

# Primary School

## Whole School Written Calculation Policy Pencil and paper procedures Key Stages 1 and 2

Parents,

It is important that children are secure with the method they are working on before moving onto the next stage.

When counting using a number line, as a school, we have agreed that jumps will be on top of the line for addition and below the line for subtraction.

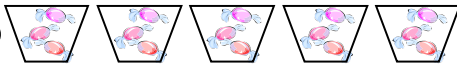
When children reach stage 5 for addition, they should be encouraged to carry under the line at the bottom of the calculation,

# MULTIPLICATION

## Stage 1 -

### Pictures and symbols

There are 3 sweets in one bag.  
How many sweets are there in 5 bags?

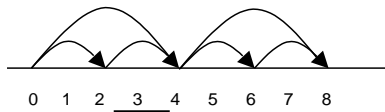


## Stage 2 -

### Arrays and repeated addition

• • • •  $4 \times 2$  or  $4 + 4$   
• • • •  
 $2 \times 4$

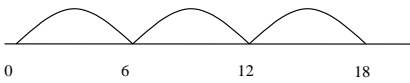
$2 + 2 + 2 + 2$



## Stage 3 -

### Number lines

E.g.  $6 \times 3$



### Partitioning

E.g.  $15 \times 2 = 30$

$$\begin{array}{r} \times \quad 10 \quad 5 \\ 2 \quad 20 \quad 10 \\ \hline = 30 \end{array}$$

## Stage 4 -

### Grid method

E.g.  $35 \times 2 = 70$

$$\begin{array}{r|l} \times & 30 & 5 \\ 2 & 60 & 10 \\ \hline & = 70 \end{array}$$

E.g.  $123 \times 3 = 369$

$$\begin{array}{r|l} \times & 100 & 20 & 3 \\ 3 & 300 & 60 & 9 \\ \hline & = 369 \end{array}$$

## Stage 5 -

### Grid method

$72 \times 38$

$$\begin{array}{r|l} \times & 70 & 2 \\ 30 & 2100 & 60 \\ 8 & 560 & 16 \\ \hline & = 2160 \\ & = 576 + \\ & \underline{2736} \\ & 1 \end{array}$$

Progress to using the grid method for decimals.

## Stage 1 -

### Pictures / marks

12 children get into teams of 4 to play a game. How many teams are there?



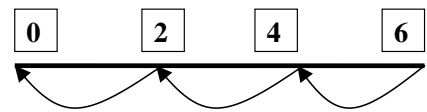
## Stage 2 -

### Sharing - 6 sweets are shared between 2 people.

How many do they have each? ( $6 \div 2$ )



**Grouping** - There are 6 sweets. How many people can have 2 each? (How many 2's make 6?)



## Stage 3 -

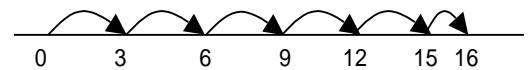
### Division with remainders

$16 \div 3 = 5 \text{ r}1$

Sharing - 16 shared between 3, how many left over?

Grouping - How many 3's make 16, how many left over?

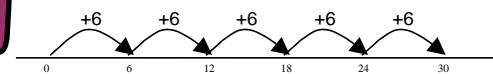
e.g.



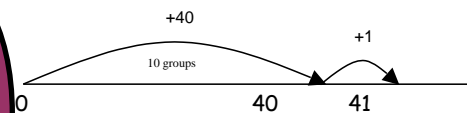
## Stage 4 -

$30 \div 6$  can be modelled as:

Grouping - groups of 6 taken away and the number of groups counted e.g.



$41 \div 4 = 10 \text{ r}1$



## Stage 5 -

### Use chunking for division.

$$\begin{array}{r} 8 \overline{) 146} \\ \underline{- 80} \quad (8 \times 10) \\ 66 \\ \underline{- 40} \quad (8 \times 5) \\ 26 \\ \underline{- 24} \quad (8 \times 3) \\ 2 \end{array}$$

Total all the 'chunks' of 8 to find the answer.

