



Lower Key Stage 2

ADDITION

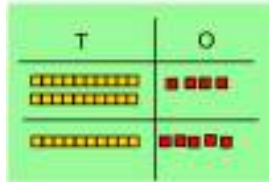
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Developing Conceptual Understanding: CONTEXTUAL - LINGUISTIC - PRACTICAL - CONCRETE

- **Column Addition**

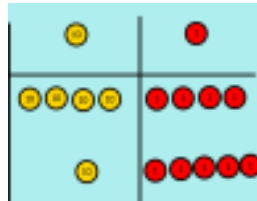
Continue to model the progression in column addition through the steps outlined in the KS1 section:

Base 10 apparatus; eg $24 + 15$



Once children are secure with Base 10 and understand place value sufficiently, they can move to modelling addition sums using place value counters:

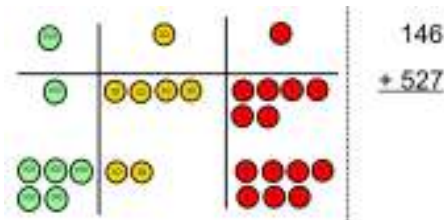
eg; $44 + 15$



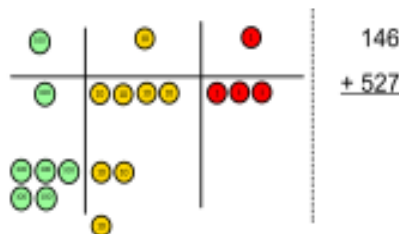
These are much easier to record pictorially than Base 10 apparatus. This can be especially useful for those children who benefit from ‘seeing’ the sum visually (see Pictorial - Mental section). They are also very effective to model adding money - to stand for £1, 10p, 1p etc.

- **Practical column addition with place value counters**

Make both numbers on a place value grid.



Add up the ones first ($6 + 7 = 13$) and **regroup** 10 ones for 1 ten ($13 = 10 + 3$).



Note the ten is ‘carried’ into the tens column underneath (as in the written method). Add up the rest of the columns, exchanging the 10 counters from one column for 1 of the value from the next place value column, until every column has been added. This must also be demonstrated and done practically first, with Base 10 apparatus, to help children clearly see the regrouping: eg, that 10 ones equal 1 ten; 10 tens equal 1 hundred and so on.



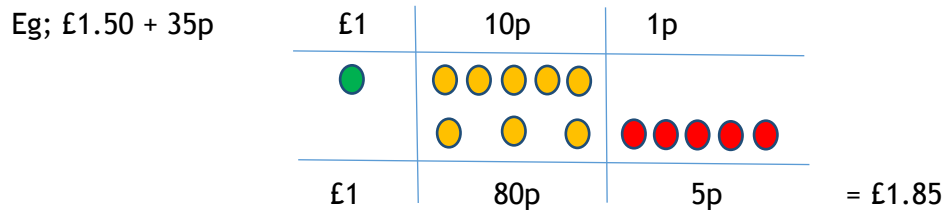
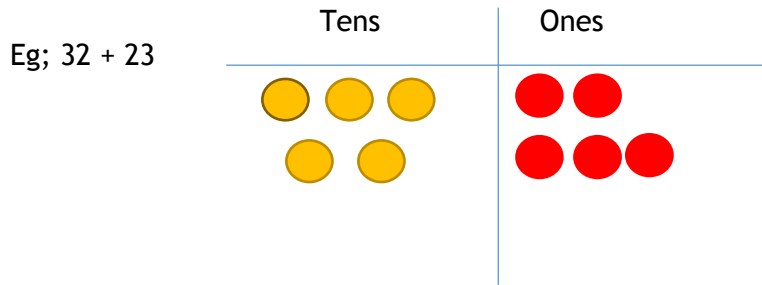
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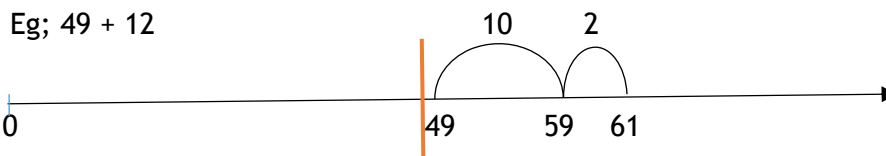
Developing Conceptual Understanding: PICTORIAL - MENTAL

- Pictorial representation using place value counters:
(Used to scaffold the learning of column addition - see above)



- Numberlines to support mental addition:

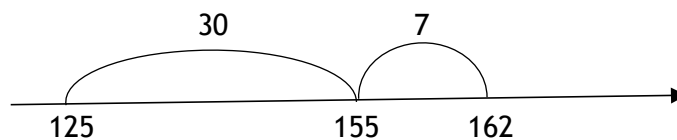
Children need to recognise that the numberline they draw for their calculation, is just the 'visible' part of a much longer numberline (starting at zero) that we don't need to draw:



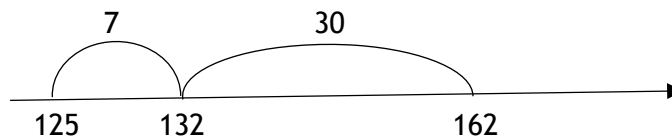
{We don't need to draw this section} {This is the section - adding on to the larger number - we need}

Eg; $37 + 125$

Put the big number on the numberline, partition the smaller number and add on...



