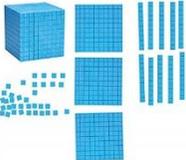
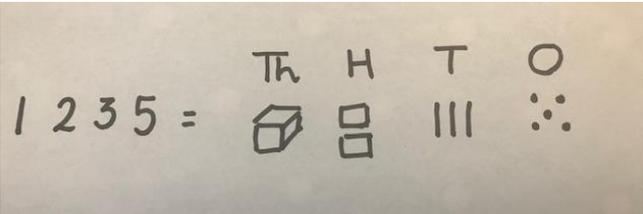
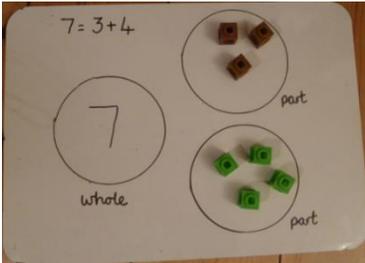
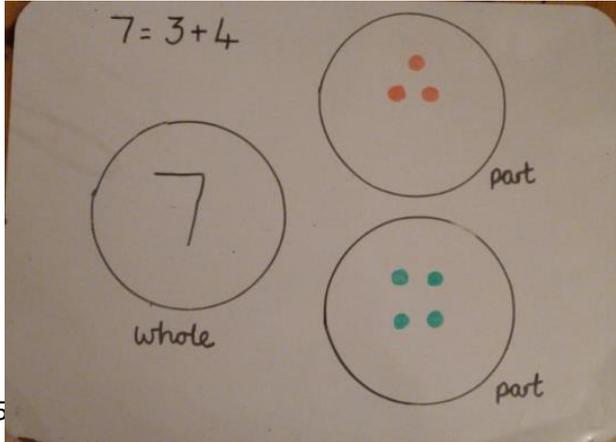


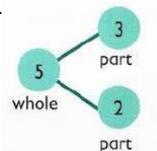
# St Michael's Mathematics Progression Document using 'Concrete Pictorial & Abstract' ADDITION

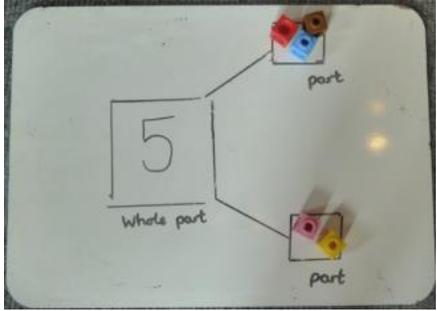
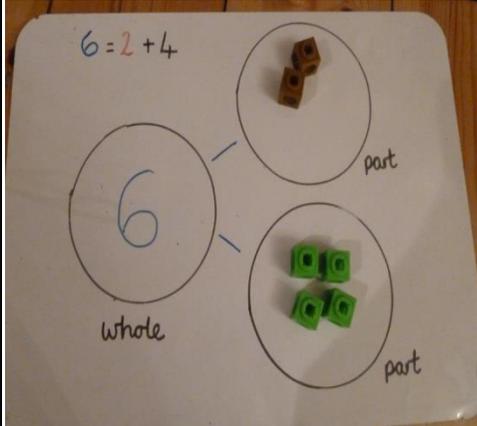
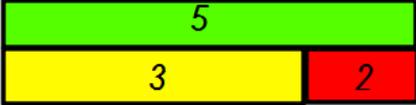
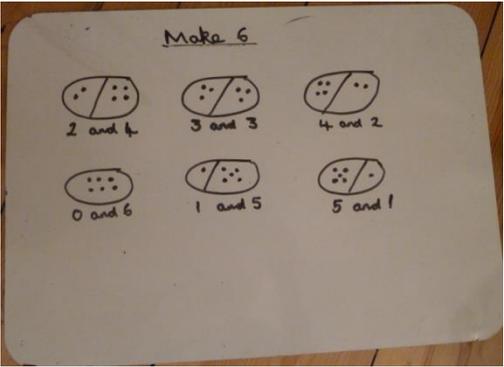
In Key Stage One and Two concrete resources to be used are: base 10 and place value counters.

