreks, Hungarian number frames, and other items.	4 - 3 = 1    	Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used.   	4- 3 = = 4 - 3 

<table>
<tr>
<td></td>
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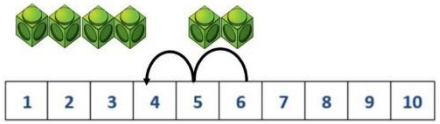
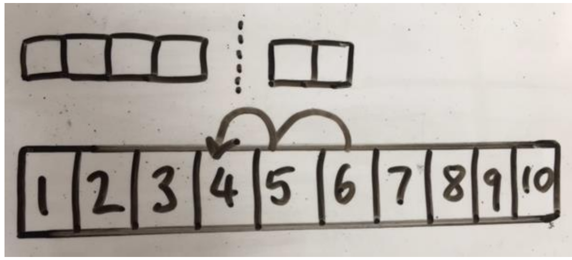
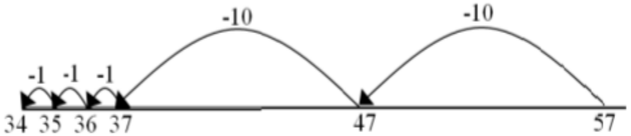
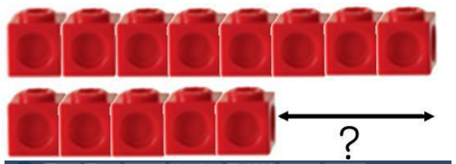
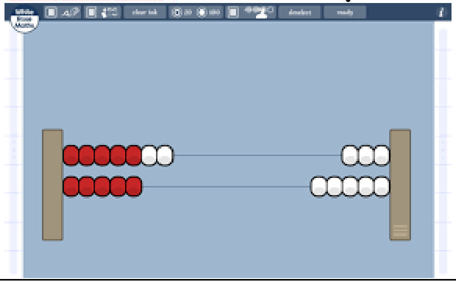
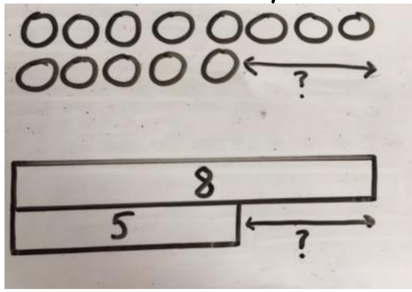
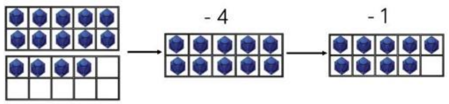
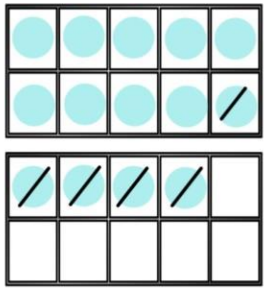
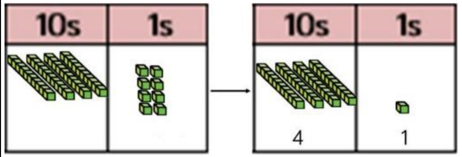
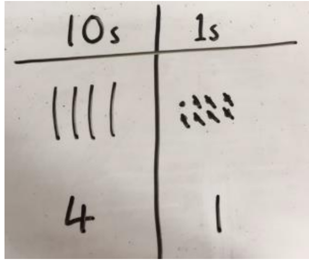
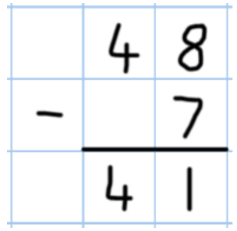
<tr>
<td>Counting back
using number lines or number tracks or rekenreks eg. start with 6 and count back 2</td>
<td>
Use counters and move them away from the group as you take them away.

</td>
<td>Children to represent what they see pictorially e.g.

</td>
<td>Put 16 in your head and count back 7. What number are you at?</td>
</tr>
</table>

Finding the difference using a variety of manipulatives eg. multilink, Numicon, rekenreks, Cuisenaire rods or other objects.	)  	Children to draw the cubes/other concrete objects which they have used or use the bar model to illustrate what they need to calculate.  	Find the difference between 8 and 5. 8 – 5, the difference is ?. Children to explore why 9 - 6 = 8 – 5 = 7 – 4 = have the same difference.
Making 10 using tens frames or rekenreks	**14 – 5**  We take away four first to make 10 and then take away one more so we have taken away 5. 	Children to present the ten frame pictorially and discuss what they did to make 10. 	Children to show how they can make 10 by partitioning the subtrahend. 14 - 5 = 9 4 1 14 – 4 = 10 10 – 1 = 9

Column method - no exchanging The column method is introduced in Year 3 (3-digit numbers); Year 4 and up progress to 4-digit numbers)	Children make the larger number with resources. They remove the smaller number to find the answer. 	Children to represent resources pictorially. 	Column method or children could count back 7. 

