<table>
<tr><th colspan="4">Addition</th></tr>
<tr><td>Objective</td><td>CONCRETE</td><td>PICTORIAL</td><td>ABSTRACT</td></tr>
<tr>
<td>YEAR 3

Add numbers with up to 3 digits

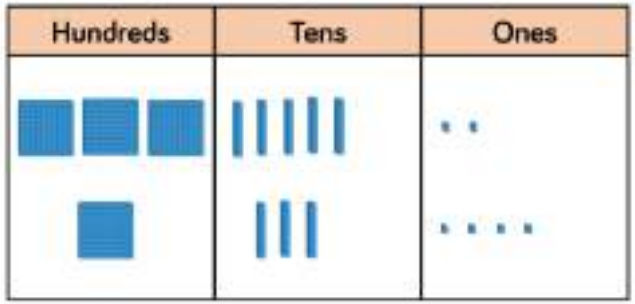
(No exchange)</td>
<td>Provide children with opportunities to use both place value counters and Base 10 in Year 3. Represent both numbers, which are being added.

When adding, always start with the smallest place value column. Introduce the concept of adding the ONES first throughout this stage.

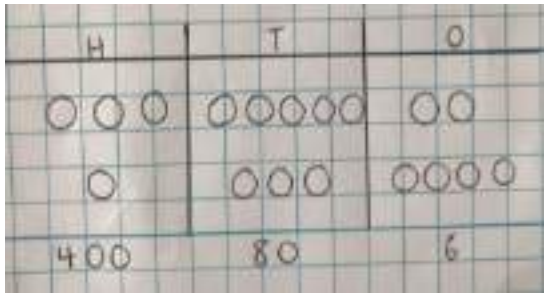
352 + 134 = 486

352 + 134 = 486

 
</td>
<td>352 + 134 = 486

Draw it using place value counters:

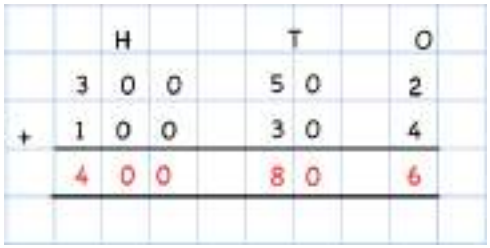
 

Or, draw it using Base 10:

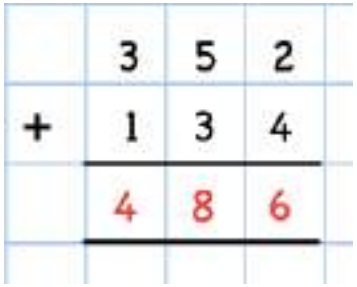
You should be able to see the addends lined up in preparation for the abstract stage.</td>
<td>Expanded method

352 + 134 = 486

Column method

352 + 134 = 486

It is important that children write out their calculations alongside using or drawing Base 10/place value counters so they can see the links between the written method and the model.</td>
</tr>
</table>

<table>
<tr>
<td>Add numbers with up to 3 digits

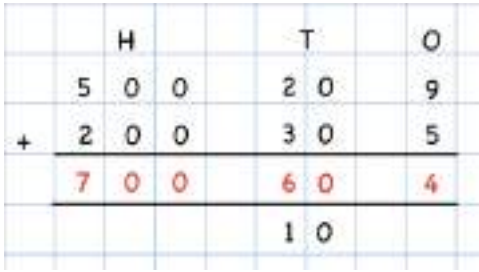
(Exchanging the ones)</td>
<td>529 + 235 =
 

Children to physically exchange 10 ones for 1 ten. Children should be able to recognise an exchange needs to be made because you can't have more than 9 in a column.

529 + 235 = 764
 
</td>
<td>Children must show any exchanges on their drawings. In this question, they would cross out 10 ones and draw the 1 ten.

529 + 235 = 764
 

Here are some questions to support the children:
How many ones are there altogether?
Can we make an exchange? (Yes or No)
How many do we exchange? (10 ones for 1 ten)
How many ones do we have left?</td>
<td>Expanded method

529 + 235 = 764
 

Column method

529 + 235 = 764
 
</td>
</tr>
</table>

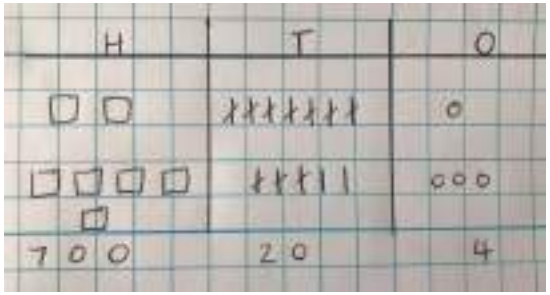
<u>St Stephen's Junior School Calculation Policy</u>

<table>
<tr>
<td>Add numbers with up to 3 digits

(Exchanging the tens)</td>
<td>271 + 453 =
 

Children to physically exchange 10 tens for 1 hundred.

271 + 453 = 724
 
</td>
<td>Children must show any exchanges on their drawings. In this question, they would cross out 10 tens and draw the 1 hundred.

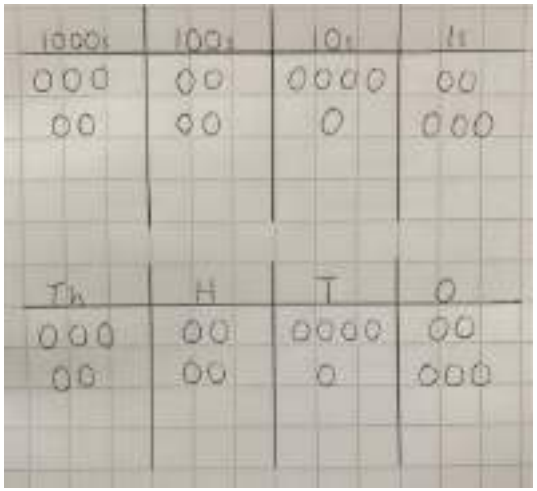
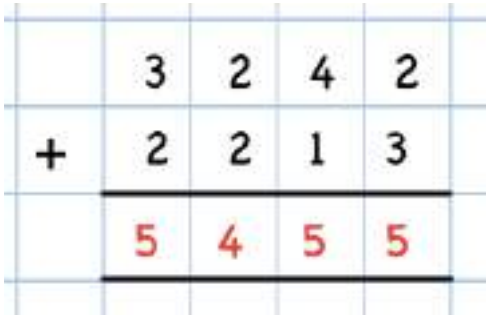
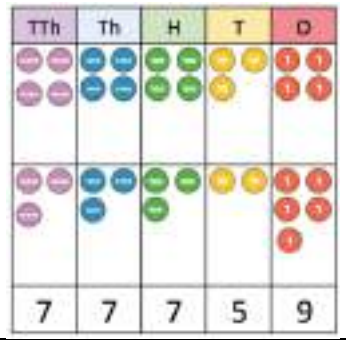
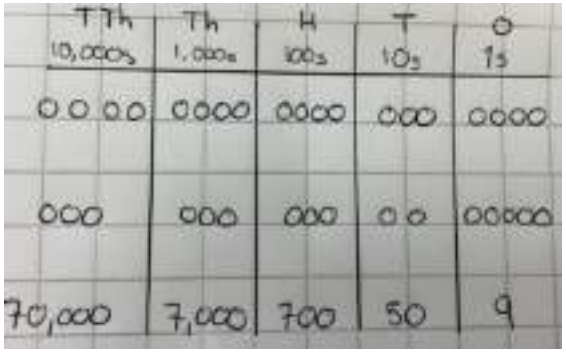
271+ 453 = 724
 