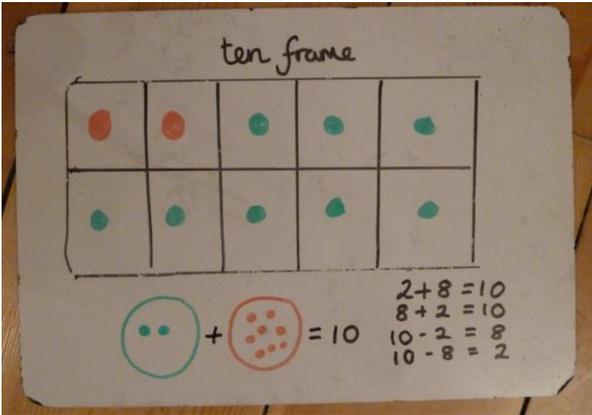
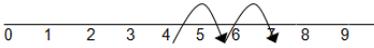
With pictorial, children should be exposed to a range of representations.

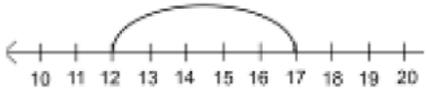
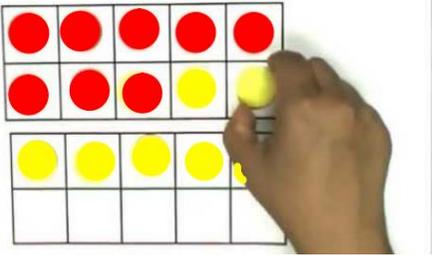
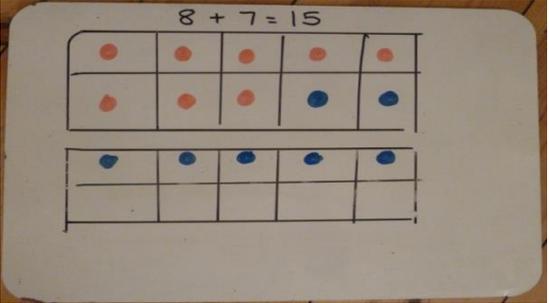
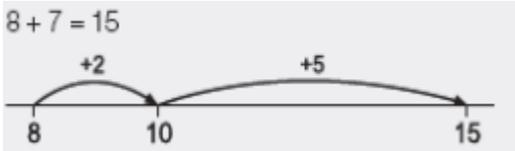
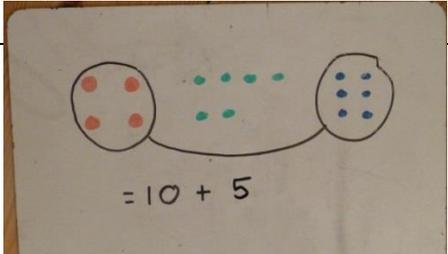
With abstract, we aim to have consistency across the years on how to present the work in books.

<p>MATHEMATICAL LANGUAGE Strategy</p> <p>EXAMPLES</p>	<p><u>CONCRETE</u></p> 	<p><u>PICTORIAL</u> Drawing pictorial in our books.</p> <p>Th = cube H = square T = I One = dot</p> <p>It is easier for children to count if the ones are drawn in groups of 5.</p> 	<p><u>ABSTRACT</u></p> <p>Calculations are also known equations</p> <p>An <i>equation</i> is a mathematical statement that two things are equal. It consists of two expressions, one on each side of an 'equals' sign. For example:</p> <p style="text-align: center;"><math>12=7+5</math></p> <p>Use the equals sign <b>both</b> ways Equals is 'the same as'</p>
<p>Combining two Parts to make a whole part-part model</p> <p>Estimate Use the language more of fewer To compare two sets of objects</p> <p>Say 'there is one more or less than a given number'</p> <p>"Part add a part equals a whole"</p>	<p>Use cubes to add two numbers together as a group or in a bar.</p> <p><math>7 = 4 + 3</math></p>  	<p>Use pictures to add two numbers together as a group or in a bar.</p> 	<p>How many different ways... Make 7</p> <p><math>4 + 3 = 7</math></p> <p><math>7 = 4 + 3</math></p> <p><math>3 + ? = 7</math></p> <p><math>7 = 3 + ?</math></p> <p>Calculations &amp; <u>Equations that Make 5</u></p> <p><math>2 + 3 = 5</math></p> <p><math>5 = 3 + 2</math></p>

