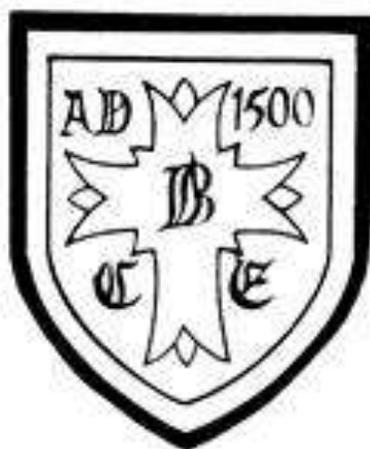


**National Curriculum
For
Mathematics
2014**



Calculation Policy

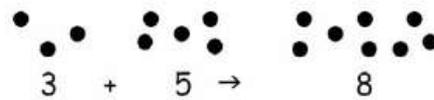
Routes through Addition

Revised and amended September 2013

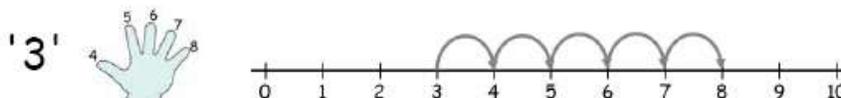
EARLY SKILLS - most children from foundation stage

- **Story around structure** - I have a set of 3 objects to start with and I get 5 more 'How many altogether?'
- Often modelled with **sets of 'things'** - essentially the story follows the same plot of 'have', 'more', 'altogether'
- Lots of **songs and rhymes**.
- Very **practical**.

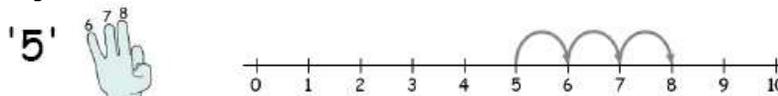
Count all - a child doing $3 + 5$ counts out three counters and then five counters and then finds the total by counting all the counters.



Count on from the first number - a child finding $3 + 5$ counts on from the first number: 'four, five, six, seven, eight'



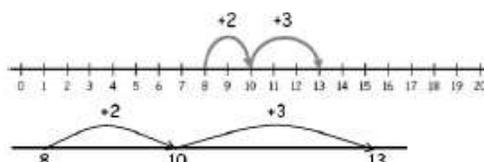
Count on from the larger number - $3 + 5$ a child chooses the larger number, even when it is not the first number, and counts on from there: 'six, seven, eight'



DEVELOPING NUMBER LINES - most children from year 1

- Children are able to **count on from the larger number**.
- First in **ones/ units** and then in **tens**.
- They can use a **marked number line** to perform addition calculations, then progress to using a partial, then **blank number line**.
- This provides a means of supporting and developing children's counting strategies with a **pictorial recording**.

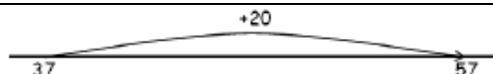
Bridging through 10 e.g. $8 + 5$



Counting in tens e.g. $20 + 23$



Counting in multiples of ten e.g. $37 + 20$ ($37 + 10 + 10 = 57$)



Counting in multiples of ten and ones e.g. $35 + 23$



PARTITIONING - most children from year 2

Partitioning both numbers into tens and units, add the tens, then add the ones.

$$\begin{array}{l} \text{T U} + \text{T U} \\ 36 + 23 \end{array}$$

$$\begin{array}{l} \text{T} \quad 30 + 20 = 50 \\ \text{U} \quad 6 + 3 = 9 \end{array}$$

$$50 + 9 = 59$$

WRITTEN METHOD FOR ADDITION

It is important that children's mental methods of calculation are practised and secured alongside their learning and use of an efficient written method for addition.

To add successfully, children need to be able to:

- recall all addition pairs to $9 + 9$ and complements in 10;
- add mentally a series of one-digit numbers, such as $5 + 8 + 4$;
- add multiples of 10 (such as $60 + 70$) or of 100 (such as $600 + 700$) using the related addition fact,
- knowledge of place value;
- Partition two-digit and three-digit numbers into multiples of 100, 10 and 1 in different ways.

