



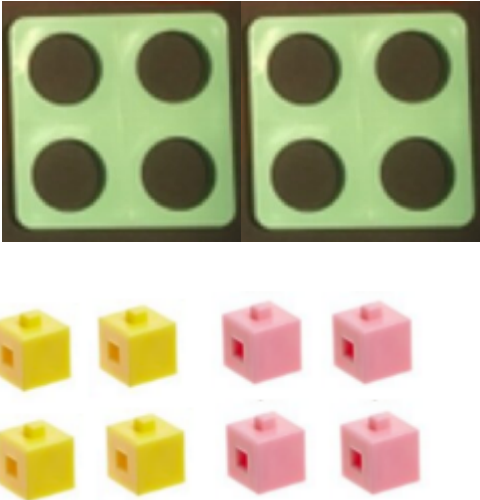
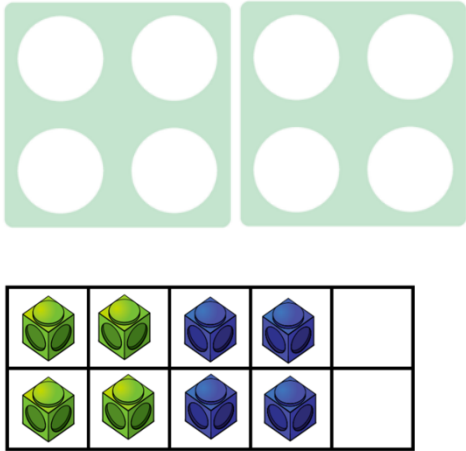
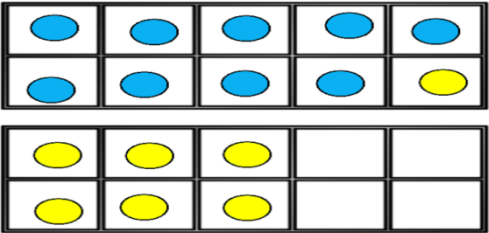
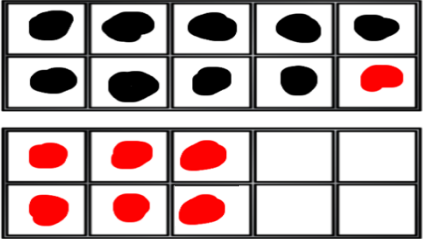
**Northway Primary School**  
**Mathematics Calculation Policy - Addition**

The **Concrete Pictorial Abstract (CPA)** approach is a system of learning that uses physical and visual aids to build a child's understanding of abstract topics.

- **Concrete:** New concepts are introduced through the use of physical objects or practical equipment e.g. Numicon or Base 10. These can be physically handled, enabling children to explore different mathematical concepts.
- **Pictorial:** Once children are confident with a concept using concrete resources, they progress to drawing pictorial representations of the objects. This stage encourages children to make a mental connection between the physical object and abstract levels.
- **Abstract:** Once children have a secure understanding of the concept through the use of concrete resources and visual images, they are then able to move on to the abstract stage. Here, children are using abstract symbols to model problems - usually numerals. To be able to access this stage effectively, children need access to the previous two stages alongside it.

For the most effective learning to take place, children need to constantly go back and forth between each of the stages. This ensures concepts are reinforced and understood.

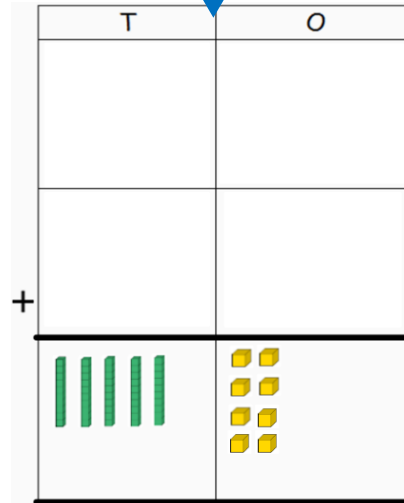
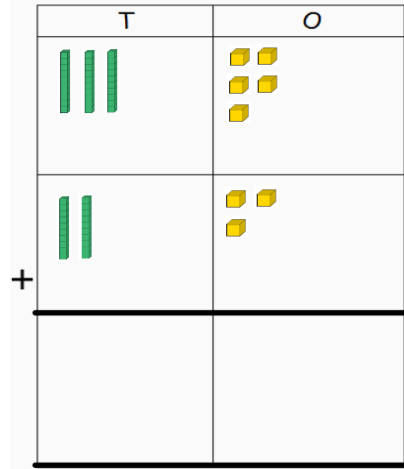
**Children should be using concrete resources when covering place value objectives in Maths lessons and making numbers with these so that they learn the value of each concrete resource. This will then support them when using the same concrete resources for addition and subtraction methods (see below).**

