



Barnfields Primary School

Calculation Progression Policy

Rationale

At Barnfields Primary School, we believe in equipping all of our children to become fluent and proficient Mathematicians. The aim of this Calculation Progression Policy is to ensure all of our children are able to use a range of mental calculation strategies effectively, efficiently and flexibly. In partnership with this, it is imperative that children can also use a range of written methods accurately and appropriately. When children are able to employ both of these strategies effectively, they can then solve problems and reason mathematically efficiently. Underpinning all this, is the belief that all children can acquire a competent and confident understanding of numbers and the number system combined with an instant recall of a set of age-appropriate number facts. This knowledge and skillset combined with the automaticity of known facts will ensure our children are able to explore Maths in depth and with success using appropriate vocabulary and skills in order to do so effectively.

Concrete, Pictorial, Abstract approach

The Concrete, Pictorial, Abstract approach (CPA) is a highly effective approach to teaching that develops a deep and sustainable understanding of maths in pupils.

It is an essential technique within the Singapore method of teaching maths for mastery which is now used to teach Maths in the majority of schools across the UK and employed at Barnfields Primary School. Children can find Maths difficult because it is abstract. The CPA approach builds on children's existing knowledge by introducing abstract concepts in a concrete and tangible way. It involves moving from concrete materials, to pictorial representations, to abstract symbols and problems. Concrete is the "doing" stage. During this stage, students use concrete objects to model problems. Unlike traditional maths teaching methods where teachers demonstrate how to solve a problem, the CPA approach brings concepts to life by allowing children to experience and handle physical (concrete) objects. With the CPA framework, every abstract concept is first introduced using physical, interactive concrete materials.

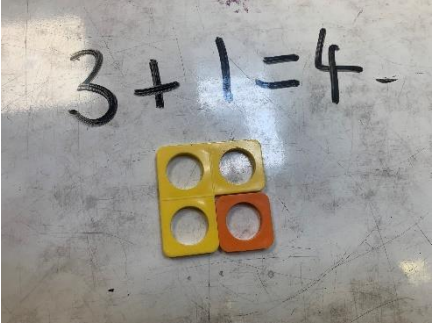

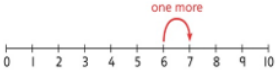

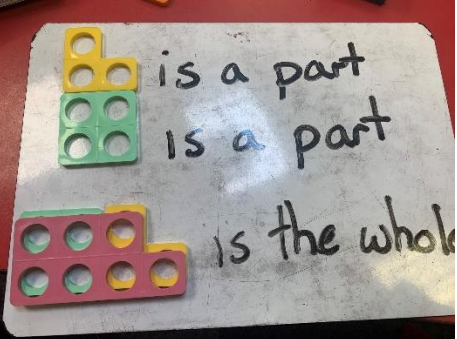

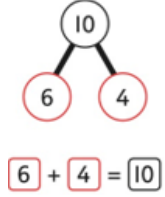
- Concrete is the "doing" stage. During this stage, children use concrete objects to model problems. Unlike traditional maths teaching methods where teachers demonstrate how to solve a problem, the CPA approach brings concepts to life by allowing children to experience and handle physical (concrete) objects.
- Pictorial is the "seeing" stage. Here, visual representations of concrete objects are used to model problems. This stage encourages children to make a mental connection between the physical object they just handled and the abstract pictures, diagrams or models that represent the

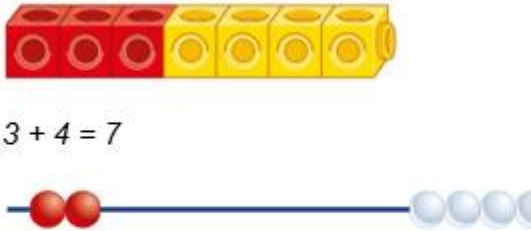
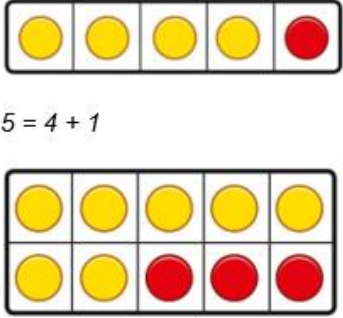
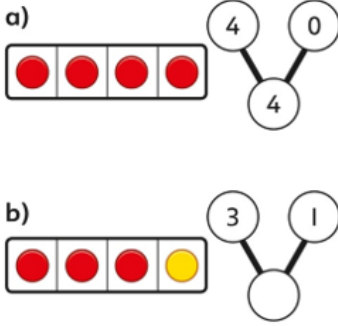

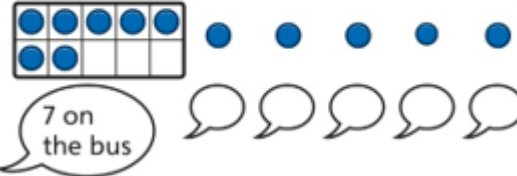
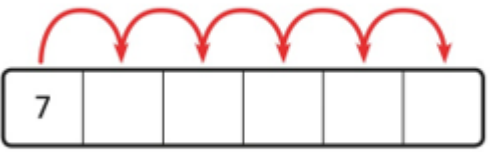

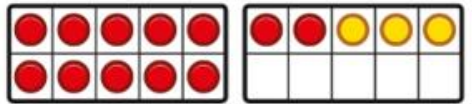
objects from the problem. Building or drawing a model makes it easier for children to grasp difficult abstract concepts (for example, fractions). Simply put, it helps students visualise abstract problems and make them more accessible.

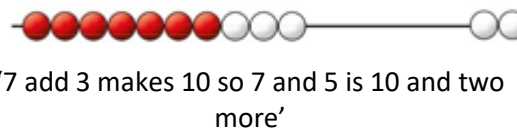
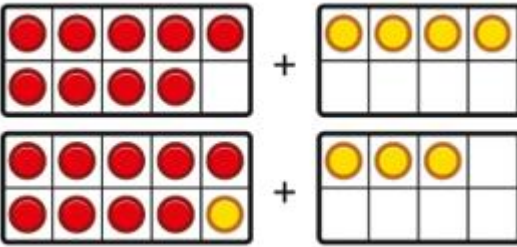
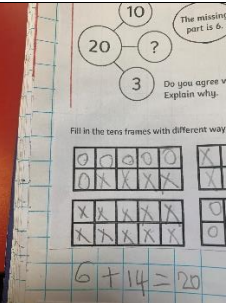


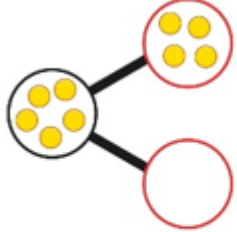
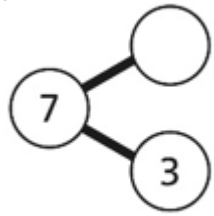
- Abstract is the “symbolic” stage, where children use abstract symbols to model problems. Students will not progress to this stage until they have demonstrated that they have a solid understanding of the concrete and pictorial stages of the problem. The abstract stage involves the teacher introducing abstract concepts (for example, mathematical symbols). Children are introduced to the concept at a symbolic level, using only numbers, notation, and mathematical symbols (for example, $+$, $-$, \times , \div) to indicate addition, multiplication or division.

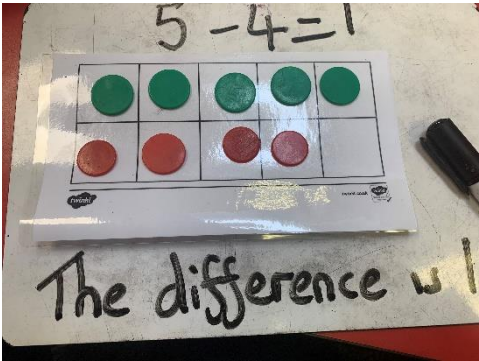
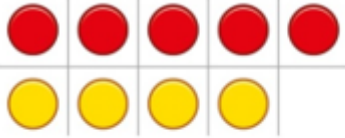


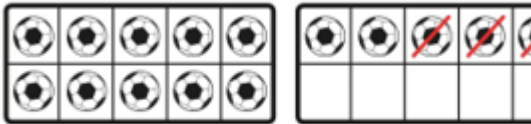
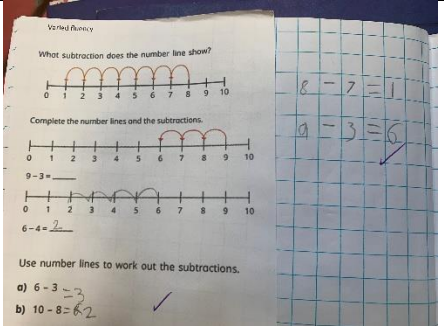
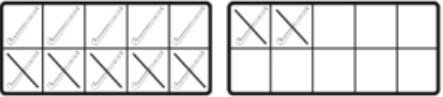
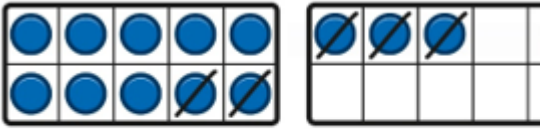
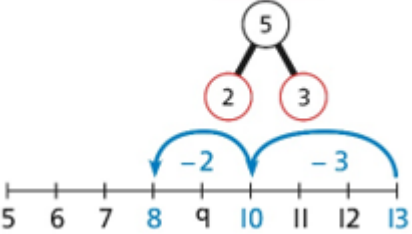
It is important to note this is not a linear approach and teachers will move back and forth between the CPA stages as required.