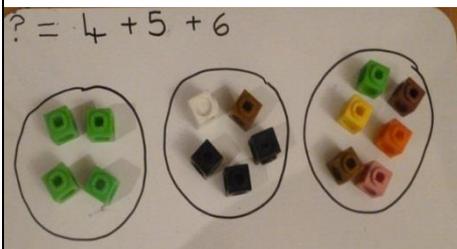


<p>Parts to make a whole part-part model</p>	 <p><u>Making six with multilink</u></p> 	<p>bar model example. 'whole part-part'</p>  <p><u>Make 6</u></p> 	$5 = \begin{array}{c} \square \\ \square \end{array} 2$ $5 = 3 \begin{array}{c} \square \\ \square \end{array} 2$ <p><u>Make 6</u></p> $2 + 4 = 6$ $3 + 3 = 6$ $6 = 0 + 6$ $6 = 4 + 2$
<p>MATHEMATICAL LANGUAGE strategy</p>	<p>CONCRETE</p>	<p>PICTORIAL</p>	<p>ABSTRACT Use the equals sign <b>both</b> ways</p>
<p>Number bonds to ten. Base 10</p>	<p>Using Numicon in Foundation</p> 	<p>Ten frame</p>	$0 + 10 = 10$ $10 = 10 + 0$

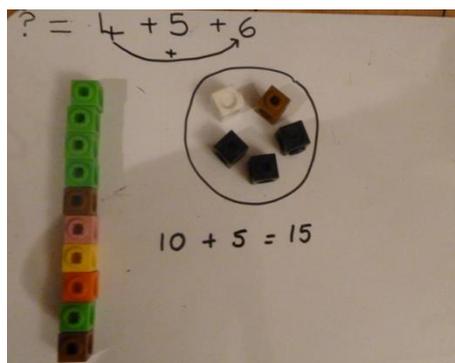
<p>Language used: Ten Frames Regrouping to make 10 Start with the largest number</p>	<p><math>1 + 9, 9 + 1, 7 + 3, 3 + 7</math> etc Other language used: <math>10 - 1 \dots</math></p> <p>Using resources in the environment eg conkers in the autumn</p>  <p>Double sided counters to create different number bonds.</p>  <p>CONCRETE</p>	 <p>The ten frame can also be used as a hundred frame.</p>  <p>PICTORIAL</p>	<p><math>9 + 1 = 10</math> <math>1 + 9 = 10</math></p> <p><math>2 + 8 = 10</math> <math>8 + 2 = 10</math> <math>10 - 2 = 8</math> <math>10 - 8 = 2</math></p>  <p>Intelligent Practise <math>20 + 80 = 100</math> <math>80 + 20 = 100</math> <math>100 - 20 = 80</math> <math>100 - 80 = 20</math></p> <p>ABSTRACT Use the equals sign <b>both</b> ways</p>
<p>Starting at the largest number and counting on.</p>	<p>Children use number lines and practical resources to support calculation and teachers <i>demonstrate</i> the use of the number line.</p>	 <p>Children then begin to use numbered lines to support their own calculations using a numbered line to count on in ones.</p>	<p><math>5 + 12 = 17</math> Place the larger number in your head and count on the smaller number to find your answer.</p>

