Abbey Village Primary School- Written Method for Addition Policy

At Abbey Village, we believe it is important that children understand the concept of addition, in that it is:

- Combining two more groups to give **total** or **sum**
- Increasing an amount

We also believe the need to understand and work with certain principles i.e. that it is:

The inverse of subtraction

Commutative – 5 + 3 = 3 + 5

Associative – 5+ 3+7 = 5 + (3 +7)

We believe the importance in teaching children that **commutative** and **associative** means that calculations can be arranged e.g.

4 + 13 = 17 is the same as 13 + 4 = 17.

At Abbey Village we use a '5 style' approach when it comes to the teaching of Mathematics. This means that our pictorial representation, concrete representation, and written representations are in rows/ lines of 5. E.g., counters are placed in rows of 5, our written representations such as our dots that show the value of 1's are also in lines of 5.

YR

Early Learning Goal:

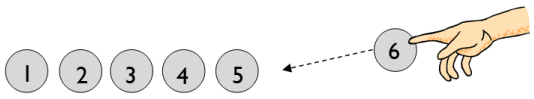
Using quantities and objects, children add two single-digit numbers and count on to find the answer.

Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They should experience practical calculation opportunities using a wide variety of practical equipment, including small world play, role play, counters, cubes etc.

Counting all method

Children will begin to develop their ability to add by using practical equipment to count out the correct amount for each number in the calculation and then combine to find the total. For example, when calculating 4 + 2, they are encouraged to count out for counters and count out two counters.

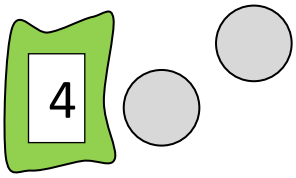
To find how many altogether, children are encouraged to touch and drag them into a line one at a time whilst counting. By touch counting and dragging in this way, it allows children to keep track of what they have already counted to ensure they don't count the same item twice.



Counting on method

To support children in moving from a counting all strategy to one involving counting on, children should still have two groups of objects but one should be covered so that it cannot be counted. For example, when calculating 4 + 2, count out the two groups of counters as before.

Then cover up the larger group with a cloth.



For most children, it is beneficial to place the digit card on top of the cloth to remind the children of the number of counters underneath. They can then start their count at 4, and touch count 5 and 6 in the same way as before, rather than having to count all of the counters separately as before. Those children are who are ready may begin to record their own calculations.

Y1

End of Year Objective:

Add one-digit and two-digit numbers to 20, including zero (using concrete objects and pictorial representations).

Children will continue to use practical experiment, combining groups of objects to find the total by counting all or counting on. Using their developing understanding of place value, they will move on to be able to use Base 10 equipment to make teens numbers using separate tens and ones.

For example, when adding 11 and 5, they can make the 11 using a ten rod and a one.

The ones can then be combined to aid with seeing the final total, e.g.

so 11 + 5 = 16. If possible, they should use two different colours of base 10 equipment so that the initial amounts can still be seen.

When showing and using a pictorial representation to the children, a line will represent 10 and a dot will represent 1.

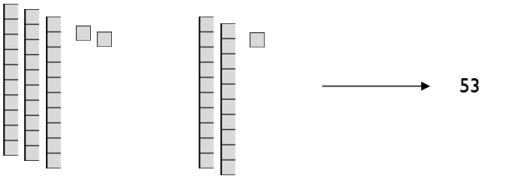
Children will also use this line and dot within their own recordings of calculation.

Y2

End of Year Objective:

Add numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers; three one-digit numbers.

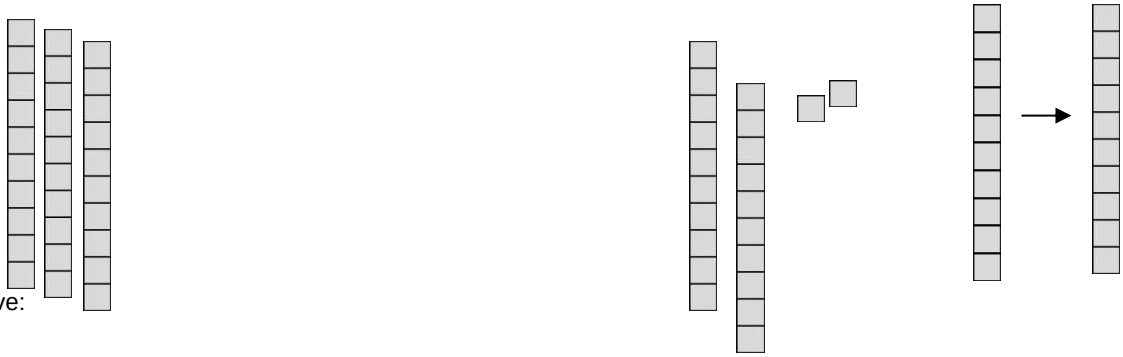
Children will continue to use the Base 10 equipment to support their calculations. For example, to calculate 31 + 21, they can make the individual amounts, counting the tens first and then count on the ones.