Year group	NC	Concrete	Pictorial	Abstract
	Objective Pupils should be taught to:			
Reception	<p><u>Development Matters:</u></p> <p>Explore the composition of numbers to 10.</p> <p>Automatically recall number bonds for numbers from 0-10.</p>			$4 + 4 = 8$
Y1	<p>Add one-digit and two-digit numbers to 20, including zero.</p>	 <p><i>Children will use two different colours of counters. Make 9 in the first tens frame (fill in using pairs and the extra 1) and then when making 7, they will add 1 to the first tens frame before adding the rest to the second tens frame.</i></p>	 <p><i>For the pictorial representation, children can have printed tens frame images and add coloured dots to represent each number in the calculation using 2 different coloured pencils.</i></p>	$9 + 7 = 16$

Y2

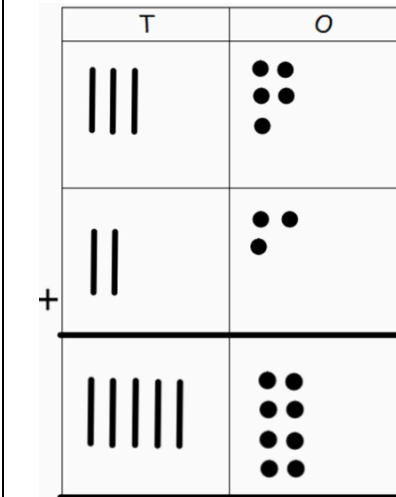
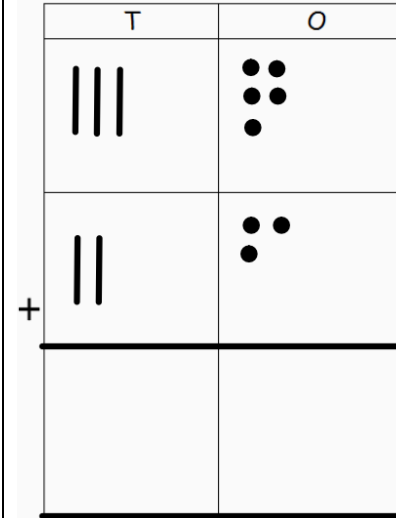
Add numbers using concrete objects, pictorial representations and mentally, including: two two-digit numbers

**Step 1 (no regrouping):**



*The ones and tens can be grouped together in the answer box at the bottom of the addition calculation mat. When children are ready, they can record numerals in the answer box.*

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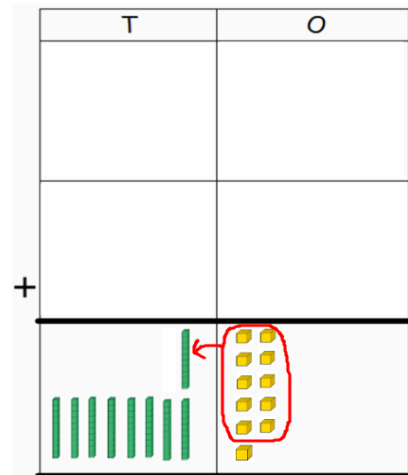
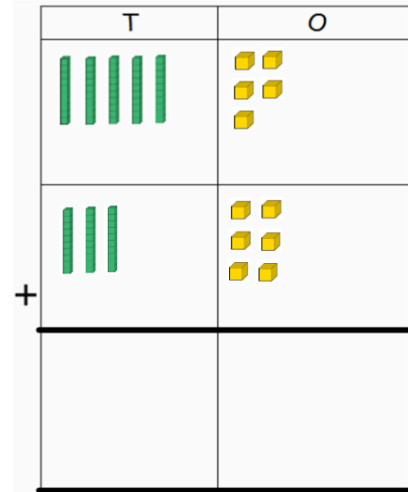


