PROGRESSION THROUGH CALCULATIONS FOR ADDITION

MENTAL CALCULATIONS
(ongoing)

Mental recall of number bonds

6 + 4 = 10	□ + 3 = 10
25 + 75 = 100	19 + □ = 20

Use near doubles
6 + 7 = double 6 + 1 = 13

Addition using partitioning and recombining
34 + 45 = (30 + 40) + (4 + 5) = 79

Counting on or back in repeated steps of 1, 10, 100, 1000
86 + 57 = 143 (by counting on in tens and then in ones)
460 - 300 = 160 (by counting back in hundreds)

Add the nearest multiple of 10, 100 and 1000 and adjust
24 + 19 = 24 + 20 – 1 = 43
458 + 71 = 458 + 70 + 1 = 529

Use the relationship between addition and subtraction

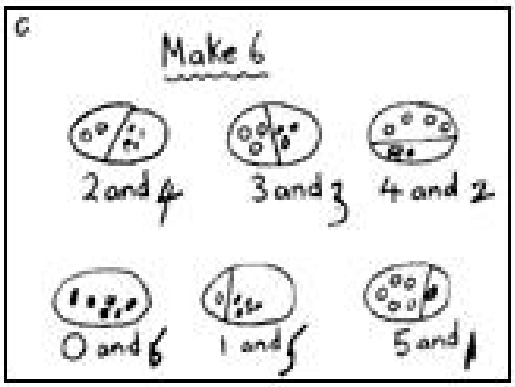
36 + 19 = 55	19 + 36 = 55
55 – 19 = 36	55 – 36 = 19

MANY MENTAL CALCULATION STRATEGIES WILL CONTINUE TO BE USED. THEY ARE NOT REPLACED BY WRITTEN METHODS.

THE FOLLOWING ARE STANDARDS THAT WE EXPECT THE MAJORITY OF CHILDREN TO ACHIEVE.

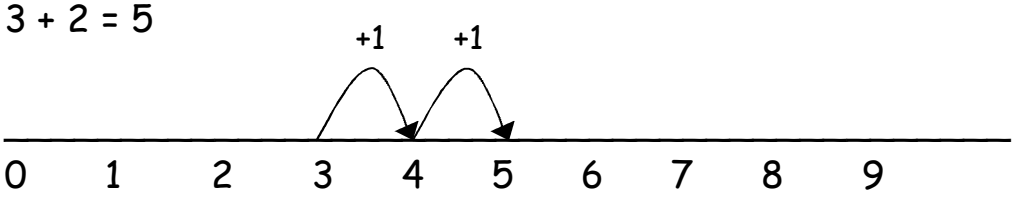
Stage 1

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.



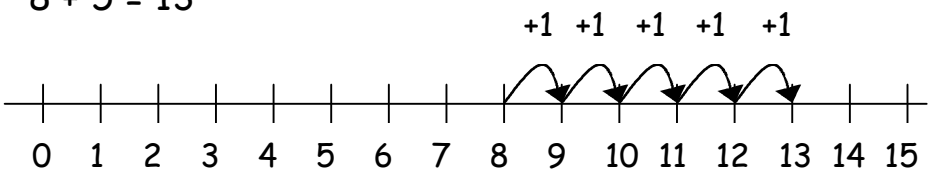
They use numberlines and practical resources to support calculation and teachers *demonstrate* the use of the numberline.

3 + 2 = 5

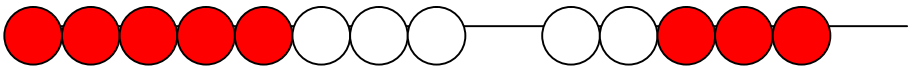


Children then begin to use numbered lines to support their own calculations using a numbered line to count on in ones.

8 + 5 = 13



Bead strings or bead bars can be used to illustrate addition including bridging through ten by counting on 2 then counting on 3.