Year 1 addition

Concept	Concrete	Pictorial	Abstract
<p>Counting and adding more</p>		<p>Children add one more cube or counter to a group to represent one more</p>  <p>One more than 4 is 5.</p>	<p>Use a number line to understand how to link counting on with finding one more.</p>  <p>One more than 6 is 7. 7 is one more than 6.</p> <p>Learn to link counting on with adding more than one.</p>  <p>5 + 3 = 8</p>
<p>Understanding part-part-whole relationship</p>		<p>Here are some frogs.</p> <ul style="list-style-type: none"> ▶ Can you see two groups of frogs? ▶ How many frogs are in each group? ▶ Complete the sentences. <p>_____ is a part. _____ is a part. The whole is _____</p> 	

<p>Knowing and finding number bonds within 10</p>	 <p>$3 + 4 = 7$</p> <p>$6 = 2 + 4$</p>	<p>Use five and ten frames to represent key number bonds.</p>  <p>$5 = 4 + 1$</p> <p>$10 = 7 + 3$</p>	<p>Use a part-whole model alongside other representations to find number bonds. Make sure to include examples where one of the parts is zero.</p> <p>a)</p>  <p>$4 + 0 = 4$ $3 + 1 = 4$</p>
<p>Adding by counting on</p>		<p>Children use counters to support and represent their counting on strategy.</p> 	<p>Children use number lines or number tracks to support their counting on strategy.</p>  <p>$7 + 5 = \square$</p>
<p>Adding the 1s</p>	 <p>Children use bead strings and other concrete resources to recognise how to add 1s to find the total efficiently.</p>		<p>$2 + 3 = 5$ so $12 + 3 = 15$</p>

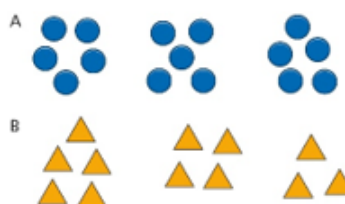
<p>Bridging the 10 using number bonds</p>	 <p>'7 add 3 makes 10 so 7 and 5 is 10 and two more'</p>		
<p>Year 1 Subtraction</p>			
<p>Counting back and taking away</p>	<p>Children arrange objects and remove to find how many are left.</p>	 <p>9 - <input type="text"/> = <input type="text"/></p> <p>There are <input type="text"/> children left.</p>	
<p>Finding a missing part, given a whole and part</p>	 <p>8 - 5 = ?</p>	 <p><input type="text"/> - <input type="text"/> = <input type="text"/></p>	 <p>7 - 3 = ?</p>

<p>Finding the difference</p>		 <p>$5 - 4 = 1$ The difference between 5 and 4 is 1.</p>	<p>Children understand 'find the difference' subtraction.</p>  <p>$10 - 4 = 6$ The difference between 10 and 6 is 4.</p>
<p>Subtraction within 20</p>	<p>Use a bead string to subtract 1s efficiently</p>  <p>$5 - 3 = 2$ $15 - 3 = 12$</p>	 <p>$5 - 3 = 2$ $15 - 3 = 12$</p>	
<p>Subtraction bridging 10 using number bonds</p>	<p>$12 - 7 =$</p> <p>Arrange objects into a 10 and some 1s, then decide on how to split the 7 into parts.</p>  <p>7 is 2 and 5, so I take away the 2 and then the 5.</p>	<p>$13 - 5 =$</p>  <p>For $13 - 5$, I take away 3 to make 10, then take away 2 to make 8.</p>	<p>$13 - 5$</p> 

Year 1 multiplication

Recognising and making equal groups

Children arrange objects in equal and unequal groups and understand how to recognise whether they are equal.



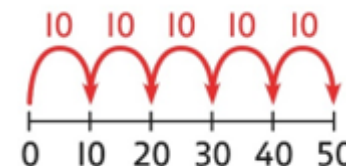
Describe equal groups using words

*Three equal groups of 4.
Four equal groups of 3.*

Finding the total of equal groups by counting in 2s, 5s and 10s

Provide objects to count

There are 5 pens in each pack ...
5... 10... 15... 20... 25... 30... 35... 40...



Year 1 Division

Grouping

Learn to make equal groups from a whole and find how many equal groups of a certain size can be made.

Sort a whole set people and objects into equal groups.



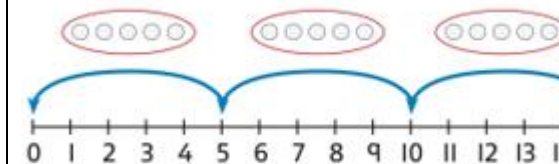
*There are 10 children altogether.
There are 2 in each group.
There are 5 groups.*

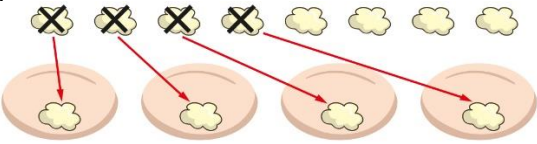

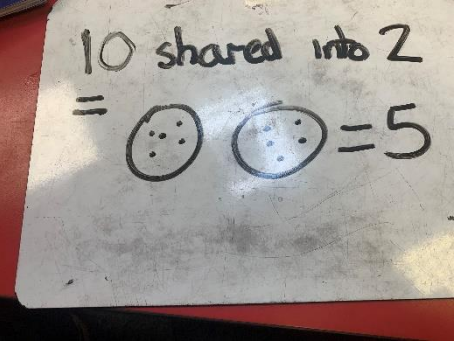
Represent a whole and work out how many equal groups.

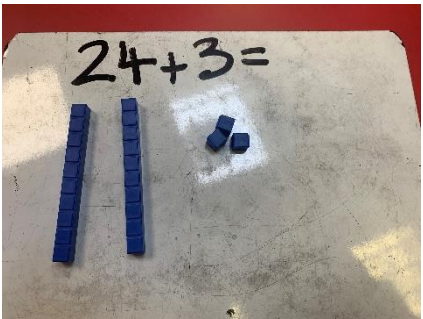
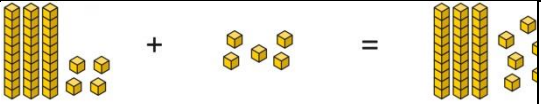
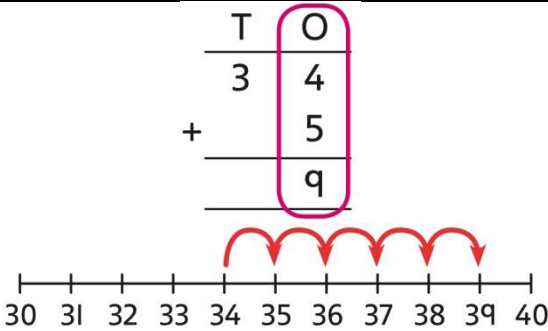


*There are 10 in total.
There are 5 in each group.
There are 2 groups.*

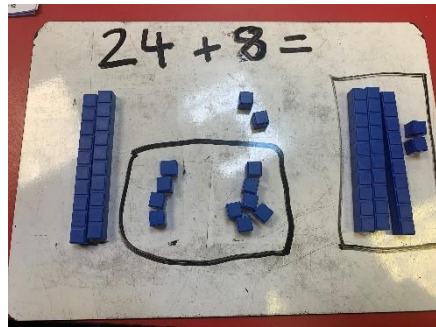
Children may relate this to counting back in steps of 2, 5 or 10.



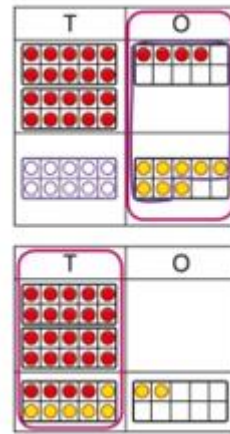
<p>Sharing</p>	<p>Share a set of objects into equal parts and work out how many are in each part.</p> 	<p>Sketch or draw to represent sharing into equal parts. This may be related to fractions.</p> 	
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Year 2			
Addition			
Concept	Concrete	Pictorial	Abstract
<p>Adding a 1-digit number to a 2-digit number not bridging a 10</p>		 <p>34 is 3 tens and 4 ones. 4 ones and 5 ones are 9 ones. The total is 3 tens and 9 ones.</p>	

Adding a 1-digit number to a 2-digit number with an exchange



Exchange 10 ones for 1 ten.



Exchange 10 ones for 1 ten.



Adding a multiple of 10 to a 2 digit number

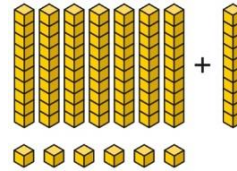
Add the 10s and then recombine.



27 is 2 tens and 7 ones.
50 is 5 tens.

There are 7 tens in total and 7 ones.
So, 27 + 50 is 7 tens and 7 ones.

Add the 10s and then recombine.



66 is 6 tens and 6 ones.
66 + 10 = 76

A 100 square can support this understanding.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Add the 10s and then recombine.

