

Calculation Policy

Addition

Year 1

+ = signs and missing numbers

Children need to understand the concept of equality before using the '=' sign. Calculations should be written either side of the equality sign so that the sign is not just interpreted as 'the answer'.

$$2 = 1 + 1$$

$$2 + 3 = 4 + 1$$

Missing numbers need to be placed in all possible places.

$$3 + 4 = \square$$

$$\square = 3 + 4$$

$$3 + \square = 7$$

$$7 = \square + 4$$

Counting and Combining sets of Objects

Combining two sets of objects (aggregation) which will progress onto adding on to a set (augmentation)



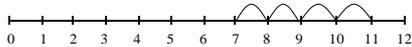
Understanding of counting on with a numbertrack.



Understanding of counting on with a numberline

(supported by models and images).

$$7 + 4$$



Year 2

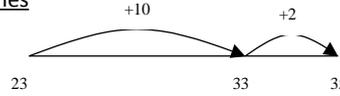
Missing number problems e.g. $14 + 5 = 10 + \square$ $32 + \square + \square = 100$
 $35 = 1 + \square + 5$

It is valuable to use a range of representations (also see Y1).

Continue to use numberlines to develop understanding of:

Counting on in tens and ones

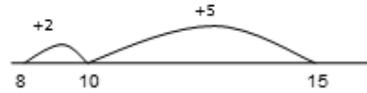
$$\begin{aligned} 23 + 12 &= 23 + 10 + 2 \\ &= 33 + 2 \\ &= 35 \end{aligned}$$



Partitioning and bridging through 10.

The steps in addition often bridge through a multiple of 10 e.g. Children should be able to partition the 7 to relate adding the 2 and then the 5.

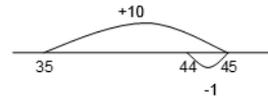
$$8 + 7 = 15$$



Adding 9 or 11 by adding 10 and adjusting by 1

e.g. Add 9 by adding 10 and adjusting by 1

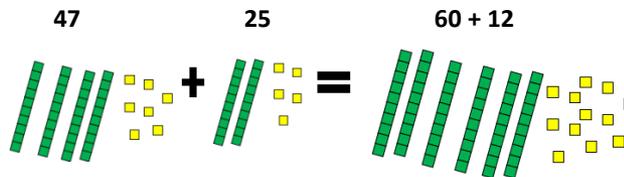
$$35 + 9 = 44$$



Towards a Written Method

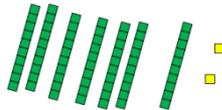
Partitioning in different ways and recombine

$$47 + 25$$



Leading to exchanging:

$$72$$



Expanded written method

$$40 + 7 + 20 + 5 =$$

$$40 + 20 + 7 + 5 =$$

$$60 + 12 = 72$$

$$\begin{aligned} &40 + 7 \\ &+ 20 + 5 \\ &60 + 12 = 72 \end{aligned}$$

Year 3

Missing number problems using a range of equations as in Year 1 and 2 but with appropriate, larger numbers.

Partition into tens and ones

Partition both numbers and recombine.

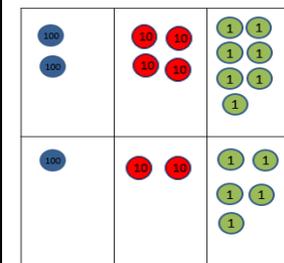
Count on by partitioning the second number only e.g.

$$\begin{aligned} 247 + 125 &= 247 + 100 + 20 + 5 \\ &= 347 + 20 + 5 \\ &= 367 + 5 \\ &= 372 \end{aligned}$$

Children need to be secure adding multiples of 100 and 10 to any three-digit number including those that are not multiples of 10.

Towards a Written Method

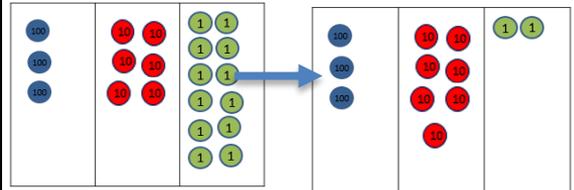
Introduce expanded column addition modelled with place value counters (Dienes could be used for those who need a less abstract representation)



$$\begin{aligned} &200 + 40 + 7 \\ &100 + 20 + 5 \\ &300 + 60 + 12 = 372 \end{aligned}$$

$$\begin{array}{r} 247 \\ +125 \\ \hline 12 \\ 60 \\ 300 \\ \hline 372 \end{array}$$

Leading to children understanding the exchange between tens and ones.



Some children may begin to use a formal columnar algorithm, initially introduced alongside the expanded method. The formal method should be seen as a more streamlined version of the expanded method, not a new method.

$$\begin{array}{r} 247 \\ +125 \\ \hline 372 \\ \hline 10 \end{array}$$

Year 4

Missing number/digit problems:

Mental methods should continue to develop, supported by a range of models and images, including the number line. The bar model should continue to be used to help with problem solving.

Written methods (progressing to 4-digits)

Expanded column addition modelled with place value counters, progressing to calculations with 4-digit numbers.

			$200 + 40 + 7$
			$100 + 20 + 5$
			$300 + 60 + 12 = 372$

	247
	+125
	12
	60
	300
	372

Compact written method

Extend to numbers with at least four digits.

	2634
	+4517
	7151
	1 1

Children should be able to make the choice of reverting to expanded methods if experiencing any difficulty.

Extend to up to two places of decimals (same number of decimals places) and adding several numbers (with different numbers of digits).

$$\begin{array}{r} 72.8 \\ + 54.6 \\ \hline 127.4 \\ 1\ 1 \end{array}$$

Year 5

Missing number/digit problems:

Mental methods should continue to develop, supported by a range of models and images, including the number line. The bar model should continue to be used to help with problem solving. Children should practise with increasingly large numbers to aid fluency
e.g. $12462 + 2300 = 14762$

Written methods (progressing to more than 4-digits)

As year 4, progressing when understanding of the expanded method is secure, children will move on to the formal columnar method for whole numbers and decimal numbers as an efficient written algorithm.

$$\begin{array}{r} 172.83 \\ + 54.68 \\ \hline 227.51 \\ 1\ 1\ 1 \end{array}$$

Place value counters can be used alongside the columnar method to develop understanding of addition with decimal numbers.

Year 6

Missing number/digit problems:

Mental methods should continue to develop, supported by a range of models and images, including the number line. The bar model should continue to be used to help with problem solving.

Written methods

As year 5, progressing to larger numbers, aiming for both conceptual understanding and procedural fluency with columnar method to be secured. Continue calculating with decimals, including those with different numbers of decimal places

Problem Solving

Teachers should ensure that pupils have the opportunity to apply their knowledge in a variety of contexts and problems (exploring cross curricular links) to deepen their understanding.

