Addition

Progression towards a formal written method:

47+25 =

47   **25**   **60 + 12**

Addition starts very practically using straws then dienes.   Children use knowledge of place value to make the numbers and then add them together before exchanging when there are 10 1's.

Leading to exchanging:

72

Children partition their numbers horizontally and add each place value column (starting with the ones) continuing to use resources for support (straws, dienes and then place value counters).

$$200 + 40 + 7$$
$$100 + 20 + 5$$
$$300 + 60 + 12 = 372$$

Children then use the expanded vertical method continuing to focus on place value and adding their ones first. Children   continue to use practical   resources alongside this to   support understanding.
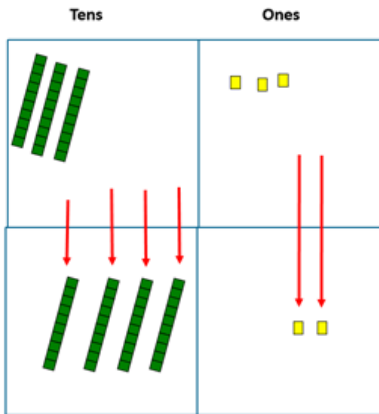
$$247$$
$$+125$$
$$12$$
$$60$$
$$300$$
$$372$$

Finally children use the formal written method for addition   lining their numbers up vertically and exchanging underneath when required.

$$2634$$
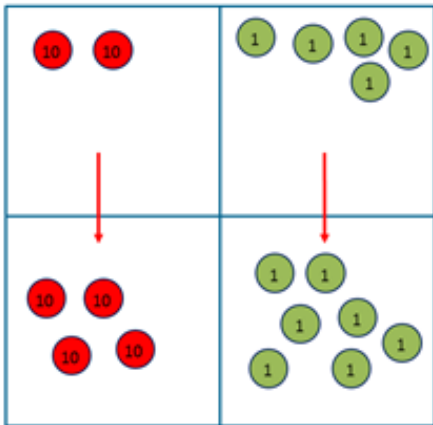$$+4517$$
$$7151$$

7   1   5   1

Subtraction

Progression towards a formal written method:

Subtraction starts practically using straws then dienes. Children learn that they only need to make the top number and that they have to subtract the bottom number from this. They learn to write this expanded horizontally using place value columns.

$$\begin{array}{c c} 70 & 5 \\ -\ 40 & 2 \\ \hline 30 & 3 \end{array}$$

This progresses to questions where children will need to exchange. Again, children start by doing this practically to reinforce the understanding that a 10 is the same as 10 1's. They learn how to record this by crossing out and exchanging to the 10.
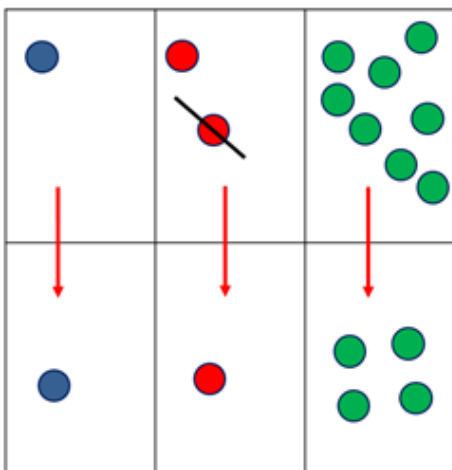
$$\begin{array}{c c} 60\ \cancel{70} & ^1 2 \\ -\ 40 & 7 \\ \hline 20 & 5 \end{array}$$

When children are secure with their place value they no longer need to expand the method horizontally by partitioning and use the formal written method for subtraction. Numbers are lined up vertically in the correct columns and exchanging is marked without place value.

$$\begin{array}{c} ^2\cancel{3}^1 \\ 2\ 3\ 2 \\ -\ 1\ 1\ 4 \\ \hline 1\ 1\ 8 \end{array}$$
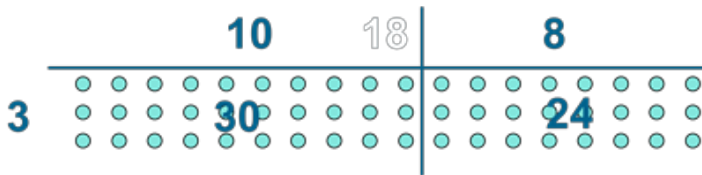
Multiplication

Progression towards a formal written method:
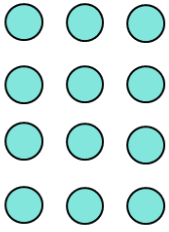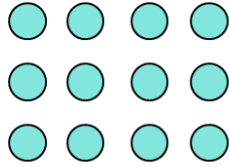
$$3 \times 4 \qquad 4 \times 3$$

Children use arrays as a visual to represent multiplication. These can be done practically as well as written. Children understand that multiplication is the same as repeated addition and that 3 multiplied by 4 and 4 multiplied by 3 give the same answers.

	10	18	8
3	**30**		**24**

The array is used to represent multiplication with larger numbers so children understand the place value involved.

	10	8
3	30	24
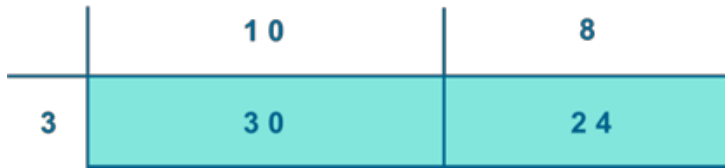
This leads clearly into the grid method where children partition each of the numbers they are multiplying and write the answers to each calculation within their grid.

