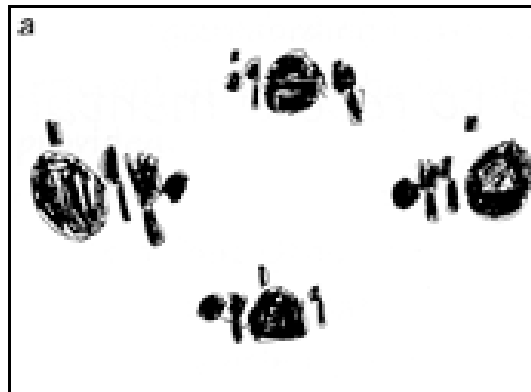


PROGRESSION THROUGH CALCULATIONS FOR MULTIPLICATION

- These standards are age-related expectations and therefore we expect the majority of children to achieve them.
- New learning is likely to be taught to groups rather than the whole class to acknowledge the different learning stages of the children.
- Children need to understand that multiplication is commutative and use this information to rearrange calculations knowing that $4 \times 6 = 24$ gives the same answer as $6 \times 4 = 24$.
- Children need to understand that 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 $15 = 3 \times 5$.
- Children should be encouraged to approximate before calculating and check whether their answer is reasonable.

YR

Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They should experience practical calculation opportunities involving equal sets or groups 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.



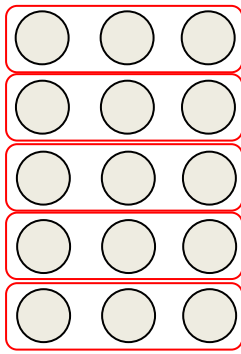
Y1

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?'

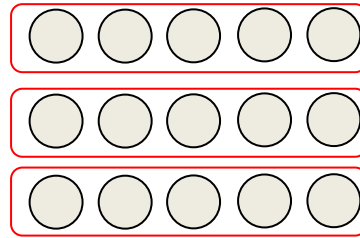
Y2

Children should utilise multiplication as repeated addition - linked to arrays (**as this knowledge will support with the development of the grid method**). They should also use jottings to support their calculation. These should be supported by the use of counters/cubes.

e.g. 3×5 can be represented as an array in two forms (as it has commutativity):



$$3 + 3 + 3 + 3 + 3 = 15$$



$$5 + 5 + 5 = 15$$

Y3

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.

$$4 \times 7 =$$

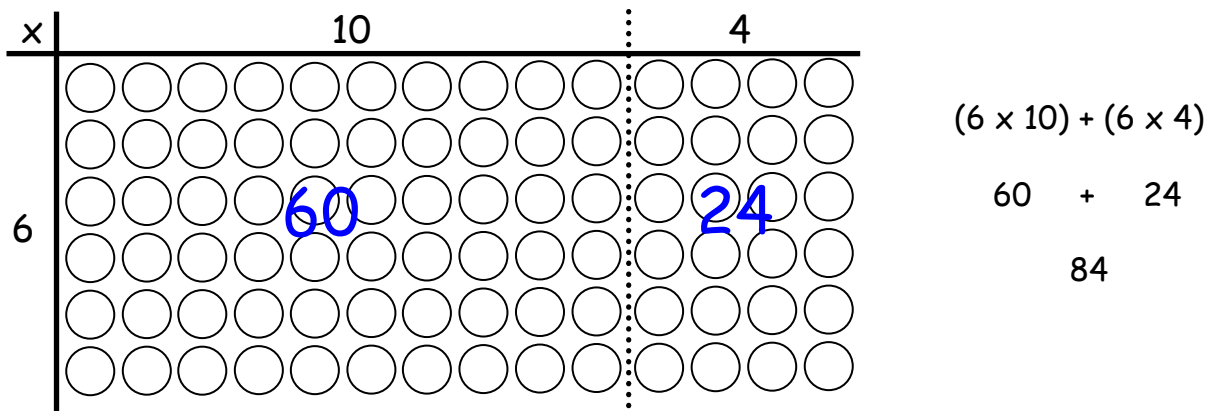
x	x	x	x	x	x	x	
x	x	x	x	x	x	x	
x	x	x	x	x	x	x	
x	x	x	x	x	x	x	

$$4 \times 7 = \quad 7 + 7 + 7 + 7 = \quad 28$$

(For mathematical accuracy the above example is actually 7×4 -> Seven, four times, however, because we use terms such as 'groups of' or 'lots of', children are more familiar with the initial notation. Once children understand the commutative order of multiplication the order is irrelevant).

Y4

Children will continue to use arrays where appropriate leading into the grid method of multiplication (the picture below shows the link between arrays and grid method).



TO x O (Short multiplication - multiplication by a single digit)

$$23 \times 8$$

$$\begin{array}{r} \times \quad 20 \quad 3 \\ 8 \quad \boxed{160} \quad \boxed{24} \end{array}$$

$$\begin{array}{r} 160 \\ + \quad 24 \\ \hline 184 \end{array}$$

Y5

HTO x O (Short multiplication - multiplication by a single digit)

$$346 \times 9$$

$$\begin{array}{r} \times \quad 300 \quad 40 \quad 6 \\ 9 \quad \boxed{2700} \quad \boxed{360} \quad \boxed{54} \end{array}$$

$$\begin{array}{r} 2700 \\ + \quad 360 \\ + \quad \quad 54 \\ \hline 3114 \\ \quad \quad 11 \end{array}$$

$$4.9 \times 3$$

$$\begin{array}{r} \times \quad 4 \quad 0.9 \\ 3 \quad \boxed{12} \quad \boxed{2.7} \end{array}$$

$$\begin{array}{r} 12 \\ + \quad 2.7 \\ \hline 14.7 \end{array}$$

Y6

ThHTO × O

(Short multiplication - multiplication by a single digit)

4346×8

x	4000	300	40	6	
8	32000	2400	320	48	

32000
+ 2400
+ 320
+ <u>48</u>
<u>34768</u>

4.92×3

x	4	0.9	0.02	
3	12	2.7	0.06	

12
+ 2.7
+ <u>0.06</u>
<u>14.76</u>

TO × TO (Long multiplication - multiplication by more than a single digit)

72×38

x	70	2	
30	2100	60	
8	560	16	

2100
+ 560
+ 60
+ <u>16</u>
<u>2736</u>
1

When mathematically ready, children can progress onto HTO × TO and beyond.

+ - + - + - + - + - + - +

By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.

Children should not be made to go onto the next stage if:

- 1) they are not ready.
- 2) they are not confident.

Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.