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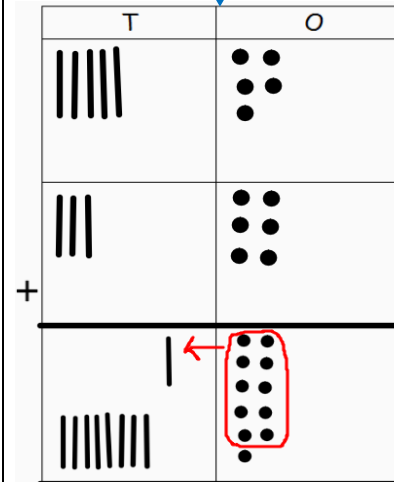
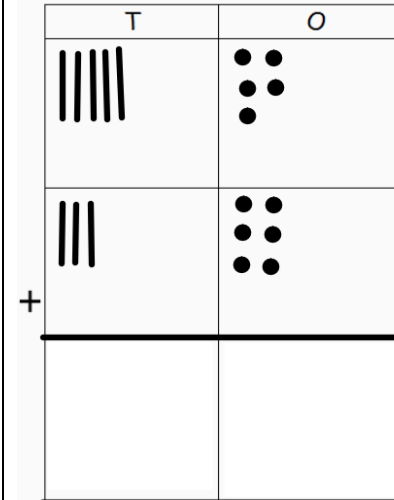
	T	O	
	3	5	
+	2	3	
	5	8	

**Step 2 (with regrouping):**



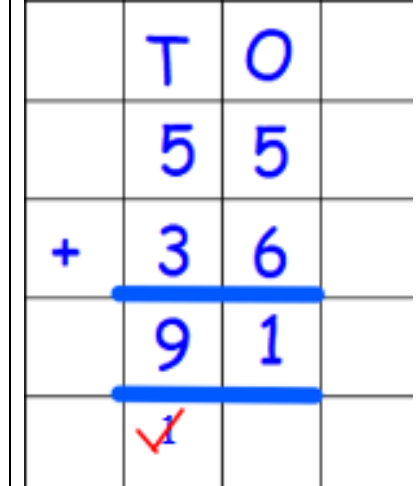
*The ones and tens can be grouped together in the answer box at the bottom of the addition calculation mat. The group around the ten 'ones' and the arrow represents the regrouping of ten 'ones' for one 'ten'. When children are ready, they can record numerals in the answer box.*

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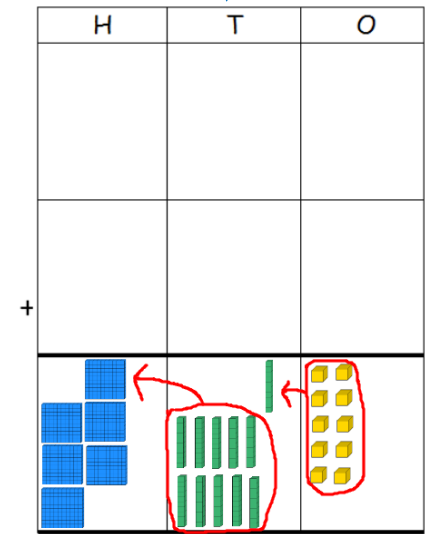
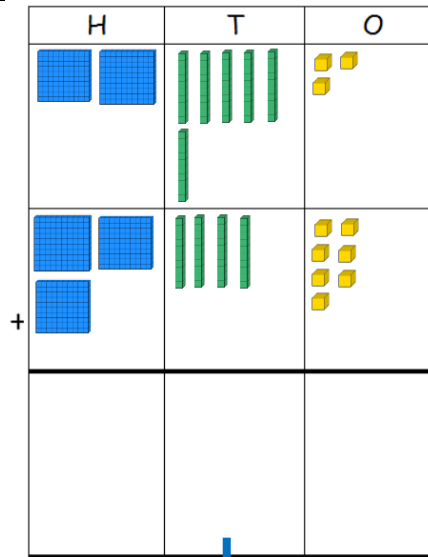
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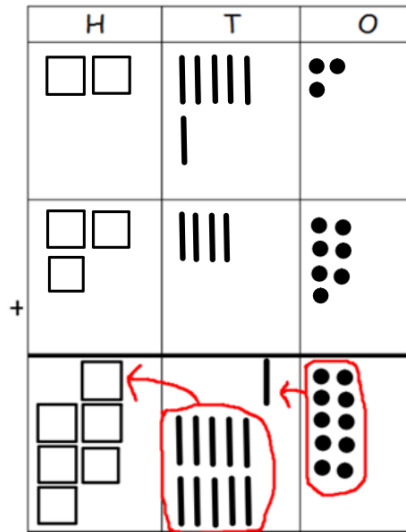
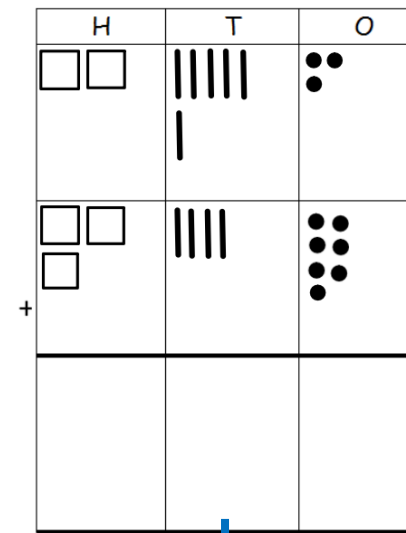
*The regrouping below the equals line should be ticked to help children remember to add this on.*

