



## Boothferry Primary School Calculation Policy

# Y4 ADDITION

NC Objective, Strategy & Key Vocabulary	Concrete	Pictorial	Abstract																				
<p>1. Column addition with numbers with up to 4 digits.</p> <p><b>Thousands, hundreds, tens, ones</b></p> <p>Add numbers with up to 4 digits using the formal written method of columnar addition.</p>	<p>Children continue to use place value counters to add; exchanging ten ones for a ten and ten tens for a hundred and ten hundreds for a thousand.</p> <p><math>2356 + 3115 = 5471</math></p>	<p>Children can draw their own place value chart and circles to represent counters.</p> <p><math>326 + 135</math> (10 ones renamed – swapped – for 1 ten)</p> <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">Th</th> <th style="padding: 5px;">H</th> <th style="padding: 5px;">T</th> <th style="padding: 5px;">O</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">○ ○</td> <td style="text-align: center;">○ ○ ○</td> <td style="text-align: center;">○ ○ ○</td> <td style="text-align: center;">○ ○ ○</td> </tr> <tr> <td style="text-align: center;">○ ○ ○</td> <td style="text-align: center;">○</td> <td style="text-align: center;">○ ○</td> <td style="text-align: center;">○ ○ ○</td> </tr> <tr> <td style="text-align: center;">○ ○ ○</td> <td style="text-align: center;">○</td> <td style="text-align: center;">○</td> <td style="text-align: center;">○ ○ ○</td> </tr> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;">4</td> <td style="text-align: center;">7</td> <td style="text-align: center;">1</td> </tr> </tbody> </table> <p style="text-align: center; margin-top: 10px;">underneath <span style="margin-left: 20px;">1 ○</span></p>	Th	H	T	O	○ ○	○ ○ ○	○ ○ ○	○ ○ ○	○ ○ ○	○	○ ○	○ ○ ○	○ ○ ○	○	○	○ ○ ○	5	4	7	1	<p>Continue from Y3 – when children are confident exchanging ten 1s for one 10, they should progress to questions which require them to exchange in more than one place value column.</p> <p style="font-size: small; margin-top: 10px;">NB. Ones/tens/hundreds that are 'carried' should be placed underneath. Once children are secure when calculating with numbers, apply to the contexts of measures inc. money. Children should be exposed to questions in which the number have different numbers of digits.</p>
Th	H	T	O																				
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5	4	7	1																				
<p>2. Estimation and inverse</p> <p><b>Estimate, round, approximate, inverse, opposite</b></p> <p>Estimate and use inverse operations to check answers to a calculation.</p>	<p>See Y4 subtraction for use of place value counters to check using inverse.</p>	<p><b>Inverse:</b> Use bar models to show the relationship between the numbers in any calculation.</p> <table style="margin-left: auto; margin-right: auto; border-collapse: collapse; border: 1px solid black;"> <tr> <td style="width: 100px; height: 20px;"></td> <td style="width: 100px; height: 20px; text-align: center;">3913</td> <td style="width: 100px; height: 20px;"></td> </tr> <tr> <td style="width: 100px; height: 20px;"></td> <td style="width: 100px; height: 20px; text-align: center;">3517</td> <td style="width: 100px; height: 20px; text-align: center;">396</td> </tr> </table> <p style="font-size: small; margin-top: 10px;"><math>3517 + 396 = 3913</math>      <math>396 + 3517 = 3913</math>  <math>3913 - 3517 = 396</math>      <math>3913 - 396 = 3517</math></p> <p style="font-size: x-small; margin-top: 5px;">Children should draw their own bars and understand that the placement of the dividing line between the bars is relative to the place value of the numbers. Each bar = 1 square deep in maths books.</p>		3913			3517	396	<p><b>Inverse:</b> see Y4 subtraction for using column subtraction to check calculations identified using the bar model.</p> <p><b>Estimation:</b> throughout addition, children should be taught to estimate to predict/ check their answers.</p> <p>Eg. <math>3517 + 396 = 3913</math>  Rounded to the nearest 100s:  <math>3500 + 400 = 3900</math></p> <p style="font-size: small; margin-top: 5px;">Building on work in place value, discuss when to round to the nearest 100/10.</p>														
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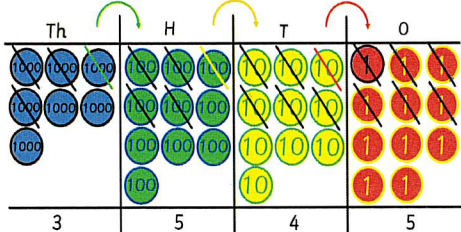
**Notes and guidance (non-statutory)**