</td>
<td>Expanded method

271 + 453 = 724
 

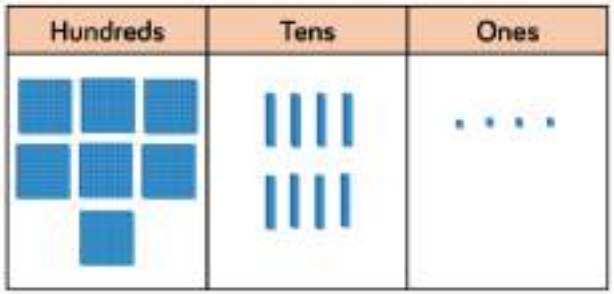
Column method

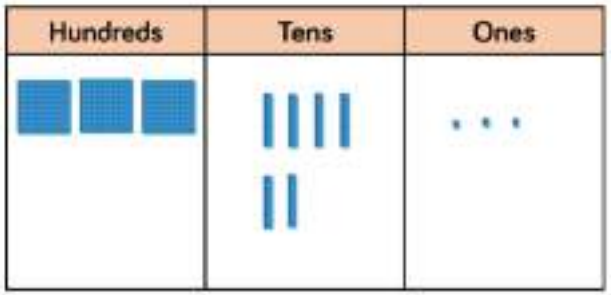
271 + 453 = 724
 
</td>
</tr>
</table>

St Stephen's Junior School Calculation Policy

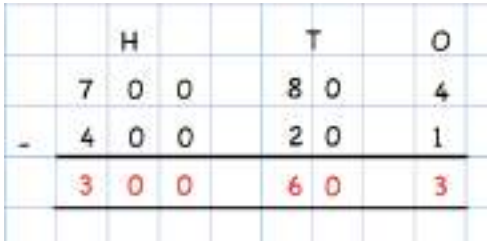
YEAR 4 Add numbers with up to 4 digits	3242 + 2213 = 5455  Base 10 can be used at times to highlight the difference in value between 1000s, 100s, 10s & 1s as the physical size of the manipulatives will reinforce this. However, the representation becomes less efficient with larger numbers due to the size of the Base 10. In this case, place value counters may be the better model to use.	3242 + 2213 = 5455  	Column method 3242 + 2213 = 5455 
YEAR 5 Add whole numbers with more than 4 digits	Use place value counters. If you don't have place value counters, use normal counters on a place value grid to enable children to experience any exchanges between columns. 44434 + 33325 = 77759  	44434 + 33325 = 77759  	Column method 44434 + 33325 = 77759  Children to also apply this understanding to adding decimals with 1, 2 and then 3 decimal places.

<table>
<tr><th colspan="4">Subtraction</th></tr>
<tr><td>Objective</td><td>CONCRETE</td><td>PICTORIAL</td><td>ABSTRACT</td></tr>
<tr>
<td>YEAR 3
Subtract numbers with up to 3 digits

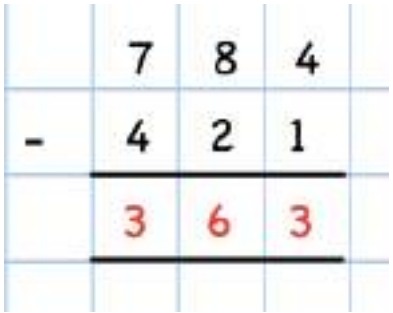
(No exchange)</td>
<td>Use place value counters or Base 10. When building the model, children should just make the minuend and then subtract the subtrahend. Highlight this difference to addition to avoid errors by making both numbers.
784 - 421 =
 

Children start with the smallest place value column. Physically take away the ones, then the tens and finally the hundreds.
In this example: 1 one, 2 tens, 4 hundreds.
784 - 421 = 363
 
</td>
<td>Children to cross out the number being subtracted, starting with the smallest place value column. In this case, the ones.

784 – 421 = 363
 
</td>
<td>Expanded method

784 – 421 = 363
 

Column method

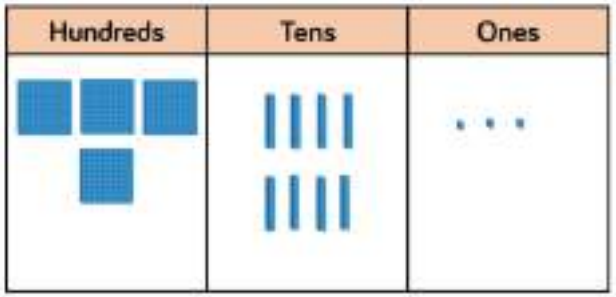
784 – 421 = 363
 

It is important that children write out their calculations alongside using or drawing Base 10/place value counters so they can see the links between the written method and the model.</td>
</tr>
</table>

<table>
<tr>
<td>Subtract numbers with up to 3 digits

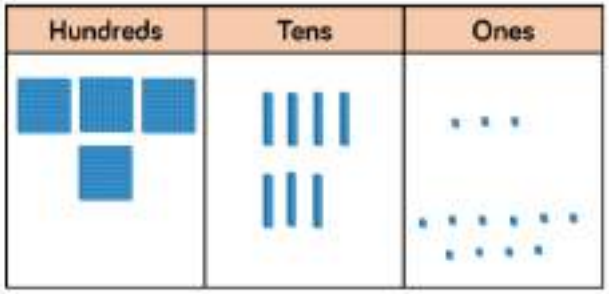
(Exchanging the ones)</td>
<td>When there are not enough ones/tens/hundreds in a column, children need to move to the column to the left and exchange. They can then subtract efficiently.

483 - 127 =

As 7 ones cannot be subtracted, children need to physically exchange 1 ten for 10 ones.

483 - 127 =

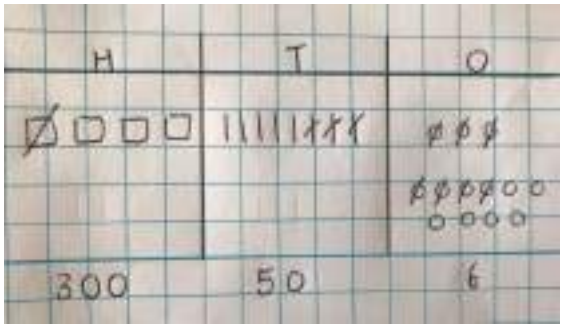
 

Then, subtract the correct amount, starting with the ones. In this example: 7 ones, 2 tens and 1 hundred.</td>
<td>483 – 127 = 356

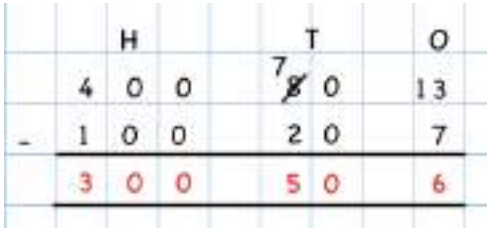
Any exchanges must be shown on their drawings. In this question, they would cross out 1 ten and draw the 10 ones.

Children to cross out the correct number of ones, tens and hundreds being subtracted.