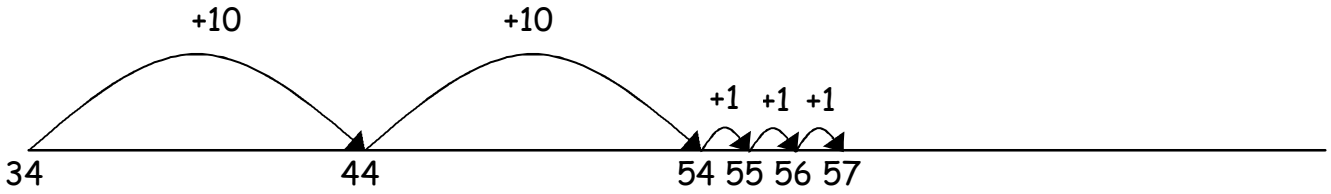


Stage 2

Children will begin to use 'empty number lines' themselves starting with the larger number and counting on.

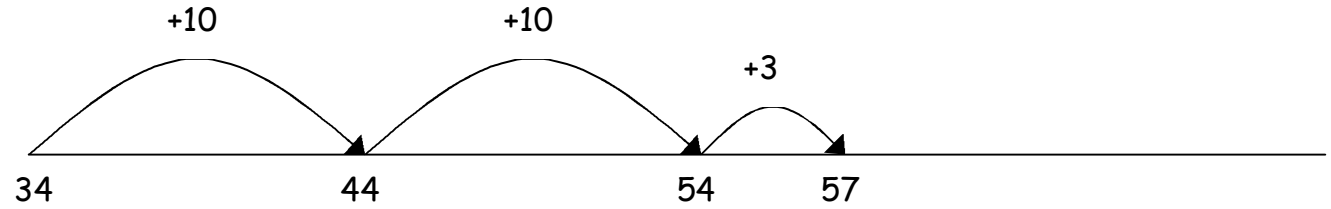
✓ First counting on in tens and ones.

34 + 23 = 57



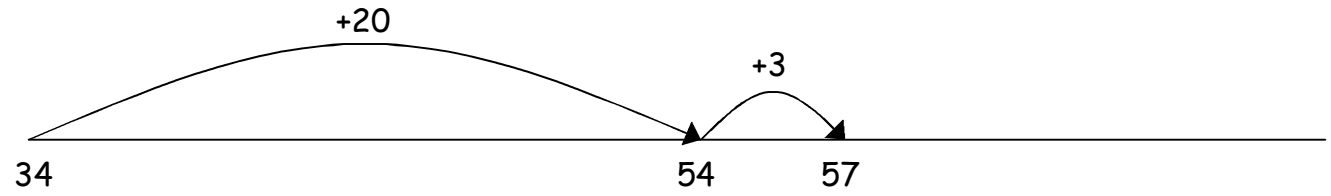
✓ Then helping children to become more efficient by adding the units in one jump (by using the known fact 4 + 3 = 7).

34 + 23 = 57



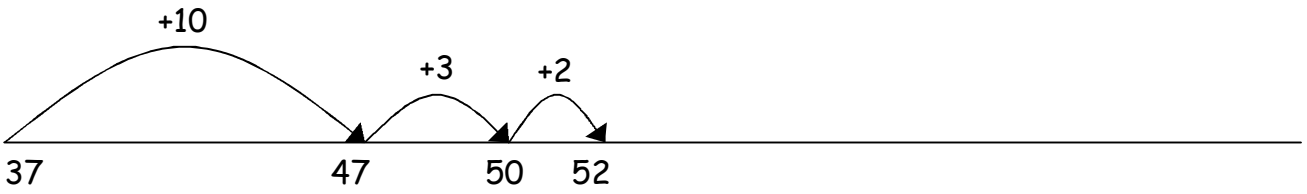
✓ Followed by adding the tens in one jump and the units in one jump.

34 + 23 = 57



✓ Bridging through ten can help children become more efficient.

