Addition

Mental Calculation

The ability to calculate mentally forms the basis of all methods of calculation. This involves

- instant recall of number facts (+ - x ÷)

- having a secure understanding of place value and the number system

- having a range of strategies to apply to a calculation

- understand the language and rules of maths
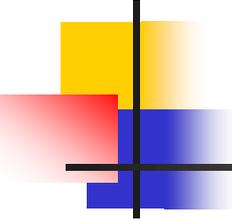
Written Calculation

- Throughout their primary years, children should progress from informal jottings to efficient written methods for each of the four operations.

- Standard written methods should only be introduced when a child has a secure knowledge and understanding of the process involved and can clearly explain the strategies they have used.

- Children become secure with these methods when they have regular practice and persevere!

Mental Strategies for Addition

**Secure mental addition requires the ability to**

- recall key number facts instantly (number pairs to 10, 20 & 100, doubles etc) and to apply these to similar calculations

- recognise that addition can be done in any order and use this to add mentally different combinations of one and two digit numbers

- partition two-digit numbers in different ways, including adding the tens and units separately before recombining

- understand the language of addition including more than, sum, plus, greater than, total, altogether ….

Record simple mental addition using + and =

Record addition by showing jumps on prepared number lines or moving onto higher numbers with the hundred square
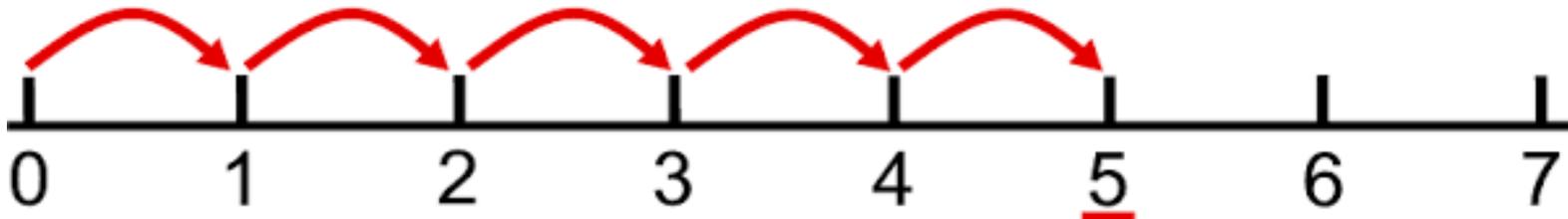
Written methods for Addition

Stage 2: The empty number line

The empty number line helps to record the steps on the way to calculating the total. The steps often bridge through a multiple of 10.

8 + 7 = 15

48 + 36 = 84

or:
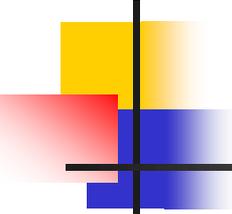
Written methods for Addition

Stage 3: Partitioning

The next stage is to record methods using partitioning. Partitioning both numbers into tens and ones mirrors the column method where ones are placed under ones and tens under tens. This also links to mental methods.

76 + 47 =
70 + 40 + 6 + 7 =
110 + 13 = 123
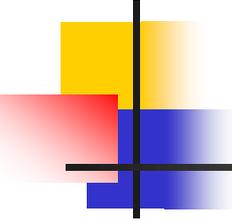
Expanded column method

Stage 4: Expanded   65 + 26

```
 60 + 5
 20 + 6
 1     1
 8     0
 9     1
```
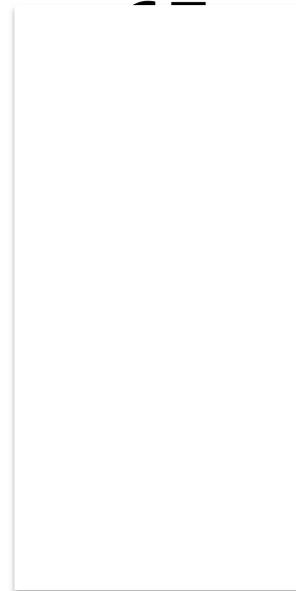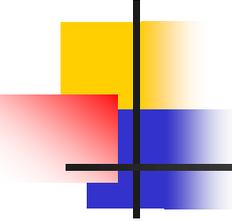
Written methods for Addition

The expanded method leads children to the more compact method so that they understand its structure and efficiency.

The amount of time spent teaching and practising the expanded method will depend on how secure the children are in their recall of **number facts and in their understanding of place value.**
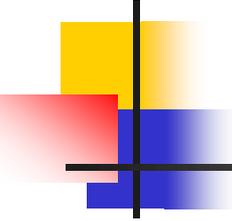
Column method