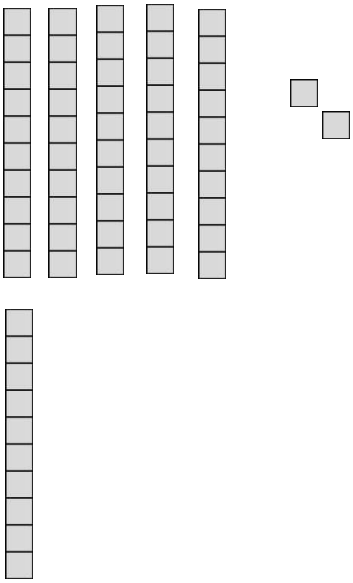
When the units total more than 10, children should be encouraged to exchange 10 units/ones for 1 ten. This is the start of children understanding 'carrying' in vertical addition. For example, when calculating
35 + 27, they can represent the amounts using Base 10 as shown:

Children use the '5 Style' to arrange the base 10 equipment.

Then, identifying the fact that there are enough units/ones to exchange for a ten, they can carry out this exchange:



To leave:



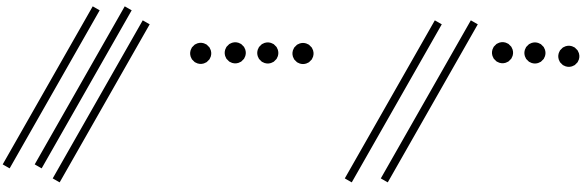
From this, we lead onto our expanded column method

e.g. 21 + 13 = 20 + 1

10+ 3

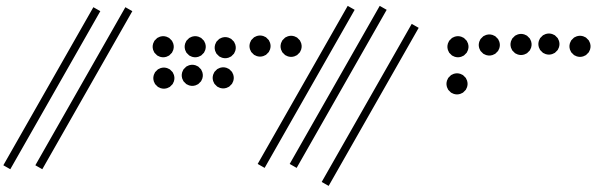
Children can also record the calculations using their own drawings of the Base 10 equipment (as slanted lines for the 10 rods and dots for the unit blocks).

e.g. 34 + 23 =

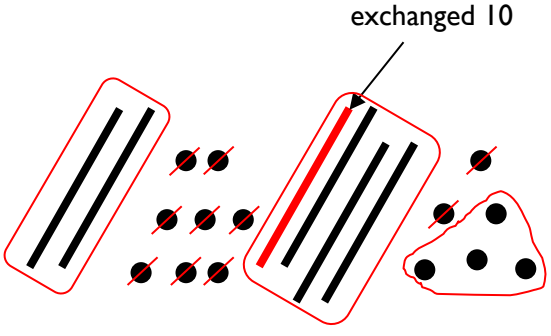


With exchange:

e.g. 28 + 36 =



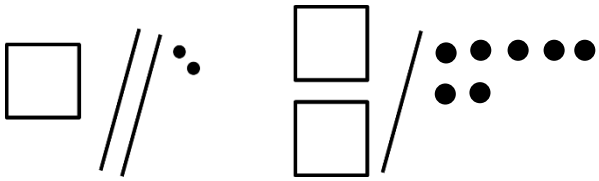
will become



so 28 + 36 = 64

It is important that children circle the remaining tens and units/ones after exchange to identify the amount remaining.

This method can also be used with adding three-digit numbers, e.g. 122 + 217 using a square as the representation of 100.



Y3

End of Year Objective:

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

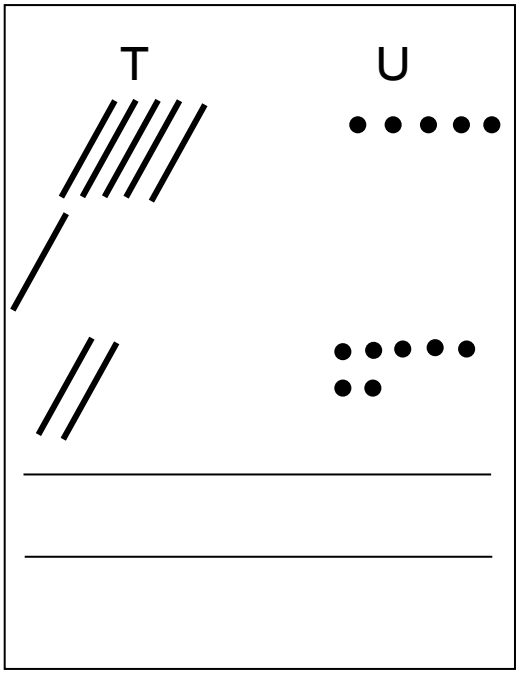
Children will build on their knowledge of using Base 10 equipment from Y2 and continue to use the idea of exchange.

