Multiplication

Stage 1:

Recording and developing mental images

Children will engage in a wide variety of songs and rhymes, games and activities. In practical activities and through discussion they will begin to solve problems involving doubling. 'Three apples for you and three apples for me. How many apples altogether?

Children will count repeated groups of the same size in practical contexts. They will use the vocabulary associated with multiplication in practical contexts. They will solve practical problems that involve combining groups of 2, 5 or 10.

e.g. socks, fingers and cubes.

Children will use repeated addition to carry out multiplication supported by the use of counters/cubes.

$5 + 5 + 5 + 5 + 5 + 5 = 30$

$5 \times 6 = 30$

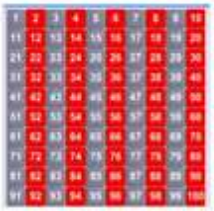
They will see everyday versions of arrays, e.g. egg boxes, baking trays, ice cube trays, wrapping paper etc. and use this in their learning answering questions such as; 'How many eggs would we need to fill the egg box? How do you know?'

Stage 2:

The bead string, number line and hundred grid.

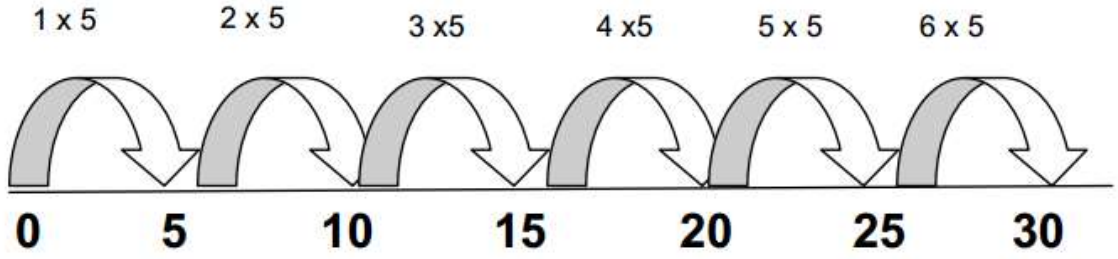
Continue to use repeated addition and represent on a bead string or hundred grid.

Show hops/jumps on number lines.



Multiples of 2

Multiples of 5



Stage 3:

Arrays

It is important to be able to visualise multiplication as a rectangular array. This helps children develop their understanding of the commutative law i.e. 3 x 4 = 4 x 3

6 x 5 = 30

'5 + 5 + 5 + 5 + 5 + 5 = 30 '

'6 rows of 5'

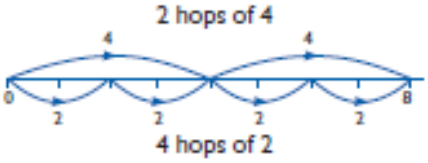
'6 groups of 5'

'5 groups of 6'

'5 x 6 = 30'

'6 x 5 = 30

The relationship between the array and the number line showing both repeated additions should be demonstrated alongside each other.



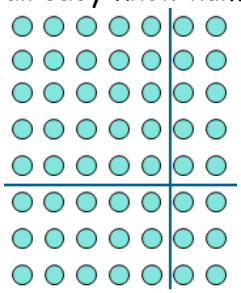
For more direct comparison, this could then be demonstrated on a single number line as appropriate.

Stage 4:

The Grid Method

Children will partition arrays in a variety of helpful ways which are not necessarily the ways in which they will eventually partition them to be in line with formal written methods

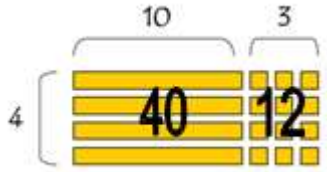
Use larger preconstructed arrays to look at ways these can be partitioned to use already know number facts e.g 7 x 8

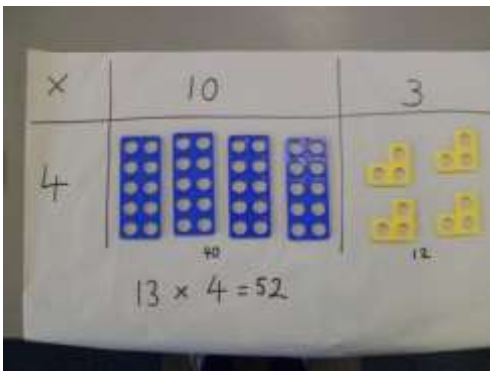


Knowing 5 and 2 x tables and being able to add, I can partition this array to use these facts to work.
5 x 5 = 25, 5 x 3 = 15, 5 x 2 = 10
2 x 3 = 6
7 x 8 = 25 + 15 + 10 + 6 = 56

- The link between arrays and the grid method should be made clear to children by the use of place value apparatus such as place value counters and Dienes.

- The TU number is partitioned e.g. 13 becomes 10 and 3 and each part of the number is them multiplied by 4.



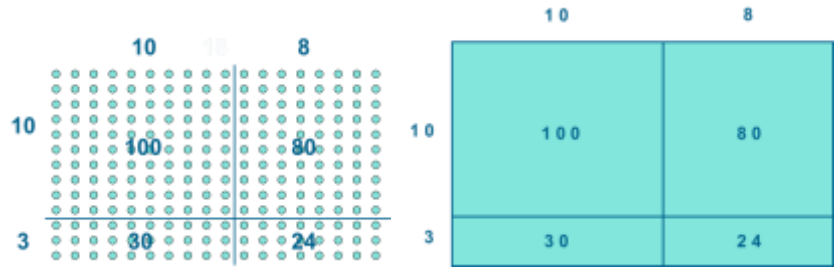


This then becomes

x	**10**	**3**
4	40	12

40 + 12 = 52

Children to embed and deepen their understanding of the grid method to multiply up 2d x 2d. Ensure this is still linked back to their understanding of arrays and place value counters.



x	10	6
50	500	300
3	30	18

Adding the rows is the most efficient calculation:
500 + 300 = 800
30 + 18 = 48
So 800 + 48 = 848

Stage 5:

Expanded Short Multiplication

The first step is to represent the method of recording in a column format, but showing the working. Draw attention to the links with the grid method above.

Multiply the units first which enables them to move towards the compact method e.g.

30 + 8
X 7
56 7 x 8
210 7 x 30
266

Use the language of place value to ensure understanding.

Stage 6:

Short multiplication for up to TU x12 (Also HTU x12)

- The recording is reduced further, with the carried digits recorded either below the line or at the top of the next column.
- This method is appropriate for multiplying two and three digit numbers by

numbers up to 12, which relies on children have recall of their times table facts up to 12.

342 × 7 becomes

	3	4	2
×			7
2	3	9	4
	2	1	

Answer: 2394

Expanded Long Multiplication

53 x 16

x	10	6
50	500	300
3	30	18

53
x 16
500 (50 x 10)
300 (50 x 6)
30 (3 x 10)
+ 18 (3 x 6)
848

Long Multiplication

Each digit continues to be multiplied by each digit, but the totals are recorded in a more compact form, using 'carrying'

$$\begin{array}{r} 2\,3 \\ \times\ 4\,7 \\ \hline 1\,6^{2}1 \\ 9^{1}2\,0 \\ \hline 1\,0\,8\,1 \end{array}$$