EXPANDED METHOD - most children from year 3

Introduce children to the expanded method of addition showing links with partitioning

$$\begin{array}{r} 46 + 27 = \\ 46 \\ + 27 \\ \hline 6 + 7 = 13 \\ 40 + 20 = 60 \\ \hline 73 \end{array}$$

<https://www.youtube.com/watch?v=2QurnZMMl1M>

Addition A

Now try your own:

$52 + 33$

$43 + 35$

$27 + 56$

Move on to a layout showing the addition of the tens to the tens and the units (1s) to the units (1s) separately. To find the partial calculations **either the tens or the units can be added first**, and the total of the partial calculations can be found by **adding them in any order**. As children gain confidence, ask them to **start by adding the units digits first always**.

The addition of the tens in the calculation $47 + 76$ is described in the words 'forty plus seventy equals one hundred and ten', stressing the link to the related fact 'four plus seven equals eleven'.

The expanded method leads children to the more compact method so that they understand its structure and efficiency. The amount of time that should be spent teaching and practising the expanded method will depend on how **secure the children are in their recall of number facts and in their understanding of place value**.

Write numbers in columns
Adding ones first.

$$\begin{array}{r} 47 \\ + 76 \\ \hline 13 \\ 110 \\ \hline 123 \end{array}$$

<https://www.youtube.com/watch?v=XK3qi1smJpc>

Addition B

Now try your own:

$52 + 73$

$43 + 95$

$87 + 56$

COMPACT METHOD - most children from year 4

In this method, recording is reduced further. **Carry digits are recorded below the line**, using the words 'carry ten' or 'carry one hundred', not 'carry one'. Carry digits are crossed out when added on.

Later, extend to adding three two-digit numbers, two three-digit numbers and numbers with different numbers of digits, and decimals.

Extending to Decimals - using the chosen method, add two or more decimal fractions with up to 4 digits and either one or two decimal places.

Children should be taught to use zero as a place holder .

Columnar addition remains efficient when used with larger whole numbers and decimals. Once learned, the method is quick and reliable.

$$\begin{array}{r} \text{C} \quad 47 \\ + 26 \\ \hline 73 \\ \hline \cancel{1} \end{array} \qquad \begin{array}{r} \text{D} \quad 368 \\ + 423 \\ \hline 791 \\ \hline \cancel{1} \end{array} \qquad \begin{array}{r} \text{E} \quad 36.8 \\ + 49.1 \\ \hline 85.9 \\ \hline \cancel{1} \end{array}$$

<https://www.youtube.com/watch?v=Bgstec3DsMU> Addition C

https://www.youtube.com/watch?v=7hMndEM_XPc Addition D

<https://www.youtube.com/watch?v=pcQ3MKDBP8E> Addition E

Now try your own:

$52 + 73$

$243 + 425$

$26.8 + 45.6$

$$\begin{array}{r} \text{F} \quad 3587 \\ + 675 \\ \hline 4262 \\ \hline \cancel{111} \end{array} \qquad \begin{array}{r} \text{G} \quad 65.84 \\ + 58.48 \\ \hline 124.32 \\ \hline \cancel{111} \end{array}$$

<https://www.youtube.com/watch?v=u-1Rku6ma6M> Addition F

<https://www.youtube.com/watch?v=mKxRdvaqPLU> Addition G

Now try your own:

$2543 + 738$

$83.17 + 76.23$

Thank you for using Berkswell's Route Through Calculation.

Please be aware that there are many very similar *and* different methods to these. You may have learnt slightly different methods to that which your children are learning within school. There may be differences between layout and presentation in these examples. The most important thing is that we encourage your children to learn a method which they are comfortable with and do not confuse them with too many contradictory strategies. The 'Route Through' is a way of making sure children understand what is happening in their maths. Skipping to the end without having been through the rest of the route may not harm you child in the short term, but could harm their chances of progressing further with maths in secondary school, due to a lack of understanding which is key to many of the more developed areas such as algebra. Thank you again for taking the time to view these examples and read through our route through calculation. It was created by a team of local schools and updated for the National Curriculum 2014.

Mr M. Penn