Pupils continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency



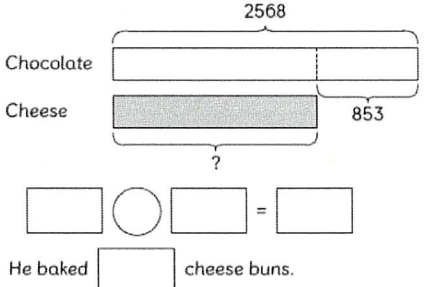
### Boothferry Primary School Calculation Policy

# Y4 SUBTRACTION

NC Objective, Strategy & Key Vocabulary	Concrete	Pictorial	Abstract				
<p>1.Column addition with numbers with up to 4 digits.</p> <p><b>Thousands, hundreds, tens, ones</b></p> <p><b>Add numbers with up to 4 digits using the formal written method of columnar addition.</b></p>	<p>Children continue to use place value counters to subtract; exchanging one ten for ten ones and one hundred for ten tens and one thousand for ten hundreds.</p> <p>7001 - 3456 =</p>  <p>1. Can't take 6 ones from 1 one: take 1 thousand and make 10 hundreds.  2. Take 1 hundred and make 10 tens.  3. Take 1 ten and make 10 ones.  4. 11 - 6, 9 - 5, 9 - 4, 6 - 3</p>	<p>Children can draw their own place value chart and circles to represent counters.</p> <p>Use the phrase 'take and make' when exchanging. Eg. take 1 ten and make 10 ones'.</p>	<p>Continue from Y3 – when children are confident exchanging 1 ten for 10 ones, they should progress to questions which require them to exchange in more than one place value column.</p> $\begin{array}{r} 7001 \\ - 3456 \\ \hline \end{array}$ <p>Once children are secure when calculating with numbers, apply to the contexts of measures inc. money.  Children should be exposed to questions in which the number have different numbers of digits.</p>				
<p>2.Estimation and inverse</p> <p><b>Estimate, round, approximate, inverse, opposite</b></p> <p><b>Estimate and use inverse operations to check answers to a calculation.</b></p>	<p>See Y4 addition for use of place value counters to check using inverse.</p>	<p><b>Inverse:</b> Use bar models to show the relationship between the numbers in any calculation.</p> <table border="1" data-bbox="981 925 1332 997"> <tr><td colspan="2">3913</td></tr> <tr><td>3517</td><td>396</td></tr> </table> <p>3517 + 396 = 3913      396 + 3517 = 3913  3913 - 3517 = 396      3913 - 396 = 3517</p> <p>Children should draw their own bars and understand that the placement of the dividing line between the bars is relative to the place value of the numbers.  Each bar = 1 square deep in maths books.</p>	3913		3517	396	<p><b>Inverse:</b> see Y4 addition for using column addition to check calculations identified using the bar model.</p> <p><b>Estimation:</b> throughout addition, children should be taught to estimate to predict/ check their answers.</p> <p>Eg. 3517 + 396 = 3913  Rounded to the nearest 100s:  3500 + 400 = 3900</p> <p>Building on work in place value, discuss when to round to the nearest 100/10.</p>
3913							
3517	396						



## Boothferry Primary School Calculation Policy

<p>3. Bar models <b>Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.</b></p>	<p>Children need to understand what each number represents to enable them to draw a model to show the information that is known and add '?' where the missing information (the answer) is.</p>	<p>A baker baked 2568 chocolate buns. He baked 853 fewer cheese buns than chocolate buns. How many buns did he bake altogether?</p>  <p>He baked <input type="text"/> cheese buns.</p>	<p>More complex, 2-step problems which require children to draw their own bar models and use more than one operation:</p> <p>There are 8265 books in a school library. 2678 are fiction books and 4679 are non-fiction books. The rest are reference books. How many reference books are there in the library?</p>
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### Notes and guidance (non-statutory)