		<p><math>12+5=17</math> Start at the larger number on the number line and count on in ones or in one jump to find the answer.</p> 	
<p>Regrouping to make 10 Use pictures or a number line. Regroup or partition the smaller number to make 10.</p>	<p>Use counters to 8 add 7 = Use two 10 square grids (children will see the ten made)</p> <p><math>8 + 7 = 15</math></p>  <p>CONCRETE</p>	 <p>Steps in addition can also be recorded on a number line. The steps often bridge through a multiple of 10.</p> <p>PICTORIAL</p>	<p>On squared paper- rulers to be used With the jumps and the + above the jump.</p>  <p><math>8 + 7 = 15</math> If I am at eight, how many more do I need to make 15. How many more do I add on now?</p> <p>ABSTRACT Use the equals sign <b>both</b> ways</p>
<p>Adding 3 one digit numbers Following on</p>	<p><math>4 + 5 + 6 = 15</math> Put 4 and 6 together to make 10. Add on 5. (Also could use a Ten Frame see above.)</p>	<p>Add together three groups of objects. Draw a picture to recombine the groups to make 10.</p> 	<p>Combine the two numbers that make 10 and then add on the remainder.</p>

from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.

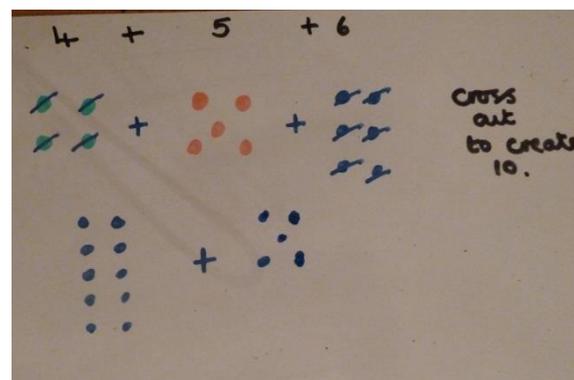


Use base 10 or place value counters in KS1 and 2.

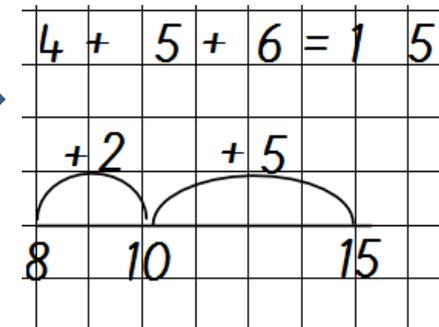


CONCRETE

Children may find crossing out their jottings easier to count and create the 10. \*\*\*\*\*



PICTORIAL



$$15 = 4 + 5 + 6$$

ABSTRACT  
Use the equals sign **both** ways

Column method  
no regrouping

$$24 + 15 =$$

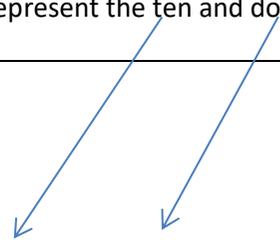
Base 10

Use the Base 10 blocks first before moving onto place value counters.

In books or on paper

Draw lines to represent the ten and dots to represent the ones

Children can deepen/prove their Understanding by drawing a pictorial representation alongside the abstract.



Use the Base 10 blocks first before moving onto place value counters.

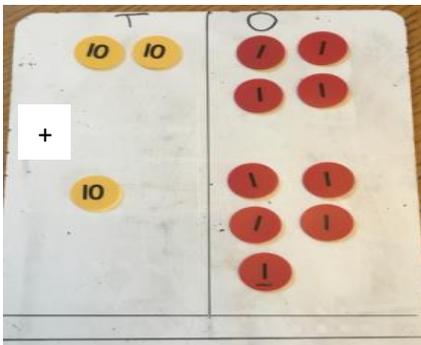
Place the numbers on top of each other lining up the tens and the ones

**“Always start on the right hand side.”**

“In this equation or calculation we start with the ones first then add the tens.”