Y3

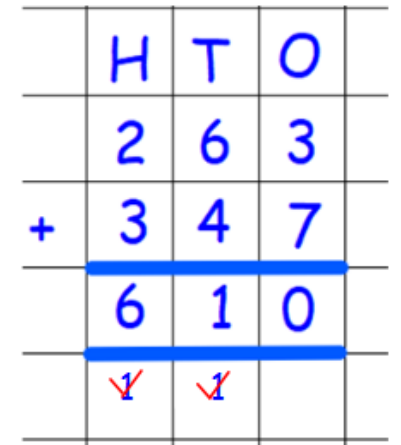
Add numbers with up to three digits, using formal written methods of columnar addition.



The ones, tens and hundreds can be grouped together in the answer box at the bottom of the addition calculation mat. The group around the ten 'ones' and the arrow represents the regrouping of ten 'ones' for one 'ten'. The group around the ten 'tens' and the arrow represents the regrouping of ten 'tens' for one 'hundred'. When children



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are ready, they can record numerals in the answer box.

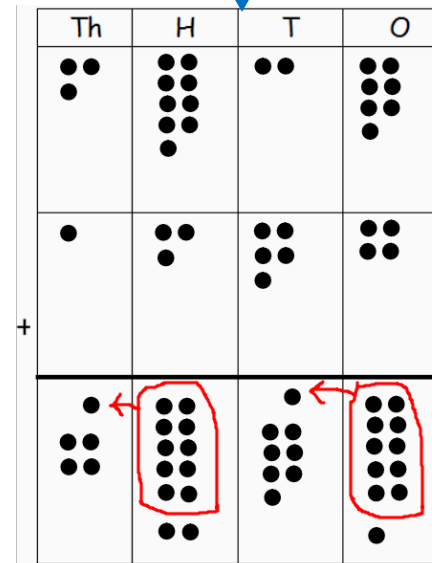
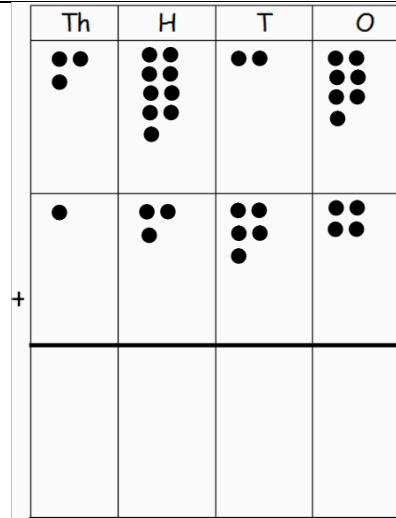
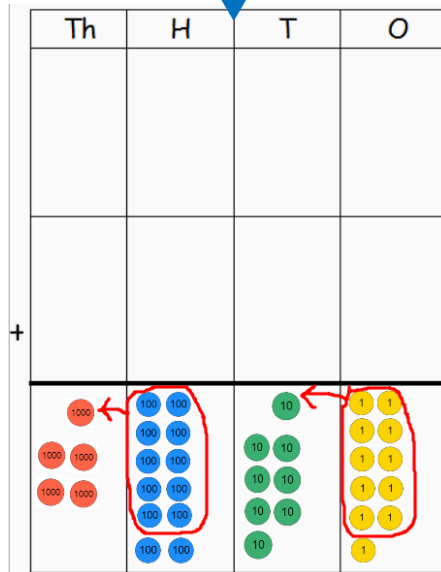
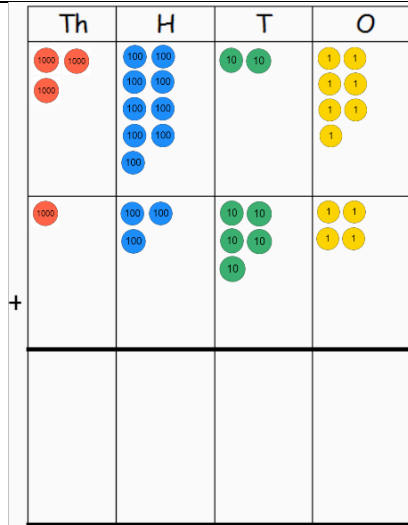
*\*NB: In Year 3, this calculation could also be made using place value counters as concrete resources too.*