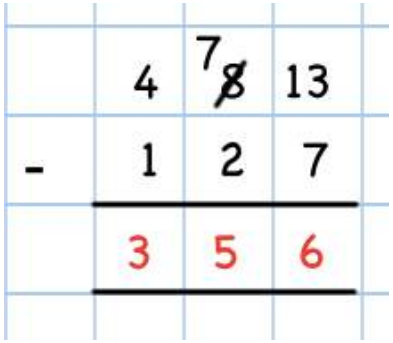
 
</td>
<td>Expanded method

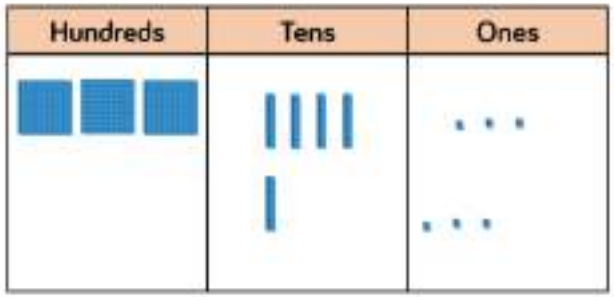
483 – 127 = 356

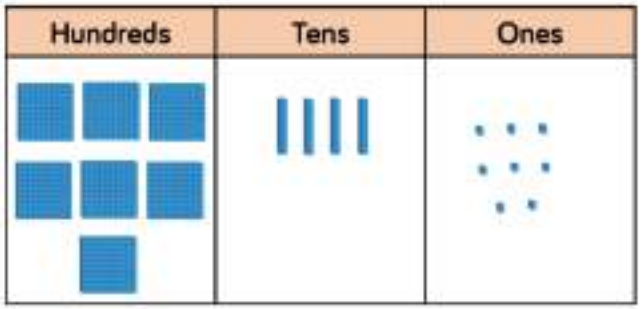
 

Column method

483 – 127 = 356

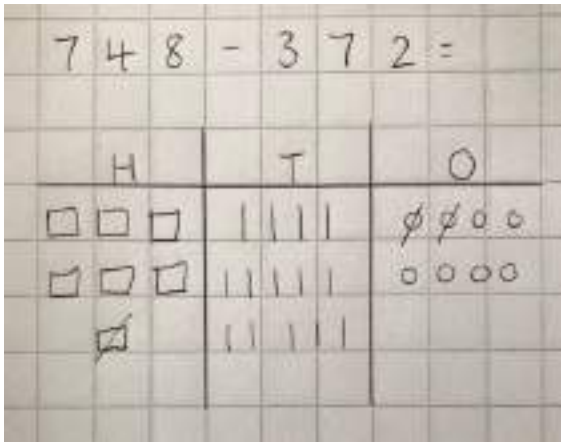
 
</td>
</tr>
</table>

<table>
<tr>
<td></td>
<td>483 - 127 = 356
 
</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtract numbers with up to 3 digits

(Exchanging the tens)</td>
<td>748 - 372 =
 

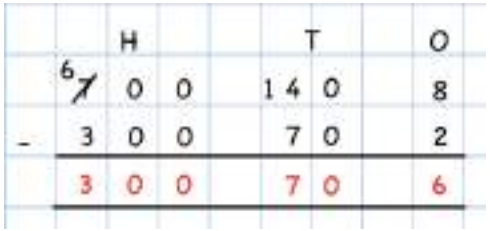
Start by subtracting the 2 ones. Then, as 7 tens cannot be subtracted, children need to physically exchange 1 hundred for 10 tens.</td>
<td>Any exchanges must be shown on their drawings. In this question, they would cross out 1 hundred and draw the 10 tens.

748 – 372 = 376

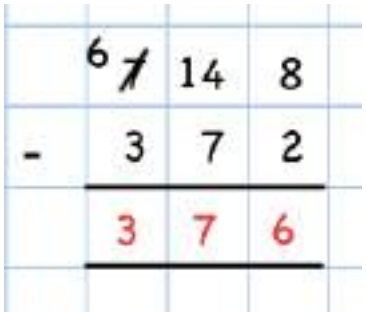
Once the exchange has been made they can subtract efficiently.</td>
<td>Expanded method

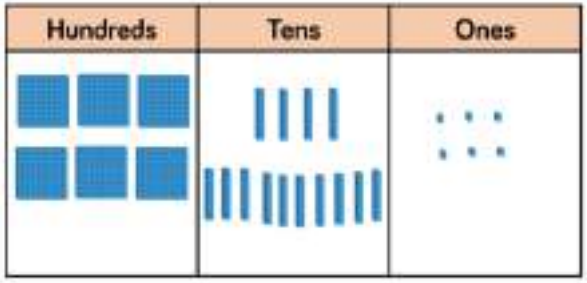
748 – 372 = 376

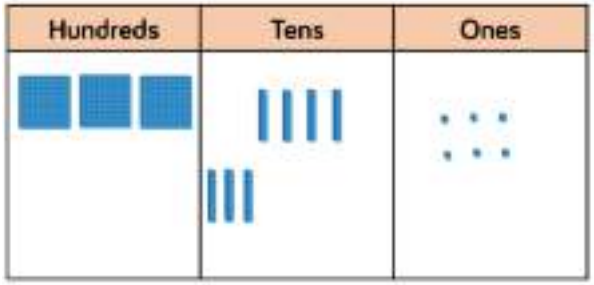
 

Column method

748 – 372 = 376

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

<table>
<tr>
<td></td>
<td>748 – 372 =
 

Then they can continue with subtracting the correct number of tens and hundreds.
748 – 372 = 376
 
