

Progression In Multiplication

Vocabulary:

Repeated addition: 'set of' e.g. $3 \times 10 = 3$ sets of 10

Scaling: increasing a quantity by a scale factor e.g. $3 \times 10 = 3$ scaled by a factor of 10 (e.g. 10 times bigger) Note - if multiplying by a number less than 1, the answer will not be bigger.

Commutivity: understanding relationship between multiplication facts, e.g. 3×4 is the same as 4×3 .

Stage 1:

Use concrete objects, pictorial representations and arrays in context, with the support of the teacher, to work on practical problems involving equal sets or groups. They will begin to make connections between different representations and to count in twos, fives and tens and extend to other patterns.

Stage 2:

Children will begin to develop their recording using pictures and written description and continue to use a wide range of representations including repeated addition, commutivity, arrays and scaling.

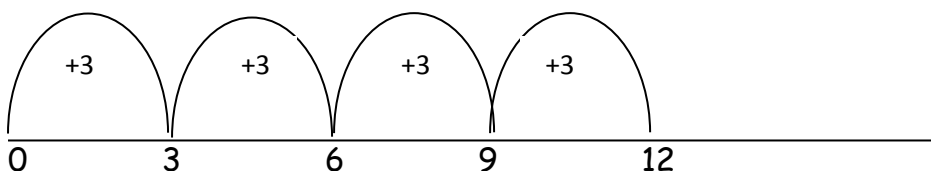
Repeated addition:

4 times 3 is $3 + 3 + 3 + 3 = 12$ or 4 lots of 3 or 3×4

$$4 \times 3 = 12$$

Children are taught to show this on a number line.

Example:



Commutivity:

Children should know that 3×5 has the same answer as 5×3 .

Arrays:

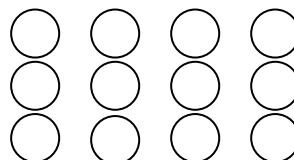
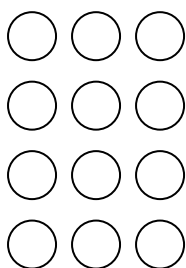
Children should be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method.

Example:

$4 \times 3 = 12$

which is the same as:

$3 \times 4 = 12$



Stage 3:

Using every day practical experiences and resources, children will develop an understanding of **multiplicative reasoning** (multiplying, not counting) including through:

Positive integer scaling:

Example: Find a ribbon that is 4 times longer than the blue ribbon.



5cm

Use language of scaling eg. Four times as high, eight times as long.

Correspondence problems: (in which x objects are related to y objects)

Example: If there are 3 hats and 4 coats, how many different outfits are there?

Associativity:

Example: $(2 \times 3) \times 4 = 2 \times (3 \times 4) = 24$

Partitioning:

Example: $38 \times 5 = (30 \times 5) + (8 \times 5)$
 $= 150 + 40$
 $= 190$

Children will continue, where appropriate, to use arrays leading into the grid method of multiplication:

x	10	4
6	0000000000	0000
	0000000000	0000
	0000000000	0000
	0000000000	0000
	0000000000	0000
	0000000000	0000

$(6 \times 10) + (6 \times 4)$
 $60 + 24 = 84$

Stage 4:

Children will now be taught to use the grid method for TU x U and HTU x U.

Example:

X	20	3	
8	160	24	160 + 24 = 184

Stage 5:

Now, the children will be taught short multiplication.

Example:

24 x 6 becomes

$$\begin{array}{r} 24 \\ \times 6 \\ \hline 144 \\ \hline 2 \end{array}$$

Answer: 144

342 x 7 becomes

$$\begin{array}{r} 342 \\ \times 7 \\ \hline 2394 \\ \hline 21 \end{array}$$

Answer: 2394

2741 x 6 becomes

$$\begin{array}{r} 2741 \\ \times 6 \\ \hline 16446 \\ \hline 42 \end{array}$$

Answer: 16 446

Stage 6:

Grid method extended to ThHTU x U and ThHTU x TU and also decimals to 3 decimal places.

Stage 7:

Children should apply their knowledge and understanding of multiplication and use materials and diagrams to multiply proper fractions and mixed numbers by whole numbers. Eg. $\frac{2}{3} \times 3$ or $2\frac{1}{2} \times 3$

Stage 8:

Children will now be taught long multiplication.

Example:

24 x 16 becomes

$$\begin{array}{r} 24 \\ \times 16 \\ \hline 240 \\ 144 \\ \hline 384 \end{array}$$

Answer: 384

124 x 26 becomes

$$\begin{array}{r} 124 \\ \times 26 \\ \hline 2480 \\ 744 \\ \hline 3224 \\ \hline 11 \end{array}$$

Answer: 3224

124 x 26 becomes

$$\begin{array}{r} 124 \\ \times 26 \\ \hline 744 \\ 2480 \\ \hline 3224 \\ \hline 11 \end{array}$$

Answer: 3224

They should be able to apply understanding in the use of formal written methods for short and long multiplication and to multiply pairs of proper fractions.