Answer:  $18 \text{ r} 2$

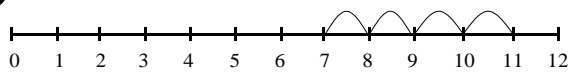
This method can also be used when dividing larger numbers and decimals, and when there is a remainder.

A  
D  
D  
I  
T  
I  
O  
N  
Z

**Stage 1 -**

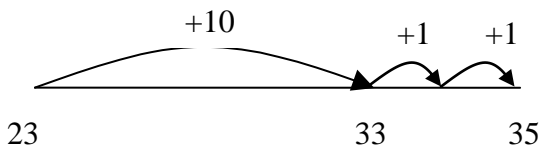
Using number lines to count on ones.

$7 + 4 = 11$



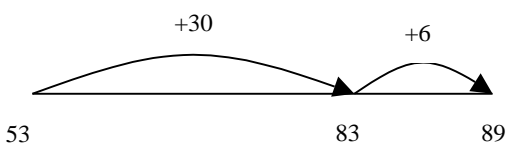
**Stage 2 -**

$23 + 12 = 23 + 10 + 1 + 1$   
 $= 33 + 1 + 1$   
 $= 35$



**Stage 3 -**

Partition into tens and ones and recombine.



**Stage 4 -**

$83 + 42 = 125$

$$\begin{array}{r} 80 + 3 \\ + 40 + 2 \\ \hline 120 + 5 = 125 \end{array}$$

Progress to:

$$\begin{array}{r} 83 \\ +42 \\ \hline 5 \\ \hline 120 \\ \hline 125 \end{array}$$



**Stage 5 -**

Formal method, showing numbers carried underneath.

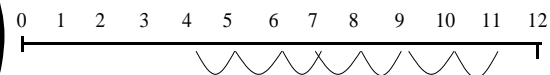
$$\begin{array}{r} 358 \\ + 73 \\ \hline 431 \\ 11 \end{array}$$

Extend to numbers with any number of digits and decimals with 1 and 2 decimal places.

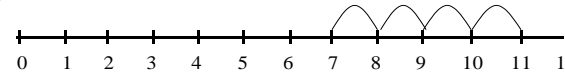
**Stage 1 -**

Using number lines to count back in ones.

$11 - 7 = 4$



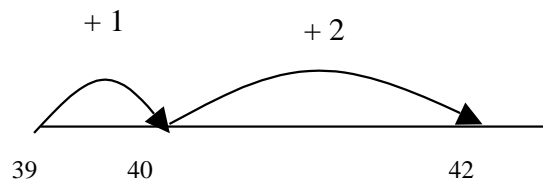
Counting on, using a number line, to find the difference between 7 and 11.



**Stage 2 -**

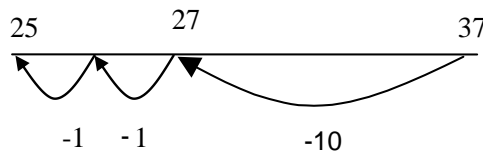
Find a small difference by counting up.

$42 - 39 = 3$



**Stage 3 -** Counting back in tens and ones.

$37 - 12 = 37 - 10 - 1 - 1$   
 $= 27 - 1 - 1$   
 $= 25$



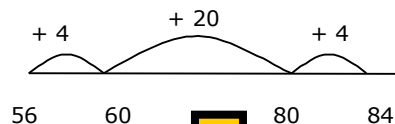
Progressing to taking larger jumps with the units.



**Stage 4 -**

Complementary addition (counting up from the smaller number to the larger number)

$84 - 56 = 28$



**Stage 5 -**

Decomposition

$$\begin{array}{r} 8 \quad 1 \\ 92 \\ - 38 \\ \hline 54 \end{array} \qquad \begin{array}{r} 2 \quad 4 \quad 1 \\ 352 \\ - 178 \\ \hline 174 \end{array}$$

Progress to using decomposition with decimals.

S  
C  
B  
T  
R  
A  
C  
T  
I  
O  
N  
Z