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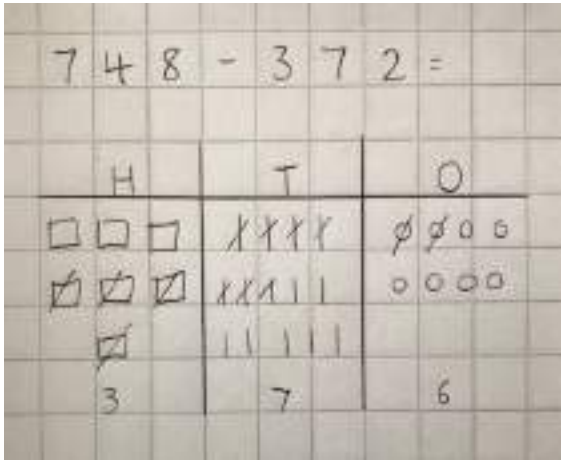
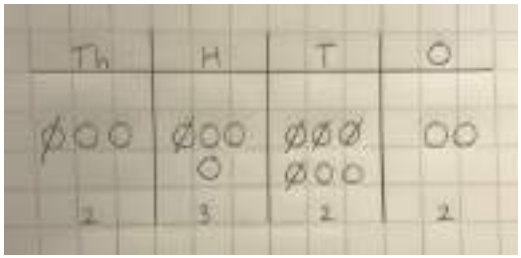
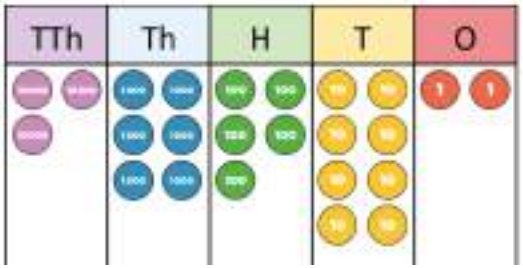
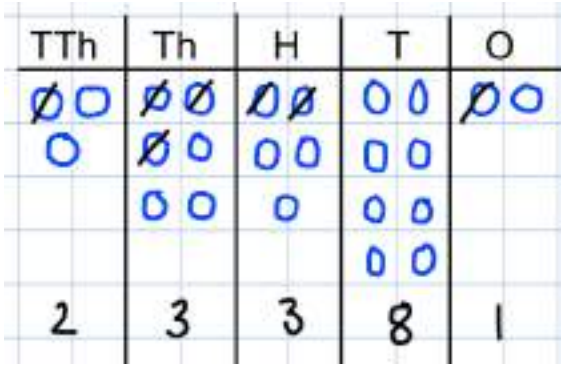
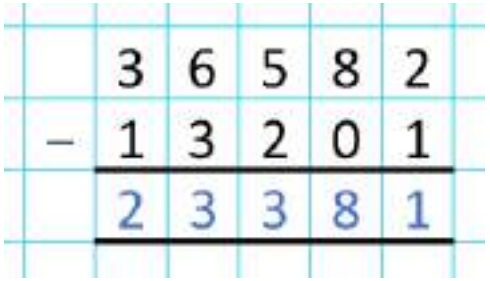
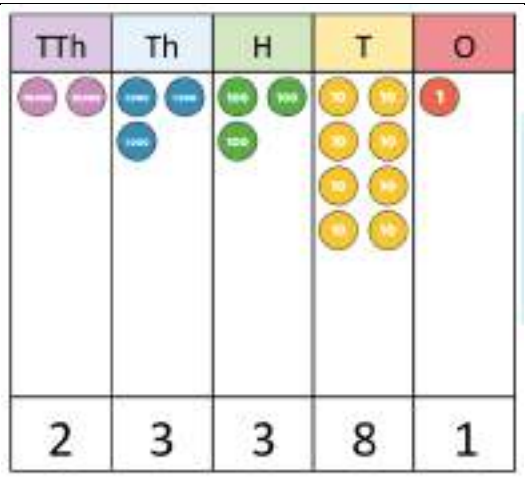
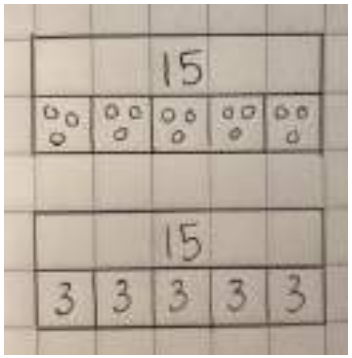
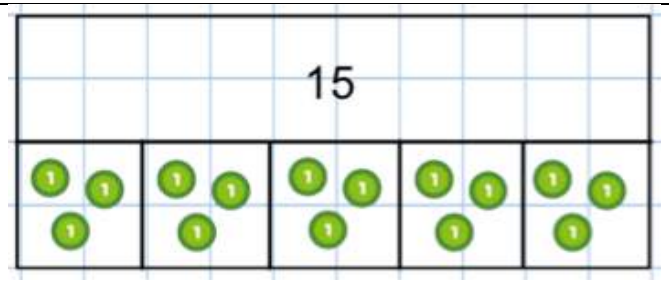
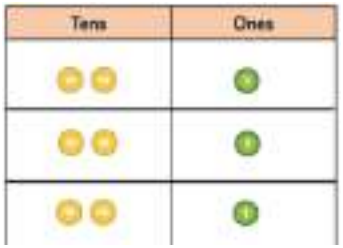
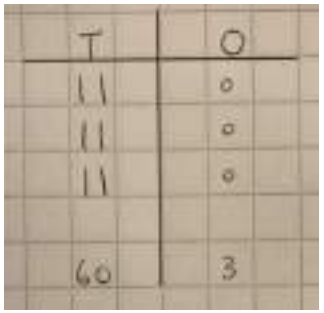
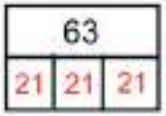
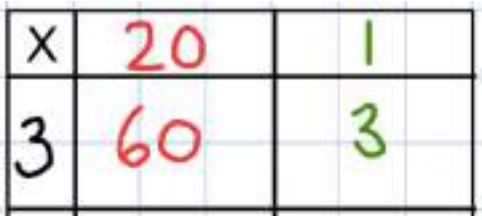
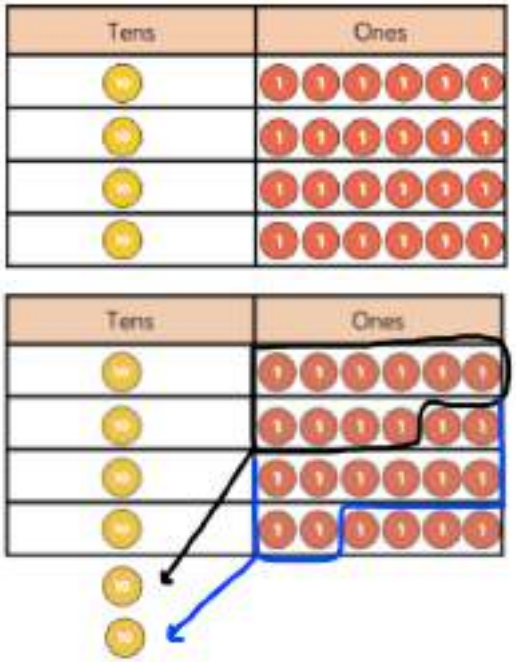
<td> 
</td>
<td></td>
</tr>
<tr>
<td>YEAR 4
Subtract numbers with up to 4 digits</td>
<td>3462 – 1140 = 2322
 

Children to physically take away the correct</td>
<td>3462 – 1140 = 2322
 
</td>
<td>Column method
3462 – 1140 = 2322
 
</td>
</tr>
</table>

	amount, starting with the ones. In this example: 0 ones, 4 tens, 1 hundred and 1 thousand. 		
YEAR 5 Subtract whole numbers with more than 4 digits	36582 – 13201 = 23381  Children to physically take away the correct amount, starting with the ones. In this example: 1 one, 0 tens, 2 hundreds, 3 thousands, 1 ten thousand.	36582 – 13201 = 23381 	Column method 36582 – 13201 = 23381 

			
Multiplication			
Objective	CONCRETE	PICTORIAL	ABSTRACT
TIMES TABLES	5 X 3 = 15  Children can use the single bar model to represent multiplication as repeated addition. They can use cubes and counters within the bar model to support.	5 X 3 = 15  Children can draw dots within the bar model before moving on to writing digits to represent the calculation.	5 X 3 = 15

	 It is important when solving word problems that the bar model represents the problem.		
YEAR 3 Multiply 2 digit numbers by 1 digit	Children can represent multiplication as repeated addition in many ways including: place value counters and Base 10. 21 X 3 = 63  	During the pictorial stage, children use a place value grid to represent the multiplication calculation. 21 X 3 = 63  It can be reinforced with the use of the bar model but it is important that when answering any word problems that the bar model matches the problem. 	Grid method 21 X 3 = 63 

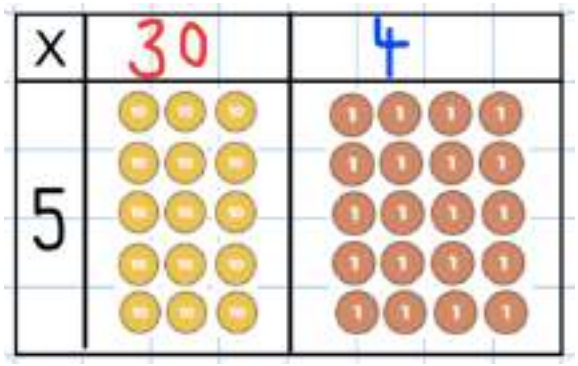
	Children can apply their understanding of exchanging to this concept. 16 X 4 = 64  Always represent the larger number – it's more efficient to draw 16, 4 times as opposed to 16 lots of 4.	16 X 4 = 64  The exchanges have been shown on the place value grid. As there are more than 9 ones, 10 ones have been crossed out and then 1 ten drawn to represent the exchange (twice as two exchanges were required here).	16 X 4 = 64  Please note: informal methods are used in Year 3 before moving on to the short multiplication method in Year 4.

<table>
<tr>
<td>YEAR 4
Multiply 2 digit and 3 digit numbers by 1 digit</td>
<td>Base 10 can still be used here to support the children's understanding of column multiplication but as the numbers become larger in multiplication or the amounts of groups becomes higher, Base 10 becomes less efficient due to the amount of equipment and number of exchanges needed.

Children to build on their understanding of the grid method from Year 3 and use manipulatives to support their understanding of the model.