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Column method - exchanging

The column method is introduced in Year 3 using concrete or pictorial resources to support (3-digit numbers); Year 4 and up progress to 4-digit numbers and abstract methods)

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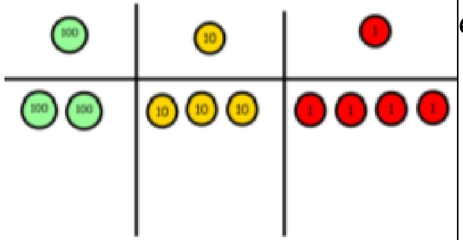
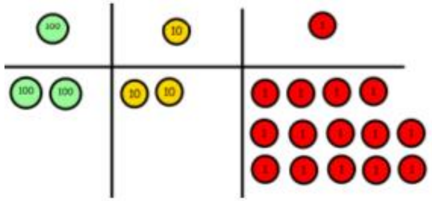
<td>

Make the larger number with the place value counters.

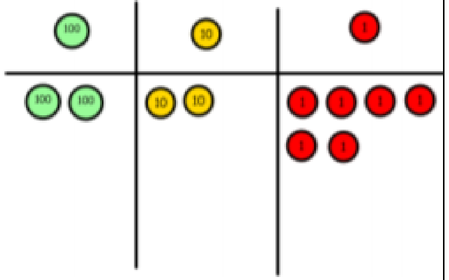
234-88



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



Now I can subtract my ones.



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

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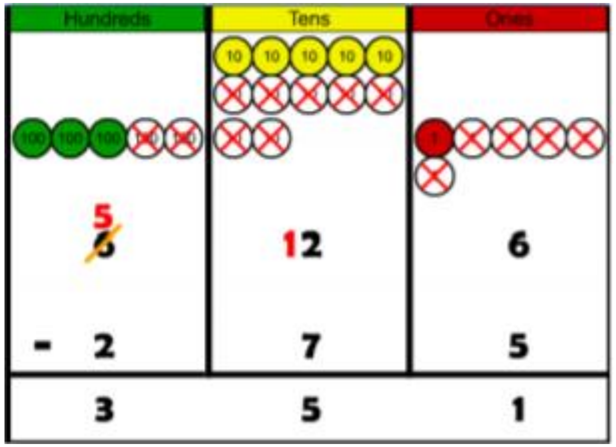
<td>

Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make.

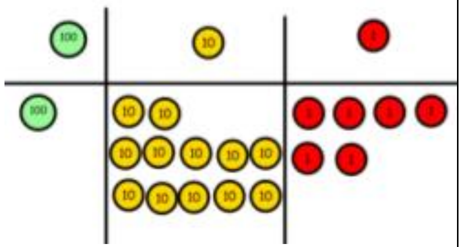
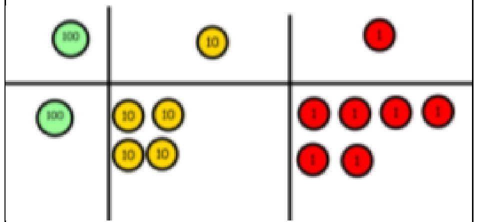


</td>
<td>

Children use the formal written method.

$$\begin{array}{cccc} & {}^{4}\cancel{5} & {}^{1}3 & 4 \\ - & 2 & 6 & 3 \\ \hline & 2 & 7 & 1 \end{array}$$

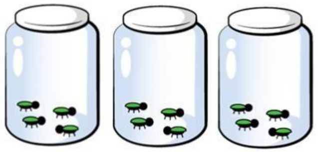
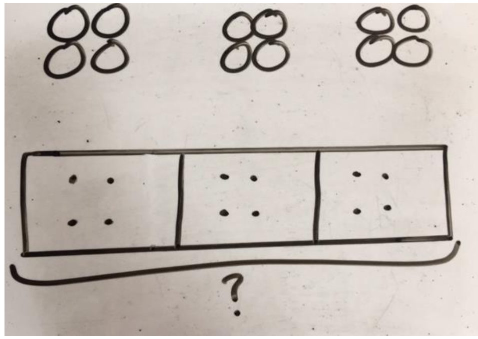
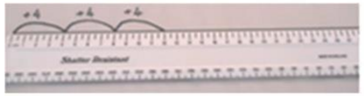
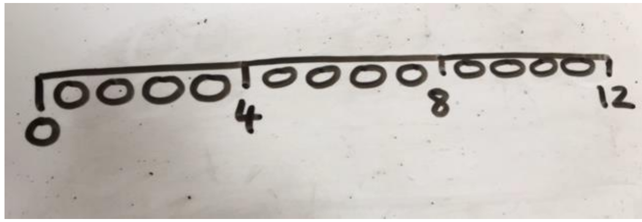
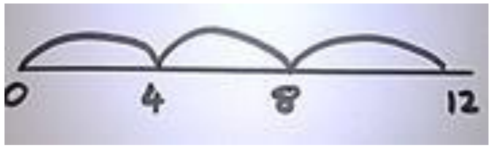
</td>
</tr>
</table>

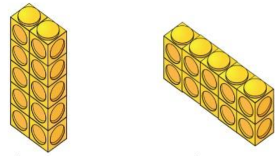
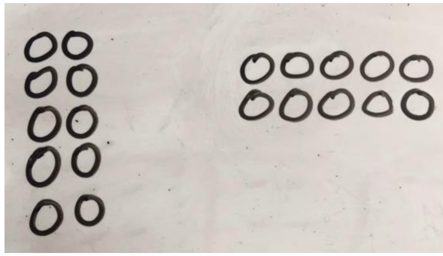
	 Now I can take away eight tens and complete my subtraction. 		

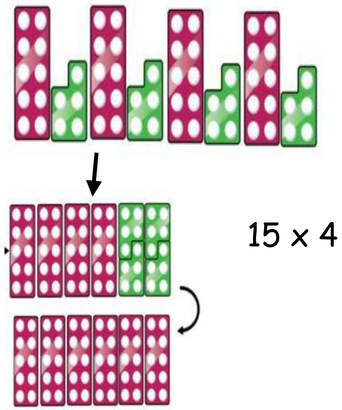
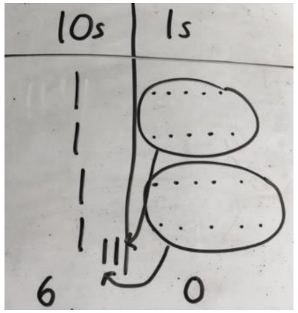
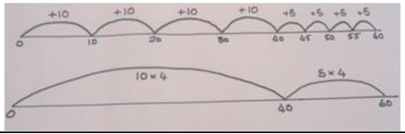
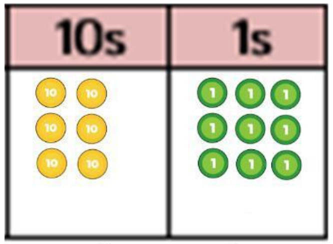
Multiplication

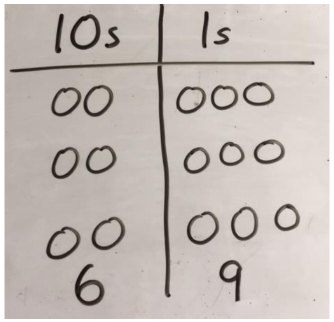
double, times, multiplied by, the product of, groups of, lots of, equal groups.

factor or multiplicand (number) x factor or multiplier (number) = multiple or product

	Concrete	Pictorial	Abstract
Repeated addition 3 x 4 = 4+4+4+4	 	Children to represent the practical resources in a picture and use a bar model. 	3 × 4 = 12 4 + 4 + 4 = 12
Number lines to show repeated addition	  Cuisenaire rods can be used too.	Represent this pictorially alongside a number line e.g. 	Abstract number line showing three jumps of four. 3 × 4 = 12 