numerals in the answer box.

*\*NB: If place value counters are used as the concrete resource then circles can be used as the pictorial representation of these (as in the Y4 example below).*

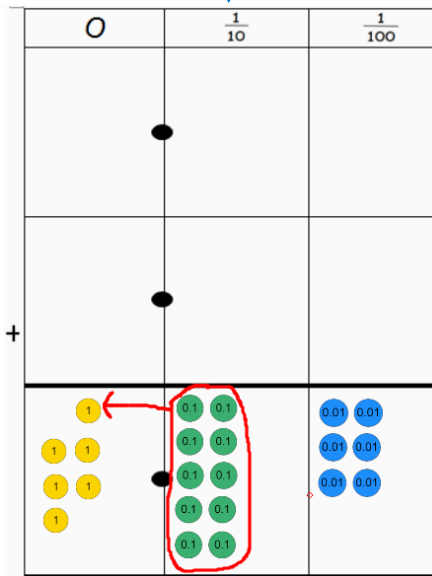
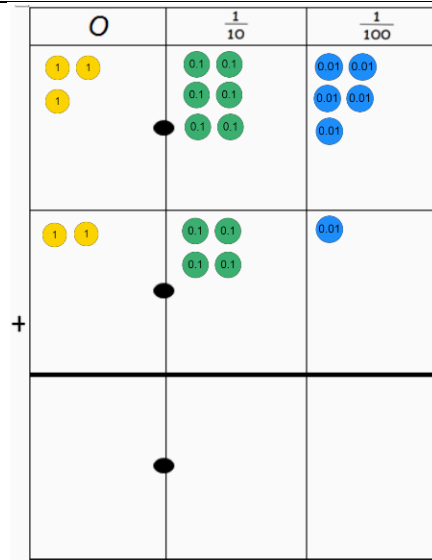
Y4

Add numbers with up to 4 digits using the formal written methods of columnar addition.

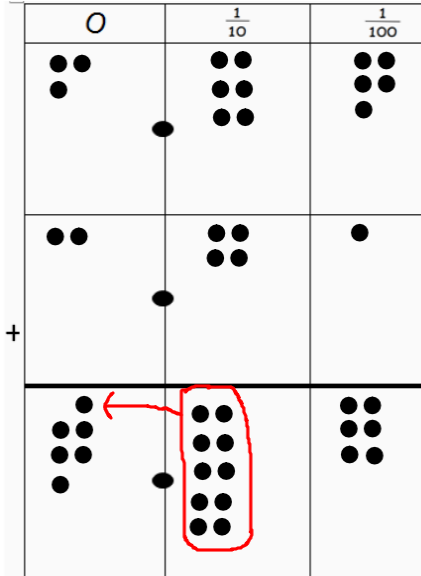
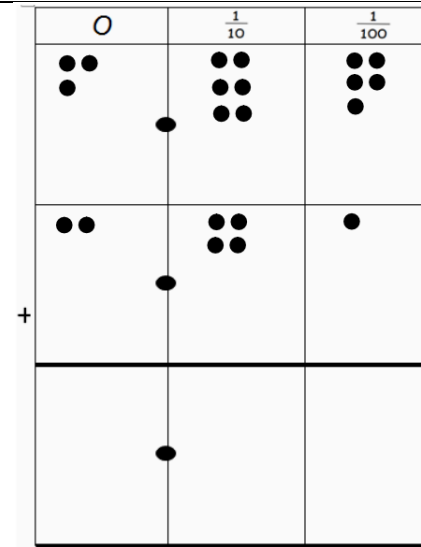