Multiply 2 digit numbers by 1 digit

34 X 5 = 170

 
</td>
<td>34 X 5 = 170

 
</td>
<td><u>Short multiplication</u>

Expanded method

34 X 5 = 170

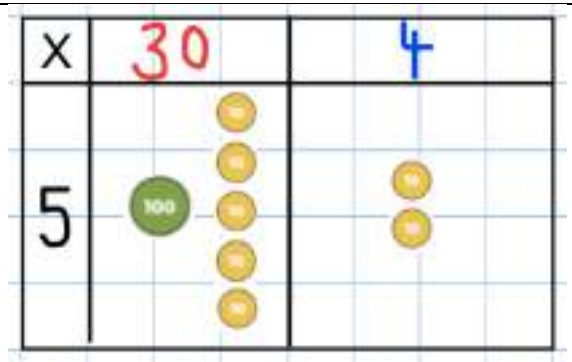
 

Column method

34 X 5 = 170

Limit the number of exchanges needed in the questions and move children away from resources when multiplying larger numbers.</td>
</tr>
</table>

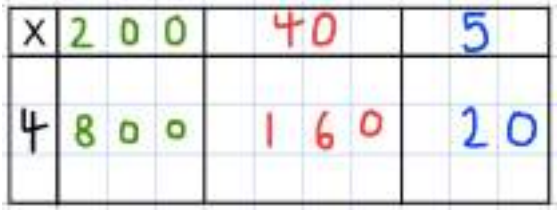


The counters should be used to support their understanding of the written method rather than support the arithmetic, as children should use times table knowledge.

Multiply 3 digit numbers by 1 digit

245 X 4 = 980

245 X 4 = 980



Expanded method

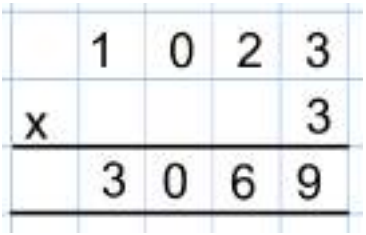
245 X 4 = 980

Column method

245 X 4 = 980

<table>
<tr>
<td>YEAR 5
Multiply numbers up to 4 digits by a 1 digit number</td>
<td>1023 X 3 = 3069
 

When multiplying 4 digit numbers, place value counters are the best manipulative to use to support children in their understanding of the formal written method.</td>
<td>1023 X 3 = 3069
 
</td>
<td><u>Short multiplication</u>

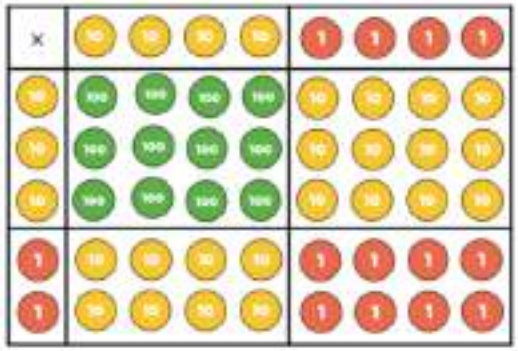
1023 X 3 = 3069
 

If children are multiplying larger numbers and struggling with their times tables, encourage the use of multiplication grids so they can focus on the use of the written method.</td>
</tr>
<tr>
<td>Multiply numbers up to 4 digits by a 2 digit number</td>
<td>Multiply 2 digits by 2 digits

Area Model

The area model will help children understand the size of the numbers they are using. This links to finding the area of a rectangle. Representations can use both place value counters and Base 10 but due to the size of the numbers, the children are likely to only have counters as the physical resource.</td>
<td>The grid method matches the area model as an initial written method before moving on to the formal written multiplication method.</td>
<td></td>
</tr>
</table>

44 X 32 = 1408



Multiply 3 digits by 2 digits

Children can continue to use the area model when multiplying 3 digits by 2 digits. Place value counters become more efficient to use but Base 10 can be used to highlight the size of numbers.

Children can use a place value grid to support when multiplying by a multiple of 10, 100 or 1000.

44 X 32 = 1408

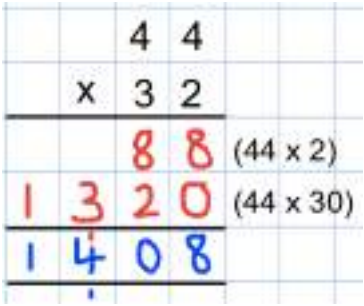
×	40	4
30	1,200	120
2	80	8

421 X 23 = 9683

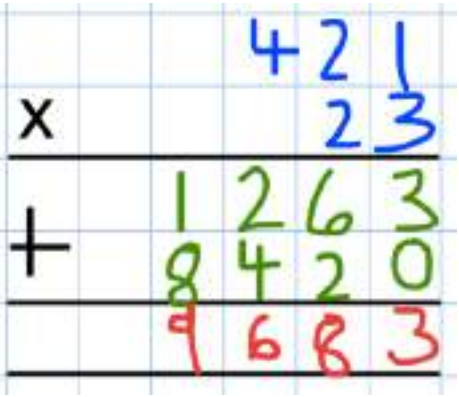
X	400	20	1
20	8000	400	20
3	1200	60	3

Long multiplication

44 X 32 = 1408



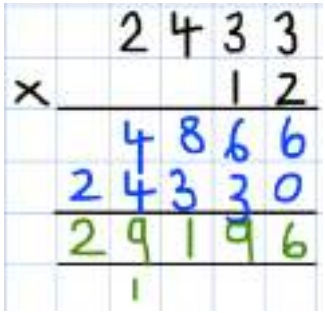
421 X 23 = 9683



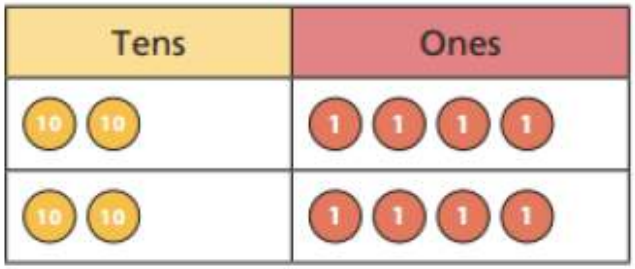
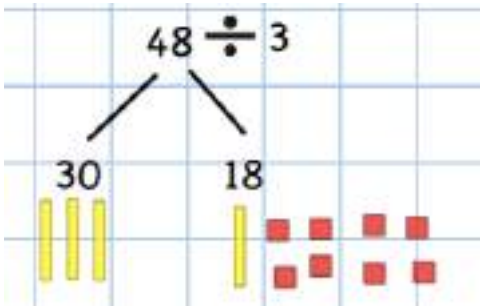
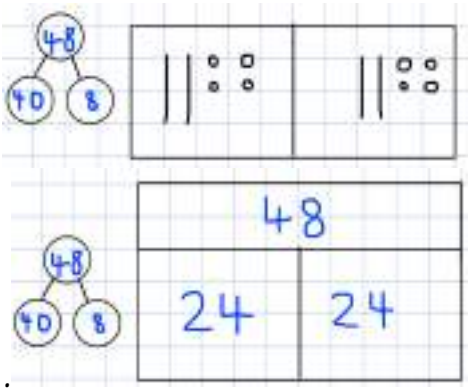
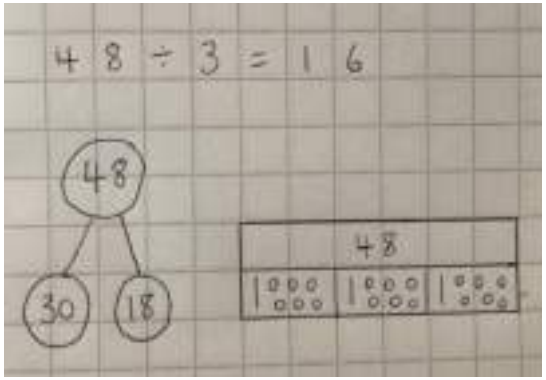
<table>
<tr>
<td></td>
<td>Multiply 4 digits by 2 digits