Children should add the **least significant digits** first (i.e. start with the units), and in an identical method to that from year 2, should identify whether there are greater than ten units which can be exchanged for one ten.

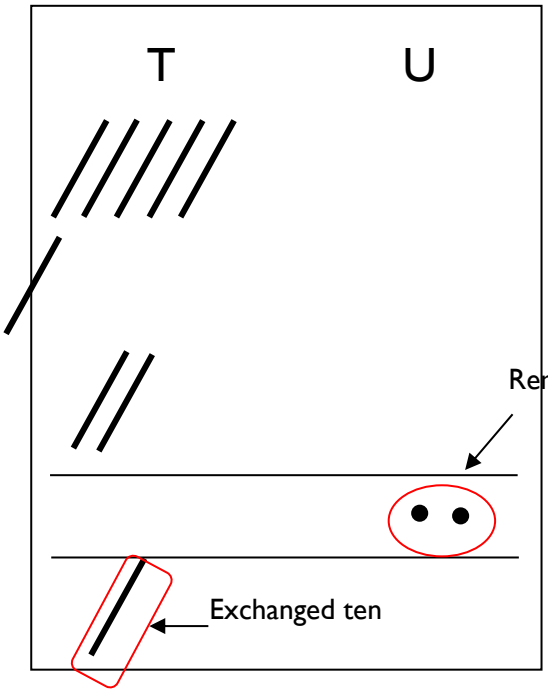
They can use a place value grid to begin to set the calculation out vertically and to support their knowledge of exchange between columns (as in Step 1 in the diagram below).

.g. 65 + 27

Step 1



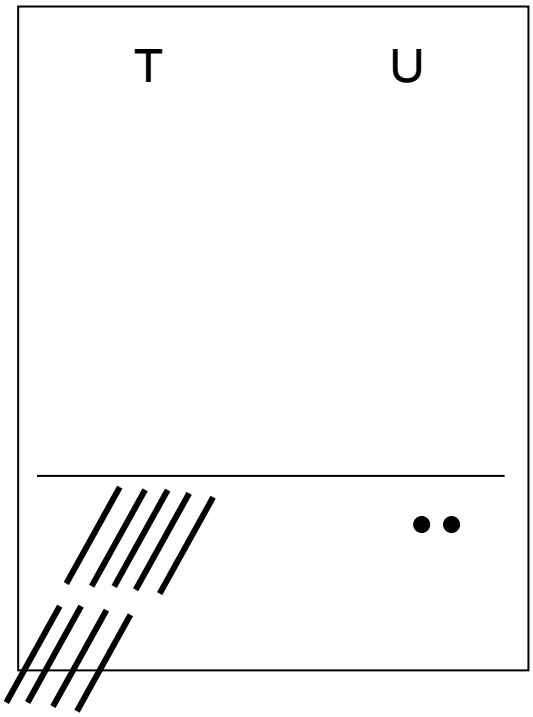
Step 2



Children would exchange ten units for a ten, placing the exchanged ten below the equals sign. Any remaining units that cannot be exchanged for a ten move into the equals sign as they are the units part of the answer (as in the diagram in Step 2 above).

If there are any tens that can be exchanged for a hundred, this can be done next. If not, the tens move into the equals sign as they are the tens part of the answer (as in the diagram in Step 3 below).

Step 3



Written method

Step 1

	T	U
	6	5
+	2	7

Step 2

	T	U
	6	5
+	2	7
		2
	1	

Step 3

	T	U
	6	5
+	2	7
	9	2
	1	

Children should utilise this practical method to link their understanding of exchange to how the column method is set out. At Abbey Village teachers will model the written method alongside this practical method initially. This should progress to children utilising the written and practical methods alongside each other and finally, and when they are ready, to children utilising just the written method.

By the end of year 3, children should also extend this method for three digit number.