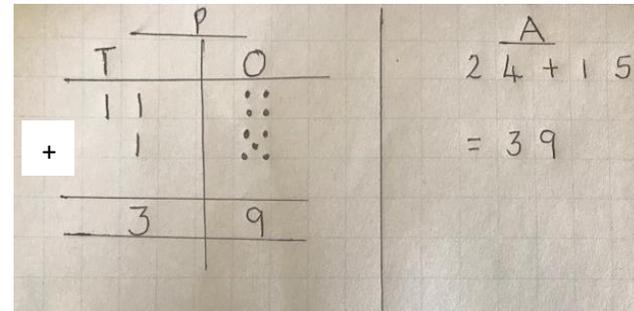
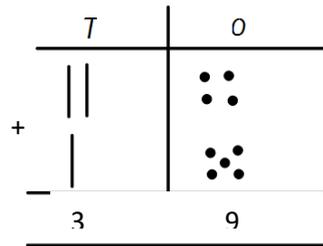


before moving onto place value counters.



CONCRETE

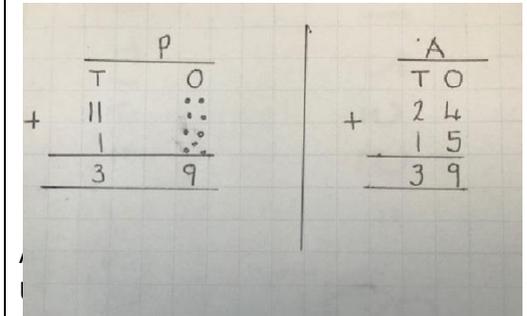
$$24 + 15 =$$



PICTORIAL

Prove pictorially  $39 = 24 + 15$   
True or False?  $24 + 15 = 39$ .  
Prove it!

$$24 + 15 =$$



**Column method – Regrouping HTO**

Language used:  
Base 10  
regroup /group  
Exchange  
Exchange one  
Exchange ten  
Exchange hundred  
Exchange thousand etc...

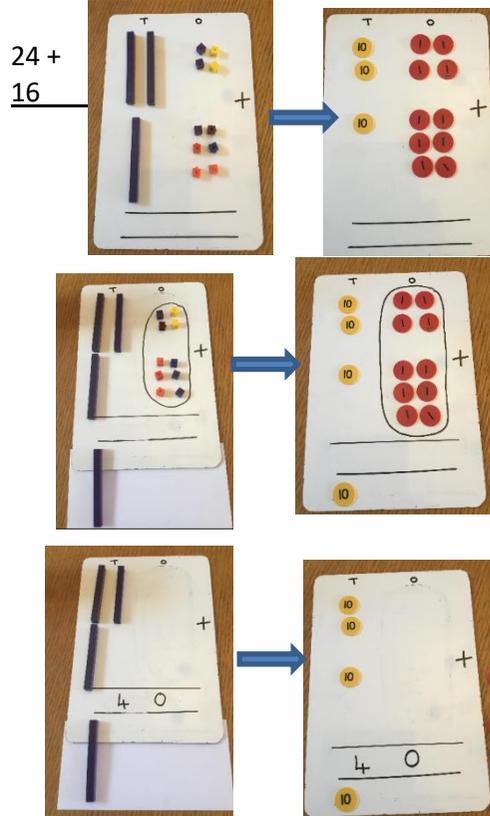
We will start adding in columns on the right hand side.

“Four ones add six ones is equal to ten ones.

I will group the ten ones together and exchange for a ten.

Three tens and one ten is equal to four tens”

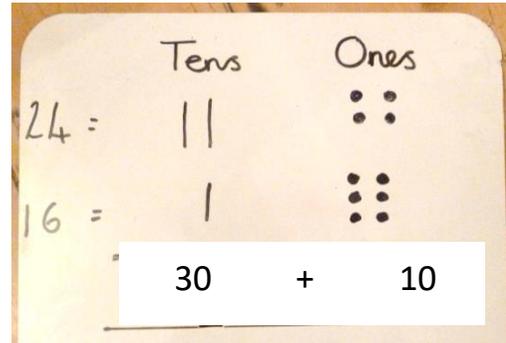
Make both numbers on a place value grid or mini white-board  
With Tens and Ones  
(If they understand move onto place value counters.)