Note that some children, once they have partitioned, may prefer to add the ones first....





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Abstract Recording:
INFORMAL JOTTINGS

- **Optional, intermediate (partitioning) method to introduce column addition:**

Eg;
$$\begin{array}{c} 54 \\ / \quad \backslash \\ 50 \quad 4 \end{array} + \begin{array}{c} 27 \\ / \quad \backslash \\ 20 \quad 7 \end{array}$$
 leads to..
$$\begin{array}{r} 50 \quad 4 \\ 20 \quad 7 \\ \hline 70 + 11 = 81 \end{array}$$

Children must be secure with adding the lowest value place value column first (ie working from right to left) in written recording.

NB: Do NOT teach 'start by adding the ones' as this is not mathematically correct and has to be un-learned once they start adding decimals!

Note that some children will naturally add the higher place value columns (eg tens or hundreds) first when working mentally, which is fine, but they have to know they cannot do this when recording a written column method.

Eg;
$$\begin{array}{c} 246 \\ / \quad | \quad \backslash \\ 200 \quad 40 \quad 6 \end{array} + \begin{array}{c} 187 \\ / \quad | \quad \backslash \\ 100 \quad 80 \quad 7 \end{array}$$

$$\begin{array}{r} 200 \quad 40 \quad 6 \\ 100 \quad 80 \quad 7 \\ \hline 300 + 120 + 13 = 433 \end{array}$$

Recombine the sub-totals using arrow cards/Base 10 to help.

- **Expanded column method (another optional intermediate step):**

Eg; $83 + 42$

$$\begin{array}{r} \text{T O} \\ 8 \quad 3 \\ + 4 \quad 2 \\ \hline 5 \quad \text{(Ones)} \\ + 1 \quad 2 \quad 0 \quad \text{(Tens)} \\ \hline 1 \quad 2 \quad 5 \end{array}$$



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Abstract Recording:
OUR WRITTEN METHOD

- Column Addition:

Eg; $54 + 67$

$$\begin{array}{r}
 \text{T O} \\
 54 \\
 + 67 \\
 \hline
 \text{1 1} \\
 \hline
 121
 \end{array}$$

Note: At Bolton Royd we carry ABOVE the answer box! This is so that the carried digit (shown in these examples in red for ease of identification) is in the correct place value column and in the child's field of vision when they add up each column.

Eg; $642 + 789$

$$\begin{array}{r}
 \text{H T O} \\
 789 \\
 + 642 \\
 \hline
 \text{1 1 1} \\
 \hline
 1431
 \end{array}$$

Eg; $2364 + 807 + 1923$

$$\begin{array}{r}
 \text{Th H T O} \\
 2364 \\
 1923 \\
 + 807 \\
 \hline
 \text{2 1} \\
 \hline
 5094
 \end{array}$$

- Column addition with carry-line:

As an intermediate step - or to support some children to clearly present their carrying, it may help to leave a 'carry line' (a space for them to add any carried digits) before they rule their answer box.

$$\begin{array}{r}
 \text{Eg} \quad \text{T O} \\
 54 \\
 + 67 \\
 \hline
 \text{1 1} \\
 \hline
 121
 \end{array}$$

$$\begin{array}{r}
 \text{Th H T O} \\
 2364 \\
 1923 \\
 + 807 \\
 \hline
 \text{2 1} \\
 \hline
 5094
 \end{array}$$



- Add decimal numbers in context (starting with money):

Eg; £5 + £1.75

	£1	•	10p	1p
	5	•	0	0
+	1	•	7	5
	6	•	7	5

Note: decimal points are written ON the vertical grid line - NOT in a square!

Expectation: We would expect the majority of Year 4 children to be confidently using this method by the end of lower Key Stage 2.

Using Bar Models when representing problems

We use Bar Models to show which numbers represent the whole and parts in a word problem. Children still need to work out the calculation but will be able to understand which numbers are important and how they should be used to answer the question.

Example

Year 3 earn 124 house points and Year 4 earn 127 house points. How many house points did Year 3 and Year 4 earn altogether?

We know that one part is 124 house points (Year 3) and that the other part is 127 house points (Year 4). We need to add the two parts together to find the whole.

124	127

so $124 + 127 = 251$

251	
124	127

In Year 3 and Year 4 there are 251 house points altogether.