37 + 15 = 52

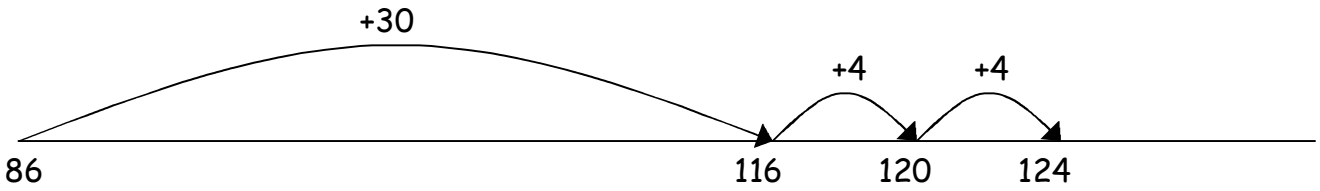


Stage 3

Children will continue to use empty number lines with increasingly large numbers, including compensation where appropriate.

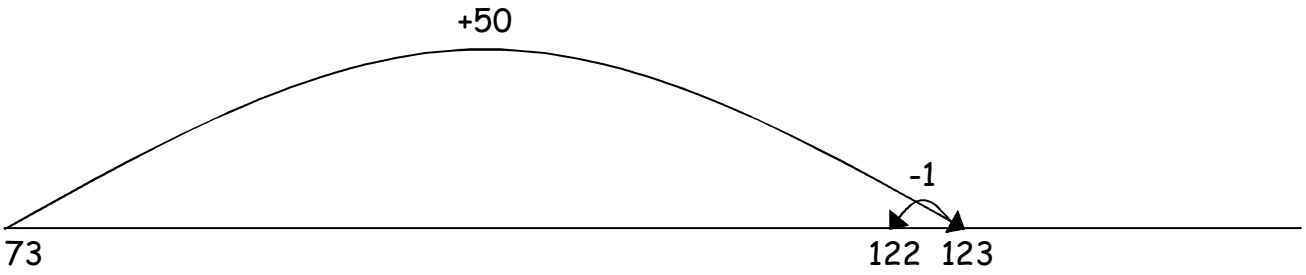
✓ Count on from the largest number irrespective of the order of the calculation.

38 + 86 = 124



✓ Compensation

49 + 73 = 122



Children will begin to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies.

Option 1 – Adding most significant digits first, then moving to adding least significant digits.

```
  67
+ 24
  80  (60 + 20)
  11  ( 7 + 4)
  91
```

```
  267
+  85
  200
   140  (60 + 80)
    12  ( 7 + 5)
  352
```

Moving to adding the least significant digits first in preparation for 'carrying'.

```
  67
+ 24
  11  ( 7 + 4)
  80  (60 + 20)
  91
```

```
  267
+  85
   12  (7 + 5)
  140  (60 + 80)
  200
```

352

Option 2 - Adding the least significant digits first

```
  67
+ 24
  11 ( 7 + 4)
  80 (60 + 20)
  91
```

```
  267
+ 85
  12 ( 7 + 5)
 140 (60 + 80)
 200
 352
```

Stage 4

From this, children will begin to carry below the line.

```
  625
+ 48
  673
   1
```

```
  783
+ 42
  825
   1
```

```
  367
+ 85
  452
  11
```

Using similar methods, children will:

- ✓ *add several numbers with different numbers of digits;*
- ✓ *begin to add two or more three-digit sums of money, with or without adjustment from the pence to the pounds;*
- ✓ *know that the decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. £3.59 + 78p.*

Stage 5

Children should extend the carrying method to numbers with at least four digits.

```
  587
+ 475
 1062
  11
```

```
  3587
+ 675
 4262
 111
```

Using similar methods, children will:

- ✓ *add several numbers with different numbers of digits;*
- ✓ *begin to add two or more decimal fractions with up to three digits and the same number of decimal places;*
- ✓ *know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 3.2 m – 280 cm.*

Stage 6

Children should extend the carrying method to number with any number of digits.

```
  7648
+ 1486
  9134
  1 1 1
```

```
  6584
+ 5848
 12432
  1 1 1
```

```
    42
  6432
   786
     3
+ 4681
 11944
  1 2 1
```

Using similar methods, children will

- ✓ *add several numbers with different numbers of digits;*
- ✓ *begin to add two or more decimal fractions with up to four digits and either one or two decimal places;*
- ✓ *know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 401.2 + 26.85 + 0.71.*

By the end of Stage 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.