PROGRESSION THROUGH CALCULATIONS FOR ADDITION

MENTAL CALCULATIONS
(ongoing)
These are a **selection** of mental calculation strategies:
See NNS Framework Section 5, pages 30-41 and Section 6, pages 40-47

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

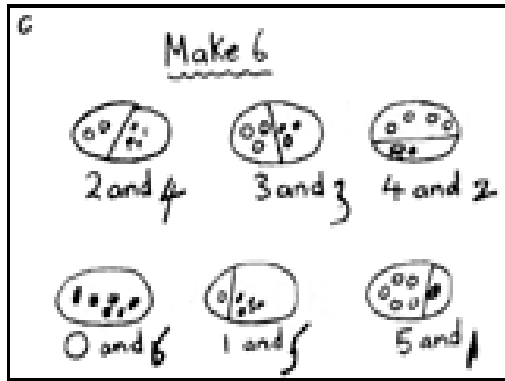36 + 19 = 55   19 + 36 = 55
55 – 19 = 36   55 – 36 = 19

MANY MENTAL CALCULATION STRATEGIES WILL CONTINUE TO BE USED. THEY ARE NOT REPLACED BY WRITTEN METHODS.
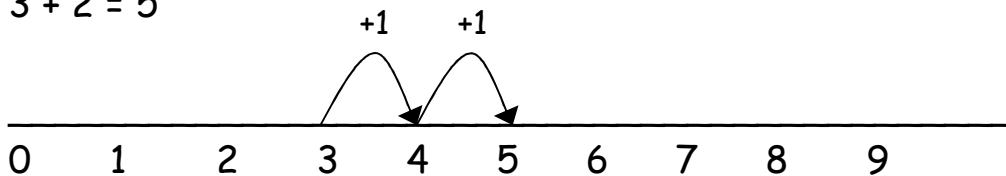
YR and Y1

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.
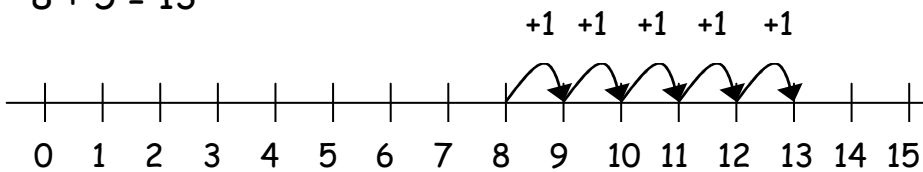

They use numberlines and practical resources to support calculation and teachers *demonstrate* the use of the numberline.
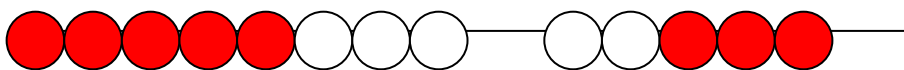
$3 + 2 = 5$

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.
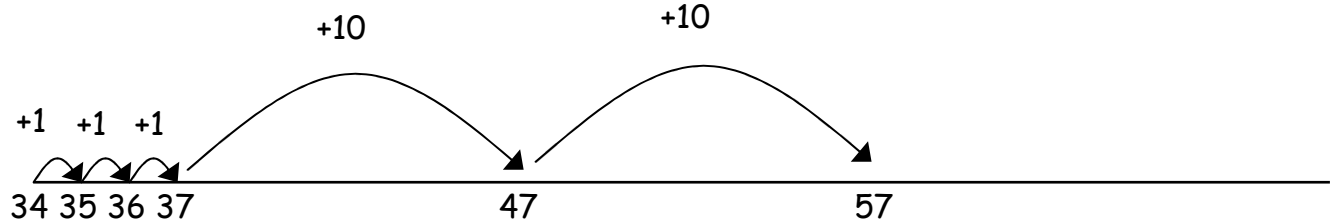
Y2

Children will begin to use 'empty number lines' themselves starting with the larger number and counting on.
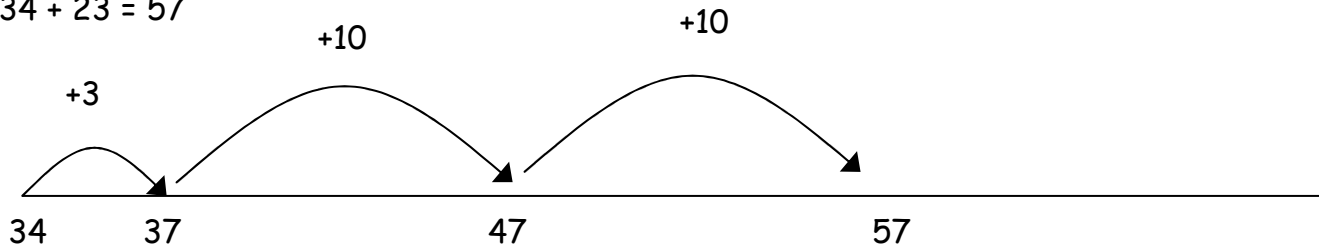
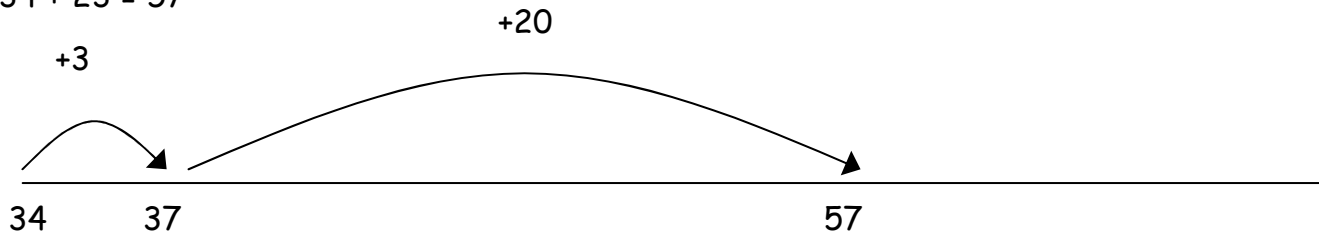✓   First counting on in tens and ones BUT starting with the units so