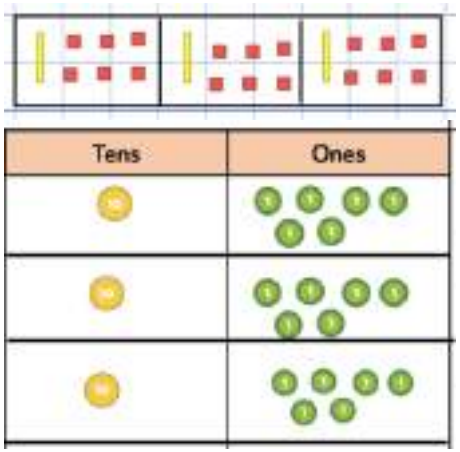
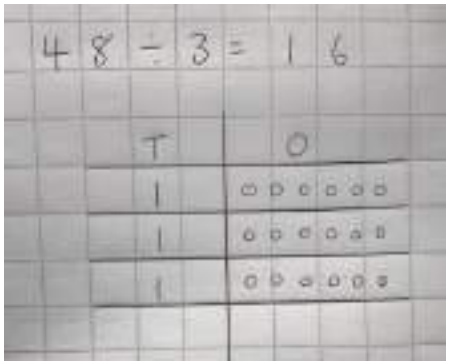
Example of how place value grids can be used to support 2000 X 10:
<table><tr><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr><tr><td></td><td>2</td><td>0</td><td>0</td><td>0</td></tr></table><table><tr><th>TTh</th><th>Th</th><th>H</th><th>T</th><th>O</th></tr><tr><td>2</td><td>0</td><td>0</td><td>0</td><td>0</td></tr></table></td>
<td>2433 X 12 = 29196

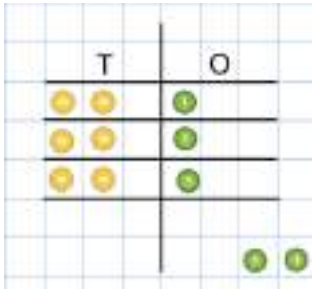
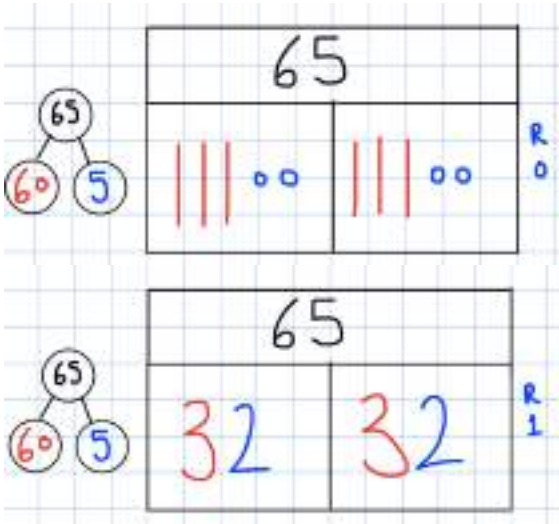
<table><tr><td>X</td><td>2000</td><td>400</td><td>30</td><td>3</td></tr><tr><td>10</td><td>20,000</td><td>4000</td><td>300</td><td>30</td></tr><tr><td>2</td><td>4000</td><td>800</td><td>60</td><td>6</td></tr></table></td>
<td>2433 X 12 = 29196

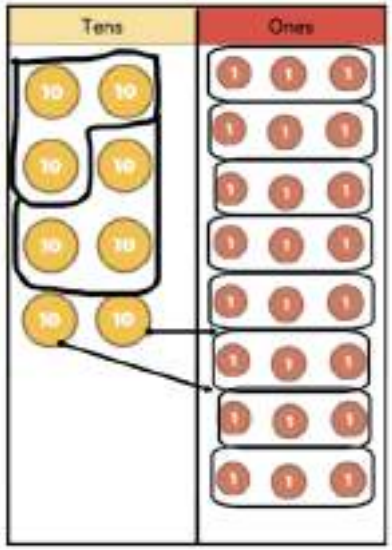
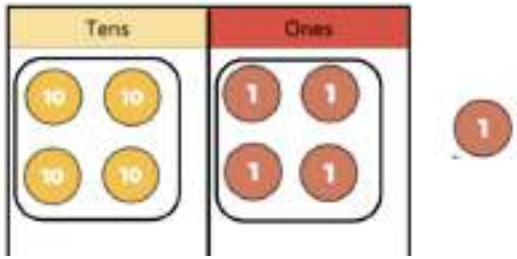
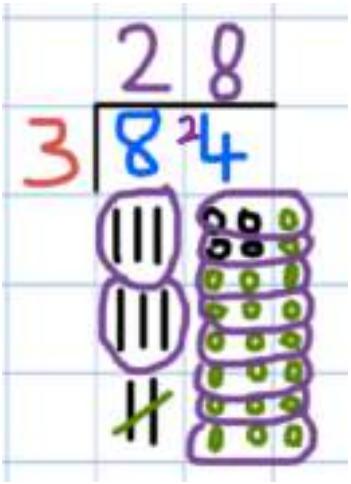
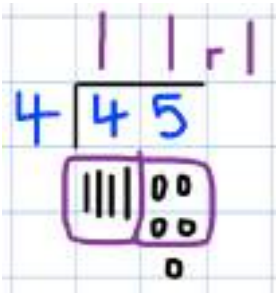
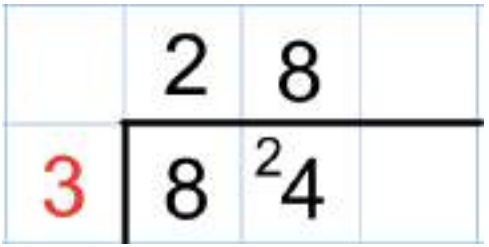
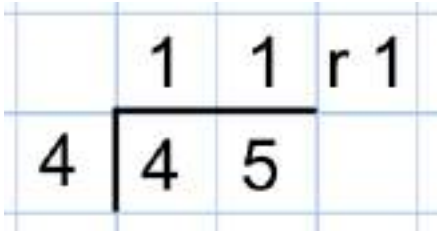
  </td>
</tr>
<tr>
<td>YEAR 6
Multiply multi digit numbers by a 2 digit number</td>
<td>See above.</td>
<td></td>
<td></td>
</tr>
<tr>
<td colspan="4">Division</td>
</tr>
<tr>
<td>Objective</td>
<td>CONCRETE</td>
<td>PICTORIAL</td>
<td>ABSTRACT</td>
</tr>
<tr>
<td>YEAR 3
Divide 2 digit numbers by 1 digit</td>
<td>Sharing with no exchange