Pupils continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency



Strategy & Key Vocabulary	Concrete	Pictorial	Abstract																																																																																																																													
<p>Times tables: All up to 12 x 12 (recap 2s, 10s, 5s, 3s, 4s, 8s from Y2+Y3) <b>multiplied by, groups of, times, product</b> <b>Recall multiplication and division facts for multiplication tables up to 12 x 12.</b></p>	<p>Look at patterns and make connections between individual calculations within a times table, between times tables (eg. <b>3s, 6s, and 9s</b>) and between x and ÷ facts:</p> <table border="1" style="font-size: small; text-align: center; width: 100%;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td></tr> <tr><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td></tr> <tr><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td><td>38</td><td>39</td><td>40</td></tr> <tr><td>41</td><td>42</td><td>43</td><td>44</td><td>45</td><td>46</td><td>47</td><td>48</td><td>49</td><td>50</td></tr> <tr><td>51</td><td>52</td><td>53</td><td>54</td><td>55</td><td>56</td><td>57</td><td>58</td><td>59</td><td>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>Encourage children to use known facts to calculate other questions more fluently and efficiently.</p> <div style="display: flex; align-items: center;"> <table border="1" style="border-collapse: collapse; text-align: center; width: 100px; height: 100px;"> <tr><td style="background-color: #add8e6;"></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td style="background-color: #add8e6;"></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td style="background-color: #add8e6;"></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td style="background-color: #add8e6;"></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td style="background-color: #add8e6;"></td></tr> </table> <div style="margin-left: 20px;"> <math>6 \times 7 = 42</math>  <math>7 \times 6 = 42</math>  <math>42 \div 6 = 7</math>  <math>42 \div 7 = 6</math> </div> </div>																										<p>Sequences (increasing and decreasing, with some consecutive missing numbers):</p> <p>27, <input style="width: 40px;" type="text"/>, 45, <input style="width: 40px;" type="text"/>, 63</p> <p><input style="width: 40px;" type="text"/>, <input style="width: 40px;" type="text"/>, 45, 54, 63</p> <p>Number sentences:  <math>9 \times 3 =</math>  <math>40 = \underline{\quad} \times 8</math></p> <p>Word problems:</p> <div style="text-align: center;"> </div> <p style="font-size: x-small;">Eggs come in small boxes and large boxes. How many eggs are there in 7 small boxes and 9 large boxes?</p>
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<p>Multiplication facts <b>Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; multiplying together three numbers.</b></p>	<div style="display: flex; flex-direction: column; align-items: flex-start;"> <div style="margin-bottom: 10px;"> <p style="font-size: x-small;">3 plates of 4 <math>3 \times 4 = 12</math></p> </div> <div style="margin-bottom: 10px;"> <p style="font-size: x-small;">2 plates of 4 <math>2 \times 4 = 8</math></p> </div> <div style="margin-bottom: 10px;"> <p style="font-size: x-small;">1 plate of 4 <math>1 \times 4 = 4</math></p> </div> <div> <p style="font-size: x-small;">0 plates of 4 <math>0 \times 4 = 0</math></p> </div> </div> <p><b>x0 and x1:</b> Look at patterns and representations to help children recognise that x 0 will always = 0 and x 1 will result in the number remaining the same.</p> <p><b>Multiplying 3 numbers:</b> Represent calculations using manipulatives/arrays and consider which numbers to multiply first/last (reiterate the commutative nature of multiplication).</p> <p><b>Using place value:</b> multiplying by 10 and 100 using dienes alongside place value charts and building on learning from Y3 about using known facts, eg. using <math>3 \times 4 = 12</math> to work out <math>3 \times 40 = 120</math>.</p>	<p>Children can draw their own place value charts to aid x and ÷ 10 and 100:</p> <table border="1" style="font-size: x-small; text-align: center; width: 150px; margin: 10px auto;"> <tr><th>Th</th><th>H</th><th>T</th><th>O</th><th>•t</th><th>h</th></tr> <tr><td></td><td>4</td><td>5</td><td>0</td><td>•</td><td></td></tr> <tr><td></td><td></td><td>4</td><td>5</td><td>•</td><td></td></tr> <tr><td></td><td></td><td></td><td>4</td><td>•5</td><td></td></tr> </table> <div style="text-align: center; margin: 10px 0;"> <span style="color: red; font-size: 2em;">←</span> x 10      ÷ 10 <span style="color: red; font-size: 2em;">→</span>  <span style="color: red; font-size: 2em;">←</span> x 100      ÷ 100 <span style="color: red; font-size: 2em;">→</span> </div> <p><b>Multiplying 3 numbers:</b></p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p style="font-size: x-small;">5 rows of 6</p> <p style="font-size: x-small;"><math>5 \times 6 = 30</math></p> </div> <div style="text-align: center;"> <p style="font-size: x-small;"><math>5 \times 6 \times 2 = 30 \times 2 = 60</math></p> </div> </div>	Th	H	T	O	•t	h		4	5	0	•				4	5	•					4	•5		<p><b>x0 and x1:</b></p> <p><math>9 \times 1 =</math> <input style="width: 40px;" type="text"/></p> <p><math>0 \times 1 =</math> <input style="width: 40px;" type="text"/></p> <p><math>9 \times 0 =</math> <input style="width: 40px;" type="text"/></p> <p><math>8 \times 0 =</math> <input style="width: 40px;" type="text"/></p> <p><math>1 \times 2 =</math> <input style="width: 40px;" type="text"/></p> <p><b>Multiplying 3 numbers:</b></p> <p><math>3 \times 6 \times 5 =</math> <input style="width: 40px;" type="text"/></p> <p><math>5 \times 7 \times 4 =</math> <input style="width: 40px;" type="text"/></p> <p><b>Using place value:</b> 10 times a number is 86. What is the number?</p>																																																																																																					
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# Y4 MULTIPLICATION