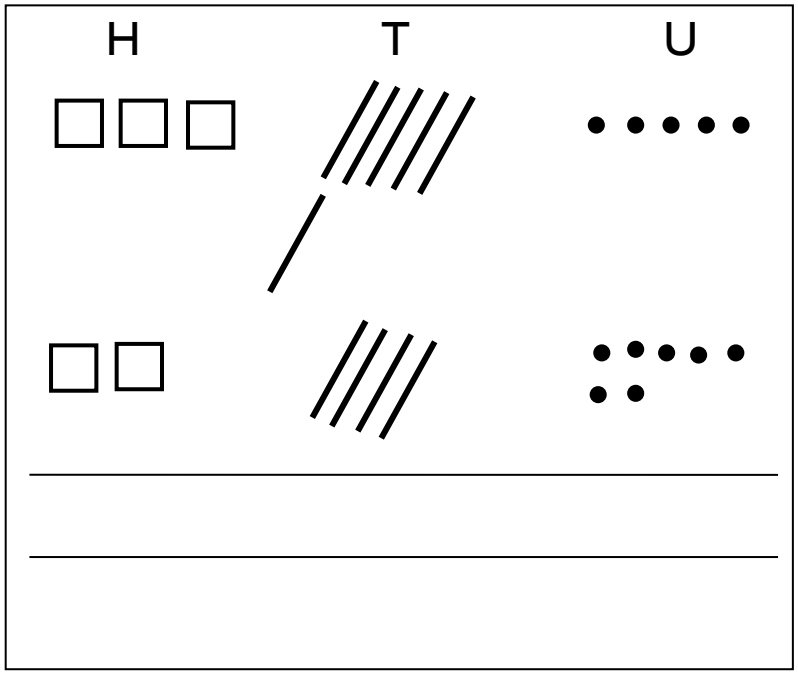
Y4

End of Year Objective:

Add numbers with up to 4 digits *and decimals with one decimal place* using the formal written method of columnar addition where appropriate.

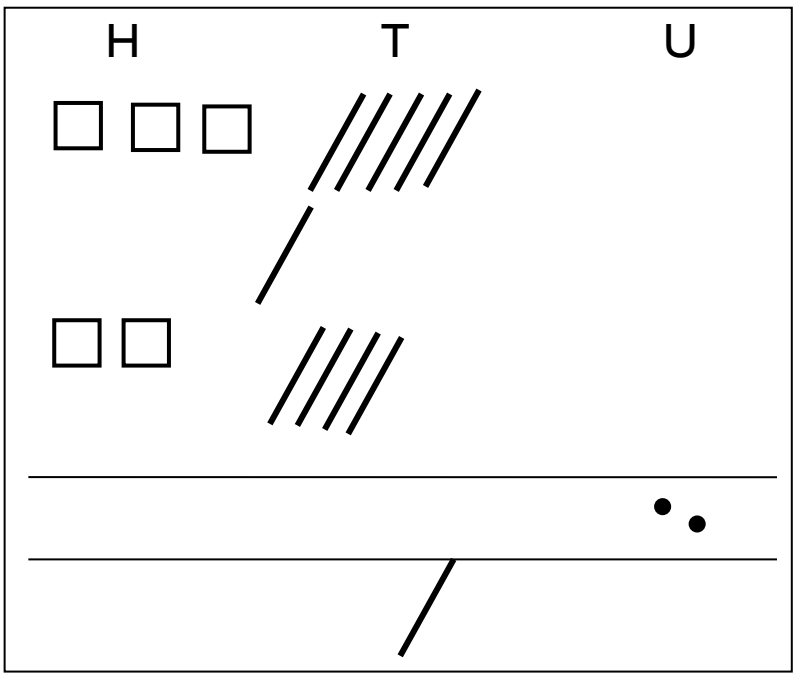
Children will move to year 4 using the method they were using as they transitioned from year 3.This allows for a consistent, and the fluid teaching of Addition.