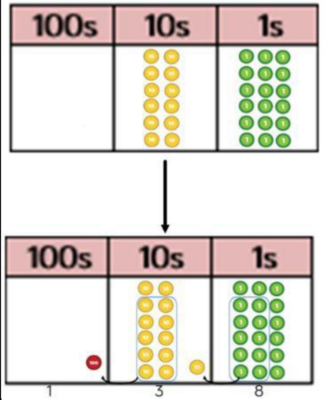
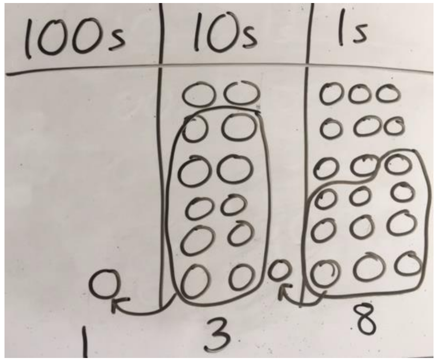
<table>
<tr>
<td>Arrays - showing commutative multiplication</td>
<td>
2 lots of 5   5 lots of 2
</td>
<td>Children to represent the arrays pictorially.
</td>
<td>Children to be able to use an array to write a range of calculations e.g.

10 = 2 × 5
5 × 2 = 10
2 + 2 + 2 + 2 + 2 = 10
10 = 5 + 5</td>
</tr>
<tr>
<td>Partition to multiply</td>
<td>
15 x 4</td>
<td>Children to represent the concrete manipulatives pictorially.
</td>
<td>Children to be encouraged to show the steps they have taken.
4 x 15
10   5
10 x 4 = 40
5 x 4 = 20
40 + 20 = 60
A number line can also be used.
</td>
</tr>
<tr>
<td>Formal column method - no exchanging
The formal method is introduced in Year 4 (3-digit numbers x 1-digit numbers); Year 5 and up progress to 4-digit</td>
<td>
6   9

3 x 23</td>
<td>Children to represent the counters pictorially.
</td>
<td>Children to record what it is they are doing to show understanding.
3 × 23
20   3
3 × 20 = 60
3 × 3 = 9
60 + 9 = 69

$$\begin{array}{r} 23 \\ \times \ 3 \\ \hline 69 \\ \hline \end{array}$$</td>
</tr>
</table>

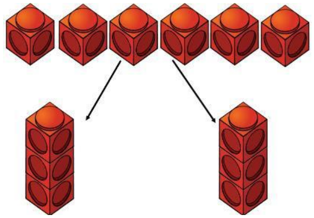
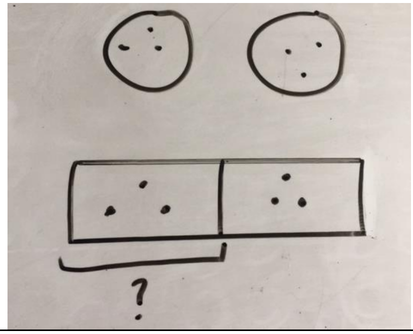
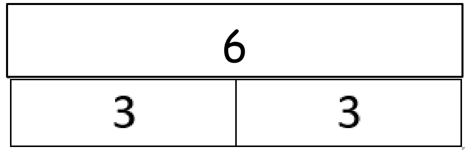
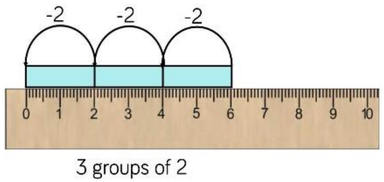
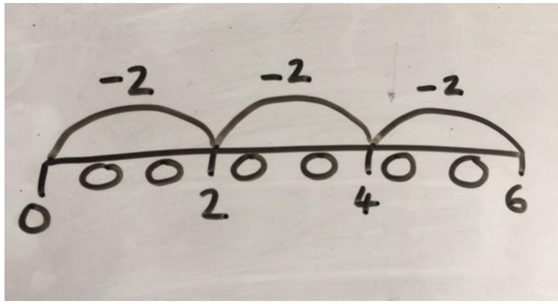
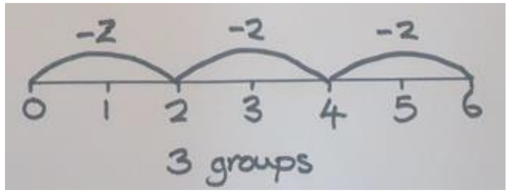
numbers x 2-digit numbers			