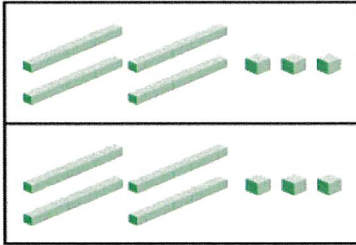


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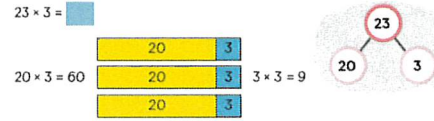
Multiplying (no regrouping)  
**Hundreds, tens, ones, times, multiply, groups/ lots of, partition**  
**Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.**

Use dienes/place value counters to represent the calculation:  
 Find the product of 43 and 2.

$43 \times 2 = \square$



Use bar models/part-part-whole models to represent the problems:

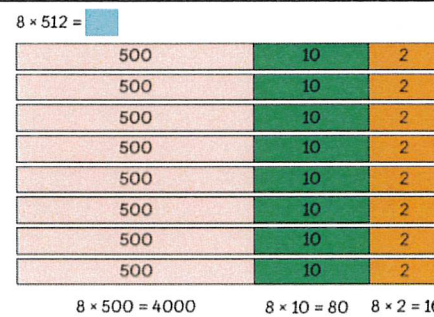
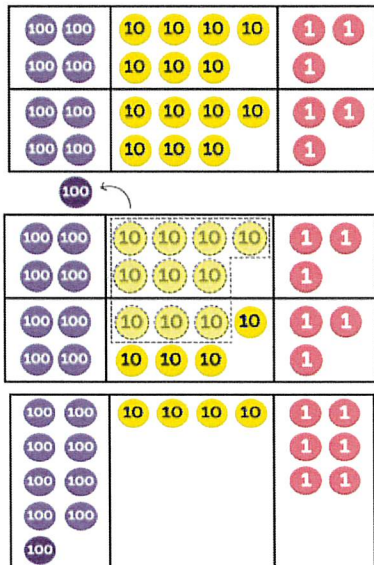


Ensure the place value of the calculation is understood before moving onto a formal written method:

$$\begin{array}{r} 23 \\ \times 3 \\ \hline \end{array}$$

Multiplying (with regrouping)  
**Hundreds, tens, ones, times, multiply, groups/ lots of, partition, product**

Use place value counters to regroup:  
 $473 \times 2 = \square$



When children are confident with 3-digit x 1-digit, they should progress to 4-digit x 1-digit (regrouping ones as tens first, followed by regrouping tens as hundreds then hundreds as thousands before combining them and regrouping in 2 or 3 columns). Be careful not to exceed 9 thousands in the product as children have not been taught 5-digit place value.

$$\begin{array}{r} 342 \\ \times 7 \\ \hline 2394 \\ \hline 21 \end{array}$$

underneath

# Y4 MULTIPLICATION




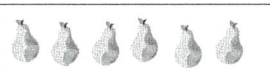
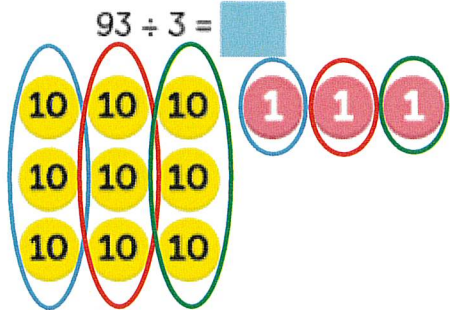
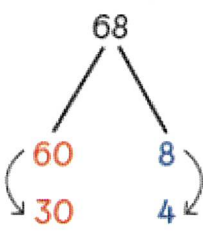




## Boothferry Primary School Calculation Policy



# Y4 DIVISION

Strategy <b>Key Vocabulary</b> NC objective	Concrete	Pictorial	Abstract																								
<p>1. Mental division</p> <p><b>Divided by, hundreds, tens, ones, tenths, hundredths</b></p> <p><b>Use place value, known and derived facts to divide mentally including: dividing by 1.</b></p>	<p><b>Place value:</b> Divide by 10 and 100 using dienes alongside place value charts and building on learning from Y3 about using known facts, eg. using <math>12 \div 3 = 4</math> to work out <math>120 \div 3 = 40</math></p> <p><b>Dividing by 1:</b></p>  <p style="text-align: right;"><math>6 \div 1 = 6</math></p>  <p style="text-align: right;">Sam gets all the coins.</p>	<p><b>Place value:</b> Children can draw their own place value charts to aid <math>\times</math> and <math>\div</math> 10 and 100:</p> <table border="1" style="margin: 0 auto; text-align: center;"> <thead> <tr> <th>Th</th> <th>H</th> <th>T</th> <th>O</th> <th>t</th> <th>h</th> </tr> </thead> <tbody> <tr> <td></td> <td>4</td> <td>5</td> <td>0</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>4</td> <td>5</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td>4</td> <td>5</td> <td></td> </tr> </tbody> </table> <p style="text-align: center;"> <math>\xleftarrow{\times 10} \quad \xrightarrow{\div 10}</math>  <math>\xleftarrow{\times 100} \quad \xrightarrow{\div 100}</math> </p> <p><b>Dividing by 1:</b> Children to circle groups to see the difference and realise patterns.</p>  <p style="text-align: right;"><math>6 \div 6 = \square</math></p>  <p style="text-align: right;"><math>6 \div 1 = \square</math></p>	Th	H	T	O	t	h		4	5	0					4	5						4	5		<p><b>Place value:</b> <math>320 \div 8 =</math></p> <p><math>27 \div \underline{\quad} = 2.7</math></p> <p>A number divided by 100 is 3.15. What is the number?</p> <p><b>Dividing by 1:</b></p> <p><math>9 \div 1 = \boxed{9}</math></p> <p><math>9 \div 3 = \boxed{3}</math></p> <p><math>9 \div 9 = \boxed{1}</math></p>
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<p>2. Division (without regrouping)</p> <p><b>Equal, same, group, divisor, groups of, divide</b></p> <p><b>Pupils practise to become fluent in the formal written method of short division with exact answers (quotients).</b> <i>(NS NC guidance)</i></p>	<p style="text-align: center;"><math>93 \div 3 = \square</math></p>  <p>Children to use place value counter to divide 2 and 3-digit numbers by a single digit.</p>	<p style="text-align: center;">68</p>  <p><math>68 \div 2 = 34</math></p> <p>Partition then divide each place value component before recombining to find the answer.</p>	<p><math>550 \div 5 = \boxed{110}</math></p> <p><math>500 \div 5 = \boxed{100}</math></p> <p><math>50 \div 5 = \boxed{10}</math></p> <p><math>\boxed{100} + \boxed{10} = \boxed{110}</math></p> <p>Children will need to record their partitioning initially before progressing to this becoming a mental calculation.</p> <p><math>486 \div 2 = \boxed{243}</math></p>																								



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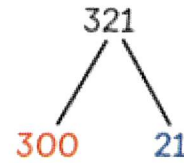
3.Division with regrouping  
**Regroup, partition, hundreds, tens, ones**  
 Pupils practise to become fluent in the formal written method of short division with exact answers (**quotients**).  
*(NS NC guidance)*

$$321 \div 3 = \square$$



Use the part-part-whole model to partition numbers in a way that are easily divisible by their divisor by using known facts.

$$321 \div 3 =$$

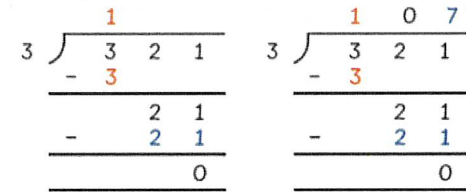


$$300 \div 3 = 100 \quad 21 \div 3 = 7$$

$$100 + 7 = 107$$

Re-introduction of formal written method should be done with a 2-digit dividend to recap learning from Y3, before progressing to a 3-digit dividend.

$$321 \div 3 =$$



3 hundreds  $\div$  3      21 ones  $\div$  3

# Y4 DIVISION