



**JOHN GULSON PRIMARY SCHOOL**

**George Street, Coventry, CV1 4HB**

**CALCULATION  
POLICY  
2014**



## **Route way through for addition, subtraction, multiplication and division (Easier version for parents to follow)**

These are the methods the school has chosen to use for the mental and written calculation strategies for addition, subtraction, multiplication and division. It is crucial that these methods are taught consistently across the school to allow children to make the maximum amount of progress in mathematics. This whole school approach will ensure continuity.

The initial methods use notes and number lines to support mental computation.

Pencil and paper methods that have been agreed are outlined in the route way through for written calculations.

The methods in this route way are a mixture of mental and written as the two are not necessarily taught separately but depending on the ability of the child.

Pupils **need to have a firm grasp of informal methods** before they go on to using written methods. These methods ensure understanding.

This guidance is not separated into year groups or even key stages. The route shows continual progression but where pupils are at, will be determined by their ability.

### **Progression in Strategies for addition and subtraction**

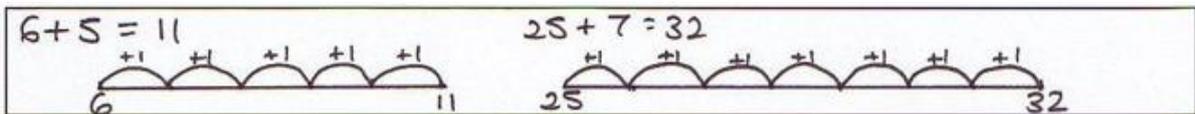
Pupils need concrete resources to add and subtract, this applies to children in all Key Stages. Children will gradually become less reliant on these resources as their ability develops.

A good understanding of Place Value underpins all other understanding of Number. It is important that the teaching of Place Value is consistent and comprehensive. Place Value should be reinforced in mental and oral sessions as often as possible.

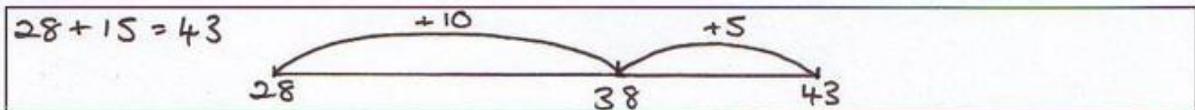
# Addition

These steps are sequential:

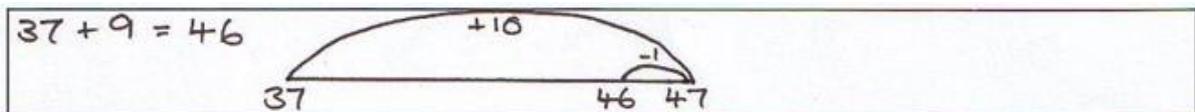
1. Add using concrete resources such as cubes, Diennes and Cuisenaire rods.
2. Use hundred squares and marked number lines, rulers, beads and other counting tools.
3. Add on in units on a number line.



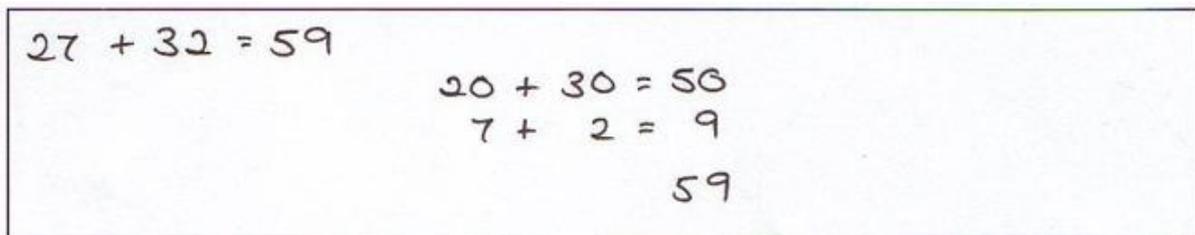
4. 2 digits + 2 digits by partitioning on a number line



5. Add on 9, 19, etc or 11, 21, etc by rounding to the nearest 10 and then adjusting



6. 2 digits + 2 digits by partitioning



7. Vertical addition, expanded, without regrouping, smallest value first

$$\begin{array}{r} 24 + 43 = 67 \\ 20 \quad 4 \\ + 40 \quad 3 \\ \hline 60 \quad 7 \\ \hline \end{array}$$

8. Vertical addition, expanded, with regrouping and then without partitioning

$$\begin{array}{r} 254 + 167 \\ 200 \quad 50 \quad 4 \\ + 100 \quad 60 \quad 7 \\ \hline 300 \quad 110 \quad 11 \\ \hline 421 \end{array}$$

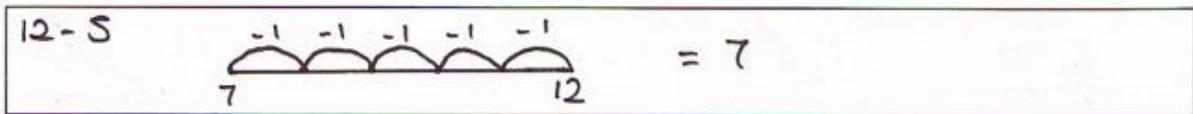
$$\begin{array}{r} 254 + 167 \\ 254 \\ + 167 \\ \hline 11 \\ 110 \\ 300 \\ \hline 421 \end{array}$$