Make both numbers on a place value grid or mini white board.

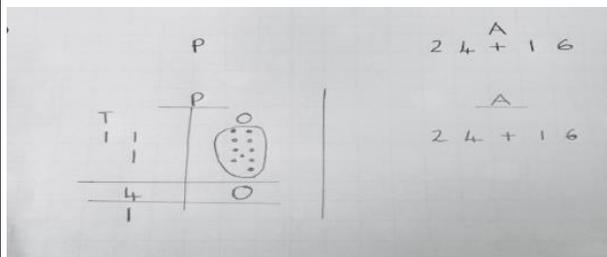
**Step 1**

Start by partitioning the numbers before moving on to clearly show the exchange.



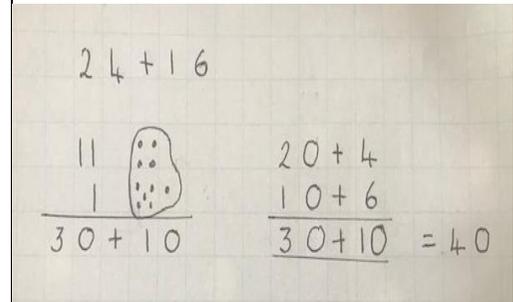
**Step 2:**

Begin by counting on the right hand side. Count up the ones, if there are 10 or more group the ten ones together. We can circle these and cross them out. Next, exchange the tens ones for one ten and place in the tens column



**Step 1**

Start by partitioning the numbers before moving on to clearly show the exchange.



**Step 2: Use compact column addition**

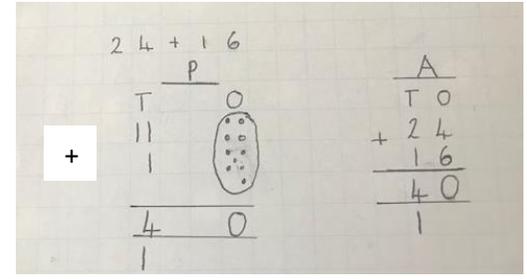
Place the numbers on top of one another, lining up the tens and ones.

Begin by counting the columns on the right hand side. Count up the ones, if there are 10 or more group the ten ones together. Next, exchange the tens ones for one ten and place in the tens column. “I have made a ten and I will place the ten in the ten’s column”

**Step 3 :** Count up the ones and write the answer numerically in the ones column. Make sure all the ones and tens are aligned.  
 Count up the tens and write the answer in the tens column.

**In books:** Show the Pictorial and the Abstract equation

**Step 3:** In books: Show the Pictorial and the Abstract equation Children can deepen/prove their understanding by drawing a pictorial representation alongside the abstract.



2634 + 4457

Step one

With larger numbers...

$$\begin{array}{r} 625 \\ + 48 \\ \hline 673 \\ 1 \end{array}$$

$$\begin{array}{r} 783 \\ + 42 \\ \hline 825 \\ 1 \end{array}$$

$$\begin{array}{r} 7648 \\ + 1486 \\ \hline 9134 \\ 111 \end{array}$$

Add up the ones and exchange 10 ones

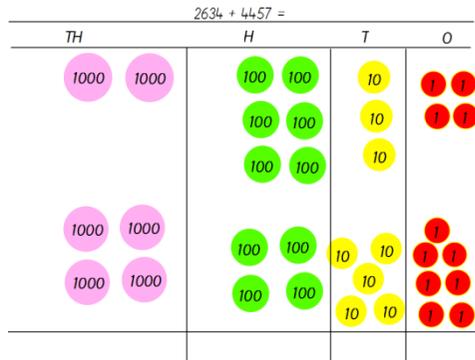
**Column method – Regrouping TH HTO**

Language used:  
Base 10  
regroup /group  
Exchange  
Exchange one  
Exchange ten  
Exchange hundred  
Exchange thousand etc...