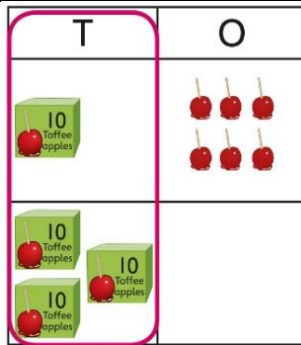
$$37 + 20 =$$

$$30 + 20 = 50$$

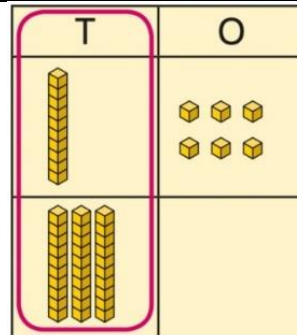
$$50 + 7 = 57$$

$$37 + 20 = 57$$

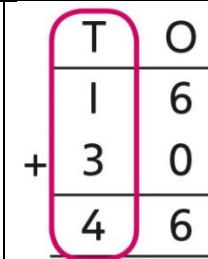
Adding a multiple of 10 to a 2-digit number using columns



16 is 1 ten and 6 ones.
30 is 3 tens.
There are 4 tens and 6 ones in total.



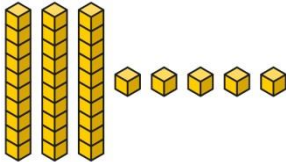
16 is 1 ten and 6 ones.
30 is 3 tens.
There are 4 tens and 6 ones in total.



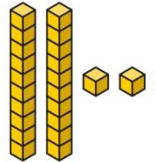
$1 + 3 = 4$
 $1 \text{ ten} + 3 \text{ tens} = 4 \text{ tens}$
 $16 + 30 = 46$

Adding two 2 digit numbers (no exchange)

Add the 10s and 1s separately.

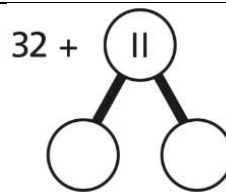


$5 + 3 = 8$
There are 8 ones in total.



$3 + 2 = 5$
There are 5 tens in total.

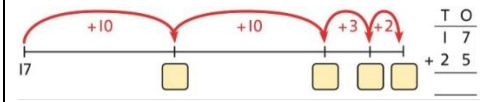
$35 + 23 = 58$



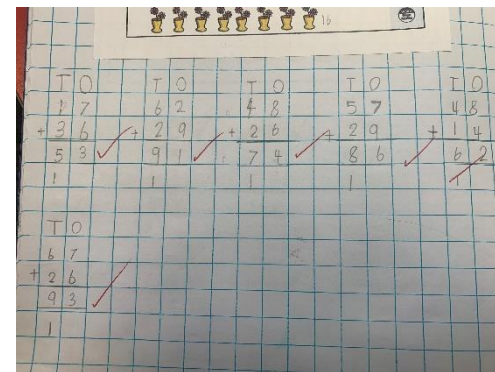
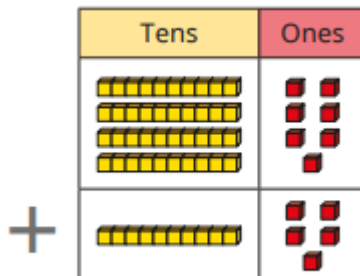
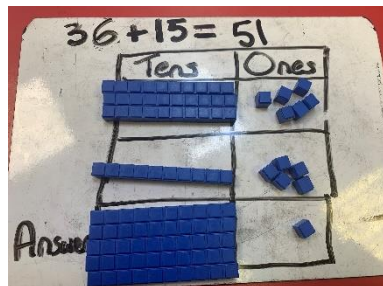
$11 = 10 + 1$
 $32 + 10 = 42$
 $42 + 1 = 43$

$32 + 11 = 43$

$17 + 25 =$

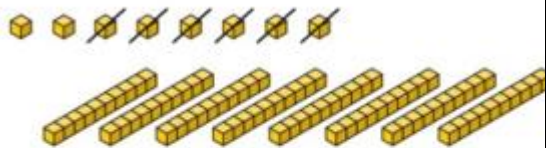


Adding two
2 digit
numbers
with an
exchange

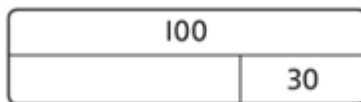


Year 2 Subtraction

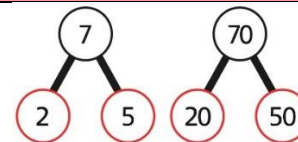
Subtracting
multiples of
10



8 subtract 6 is 2.
So, 8 tens subtract 6 tens is 2 tens.

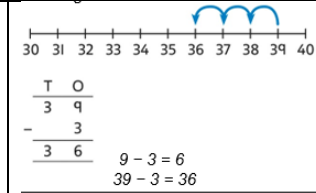
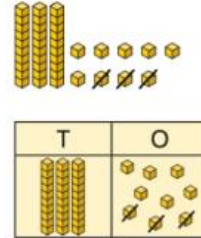
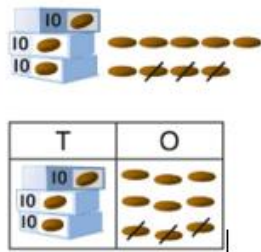


$10 - 3 = 7$
So, 10 tens subtract 3 tens is 7 tens.

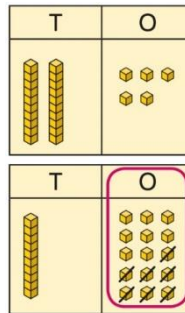
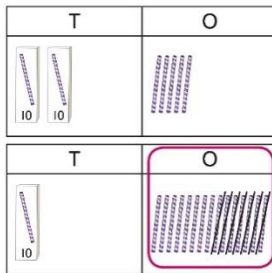


7 tens subtract 5 tens is 2 tens.
 $70 - 50 = 20$

Subtracting
a single-digit
number

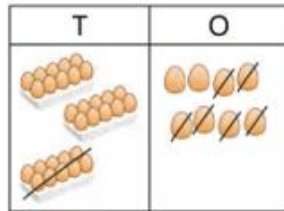


Subtracting a single digit number using exchange

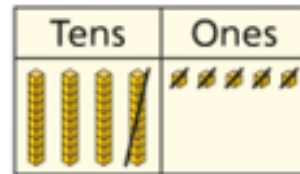


$$\begin{array}{r} \text{T} \quad \text{O} \\ 2 \quad 15 \\ - \quad 7 \\ \hline 1 \quad 8 \end{array}$$

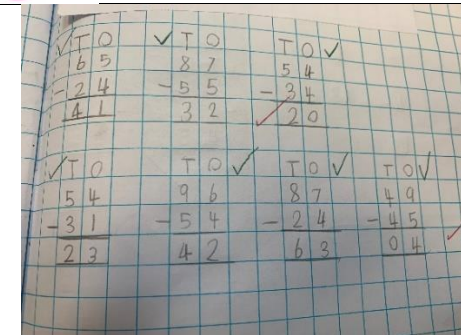
Subtracting a 2 digit number (no exchange)



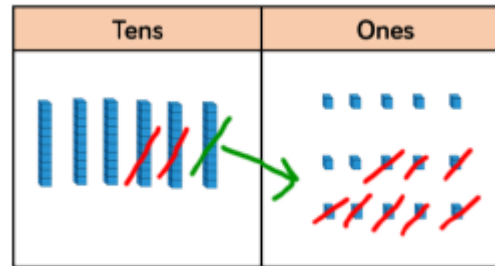
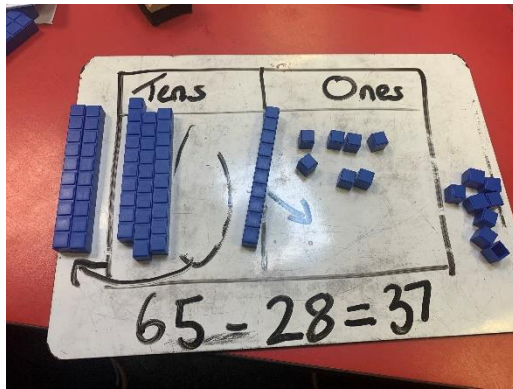
$$38 - 16 = 22$$



Subtract the ones then the tens



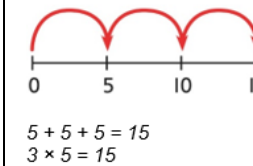
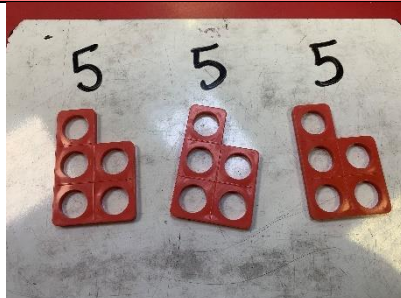
Subtracting a 2 digit number with an exchange



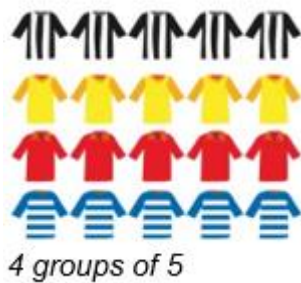
$$\begin{array}{r} \overset{5}{\cancel{6}}\overset{1}{5} \\ - 28 \\ \hline 37 \end{array}$$

Year 2 Multiplication

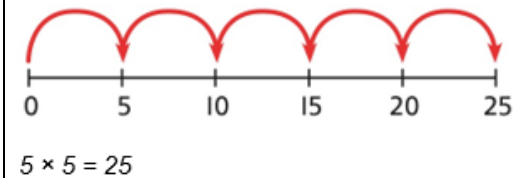
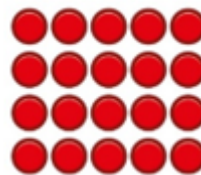
Equal groups and repeated addition



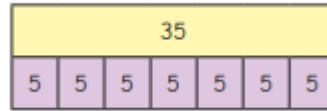
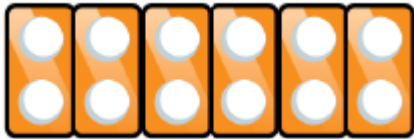
Using arrays to represent multiplication and support understanding



Four groups of 5



Learning 2x,
5x and 10 x
tables facts

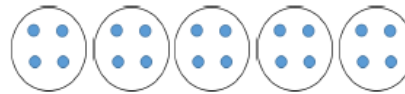


$$7 \times 5 = 35$$

Year 2 Division

Sharing
equally

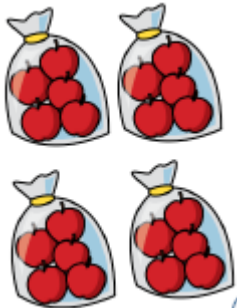
30 flowers are shared equally between 5 vases.



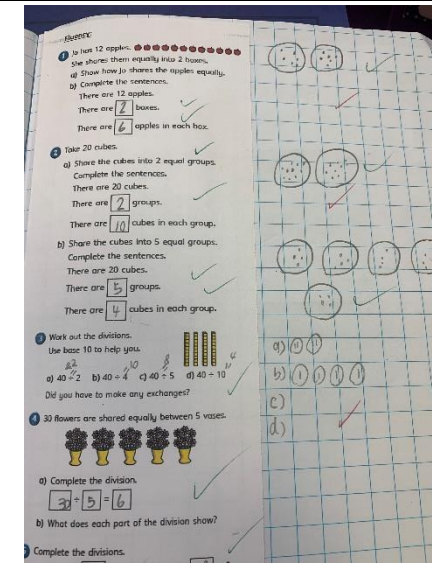
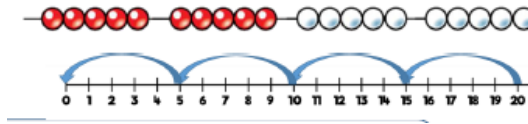
$$20 \div 5 = 4$$

$$20 \div 5 = 4$$

Grouping equally



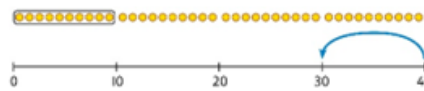
There are 20 apples altogether.
They are put in bags of 5.
How many bags are there?



Using known times tables to solve divisions

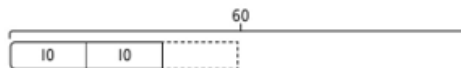


4 groups of 5 cars is 20 cars in total.
20 divided by 4 is 5.



40 divided by 4 is 10.

Use a bar model to support understanding of the link between times-table knowledge and division.



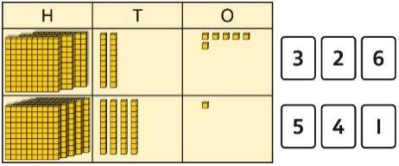
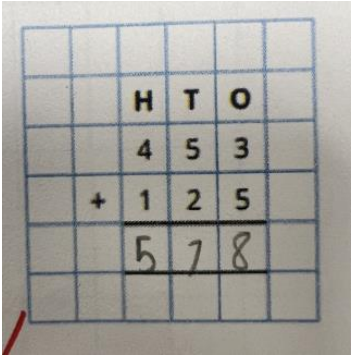
- $1 \times 10 = 10$
- $2 \times 10 = 20$
- $3 \times 10 = 30$
- $4 \times 10 = 40$
- $5 \times 10 = 50$
- $6 \times 10 = 60$
- $7 \times 10 = 70$
- $8 \times 10 = 80$

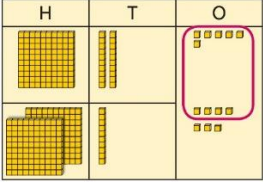
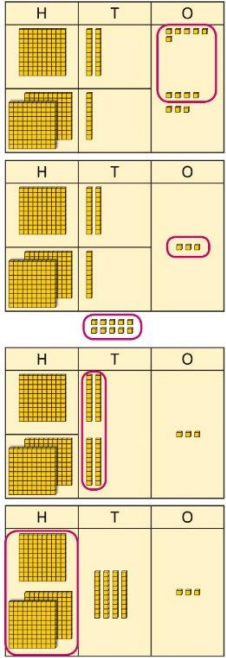
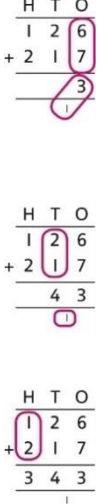
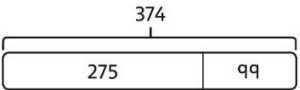
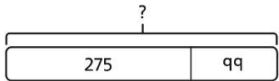
I used the 10 times-table to help me.
 $3 \times 10 = 30$.

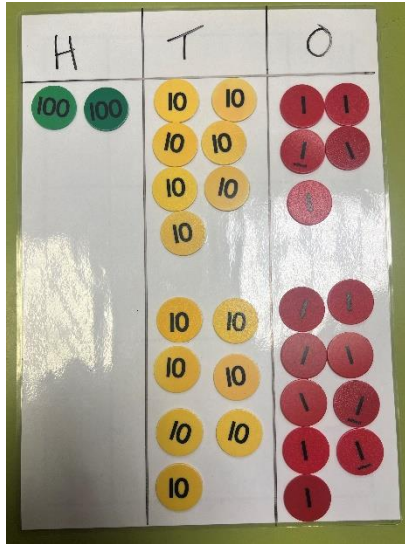
I know that 3 groups of 10 makes 30, so know that 30 divided by 10 is 3.

$3 \times 10 = 30$ so $30 \div 10 = 3$

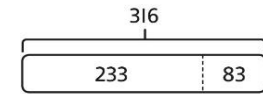
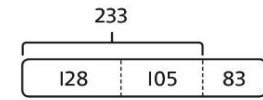
Y3 Addition

Concept	Concrete	Pictorial	Abstract
<p>Add numbers with up to three digits using the formal written method of column addition- no regrouping</p>	<p>Use place value equipment to make a representation of a calculation. This may or may not be structured in a place value grid.</p> <p><i>326 + 541 is represented as:</i></p> 	<p>Represent the place value grid with equipment to model the stages of column addition.</p>	<p>Use a column method to solve efficiently, using known bonds. Children must understand how this relates to place value at every stage of the calculation.</p> 
<p>Add numbers with up to three digits using the formal written</p>	<p>Use place value equipment to enact the exchange required.</p>	<p>Model the stages of column addition using place value equipment on a place value grid.</p>	<p>Use column addition, ensuring understanding of place value at every stage of the calculation.</p>

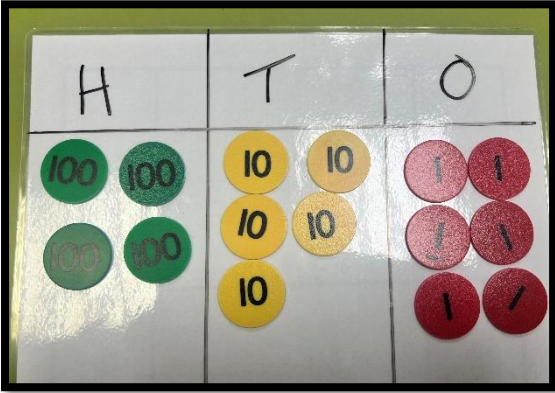
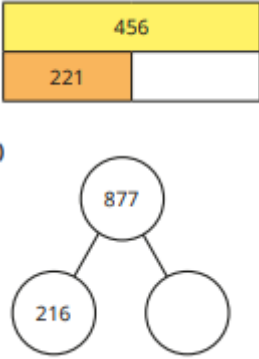
<p>method of column addition-with regrouping</p>	 <p><i>There are 13 ones. I will exchange 10 ones for 1 ten.</i></p>		 <p><i>126 + 217 = 343</i></p> <p>Note: Children should also study examples where exchange is required in more than one column, for example $185 + 318 = ?$</p>
<p>Representing addition problems, and selecting appropriate methods</p>	<p>Encourage children to use their own drawings and choices of place value equipment to represent problems with one or more steps.</p> <p>These representations will help them to select appropriate methods.</p> <p>$275 + 99 =$</p>	<p>Children understand and create bar models to represent addition problems.</p> <p>$275 + 99 = ?$</p>  <p>$275 + 99 = 374$</p>	<p>Use representations to support choices of appropriate methods.</p>  <p><i>I will add 100, then subtract 1 to find the solution.</i></p> <p>$128 + 105 + 83 = ?$ <i>I need to add three numbers.</i></p>

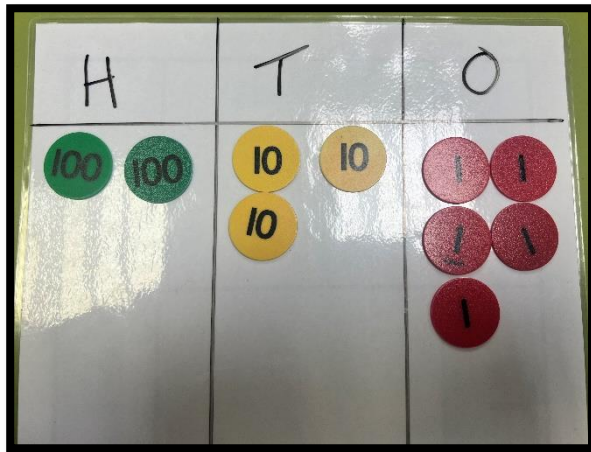


$$128 + 105 = 233$$



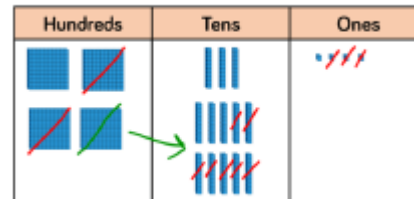
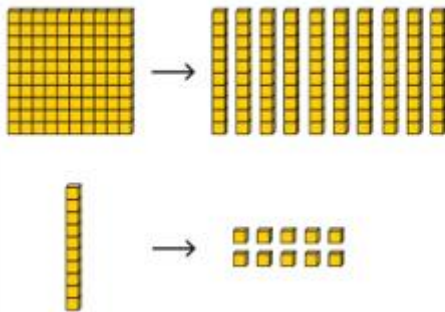
Y3 Subtraction

Concept	Concrete	Pictorial	Abstract
<p>Subtract numbers with up to three digits using formal written methods of column subtraction without exchange.</p>	<p>Model 456- 221 using place value counters</p>  <p>The first picture shows 456. The second picture shows 2 hundreds, 2 tens and 1 one being taken physically away.</p>	 <p>i)</p>	$ \begin{array}{r} \text{H T O} \\ \hline 456 \\ - 221 \\ \hline 235 \end{array} $

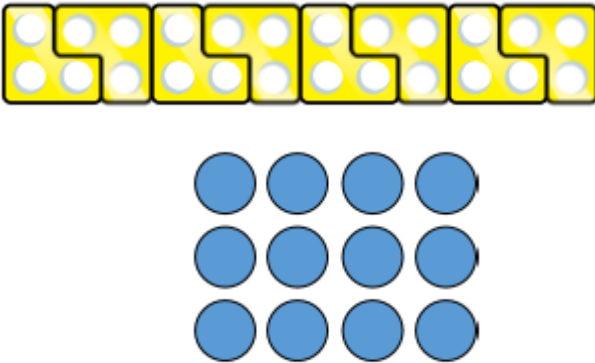
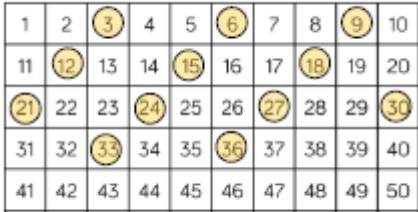

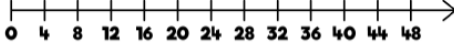


Subtract numbers with up to three digits using formal written methods of column subtraction **with** exchange.

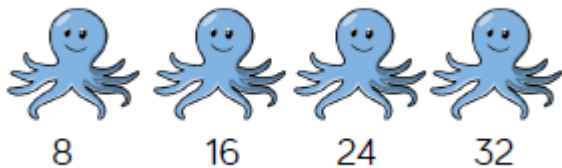
Use equipment to enact the exchange of 1 hundred for 10 tens, and 1 ten for 10 ones.



$$\begin{array}{r}
 \overset{3}{4} \overset{1}{3} 5 \\
 - 273 \\
 \hline
 162
 \end{array}$$

Y3 Multiplication			
Concept	Concrete	Pictorial	Abstract
Recall and use multiplication and division facts for the 3x tables	 <p>The concrete representation shows a row of four yellow blocks, each containing a 2x2 grid of white dots. Below this is a 3x4 grid of blue circles.</p>	 <p>The pictorial representation is a 5x10 grid of numbers from 1 to 50. The numbers 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, and 39 are circled in yellow, representing the 3x4 multiplication table.</p>	$1 \times 3 = 3$ $2 \times 3 = 6$ $3 \times 3 = 9$
Recall and use multiplication and division facts for the 4x tables	 <p>The concrete representation shows four yellow squares. Below each square is a number: 4, 8, 12, and 16.</p>	 <p>The pictorial representation is a number line from 0 to 48 with major tick marks every 4 units. The numbers 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, and 48 are labeled below the line.</p>	$3 \times 4 = 12$ $4 \times 4 = 16$ $5 \times 4 = 20$

Recall and use multiplication and division facts for the 8x tables



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

$$5 \times 8 = 40$$

$$6 \times 8 = 48$$

$$7 \times 8 = 56$$

Multiply 2-digit numbers by a one-digit number

Each person has 23 flowers.

Each person has 2 tens and 3 ones.



There are 3 groups of 2 tens.

There are 3 groups of 3 ones.

$3 \times 24 = ?$

T	O

$3 \times 4 = 12$

T	O

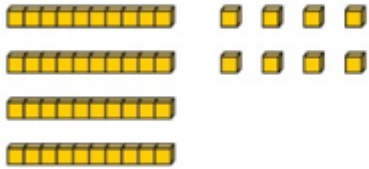
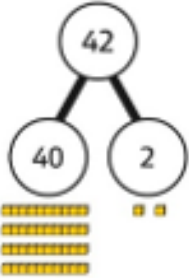
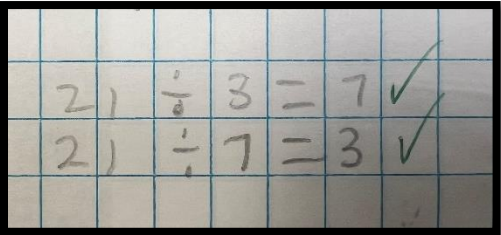


$3 \times 20 = 60$

$60 + 12 = 72$

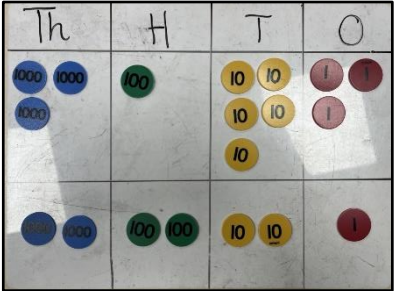
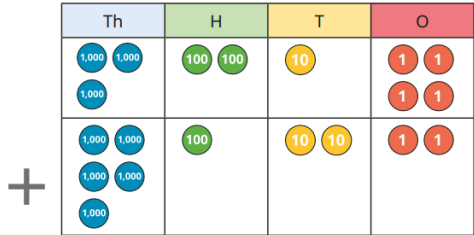
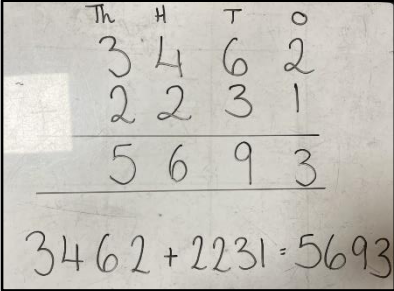

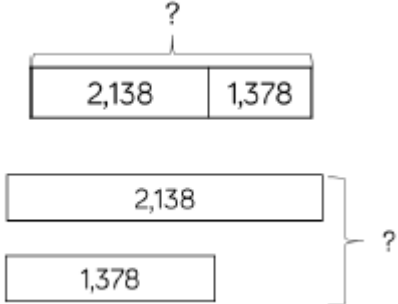
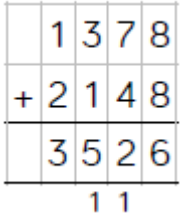
$3 \times 24 = 72$

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

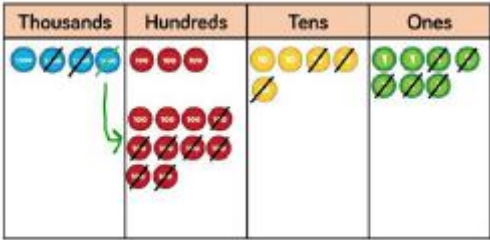
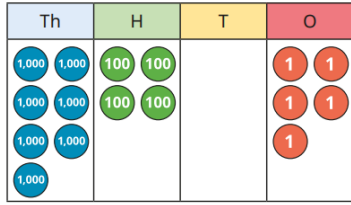

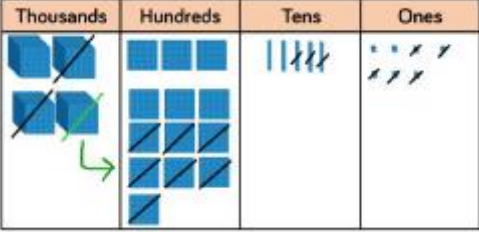
Y3 Division

Concept	Concrete	Pictorial	Abstract
<p>Divide a 2 digit number by a 1 digit number without an exchange</p>	<p>Children explore dividing 2-digit numbers by using place value equipment.</p>  <p>$48 \div 2 = ?$</p>		
<p>Divide a 2-digit number by 1-digit number with a remainder</p>		<p>$29 \div 2 = ?$</p>  <p>$29 \div 2 = 14 \text{ remainder } 1$</p>	<p>67 children try to make 5 equal lines.</p> <p>$67 = 50 + 17$ $50 \div 5 = 10$</p> <p>$17 \div 5 = 3 \text{ remainder } 2$ $67 \div 5 = 13 \text{ remainder } 2$</p> <p>There are 13 children in each line and 2 children left out.</p>

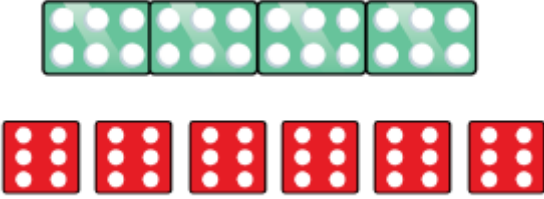
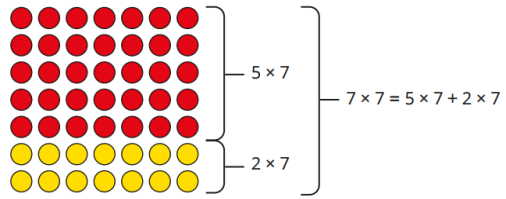

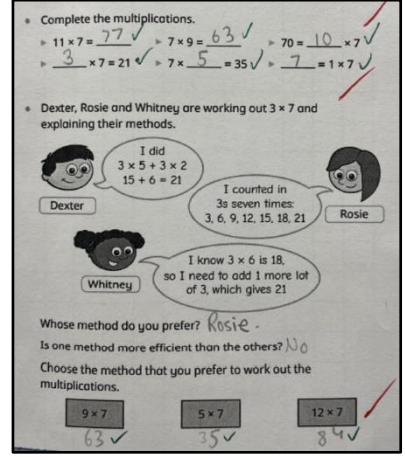
Year 4 Addition

Concept	Concrete	Pictorial	Abstract
<p>Add up to two 4 digit numbers with no exchange.</p>		<p>Calculate $3,214 + 5,122$ Use the place value chart to help you.</p> 	
<p>Add two 4 digit numbers with exchanges.</p>			

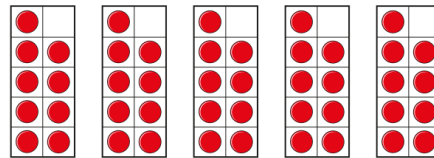
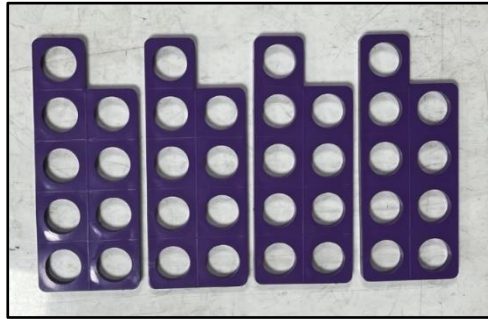
Year 4 Subtraction

Concept	Concrete	Pictorial	Abstract
Subtract two 4 digit numbers- no exchange		c) $7,405 - 404$ 	
Subtract two 4 digit numbers- with exchanges		$ \begin{array}{r} 4,357 \\ \hline 2,735 \quad ? \\ \hline 4,357 \\ \hline 2,735 \quad ? \end{array} $	$ \begin{array}{r} ^3 ^1 \\ 4357 \\ - 2735 \\ \hline 1622 \end{array} $

Year 4 Multiplication

Year 4 Multiplication																																																																																																							
Concept	Concrete	Pictorial	Abstract																																																																																																				
<p>Recall and apply multiplication and division facts for 6 times tables</p>		<table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td style="background-color: yellow;">6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>11</td><td style="background-color: yellow;">12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td style="background-color: yellow;">18</td><td>19</td><td>20</td></tr> <tr><td>21</td><td>22</td><td>23</td><td style="background-color: yellow;">24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td style="background-color: yellow;">30</td></tr> <tr><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td style="background-color: yellow;">36</td><td>37</td><td>38</td><td>39</td><td>40</td></tr> <tr><td>41</td><td style="background-color: yellow;">42</td><td>43</td><td>44</td><td>45</td><td>46</td><td>47</td><td style="background-color: yellow;">48</td><td>49</td><td>50</td></tr> <tr><td>51</td><td>52</td><td>53</td><td style="background-color: yellow;">54</td><td>55</td><td>56</td><td>57</td><td>58</td><td>59</td><td style="background-color: yellow;">60</td></tr> <tr><td>61</td><td>62</td><td>63</td><td>64</td><td>65</td><td>66</td><td>67</td><td>68</td><td>69</td><td>70</td></tr> <tr><td>71</td><td>72</td><td>73</td><td>74</td><td>75</td><td>76</td><td>77</td><td>78</td><td>79</td><td>80</td></tr> <tr><td>81</td><td>82</td><td>83</td><td>84</td><td>85</td><td>86</td><td>87</td><td>88</td><td>89</td><td>90</td></tr> <tr><td>91</td><td>92</td><td>93</td><td>94</td><td>95</td><td>96</td><td>97</td><td>98</td><td>99</td><td>100</td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	<p>$3 \times 6 = 18$</p> <p>$6 \times 3 = 18$</p> <p>18 divided by 3 = 6</p> <p>18 divided by 6 = 3</p>
1	2	3	4	5	6	7	8	9	10																																																																																														
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<p>Recall and apply multiplication and division facts for 7 times tables</p>																																																																																																							

Recall and apply multiplication and division facts for 9 times tables



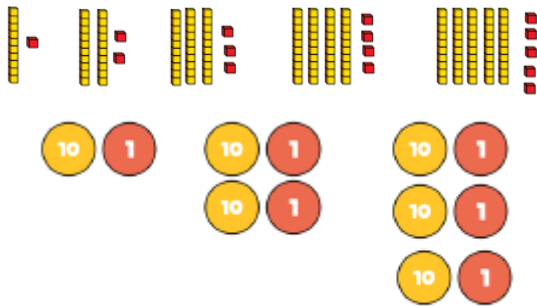
$$7 \times 9 = 63$$

$$3 \times 9 = 27$$

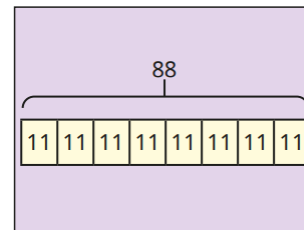
$$9 \times 9 = 81$$

$$12 \times 9 = 108$$

Recall and apply multiplication and division facts for 11 times tables



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

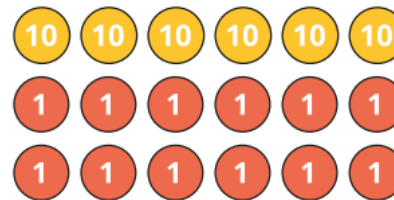
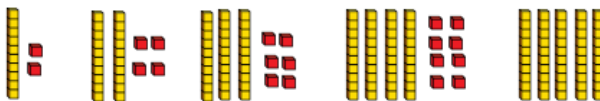


$$99 \div 11$$

$$55 \div 11$$

$$22 \div 11$$

Recall and apply multiplication and division facts for 12 times tables



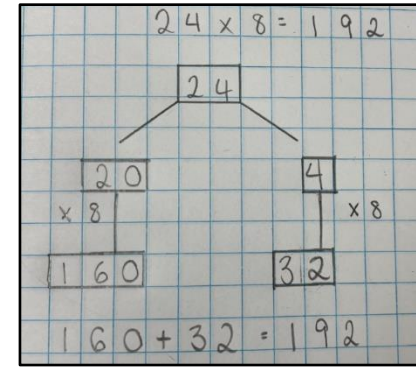
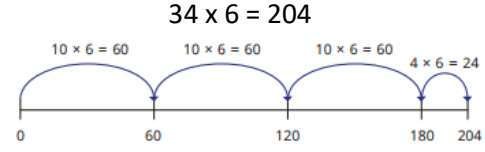
$$36 \div 12 = 3 \checkmark \quad 60 \div 12 = 5 \checkmark \quad 84 \div 12 = 7 \checkmark$$

1	2	x	3	=	3	6
5	x	1	2	=	6	0
1	2	x	7	=	8	4

Use informal written methods for multiplication



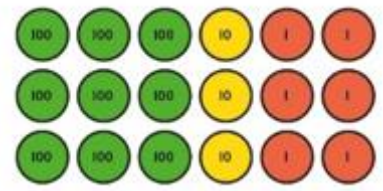
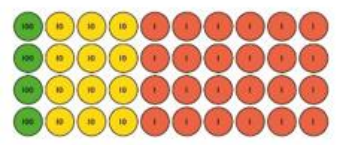
$$24 \times 3 = 12 + 60 =$$



Multiply up to 3 digit number by a 1 digit number- no exchange

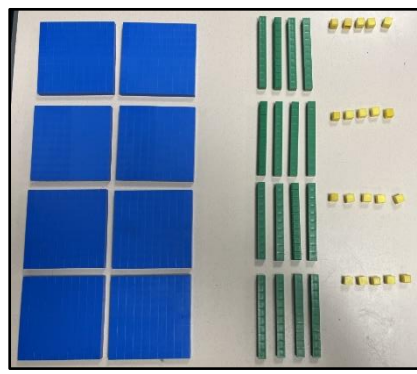
Use place value equipment to make multiplications.

Make 4×136 using equipment.

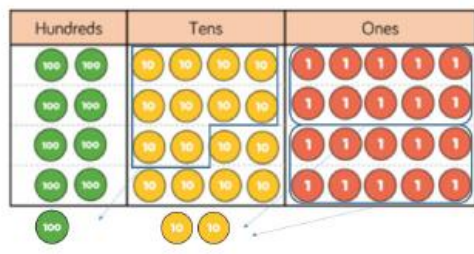


$$\begin{array}{r} 312 \\ \times \quad 3 \\ \hline 936 \end{array}$$

Multiply a 3 digit number by a 1 digit number with exchanges

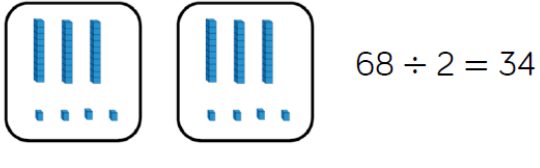
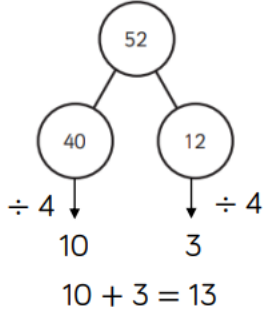
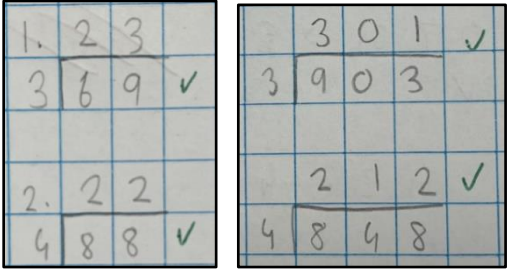
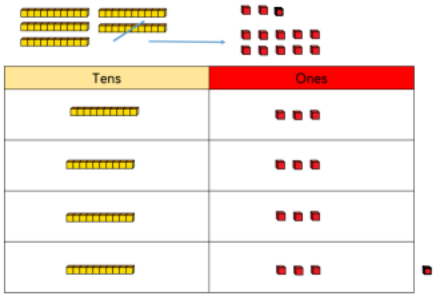
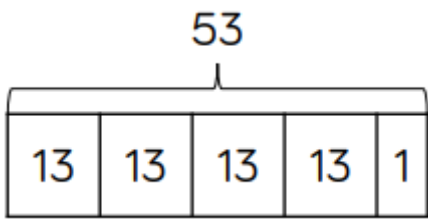
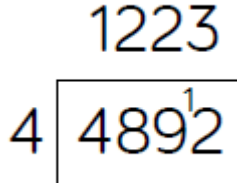


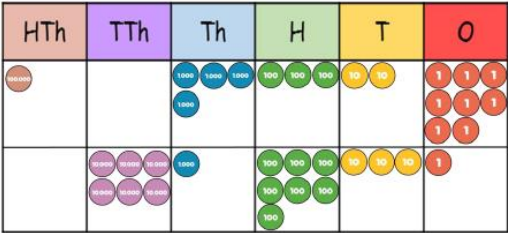
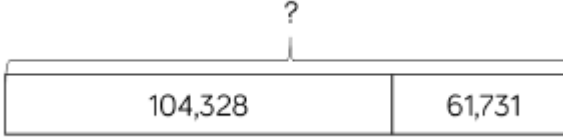
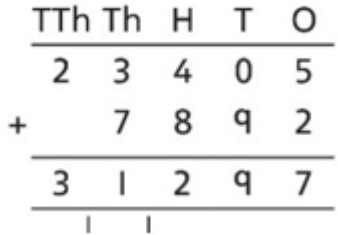
$$245 \times 4 =$$

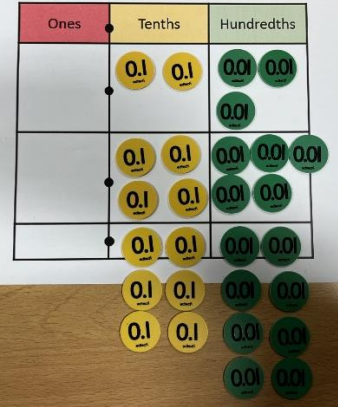
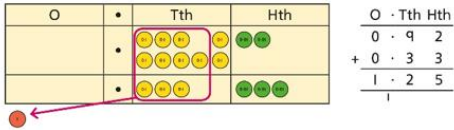


	H	T	O
		2	4
		4	5
x			4
	9	8	0
	1	2	

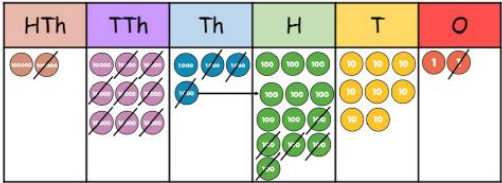
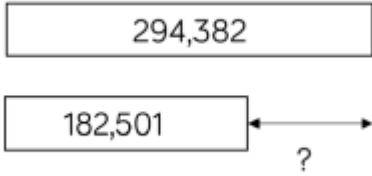
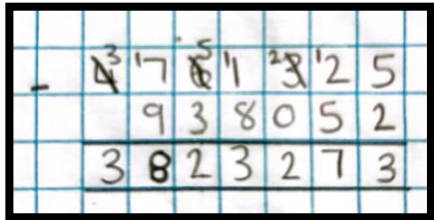
Year 4 Division

Concept	Concrete	Pictorial	Abstract
Divide 2 and 3 digit numbers using formal written method of short division			
Divide 2 and 3 digit numbers using formal written method of short division-with remainders			

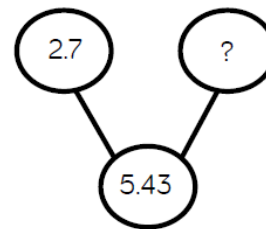
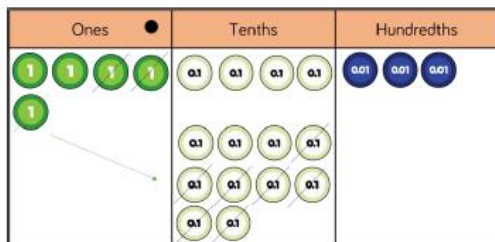
Concept	Concrete	Pictorial	Abstract
Add whole numbers with more than 4 digits using formal written methods			

<p>Add numbers with up to 3 decimal places using formal written methods</p>			$\begin{array}{r} 0.92 \\ + 0.33 \\ \hline 1.25 \end{array}$
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UKS2 Subtraction

Concept	Concrete	Pictorial	Abstract
<p>Subtract whole numbers with more than 4 digits using formal written methods</p>			

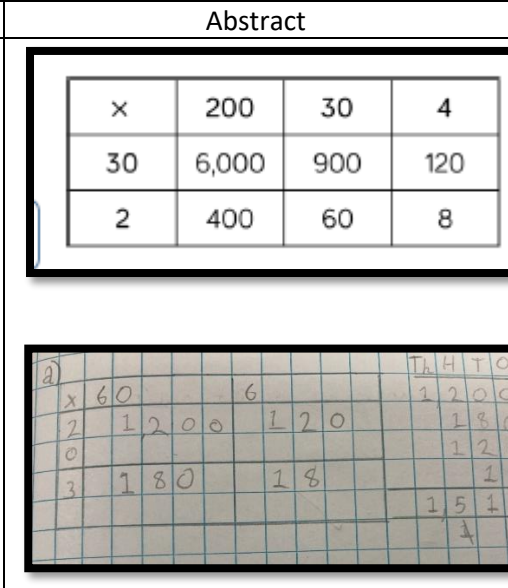
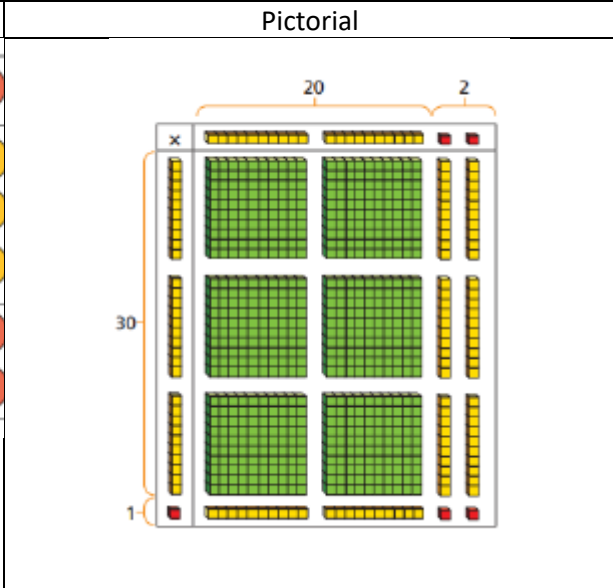
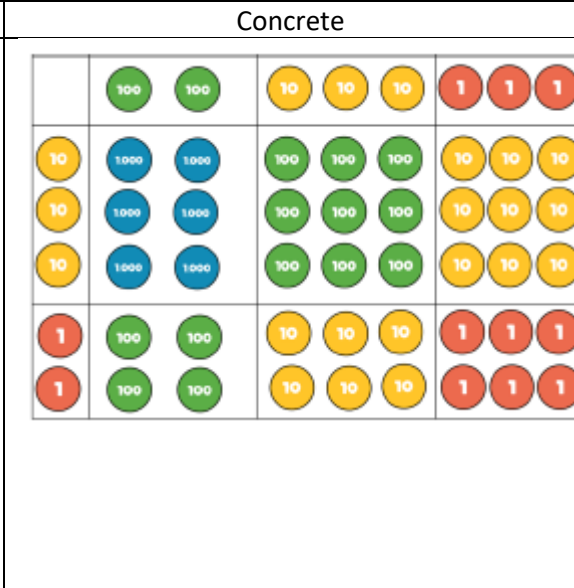
Subtract numbers with up to 3 decimal places



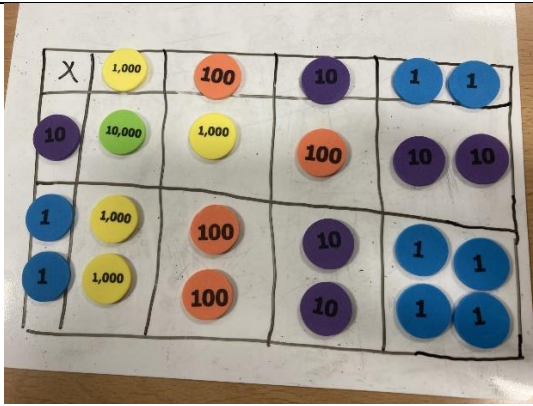
$$\begin{array}{r} 4 \quad 1 \\ 5.43 \\ - 2.7 \\ \hline 2.73 \end{array}$$

UKS2 Multiplication

Multiply numbers with up to 4 digits by a 2 digit number using an expanded formal written method (Year 5)



Multiply numbers with up to 4 digits by a 2 digit number using a compact formal written method (Year 5)



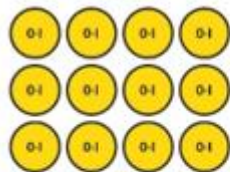
$$\begin{array}{r}
 \quad 1 \ 2 \ 3 \ 5 \\
 \times \ 2 \ 1 \\
 \hline
 \ 1 \ 2 \ 3 \ 5 \\
 2 \ 4 \ 7 \ 0 \ 0 \\
 \hline
 2 \ 5 \ 9 \ 3 \ 5
 \end{array}$$

$1 \times 1,235$
 $20 \times 1,235$
 $21 \times 1,235$

Multiply multi-digit numbers up to 4 digits by a 2 digit whole number using the formal written method of long multiplication (Y6)

	TTh	Th	H	T	O
		2	7	3	9
x				2	8
2	1	9	1	2	
2	5	3	7		
1	5	4	7	8	0
	7	6	6	9	2

Multiplying decimals
(Year 6)



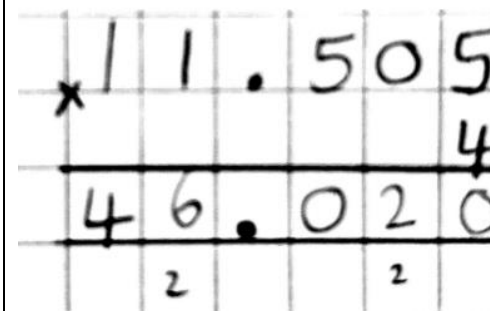
3 groups of 4 tenths is 12 tenths.
4 groups of 3 tenths is 12 tenths.

Represent calculations on a place value grid.

$$3 \times 3 = 9$$

$$3 \times 0.3 = 0.9$$

T	O	•	Tth



UKS2 Division

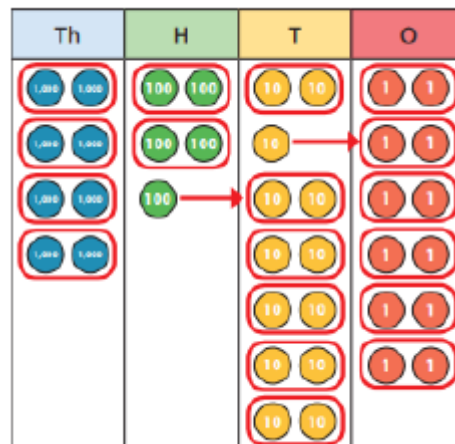
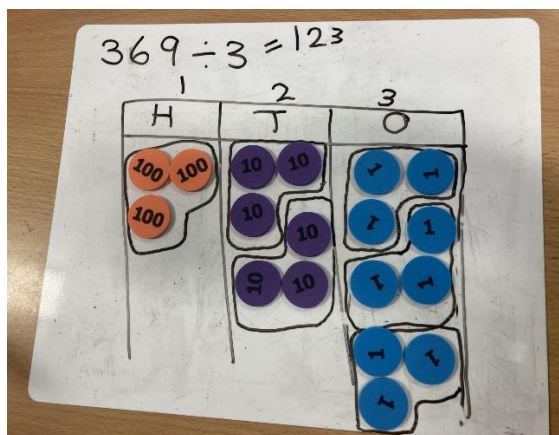
Concept

Concrete


Pictorial

Abstract

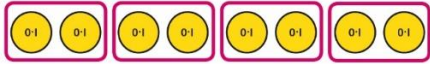
Divide up to 4 digit numbers by a 1 digit number using the formal written method of short division and interpret remainders according to context.



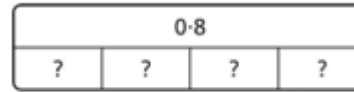
	4	2	6	6
2	8	5	13	12

<p>Dividing by a 2 digit number using factors (Y6)</p>	<p>Understand that division by factors can be used when dividing by a number that is not prime.</p>	<p>Use factors and repeated division.</p> $1,260 \div 14 = ?$  $1,260 \div 2 = 630$ $630 \div 7 = 90$ $1,260 \div 14 = 90$	<p>Use factors and repeated division where appropriate.</p> $2,100 \div 12 = ?$ $2,100 \rightarrow +2 \rightarrow +6 \rightarrow$ $2,100 \rightarrow +6 \rightarrow +2 \rightarrow$ $2,100 \rightarrow +3 \rightarrow +4 \rightarrow$ $2,100 \rightarrow +4 \rightarrow +3 \rightarrow$ $2,100 \rightarrow +3 \rightarrow +2 \rightarrow +2 \rightarrow$																																																																																				
<p>Dividing by a 2 digit number using long division (Y6)</p>			<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; margin-right: 20px;"> $7,335 \div 15 = 489$ </div> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td></td><td>0</td><td>4</td><td>8</td><td>9</td></tr> <tr><td>15</td><td>7</td><td>3</td><td>3</td><td>5</td></tr> <tr><td>-</td><td>6</td><td>0</td><td>0</td><td>0</td></tr> <tr><td></td><td>1</td><td>3</td><td>3</td><td>5</td></tr> <tr><td>-</td><td>1</td><td>2</td><td>0</td><td>0</td></tr> <tr><td></td><td></td><td>1</td><td>3</td><td>5</td></tr> <tr><td>-</td><td></td><td>1</td><td>3</td><td>5</td></tr> <tr><td></td><td></td><td></td><td></td><td>0</td></tr> </table> <div style="margin-left: 20px;"> <p>1 × 15 = 15</p> <p>2 × 15 = 30</p> <p>3 × 15 = 45</p> <p>4 × 15 = 60</p> <p>5 × 15 = 75</p> <p>10 × 15 = 150</p> </div> </div>		0	4	8	9	15	7	3	3	5	-	6	0	0	0		1	3	3	5	-	1	2	0	0			1	3	5	-		1	3	5					0																																												
	0	4	8	9																																																																																			
15	7	3	3	5																																																																																			
-	6	0	0	0																																																																																			
	1	3	3	5																																																																																			
-	1	2	0	0																																																																																			
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-		1	3	5																																																																																			
				0																																																																																			
<p>Dividing by a 2 digit number using long division with remainders (Y6)</p>			<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; margin-right: 20px;"> $372 \div 15 = 24 \text{ r}12$ </div> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td></td><td></td><td></td><td>2</td><td>4</td><td>r</td><td>1</td><td>2</td></tr> <tr><td>1</td><td>5</td><td>3</td><td>7</td><td>2</td><td></td><td></td><td></td></tr> <tr><td>-</td><td></td><td>3</td><td>0</td><td>0</td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td>7</td><td>2</td><td></td><td></td><td></td></tr> <tr><td>-</td><td></td><td></td><td>6</td><td>0</td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td>1</td><td>2</td><td></td><td></td></tr> </table> <div style="margin-left: 20px;"> <p>1 × 15 = 15</p> <p>2 × 15 = 30</p> <p>3 × 15 = 45</p> <p>4 × 15 = 60</p> <p>5 × 15 = 75</p> <p>10 × 15 = 150</p> </div> </div> <div style="margin-top: 20px;"> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td></td><td></td><td></td><td>2</td><td>4</td><td>⁴/₅</td></tr> <tr><td>1</td><td>5</td><td>3</td><td>7</td><td>2</td><td></td></tr> <tr><td>-</td><td></td><td>3</td><td>0</td><td>0</td><td></td></tr> <tr><td></td><td></td><td></td><td>7</td><td>2</td><td></td></tr> <tr><td>-</td><td></td><td></td><td>6</td><td>0</td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td>1</td><td>2</td></tr> </table> <div style="margin-left: 20px; border: 1px solid black; border-radius: 10px; padding: 5px;"> $372 \div 15 = 24 \frac{4}{5}$ </div> </div>				2	4	r	1	2	1	5	3	7	2				-		3	0	0							7	2				-			6	0								1	2						2	4	⁴ / ₅	1	5	3	7	2		-		3	0	0					7	2		-			6	0						1	2
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Dividing
decimals
(Y6)



Use place value equipment to divide
decimals into equal groups.
*8 tenths divided into 4 groups. 2 tenths in
each group.*



$$4 \times 2 = 8 \qquad 8 \div 4 = 2$$
$$\text{So, } 4 \times 0.2 = 0.8 \qquad 0.8 \div 4 = 0.2$$