t u	*h t u*	*u.*1/10
6 7	1 5 6	3.6
+ 2 5	+ 7 5	+ 1.6
9 2	2 3 1	5.2
1	*1 1*	*1*
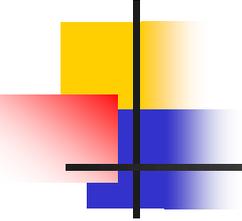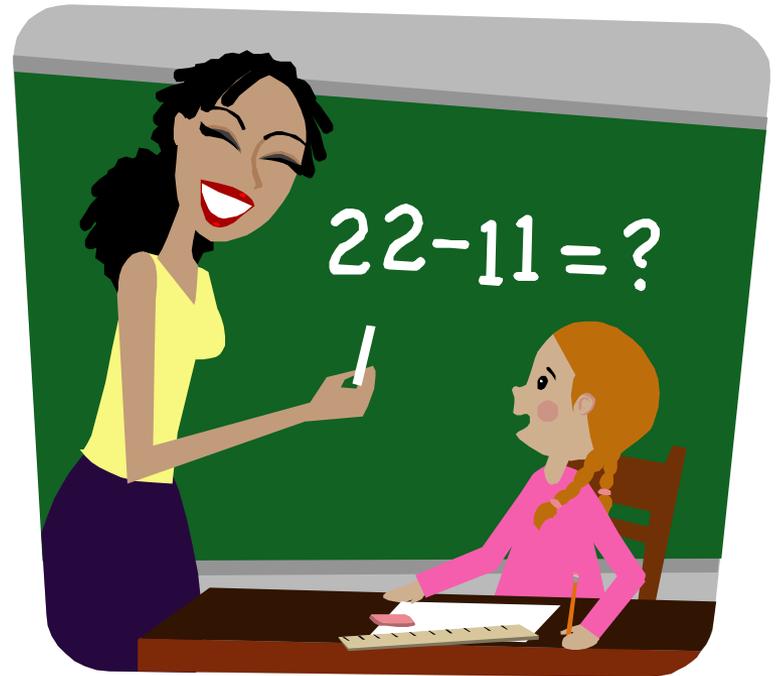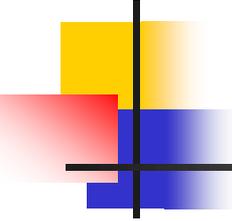
Subtraction

Mental Strategies for Subtraction

Secure mental subtraction requires the ability to:

- recall key subtraction facts instantly (inverse of number pairs to 10, 20 & 100, halves etc) and to apply these to similar calculations

- mentally subtract combinations of one and two digit numbers

- understand that subtraction is the inverse of addition and recognise that subtraction <u>can't</u> be done in any order (it has to start with the larger number)

- understand the language of subtraction including less, minus, take away, difference between etc

Lots of practical activities

Stage 1

Record simple mental subtraction using - and =

Using simple drawings or marks
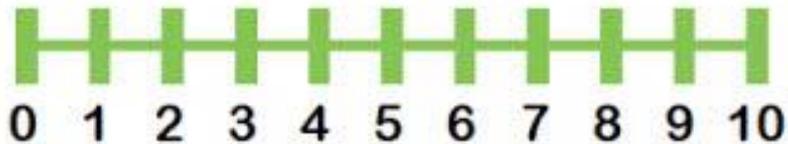
5-2=

I had five balloons. Two burst. How many did I have left?

Take away

A teddy bear costs £5 and a doll costs £2. How much more does the bear cost?

Find the difference

Written methods for Subtraction

Stage 2: The empty number line

The empty number line helps to record the steps in mental subtraction. There are several ways to do this:

- Counting Back - a calculation like 74 - 27 can be recorded by counting back 27 from 74 to reach 47.
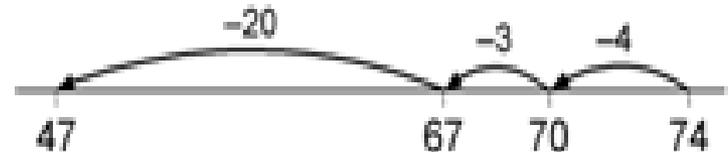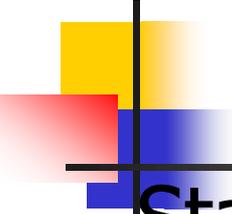
<u>Written methods for Subtraction</u>

Stage 3: Expanded column method

The partitioning stage should be followed by the expanded column method, where tens and units are placed under each other. This is where the concept of 'borrowing' is introduced.

Example: 74 - 27

$$
\begin{array}{r}
70 + 4 \\
-\ 20 + 7 \\
\hline
\end{array}
\qquad
\begin{array}{r}
\overset{60}{\cancel{70}} + \overset{14}{\cancel{4}} \\
-\ 20 + 7 \\
\hline
40 + 7
\end{array}
$$
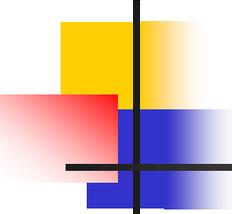
Written methods for Subtraction

Stage 4: Column method
The expanded method is eventually reduced to:

$$
\begin{array}{r}
\overset{6}{\cancel{7}}\,\overset{14}{\cancel{4}} \\
-\;2\;7 \\
\hline
4\;7
\end{array}
\qquad
\begin{array}{r}
\overset{6}{\cancel{7}}\,\overset{13}{\cancel{4}}\,\overset{11}{\cancel{1}} \\
-\;3\;6\;7 \\
\hline
3\;7\;4
\end{array}
\qquad
\begin{array}{r}
\overset{4}{\cancel{5}}\,\overset{9}{\cancel{0}}\,\overset{13}{\cancel{3}} \\
-\;2\;7\;8 \\
\hline
2\;2\;5
\end{array}
$$