9. Compact method for addition

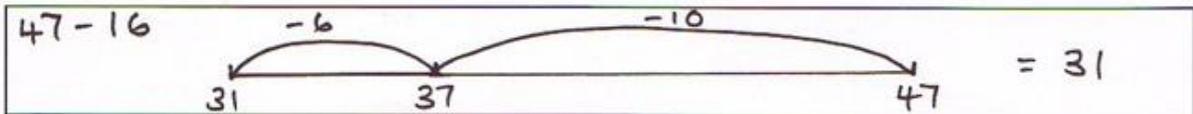
$$\begin{array}{r} 254 + 167 \\ \overset{1}{2} \overset{1}{5} 4 \\ + 167 \\ \hline 421 \\ \hline \end{array}$$

## Subtraction

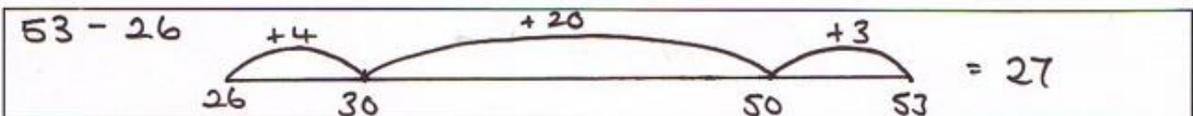
1. Subtract using concrete resources such as cubes, Diennes and Cuisenaire rods.
2. Use hundred squares and marked number lines, rulers and other counting tools.
3. Subtract in units on a number line



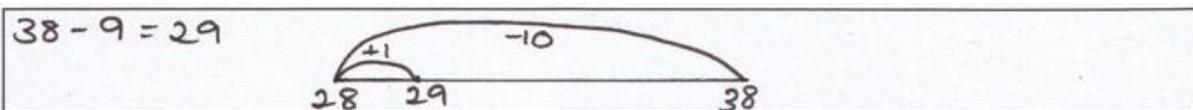
4. Subtract 2 digit – 2 digit using partitioning



5. Find the difference by using the counting on method



6. Subtract 9, 19 etc or 11, 21 etc by rounding to the nearest 10 and then adjusting



7. Vertical subtraction, expanded, no adjustments

$$\begin{array}{r} 257 - 126 = 131 \\ \begin{array}{r} 200 \ 50 \ 7 \\ - 100 \ 20 \ 6 \\ \hline 100 \ 30 \ 1 \\ \hline 131 \end{array} \end{array}$$

8. Vertical subtraction, expanded, with adjustments

$$\begin{array}{r} 226 - 167 = 59 \\ \begin{array}{r} 100 \ 110 \\ \cancel{200} \ \cancel{20} \ 16 \\ - 100 \ 60 \ 7 \\ \hline 0 \ 50 \ 9 \\ \hline 59 \end{array} \end{array}$$

9. Compact subtraction

$$\begin{array}{r} 226 - 167 = 59 \\ \begin{array}{r} \overset{1}{\cancel{2}} \ \overset{11}{\cancel{2}} \ 6 \\ - 1 \ 6 \ 7 \\ \hline 0 \ 5 \ 9 \\ \hline \end{array} \end{array}$$

# Multiplication

All children are expected to know the times tables by the end of Year 4.

Order:

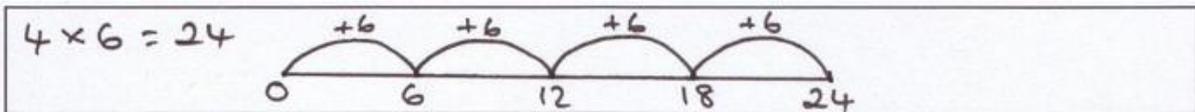
2, 5, 10

3, 4, 6, 8

,7, 9, 11, 12

Pupils will need to know what happens when you multiply by 0, 1, 10, 100 and 1000.

## 1. Informal number line



## 2. 2 digit x 1 digit by partitioning

$$\begin{array}{r} 27 \times 4 = 108 \\ 20 \times 4 = 80 \\ 7 \times 4 = 28 \\ \hline 108 \end{array}$$

## 3. Grid method

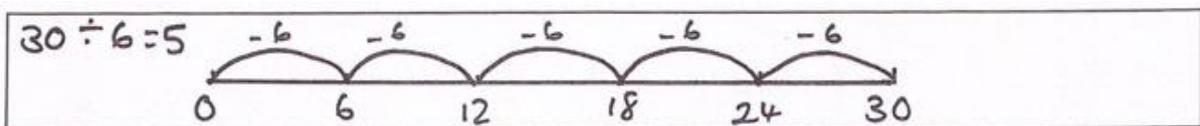
$$\begin{array}{r|l} 37 \times 23 & \\ \hline \times & 30 \quad 7 \\ 20 & 600 \quad 140 = 740 \\ 3 & 90 \quad 21 = 111 \\ \hline & 851 \end{array}$$

# Division

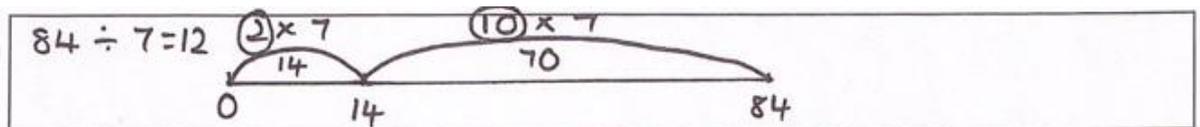
Children need to practice division facts alongside multiplication facts.

They will also need to understand what happens to a number when it is divided by 0, 1, 10, 100 and 1000.

## 1. Informal number line



## 2. Division on a number line taking away chunks



## 3. Chunking vertically