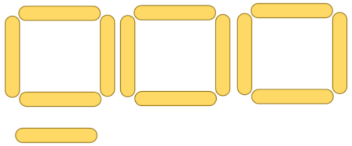
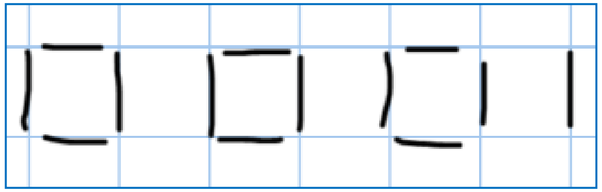
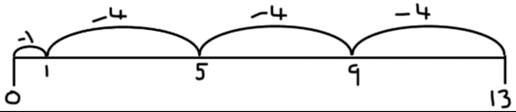
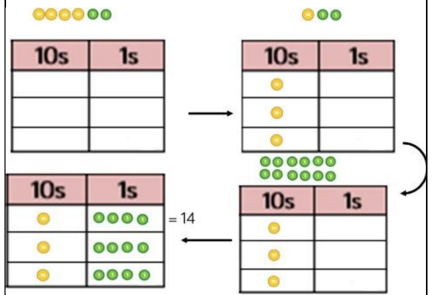
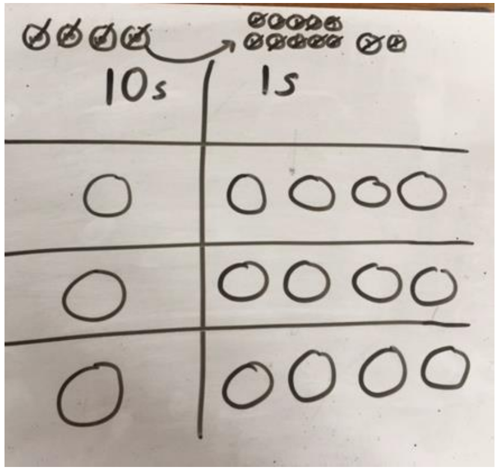
Formal column method - no exchanging The formal method is introduced in Year 4 (3-digit numbers x 1-digit numbers); Year 5 and up progress to 4-digit numbers x 2-digit numbers	 6 x 23	Children to represent the counters/base 10, pictorially e.g. the image below. 	Formal written method 6 x 23 = $\begin{array}{r} 23 \\ \times\ \ 6 \\ \hline 138 \\ \hline {\scriptstyle 1\ 1} \end{array}$
When children start to multiply 3d × 3d and 4d × 2d etc., they should be confident with exchanging and with the abstract:			$\begin{array}{rrrr} & 1 & 2 & 4 \\ \times & & 2 & 6 \\ \hline & 7 & 4 & 4 \\ & {\scriptstyle 1} & {\scriptstyle 2} & \\ 2 & 4 & 8 & 0 \\ \hline 3 & 2 & 2 & 4 \\ \hline {\scriptstyle 1} & {\scriptstyle 1} & & \end{array}$ Answer: 3224

Division

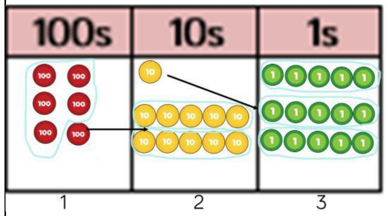
share, group, divide, divided by, half

dividend ÷ divisor = quotient (remainder)

<table>
<tr><th></th><th>Concrete</th><th>Pictorial</th><th>Abstract</th></tr>
<tr>
<td>Sharing using objects</td>
<td>
6 ÷ 2</td>
<td>Represent the sharing pictorially or with a bar model.
</td>
<td>6 ÷ 2 = 3

Children should also be encouraged to use their 2 times tables facts.</td>
</tr>
<tr>
<td>Repeated subtraction</td>
<td>
6 ÷ 2</td>
<td>Children to represent repeated subtraction pictorially.
</td>
<td>Abstract number line to represent the equal groups that have been subtracted.
</td>
</tr>
</table>

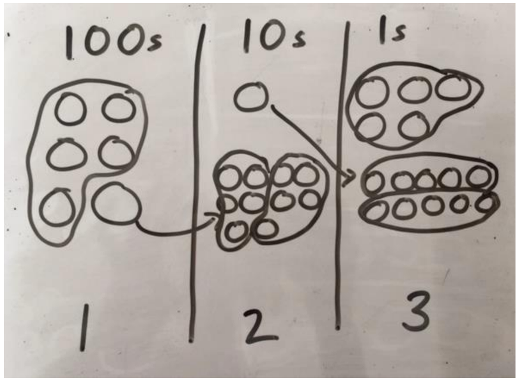
2-digit ÷ 1-digit with remainders	Use of lollipop sticks to form wholes- squares are made because we are dividing by 4.  There are 3 whole squares, with 1 left over. 13 ÷ 4.	Children to represent the lollipop sticks pictorially.  There are 3 whole squares, with 1 left over.	13 ÷ 4 = 3 remainder 1 Children should be encouraged to use their times table facts; they could also represent repeated addition on a number line. '3 groups of 4, with 1 left over' 
Sharing	 42 ÷ 3 -	Children to represent the place value counters pictorially. 	Children to be able to make sense of the place value counters and write calculations to show the process. 42 ÷ 3 42 = 30 + 12 30 ÷ 3 = 10 12 ÷ 3 = 4 10 + 4 = 14