Step 1



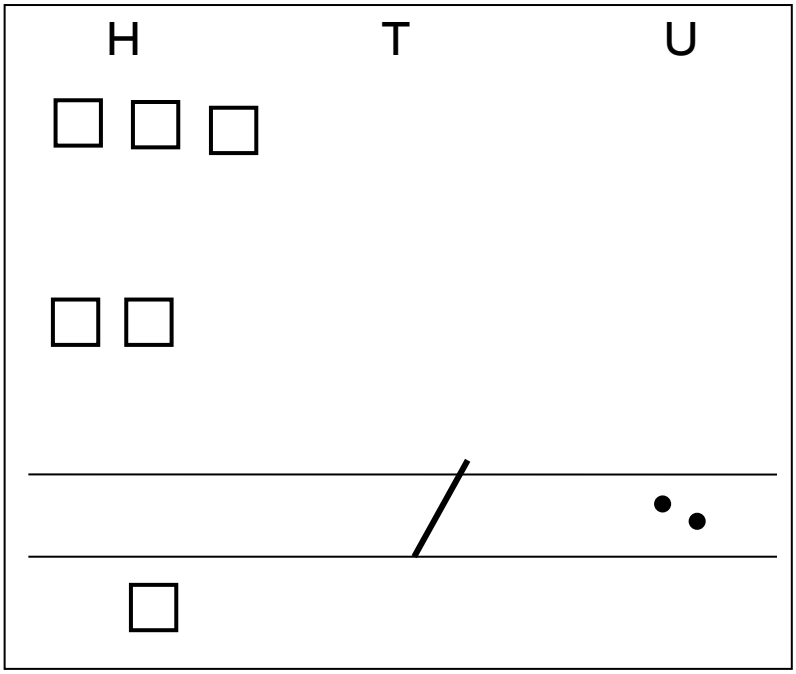
	H	T	U
	3	6	5
+	2	4	7

Step 2



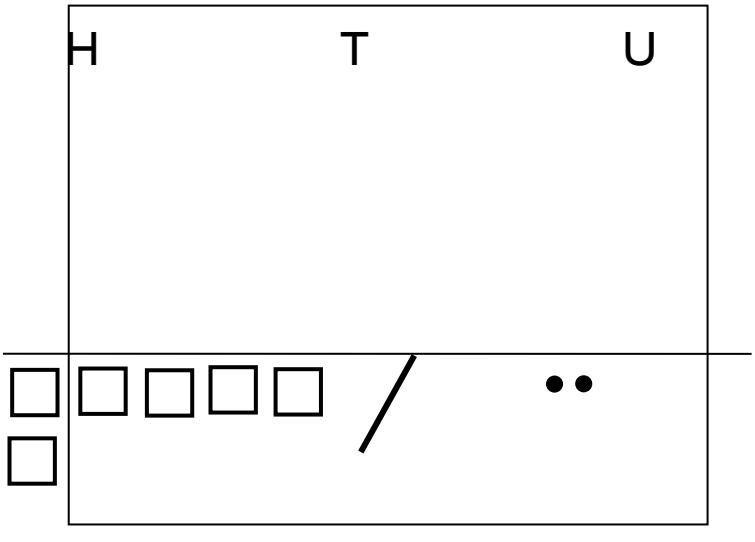
	H	T	U
	3	6	5
+	2	4	7
			2
		1	

Step 3



	H	T	U
	3	6	5
+	2	4	7
		1	2
	1	1	

Step 4



	H	T	U
	3	6	5
+	2	4	7
	6	1	2
	1	1	

By the end of year 4, children should be using the written method confidently and with understanding. As part of the National Curriculum expectations, they will also be adding:

- Several numbers with different numbers of digits, understanding the place value.
- Decimals with one decimal place, knowing that the decimal points line up under one another.

Y5

End of Year Objective:

Add whole numbers with more than 4 digits *and decimals with two decimal places*, including formal written methods (columnar addition).

Children should continue to use the carrying method to solve calculations such as:

$$\begin{array}{r} 3364 \\ +\ 247 \\ \hline 3611 \\ \hline 11 \end{array} \qquad \begin{array}{r} 3121 \\ 37 \\ +\ 148 \\ \hline 3306 \\ \hline 11 \end{array} \qquad \begin{array}{r} 3.56 \\ +\ 2.47 \\ \hline 6.03 \\ \hline 1 \end{array}$$

They will also be adding:

- several numbers with different numbers of digits, understanding the place value;
- *decimals with up to two decimal places (with each number having the same number of decimal places), knowing that the decimal points line up under one another.*
- amounts of money and measures, including those where they have to initially convert from one unit to another

Y6

End of Year Objective:

Add whole numbers and decimals using formal written methods (columnar addition).

Children should extend the carrying method and use it to add whole numbers and decimals with any number of digits.

$$\begin{array}{r} 42 \\ 6432 \\ 786 \\ 3 \\ +\ 4681 \\ \hline \end{array} \qquad \begin{array}{r} 401.20 \\ 26.85 \\ +\ 0.71 \\ \hline 428.76 \\ \hline 1 \end{array}$$

When adding decimals with different numbers of decimal places, children should be taught and encouraged to make them the same through identification that 2 tenths is the same as 20 hundredths, therefore, 0.2 is the same value as 0.20.

They will also be adding:

- several numbers with different numbers of digits, understanding the place value;
- *decimals with up to two decimal places (with mixed numbers of decimal places), knowing that the decimal points line up under one another.*
- amounts of money and measures, including those where they have to initially convert from one unit to another.