Progression in Written Multiplication

Stage 1

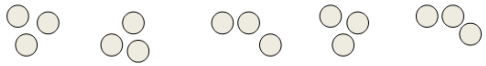
Children are encouraged to develop a mental image of the size of numbers. They learn to think about equal groups or sets of objects in practical, real life situations.
They begin to record these situations using pictures.

A child's jotting showing fingers on each hand as a double.

A child's jotting showing double three as three cookies on each plate.

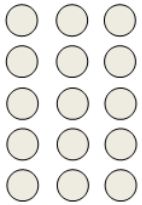
Stage 2

Children understand that multiplication is repeated addition and that can be done by counting in equal steps/groups.



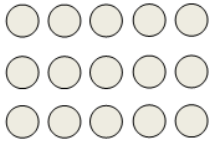
or

Children can then be introduced to the image of a rectangular array, initially through real items such as egg boxes, baking trays, ice cube trays, wrapping paper etc. and using these to show that counting up in equal groups can be a quicker way of finding a total.



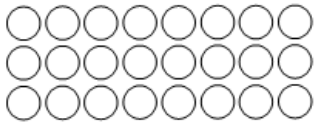
3 + 3 + 3 + 3 + 3 = 15

Children also understand that 3 x 5 is the same as 5 x 3

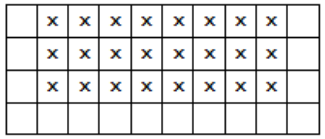


5 + 5 + 5 = 15

Stage 3



3 x 8 = 8 + 8 + 8 = 24

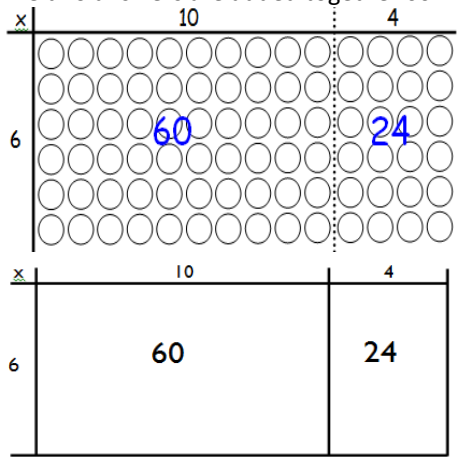


3 x 8 = 8 + 8 + 8 = 24

Children continue to use arrays and create their own to represent multiplication calculations

Stage 4

Children will continue to use arrays to lead into the grid method of multiplication.
14 x 6
The 14 is partitioned (split) into 10 and 4.
The answer to 6 x 10 is found = 60
The answer to 6 x 4 is found = 24
The two answers are added together 60 + 24 = 84



(6 x 10) + (6 x 4)

60 + 24

84

Stage 5

The array is removed and children use the grid method.

23 x 8

×	20	3
8	160	24

160
+ 24
184

346 x 9

×	300	40	6
9	2700	360	54

2700
+ 360
+ 54
3114

The grid method can be used for multiplying any numbers, including long multiplication and multiplication involving decimals

4.92 x 3

x	4	0.9	0.02
3	12	2.7	0.06

12
+ 2.7
+ 0.06
14.76

72 x 38

×	70	2
30	2100	60
8	560	16

2100
+ 560
+ 60
+ 16
2736

Stage 6

Following on from this, children should be able to carry out multiplication using the expanded column method, for example,

```
  32
X  5
  10
+ 150
 160
```

The children would multiply 5 by 2 to get 10 and place this under the line. They would then multiply 30 by 5 to get 150, place this under the line then add the two together to make the total.

This would then be further developed with the multiplication of two 2 digit numbers, for example,

```
  32
X 12
   4
+ 60
  20
 300
 384
```

Once children are confident at stage 6, they can move on to multiplying a 2 digit number with a decimal by adjusting the decimal to a whole number then readjusting at the end, for example,
23 x 0.6 would be adjusted to 23X6 = 138, then readjusted to 138÷10=13.8

Stage 7

Children would then move on to multiplication using the compact column method of long multiplication (required for speed in arithmetic)
For example:

```
  24
X 16
 240
 144
 384
```