Short division and expanded short division using place value counters to group (Year 5 and 6)



1. How many groups of 5 hundreds can you make with 6 hundred counters?
2. Exchange 1 hundred for 10 tens.
3. How many groups of 5 tens can you make with 11 ten counters?
4. Exchange 1 ten for 10 ones.
5. How many groups of 5 ones can you make with 15 ones?

Represent the place value counters pictorially.



Children to complete the calculation using the 'bus stop' method

Short division where the divisor is within the times tables (1 to 12):

$$\begin{array}{r} 123 \\ 5\overline{\smash{)}\,6\,{}^{1}1\,{}^{1}5} \end{array}$$

Expanded short division where the divisor is NOT within the times tables, the children should write out the required times table first, using column addition to support calculation as the numbers increase:

3432 ÷ 24

3432 ÷ 24

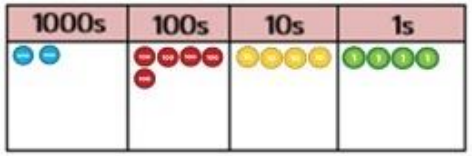
$$\begin{array}{r} 0\;\;1\;\;4\;\;3 \\ 24\overline{\smash{)}\,3\;{}^{3}4\;{}^{10}3\;{}^{7}2} \end{array}$$

$$\begin{array}{r} 34 \\ -\,24 \\ \hline 10 \end{array} \qquad \begin{array}{r} 103 \\ -\,96 \\ \hline 007 \end{array}$$

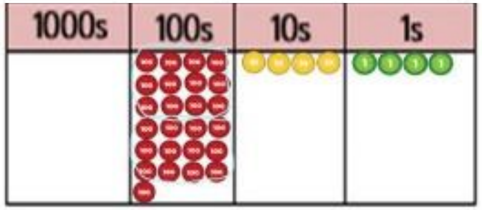
24
48
72
96
120
144
168
192
216
240

Use column subtraction to calculate remainders.

Long division 2544 ÷ 12 (Year 6)

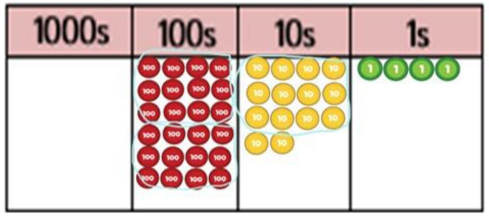


We can't group 2 thousands into groups of 12 so will exchange them.



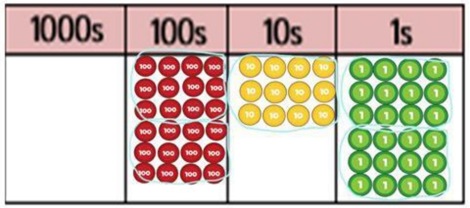
We can group 24 hundreds into groups of 12 which leaves with 1 hundred.

```
   0 2
12|2544
   24
    1
```



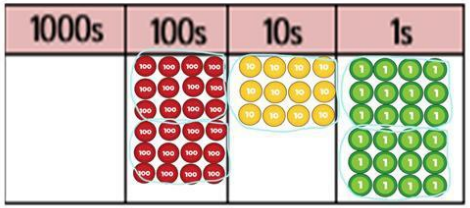
After exchanging the hundred, we have 14 tens. We can group 12 tens into a group of 12, which leaves 2 tens.

```
   0 2 1
12|2544
   24
    14
    12
     2
```



After exchanging the 2 tens, we have 24 ones. We can group 24 ones into 2 group of 12, which leaves no remainder.

```
   0 2 1 2
12|2544
   24
    14
    12
     24
     24
      0
```



After exchanging the 2 tens, we have 24 ones. We can group 24 ones into 2 group of 12, which leaves no remainder.

$$
\begin{array}{r}
0212 \\
12\,\overline{)\,2544} \\
\underline{24} \\
14 \\
\underline{12} \\
24 \\
\underline{24} \\
0
\end{array}
$$