	Th	H	T	O
	3	9	2	7
+	1	3	5	4
	5	2	8	1
	✓		✓	

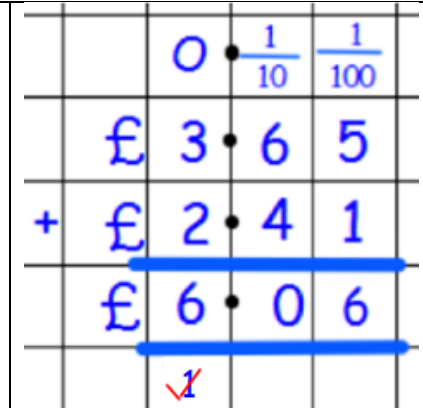
The regroupings below the equals line should be ticked to help children remember to add these on.



Children can record numerals in the answer box.



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The regrouping below the equal line can be ticked to help children remember to add this on.

<p><b>Y5</b></p>	<p>Add whole numbers with more than 4 digits, including using formal written methods (columnar addition).</p>			<table border="1"> <thead> <tr> <th></th> <th>HTh</th> <th>TTh</th> <th>Th</th> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td></td> <td>2</td> <td>7</td> <td>9</td> <td>1</td> <td>2</td> <td>4</td> </tr> <tr> <td>+</td> <td>3</td> <td>6</td> <td>2</td> <td>9</td> <td>0</td> <td>8</td> </tr> <tr> <td></td> <td>6</td> <td>4</td> <td>2</td> <td>0</td> <td>3</td> <td>2</td> </tr> <tr> <td></td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td>✓</td> <td></td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th></th> <th>H</th> <th>T</th> <th>O</th> <th><math>\frac{1}{10}</math></th> <th><math>\frac{1}{100}</math></th> <th><math>\frac{1}{1000}</math></th> </tr> </thead> <tbody> <tr> <td></td> <td>1</td> <td>2</td> <td>4</td> <td>3</td> <td>4</td> <td>0</td> </tr> <tr> <td>+</td> <td></td> <td>5</td> <td>9</td> <td>8</td> <td>9</td> <td>8</td> </tr> <tr> <td></td> <td>1</td> <td>8</td> <td>4</td> <td>2</td> <td>3</td> <td>8</td> </tr> <tr> <td></td> <td></td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> </tbody> </table> <p><i>The regroupings below the equals line should be ticked to help children remember to add these on.</i></p>		HTh	TTh	Th	H	T	O		2	7	9	1	2	4	+	3	6	2	9	0	8		6	4	2	0	3	2		✓	✓	✓		✓			H	T	O	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$		1	2	4	3	4	0	+		5	9	8	9	8		1	8	4	2	3	8			✓	✓	✓		
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<p><b>Y6</b></p>	<p>Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</p>			<table border="1"> <thead> <tr> <th></th> <th>HTh</th> <th>TTh</th> <th>Th</th> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td></td> <td>2</td> <td>7</td> <td>9</td> <td>1</td> <td>2</td> <td>4</td> </tr> <tr> <td>+</td> <td>3</td> <td>6</td> <td>2</td> <td>9</td> <td>0</td> <td>8</td> </tr> <tr> <td></td> <td>6</td> <td>4</td> <td>2</td> <td>0</td> <td>3</td> <td>2</td> </tr> <tr> <td></td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td>✓</td> <td></td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th></th> <th>H</th> <th>T</th> <th>O</th> <th><math>\frac{1}{10}</math></th> <th><math>\frac{1}{100}</math></th> <th><math>\frac{1}{1000}</math></th> </tr> </thead> <tbody> <tr> <td></td> <td>1</td> <td>2</td> <td>4</td> <td>3</td> <td>4</td> <td>0</td> </tr> <tr> <td>+</td> <td></td> <td>5</td> <td>9</td> <td>8</td> <td>9</td> <td>8</td> </tr> <tr> <td></td> <td>1</td> <td>8</td> <td>4</td> <td>2</td> <td>3</td> <td>8</td> </tr> <tr> <td></td> <td></td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> </tbody> </table> <p><i>The regroupings below the equals line should be ticked to help children remember to add these on.</i></p>		HTh	TTh	Th	H	T	O		2	7	9	1	2	4	+	3	6	2	9	0	8		6	4	2	0	3	2		✓	✓	✓		✓			H	T	O	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$		1	2	4	3	4	0	+		5	9	8	9	8		1	8	4	2	3	8			✓	✓	✓		
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