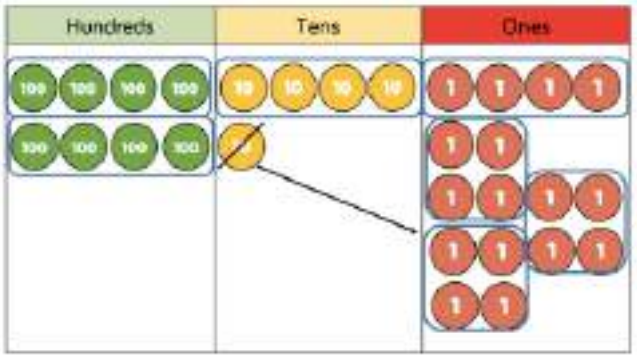
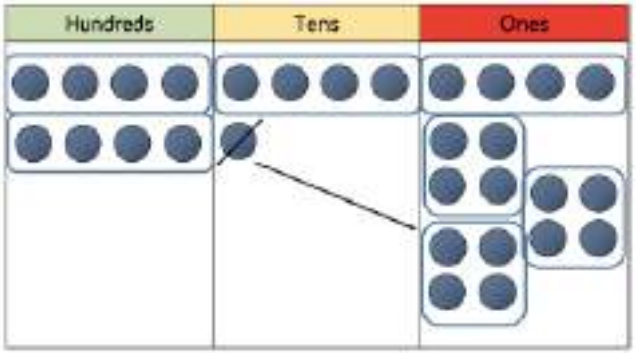
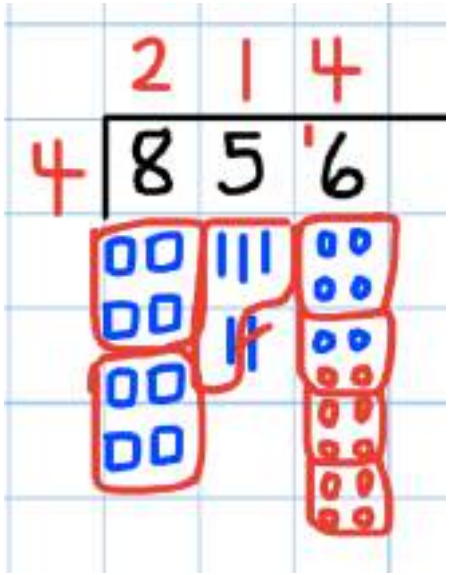
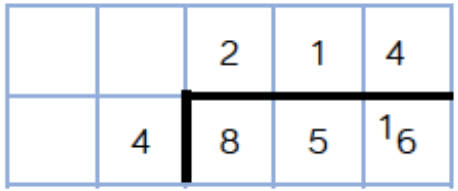
When dividing larger numbers, children can use manipulatives that allow them to partition into tens and ones. Base 10 and place value counters can be used to share numbers into equal groups.</td>
<td>Children can draw a part-whole model to represent their partitioning. It provides a clear link with the concrete representation. Any children who are particularly efficient with their times tables might prefer to write the digit straight into the bar model. In this case, they would write a 2 in each part to represent 2 tens, then a 4 in each part to represent 4 ones.</td>
<td></td>
</tr>
</table>

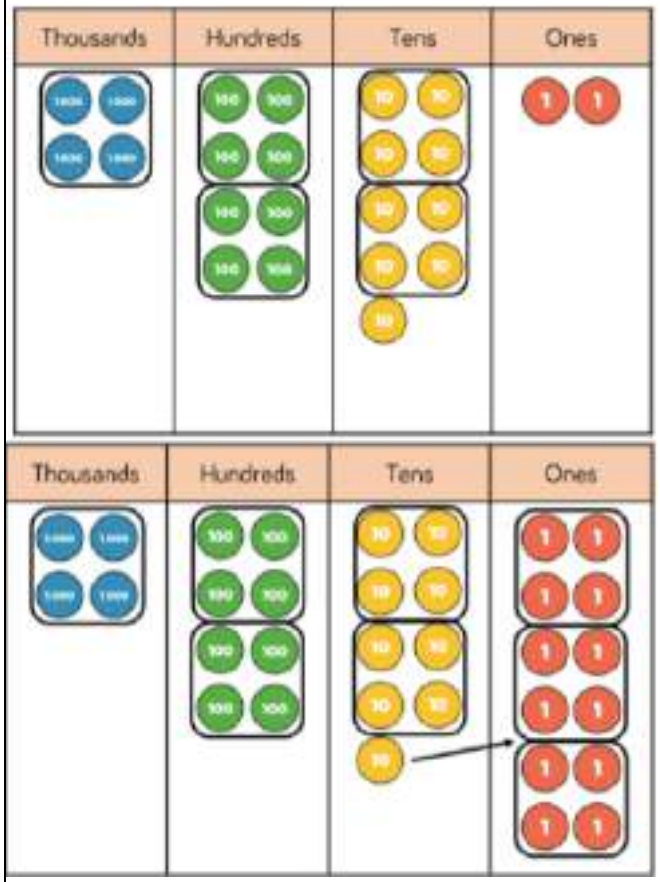
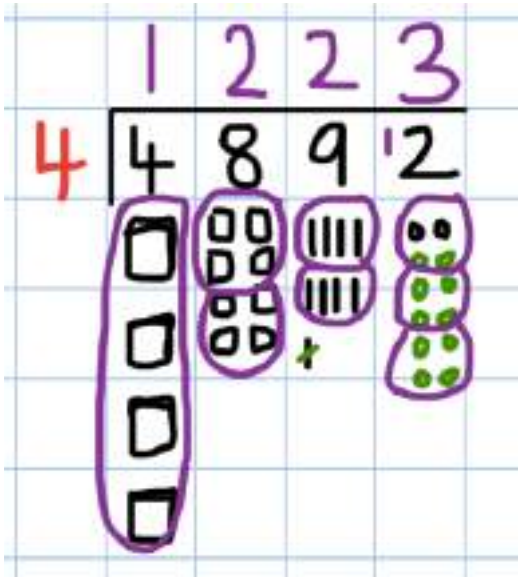
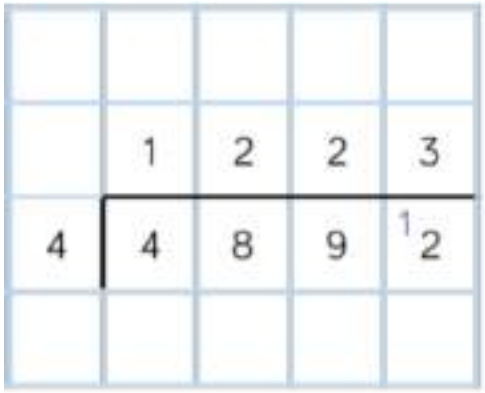
	48 ÷ 2 = 24  Sharing with exchange When dividing numbers involving exchange, children can use Base 10 and place value counters to exchange one ten for ten ones. Children should start with the equipment outside the place value grid before sharing. 48 ÷ 3 = 16 Look at the divisor and partition the number into two smaller numbers. (10X the divisor or 20X the divisor where appropriate)  	48 ÷ 2 = 24  . Again, a part-whole model can be used to support the concrete representation. In this case, flexible partitioning in a part-whole model supports the method. 48 ÷ 3 = 16  Children can choose to use a bar model or place value grid.	48 ÷ 2 - 24 40 ÷ 2 = 20 8 ÷ 2 = 4 48 ÷ 2 = 24 48 ÷ 3 = 16 30÷ 3 = 10 18 ÷ 3 = 6 48 ÷ 3 = 16 No formal written methods are used for division in Year 3.

	Children then need to share the tens and ones into the bar model or place value grid, starting with the tens. As the 18 cannot be shared equally as 1 ten and 8 ones it needs to be shared as 18 ones.  	 For this question, as it is dividing by 3, the bar model will need 3 parts/ the place value grid will need 3 rows.	
Divide 2 digit numbers by 1 digit (with remainders)	Sharing with remainders When dividing numbers with remainders, children can use Base 10 and place value counters. Starting with the equipment outside the place value grid or bar model will highlight remainders as they will be left outside once the equal groups have been made.		No formal written method used for division in Year 3.

	65 ÷ 3 = 21 r 2   	65 ÷ 3 = 21 r 2  	
YEAR 4 Divide 2 digit and 3 digit numbers by 1 digit number	Children to reinforce Year 3 division with opportunities to share with no exchange, exchange and remainders. (See above) It is important to be explicit about the different division structures: sharing & grouping. When using the short division method, children use grouping. Starting with the largest place value, they group by the divisor.	Children use the short division method and draw the dividend below to support the grouping. Starting with the highest place value allows them to make any necessary exchanges. Language is important here. Children should consider: 'How many groups of 3 tens can we make?' and 'How many groups of 3 ones can we make?' Children can choose to draw the dividend as Base 10 or counters.	

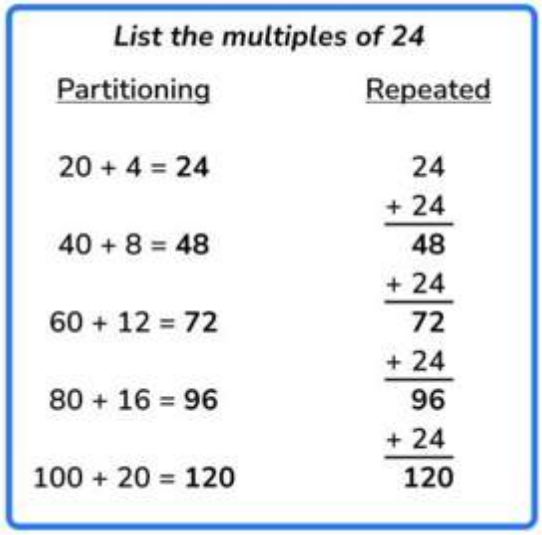
	2 digit ÷ 1 digit 84 ÷ 3 = 28  2 digit ÷ 1 digit (with remainders) 45 ÷ 4 = 11 r 1  	2 digit ÷ 1 digit 84 ÷ 3 = 28  2 digit ÷ 1 digit (with remainders) 45 ÷ 4 = 11 r 1 	Short division 2 digit ÷ 1 digit 84 ÷ 3 = 28  2 digit ÷ 1 digit (with remainders) 45 ÷ 4 = 11 r 1 

	3 digit ÷ 1 digit Base 10, place value counters or plain counters can be used on a place value grid. 856 ÷ 4 = 214   	3 digit ÷ 1 digit 856 ÷ 4 = 214  	3 digit ÷ 1 digit 856 ÷ 4 = 214 

YEAR 5 Divide numbers up to 4 digits by a 1 digit number	4 digit ÷ 1 digit 4892 ÷ 4 = 1223 	4 digit ÷ 1 digit 4892 ÷ 4 = 1223 	Short division 4 digit ÷ 1 digit 4892 ÷ 4 = 1223  Children should be encouraged to move away from the concrete and pictorial when dividing numbers with multiple exchanges.

<table>
<tr>
<td>YEAR 6
Divide numbers up to 4 digits by a 2 digit number</td>
<td>When children begin to divide up to 4-digits by 2-digits, written methods become the most accurate as concrete and pictorial representations become less effective.</td>
<td>

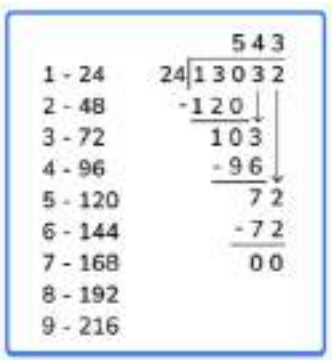

Children can write out multiples to support their calculations. Listing multiples can be done through repeated addition or partitioning.



</td>
<td>
<u>Long division</u>

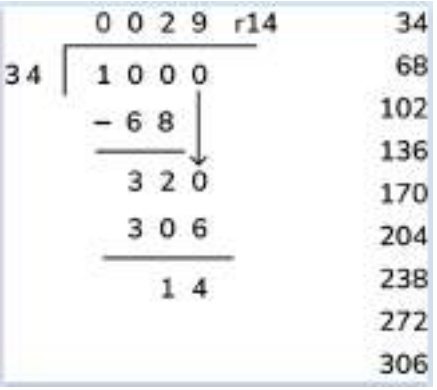
Dividing 4-digit numbers by 2-digit numbers

13032 ÷ 24 = 543



Dividing 4-digit numbers by 2-digit numbers with remainders.

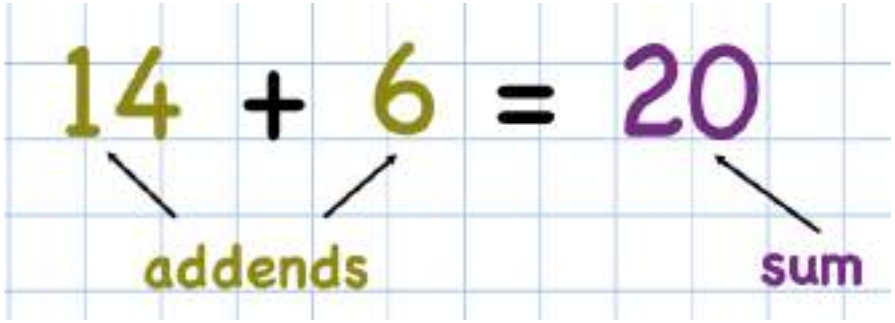
1000 ÷ 34 = 29 r 14



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

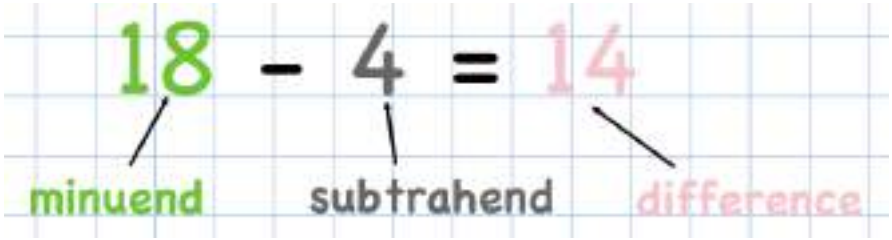
ADDITION

Addends are the numbers added, and the result or the final answer we get after the process is called the **sum**.

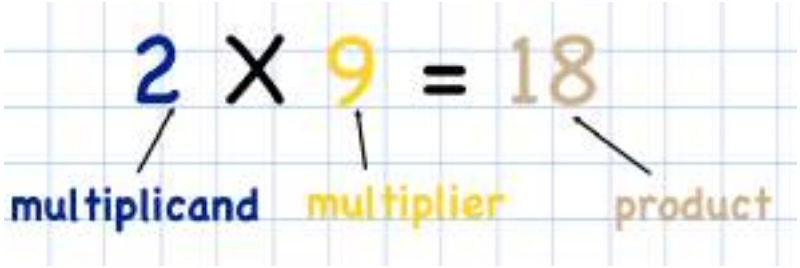


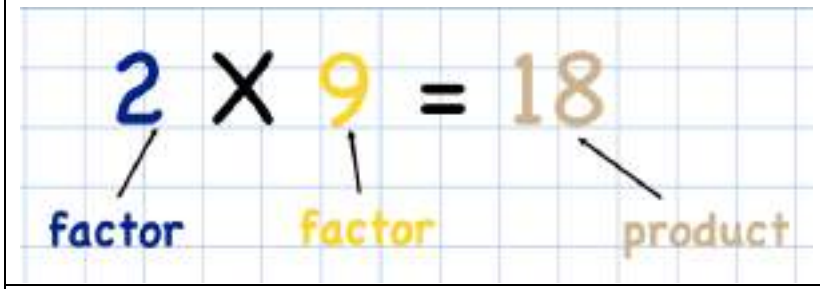
SUBTRACTION

The **minuend** is the number from which another number is to be subtracted.
The **subtrahend** is the number that will be subtracted from another.
The **difference** is the result of subtracting the subtrahend from the minuend.



MULTIPLICATION





DIVISION

The **dividend** is the number you are dividing.
The **divisor** is the number you are dividing by.
The **quotient** is the amount each divisor receives i.e. the answer in most cases.