“Four ones add seven ones is equal to eleven ones.  
I will regroup the ones and exchange ten ones for one ten and draw a ten in the tens column.  
There is one left in the ones column.  
Eight tens add one ten is equal to 9 tens.  
I will now add together the hundreds.  
Six hundreds add 4 hundreds is equal to ten hundreds. I will exchange 10 hundreds for one thousand.  
Six thousands add one thousand is equal to 7 thousand

for one 10.

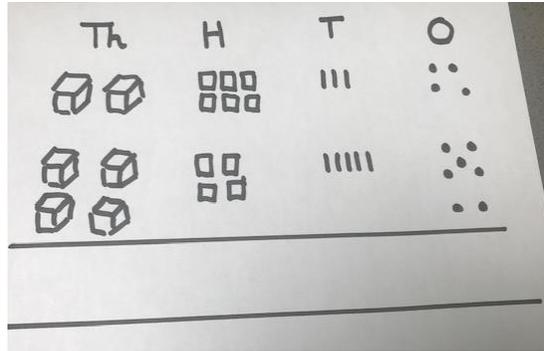
2634 + 4457



Add up the rest of the columns, exchanging the 10 counters from one column for the next place value column until every column has been added.

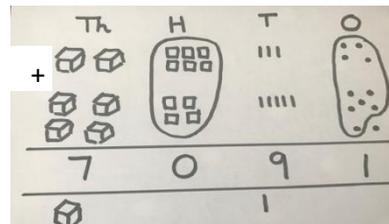
This can also be done with Base 10 to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100 and 10 100s equals 1000.

Adding together numbers with up to three decimal places



**Step two**

“Four ones add seven ones is equal to eleven ones.  
I will regroup the ones and exchange ten ones for one ten and draw a ten in the tens column. There is one left in the ones column.  
Eight tens add one ten is equal to 9 tens.  
I will now add together the hundreds.  
Six hundreds add 4 hundreds is equal to ten hundreds. I will exchange 10 hundreds for one thousand.  
Six thousands add one thousand is equal to 7 thousand



Adding using the bar to solve problems:  
What is the total measurement of all these ....

	TH	H	T	O
	2	6	3	4
4	+	4	5	7
<hr/>				
	7	0	9	1
<hr/>				
1	1			

Children can deepen/prove their Understanding by drawing a pictorial representation alongside the abstract.

Pupils should be able to add more than two values, carefully aligning place value columns.

	2	3	.	6	1
		9	.	0	8
	5	9	.	7	7
		1	.	3	0
	9	3	.	7	6
	2			1	

**Column addition with decimals**

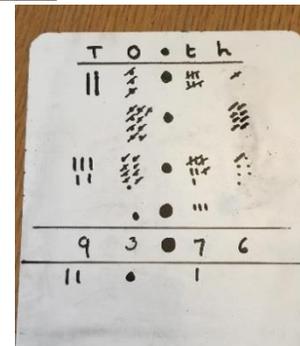
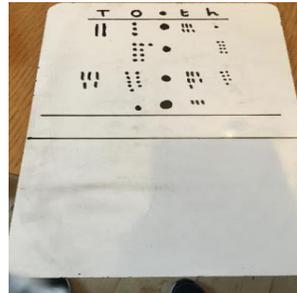
As children move on to decimals, money and decimal place value counters can be used to support learning. Adding several

$$23.61 + 9.08 + 59.77 + 1.3$$

Decimal P.V counters may be used



$$23.61 + 9.08 + 59.77 + 1.3$$



Empty boxes should be filled with zero to show their understanding of place value.

Or if the calculation was  $23.361 + 9.08 + 59.77 + 1.3$ . Place the zeros in the empty boxes as shown:

