

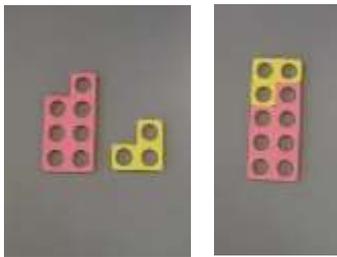
Addition

Stage 1:

Recording and developing mental pictures

Children will engage in a wide variety of songs and rhymes, games and activities. They will begin to relate addition to combining two groups of objects, first by counting all and then by counting on from the largest number. They will find one more than a given number. In practical activities and through discussion they will begin to use the vocabulary involved in addition.

'You have five apples and I have three apples. How many apples altogether?'



Stage 2:

- Add single digit numbers using fingers
- Combining sets of Objects

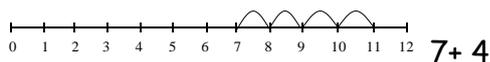
Combining two sets of objects (aggregation) which will progress onto adding on to a set (augmentation)

- Understanding of counting on with a numbertrack.



- Understanding of counting on with a numberline (supported by models and images).

Children should experience a range of representations of number lines and number tracks.



- Use of bead string to count on

- Use of a 100 grid to count on

Different orientations of the 100 square help children transfer their skills and understanding between similar representations.

Stage 3:

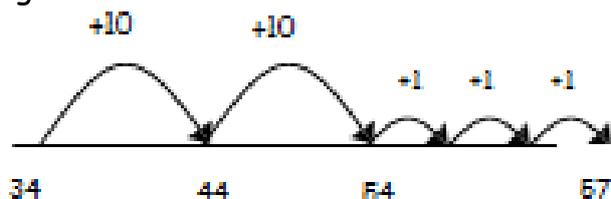
The empty number line as a representation of a mental strategy (this stage is a representation of a mental method not a formal written method)

- Partitioning numbers and bridge through 10s.
eg $8+7$

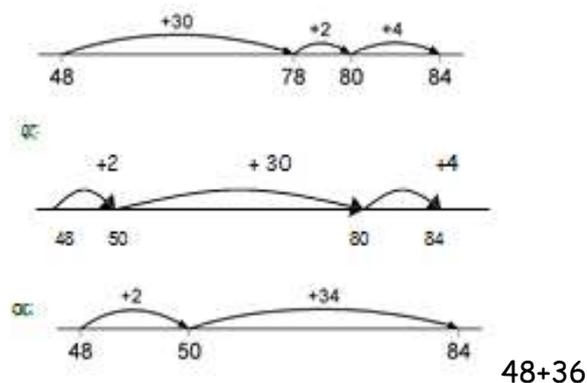


Children need to be able to add multiples of 10 and single digits and show this on an empty number line.

Then move to partitioning numbers into tens and ones.
eg $34+23=$

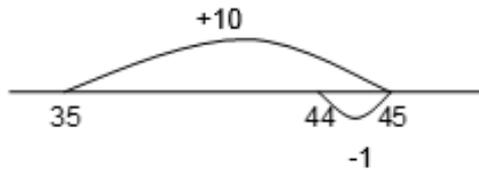


As children become more efficient they will be able to use different sized jumps, use partitioning and bridging through 10.



-Adding 9 or 11 by adding 10 and adjusting by 1 e.g. Add 9 by adding 10 and adjusting by 1

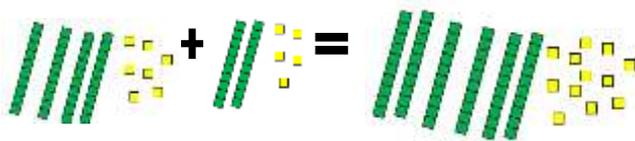
$$35 + 9 = 44$$



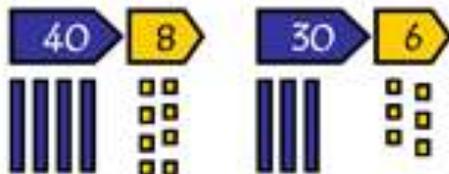
Stage 4:

Partitioning into tens and ones to lead to a formal written method

Children should use a range of practical apparatus (place value cards, straws, Dienes apparatus, place value counters) to complete TU + TU. They partition the number into tens and ones before adding the numbers together, finding the total.



48 + 36



40 + 30 = 70

8 + 6 = 14

70 + 14 = 84



When crossing the tens barrier with ones, children should use the term 'exchange' to describe converting ten ones into one ten.

Children may make these jottings to support their calculation.

47 + 76

40 + 70 = 110 or 7 + 6 = 13

7 + 6 = 13 40 + 70 = 110

110 + 13 = 123 110 + 13 = 123

or

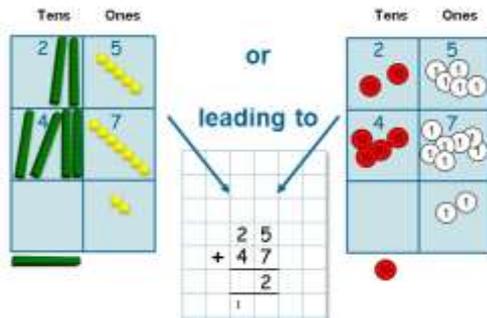
47 + 70 = 117

117 + 6 = 123

$$\begin{array}{r}
 40 + 7 \\
 + 20 + 5 \\
 \hline
 60 + 12 = 72
 \end{array}$$

Stage 5

Using Dienes/place value counters alongside columnar written method



Introduce expanded column addition modelled with place value counters

● ●	●● ●●	●● ●● ●● ●
●	●●	●● ●● ●

$$\begin{array}{r}
 200 + 40 + 7 \\
 100 + 20 + 5 \\
 \hline
 300 + 60 + 12 = 372
 \end{array}$$

Expanded written method, vertical layout, adding the least significant number first.

$$\begin{array}{r}
 264 \\
 + 148 \\
 \hline
 12 \\
 100 \\
 \hline
 300 \\
 \hline
 412
 \end{array}$$

Stage 6: Compact column method

$$\begin{array}{r} 258 \\ + 87 \\ \hline 11 \\ \hline 345 \end{array} \qquad \begin{array}{r} 366 \\ + 458 \\ \hline 11 \\ \hline 824 \end{array}$$

Children should leave a line for any 'carried' numbers.

- Continue using mental and informal strategies (number lines work well with time, money, weight etc.)
- Extend written methods to column addition of two numbers less than 10,000. By end of year 4 (NC 2014)
- Use with decimals e.g. money, length, weight. By end of year 5 (NC 2014)
- Extend written methods to column addition of two or more numbers, or decimals in different contexts. By end of year 5 (NC 2014)
- Be able to select a suitable strategy (mental, informal, compact, calculator) when solving problems. By end of year 5 (NC 2014)