ADDITION

In order to support written calculations, the following mental strategies are essential.

To add successfully, children need to be able to:
- recall all addition pairs to 9 + 9;
- add mentally a series of single-digit numbers, such as 5 + 8 + 4;
- partitioning of single-digit numbers in order to bridge multiples of 10, knowing for example that 7 can be split into 5 and 2 when working out 35 + 7
- add multiples of 10 (such as 60 + 70) or of 100 (such as 600 + 700) or of 1000 (such as 6000 +7000) using the related addition fact, 6 + 7, and their knowledge of place value;
- partition two, three and four digit numbers into multiples of 1000, 100, 10 and 1.

Note: 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.

Key Vocabulary related to Addition:

Foundation
Add, more, plus, altogether, total, makes.

Key Stage One
greater, addition, plus, more

Lower Key Stage Two
Sum, and

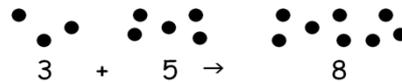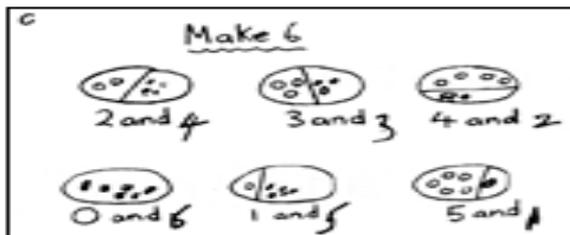### Upper Key Stage Two
Positive, increase

Addition

Foundation Stage

Add two single digit numbers together

Children are encouraged to develop a mental picture of the number system in their heads to use for calculation.

They develop ways of recording calculations using pictures, etc.

Bead strings or bead bars can be used to illustrate addition

8+2=10

Children use and make their own number lines and practical resources to support calculation and teachers demonstrate the use of the number line, using appropriate mathematical vocabulary.

Children are encouraged to use methods in the inside and outside environment.

They work with numbers to 20 and develop ways of recording calculations using pictures and objects.

They will add two single digit numbers using objects and by counting on, on a number line.
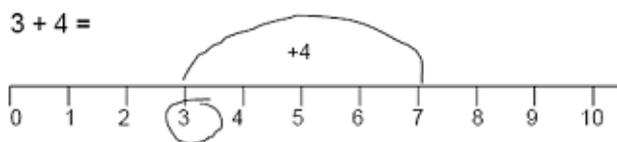
Year 1

Add with numbers up to 20

Count on, first in ones, then using number facts

4+2 = 6

6+3=9

0 1 2 3 4 5 6 7 8 9 10

Put the larger number first
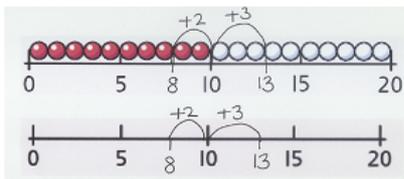
3 + 6, find 6 and count on 3

Number tracks, moving to numbered lines, using beadstring (if necessary) to support transition to landmarked number lines:

3 + 4 =

+4

0 1 2 3 4 5 6 7 8 9 10

Bridge ten

8 + 5 = 13

+2 +3

0   5   8 10 13 15   20

+2 +3

0   5   8 10 13 15   20

Read and write the addition (+) and equals (=) signs within number sentences.

Year 2

Adding with 2 digit numbers

Using Landmarked number lines moving to empty number lines:

Add two digit numbers and units
including bridging ten

65+7 = 72

Add two digit numbers and tens

27+30 = 57

Adding pairs of two digit numbers
34+22 = 56

Partition and recombine (use place value apparatus or place value cards as appropriate to support)

34 + 27

= 30 + 20 = 50   4 + 7 = 11
= 50 + 11 = 61

Progress to showing this vertically in preparation for vertical methods in Year 3. This process will probably occur later in Year 2 and once children are confident at adding tens and units on a number line.

Begin with examples that involve no crossing of boundaries and progress to crossing the tens boundary.

Year 3

Add numbers with up to three digits

Add two-digit numbers (including using number lines as in Year 2)
e.g. 68 + 53

Revisit method of partition and recombine, to support transition into expanded written.

34 + 27

= 30 + 20 = 50   4 + 7 = 11
= 50 + 11 = 61

Use the expanded column addition method:

360 + 157
   300 60 0
+ 100 50 7
   400 110 7
= 517

*Add the **units** first, in preparation for the compact method.*

Move to the compact **column addition** method, with 'carrying':

328 + 443 =

   300 20 8
+ 400 40 3
   700 60 11

   328
+ 443
   771
    1

Children who are very secure and confident with 3-digit expanded column addition should be moved onto the **compact column addition** method, being introduced to 'carrying' for the first time. Compare with the expanded method to develop an understanding of the process.

*'Carry' numbers **underneath** the bottom line.*

The language used matches that used in the expanded layout e.g. 60 add 50 is 110 so 100 and one ten. This may also be understood as 6 tens add 5 tens is 11 tens

Year 4

Add numbers with up to four digits

Use compact method to add pairs of four digit numbers. Model with expanded method if place value is weak.

```
3467 + 2349
    3000  400  60  7          3 4 6 7
+   2000  300  40  9        + 2 3 4 9
    5000  700 100 16          5 8 1 6
                                 1  1
  = 5816
```

*'Carry' numbers **underneath** the bottom line.*

The language used matches that used in the expanded layout e.g. 60 add 50 is 110 so 100 and one ten. This may also be understood as 6 tens add 5 tens is 11 tens

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Year 5

Add with at least 4 digit numbers and up to two decimal places

Use compact method to add numbers with 4 or more digits and numbers with 2 decimal places.

```
   6743              £75.45
  +5679            +£26.79
  12422            £102.14
   1 1 1              1 1 1
```

*'Carry' numbers **underneath** the bottom line.*

Year 6

Adding with increasingly large and more complex numbers and decimals

Use formal written method of columnar addition to add large numbers and numbers with up to 3 decimal places.

e.g. 34.5 + 4.58 =

```
    3  4  .  5
 +     4  .  5  8
    3  9  .  0  8
          1
```

Examples should include addition of numbers with a different number of decimal places.