	10	8
10	100	80
3	30	24

|	1	8
×	1	3
1	8	0
	5	4
2	3	4
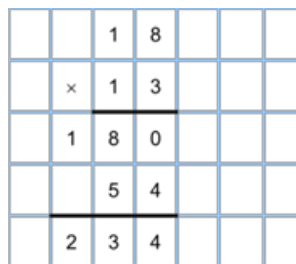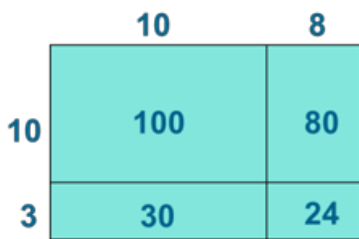
The grid method continues to be used with larger numbers and when children are confident and secure they are moved onto the formal written method for multiplication. Children are encouraged to see the connections between the grid and formal methods. As this gets more difficult, the children show their exchanging above and below the numbers.

```
      2  3  1
   1  3  4  2
 x       1  8
 1  3  4  2  0
 1  0  7  3  6
 2  4  1  5  6
         1
```

Division

Progression towards a formal written method:

$15 \div 5 = 3$

15 shared between 5

$15 \div 3 = 5$
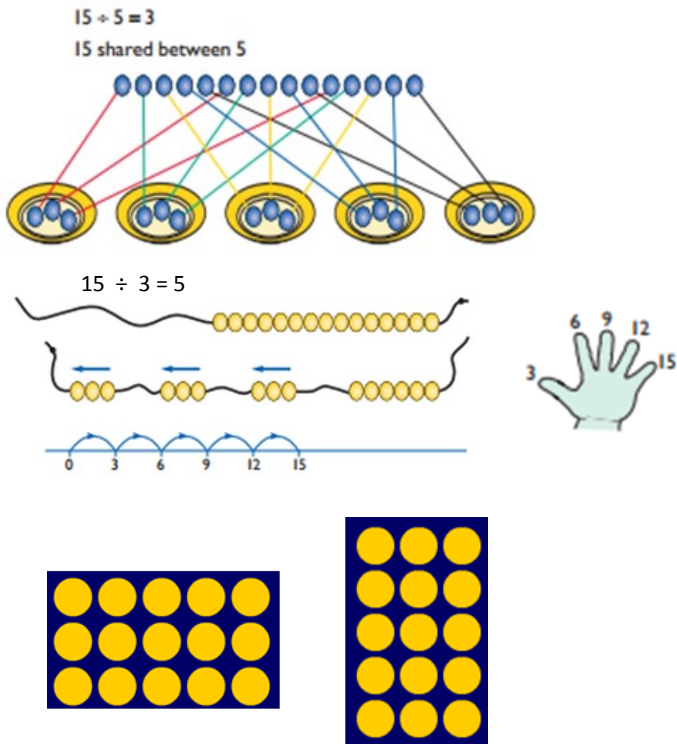
Children look at division as sharing and grouping. When children share they use objects to share practically. When grouping, children apply their counting skills using practical resources, their fingers or a number line.

Children make links between multiplication and division using arrays.
E.g.
$15 \div 3 = 5$ there are 5 groups of 3
$15 \div 5 = 3$ there are 3 groups of 5

$840 \div 7 = 120$

100 groups	20 groups
0	700 840

Children continue to develop grouping on a number line using their times tables facts to work with larger numbers. They learn to look for groups of the divisor e.g. 10 groups of, 100 groups of.   Calculations may have remainders.

$$\begin{array}{r} 1\ 2\ 1 \\ 3\ \overline{)\ 3\ 6\ 3} \end{array}$$
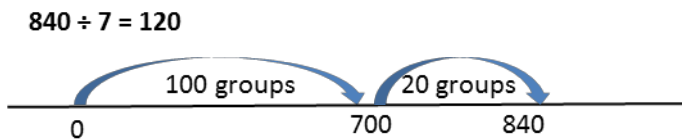
Children learn to use the formal method alongside place value counters or dienes. They continue to use grouping within this method e.g. How many groups of 3 can I make in the hundreds?
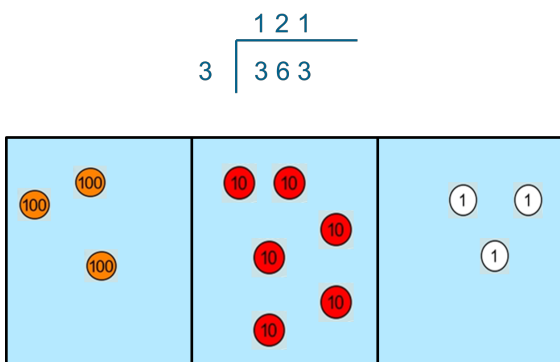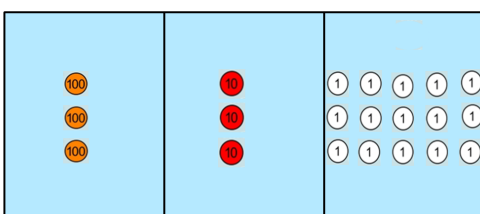
$345 \div 3 =$

$$\begin{array}{r} 1\ 1\ 5 \\ 3\ \overline{)\ 3\ 4\ {}^{1}5} \end{array}$$

Children continue to develop their use of the formal method where questions   involve exchange.