## Calculations Policy: Addition

Children should understand that addition is:

- Combining two or more groups to give a total or sum
- Increasing an amount
- The inverse of subtraction, e.g. 5+3=7 7-5=3
- Commutative, e.g. $5+3=3+5$
- Associative, e.g. $5+3+7=5+(3+7)$
- Calculations can be rearranged, e.g. $4+13=17$ is the same as $13+4=17$


## Step One

Children should experience practical calculation opportunities using a wide variety of practical equipment, including small world play, role play, counters, cubes with the 'Counting all method'

Counting


Combining


Calculating


## Step Two

Children record the calculations using their own drawings of the Base 10 equipment (as slanted lines for the tens and dots for ones).


## Step Three

Exchanging tens:

$28+$


| Step Four |  |
| :---: | :---: |
| $89+42$ becomes | $\begin{array}{r} 89 \\ +42 \\ \hline 131 \\ \hline 1 \end{array}$ |
| Step Five |  |
| $789+642$ becomes | $\begin{array}{r} 789 \\ +642 \\ \hline 1431 \\ \hline 11 \end{array}$ |

## Calculations Policy: Subtraction

Children should understand that subtraction is:

- Removal of an amount from a larger group (take away)
- Comparison of two amounts (difference)
- The inverse of addition, e.g. 5+3=7 7-5=3
- Not commutative e.g. 5-3 $=3$-5
- Not associative e.g. (9-3)-2 $=9-(3-2)$


## Step One

Children should experience practical calculation opportunities using a wide variety of equipment, e.g. small world play, role play, counters, cubes etc. They develop ways of recording calculations using pictures, etc.


## Step Two

Children use equipment for recording and can begin toChildren should be shown that finding the pictorially solve their own calculations.difference is linked to subtraction and should know that it is an ap numbers are
 to use when the e difference

$7-4=3$


## Step Three

15-4 = 1 123-12= 11


## Step Four

EXCHANGING: 35-16 = Children can see that they cannot subtract 9 units from 7 units so they need to exchange a ten for ten units.


Step Five

874-523 becomes

| 874 |
| ---: |
| $-\quad 523$ |
| 351 |

Answer: 351

932-457 becomes

$$
\begin{array}{r}
83^{12}{ }^{1} 2 \\
-\quad 4 \quad 5 \quad 7 \\
\hline 4 \quad 7 \quad 5 \\
\hline
\end{array}
$$

932-457 becomes
11
932
$-437$

| $5 \quad 6$ |
| :---: |
| 475 |

Answer: 475

## Calculations Policy: Multiplication

Children should understand that multiplication is:

- Commutative, e.g. $4 \times 6=6 \times 4$
- Associative, e.g. $4 \times 3 \times 6=4 \times(3+7)$
- Multiplication is repeated addition

Ensure that children understand the $=$ sign means 'is the same as' and that children see calculations where the equals sign is in a different position, e.g. $3 \times 5=15$ and $15=3 \times 5$

## Step One

Children will use practical equipment to make groups of objects to represent multiplication. They should see everyday versions of arrays, e.g. egg boxes, baking trays, ice cube trays, wrapping paper etc and use this in their learning answering questions such as 'How many eggs would we need to fill the egg box? How do you know?'


## Step Two

Multiplication as repeated addition. E.g. $3 \times 5$ can be represented as an array in two forms (as it has commutativity).


## Step Three

Children should continue to utilise multiplication as repeated addition linked to arrays (as this knowledge will support with the development of the grid method) and use jottings to support their calculation. These should be supported by the use of crosses on squared paper, e.g.
$4 \times 7=28$
$7+7+7+7=28$

| $\mathbf{X}$ | $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ |
| $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ |
| $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ | $\mathbf{x}$ |

## Step Four



## Step Five

## Short Multiplication



Answer: 144


Answer: 2394


## Step six

## Long Multiplication

| $24 \times 16$ | becomes |  |
| ---: | :--- | :--- |
|  | 2 |  |
|  | $\mathbf{2}$ | $\mathbf{4}$ |
| $\times$ | $\mathbf{1}$ | 6 |
| $\mathbf{2}$ | $\mathbf{4}$ | $\mathbf{0}$ |
| $\mathbf{1}$ | $\mathbf{4}$ | $\mathbf{4}$ |
| $\mathbf{3}$ | $\mathbf{8}$ | $\mathbf{4}$ |

Answer: 384
$124 \times 26$ becomes
$\begin{array}{lll}1 & 2 & \\ 1 & 2\end{array}$

| $\times$ | 2 | 6 |
| :---: | :---: | :---: |
| 2 | 4 | 8 |


|  | 7 | 4 | 4 |
| ---: | ---: | ---: | ---: |
| 3 | 2 | 2 | 4 |

Answer: 3224
$124 \times 26$ becomes
12
$\times 26$
$\times 744$

| 2 | 4 | 8 | 0 |
| :--- | :--- | :--- | :--- |
| 3 | 2 | 2 | 4 |

Answer: 3224

Calculations Policy: Division
Children should understand that division can be sharing or grouping (repeated subtraction) and that it is:

- Not commutative, e.g. $6 \div 4 \neq 4 \div 6$
- Not associative, e.g. $(6 \div 3) \div 4 \neq 6 \div(4 \div 3)$
- Ensure that children understand the $=$ sign means is the same as and that children see calculations where the equals sign is in a different position, e.g. $12 \div 3=4$ and $4=12 \div 3$.


## Step One

They should experience practical calculation opportunities involving equal groups and sharing items using a wide variety of equipment, e.g. small world play, role play, counters, cubes etc. This progresses to children recording on their own.


## Step Two

Children will use practical equipment to represent division calculations as grouping (repeated subtraction) and use jottings to support their calculation.
Children need to understand that this calculation reads as 'How many groups of 3 are there in 12?'


## Step Three

$13 \div 4=$

$13 \div 4=3$ remainder 1

## Step Four

Before starting the formal method of 'chunking', children should use repeated subtraction on a vertical number line.
$48 \div 4=12$ (groups of 4 )

leading to
$48 \div 4=10($ groups of 4$)+2($ groups of 4$)$ $=12($ groups of 4$)$


Children will develop their use of grouping (repeated subtraction) to be able to subtract multiples of the divisor, developing the use of the 'chunking' method.

## Step Five

## Short Division



## Long Division

$$
\begin{aligned}
& 432 \div 15 \text { becomes }
\end{aligned}
$$

> | 1 | 2 | 0 |
| :--- | :--- | :--- |
|  | 1 | 2 |

Answer: 28 remainder 12
$432 \div 15$ becomes

|  |  |  | 2 | 8 |
| :--- | :--- | :--- | :--- | :--- |
|  | 5 | 4 | 3 | 2 |


$\frac{12}{15}=\frac{4}{5}$
Answer: $28 \frac{4}{5}$
$432 \div 15$ becomes
$\begin{array}{llllll} & & & & 2 & 8\end{array} \quad 8$

| 3 | 0 | $\downarrow$ |  |
| :---: | :---: | :---: | :---: |
| 1 | 3 | 2 |  |
| 1 | 2 | 0 | $\downarrow$ |
|  | 1 | 2 | 0 |
|  | 1 | 2 | 0 |
|  |  | 0 |  |

Answer: 28.8