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).
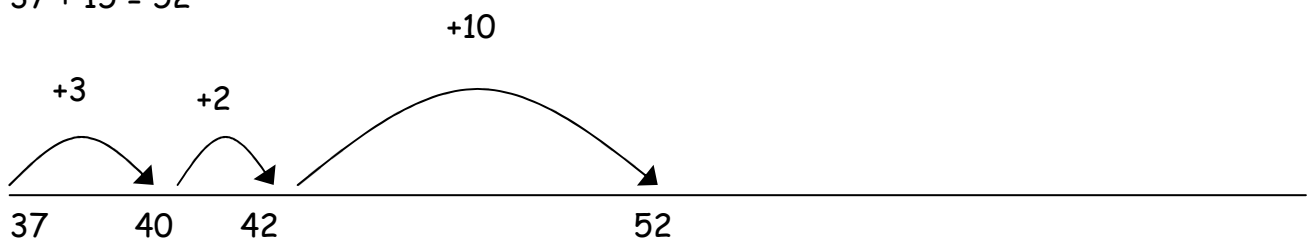
34 + 23 = 57

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

34 + 23 = 57

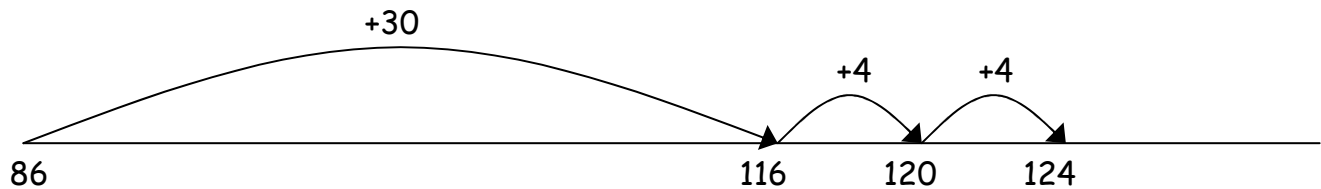✓   Bridging through ten can help children become more efficient.

37 + 15 = 52

Y3

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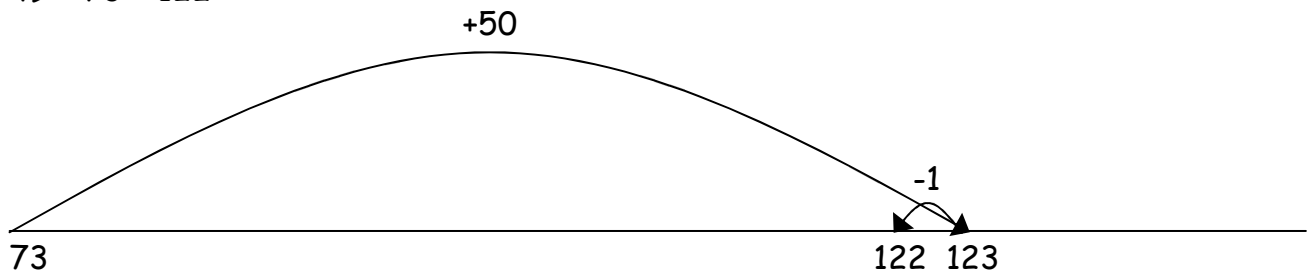
Children will begin to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies.

Adding the least significant digits first

67	267
+ 24	+ 85
1 1 (7 + 4)	12 (7 + 5)
80 (60 + 20)	140 (60 + 80)
91	200
	352

Y4

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

```
   625              783              367
+   48           +   42           +   85
   673              825              452
     1                1               1 1
```

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.*

Y5

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

```
   587             3587
+ 475            +  675
  1062             4262
   1 1             1 1 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 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.*

Y6

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

```
   7648            6584               42
+  1486          + 5848             6432
   9134           12432              786
   1 11           1 11                 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 year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.

Children should not be made to go onto the next stage if:

1) they are not ready.
2) they are not confident.

Children should be encouraged to approximate their answers before calculating.
Children should be encouraged to check their answers after calculation using an appropriate strategy.
Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.