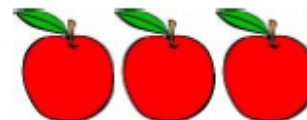




## Stages in Multiplication

### Multiplication – Stage 1

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?'

### Multiplication – Stage 2

Solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher

Count in multiples of twos, fives and tens (to the 10th multiple)

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



'Six pairs of socks. How many socks altogether? 2, 4, 6, 8, 10, 12'

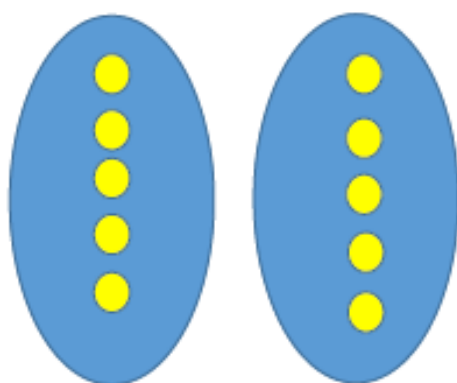


'Three pots of ten crayons. How many crayons altogether? 10, 20, 30'

Use **arrays** to support early multiplication



'Five groups of two faces. How many faces altogether? 2, 4, 6, 8, 10'  
Two groups of five faces. How many faces altogether? 5, 10'



'2 groups of 5'

'How many altogether?'

'5+5=10'

Double five is ten

Continue to solve problems in practical contexts and develop the language of early multiplication, with appropriate resources, throughout stage 2.

### **Multiplication – Stage 3**

Recall and use multiplication facts for the 2, 5 and 10 multiplication tables  
Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication ( $\times$ ) and equals (=) signs  
Solve problems involving multiplication, using materials, arrays, repeated addition, mental methods, and multiplication facts, including problems in contexts  
Show that multiplication of two numbers can be done in any order (commutative)

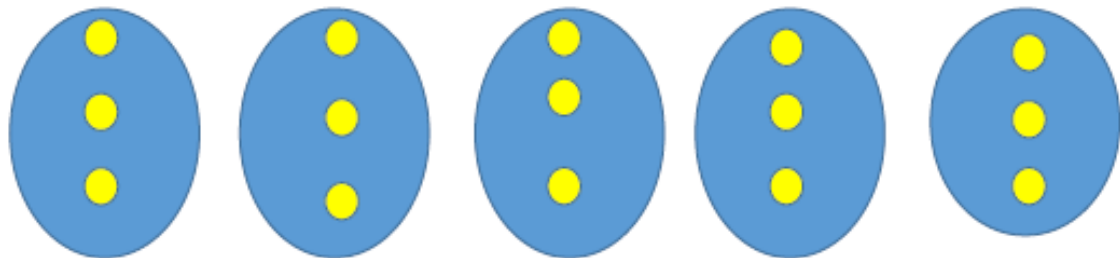
**NB** Ensure that children are confident with the methods outlined in the previous stage's guidance before moving on.

Children will use a range of vocabulary to describe multiplication and use practical resources, pictures, diagrams and the x sign to record.

**Combining Groups (repeated addition):**



'3 groups of 10 crayons'  
 'How many crayons altogether?'  
 ' $10 + 10 + 10 = 30$ '  
 '3 groups of 10' '3 times 10'  
 ' $3 \times 10 = 30$ ' ' $10 \times 3 = 30$ '



'5 groups of 3' '5 lots of 3' ' $3 + 3 + 3 + 3 + 3 = 15$ '  
 '5 times 3' '3 multiplied by 5' ' $5 \times 3 = 15$ ' ' $3 \times 5 = 15$ '

**Use arrays to support multiplication**

**$6 \times 5 = 30$**

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



'6 rows of 5'



'6 groups of 5'



'5 groups of 6'



' $5 \times 6 = 30$ '



' $6 \times 5 = 30$ '



Use an empty number line:

$$6 \times 5 = 30$$



Make the link to repeated addition.

**NB** If, at any time, children are making significant errors, return to the previous stage in calculation.

#### **Multiplication – Stage 4**

**Recall and use multiplication facts for the 3, 4 and 8 multiplication tables (continue to practise the 2, 5 and 10 multiplication tables)**

**Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to a formal written method**

NB Ensure that children are confident with the methods outlined in the previous stage's guidance before moving on.  
Continue to use number lines and arrays to support multiplication, as appropriate (see stage 3 guidance).

$$4 \times 3 = 12$$



**Partitioning method for multiplication of a teen number by a one-digit number:**

$$13 \times 5 = 65 \text{ (Partition 13 into } 10 + 3)$$

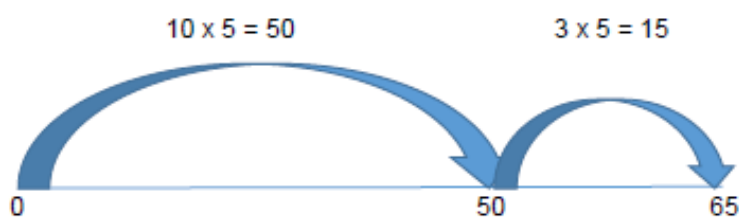
$$10 \times 5 = 50$$

$$3 \times 5 = 15$$

$$50 + 15 = 65$$

Demonstrate the partitioning method using **a number line**:

$$13 \times 5 = 65$$



Grid Method (teen number multiplied by a one- digit number):

$$13 \times 8 = 104$$

X	10	3
8	80	24

Partition 13 into 10 + 3 then multiply each number by 8. Add the partial products (80 and 24) together.'

This will lead into **expanded short multiplication**:

$$13 \times 8 = 104$$

$$\begin{array}{r}
 10 \ 3 \\
 \times \ 8 \\
 \hline
 24 \quad (3 \times 8) \\
 + 80 \quad (10 \times 8) \\
 \hline
 104
 \end{array}$$

Include an addition symbol when adding partial products.

Refine the recording in preparation for formal short multiplication:

$$13 \times 8 = 104$$

$$\begin{array}{r} 13 \\ \times 8 \\ \hline 24 \quad (3 \times 8) \\ +80 \quad (10 \times 8) \\ \hline 104 \end{array}$$

Use the language of place value to ensure understanding

Include an addition symbol when adding partial products

Model the same calculation using a number line, if necessary, to ensure understanding.

Formal short multiplication:

$$\begin{array}{r} 13 \\ \times 8 \\ \hline 104 \end{array}$$

Ensure that the digit 'carried over' is written under the line in the correct column.

Use the language of place value to ensure understanding

Continue to develop the formal written method of multiplication throughout year three using teen- numbers multiplied by a one-digit number. If children are confident progress to multiplying other two-digit numbers by a one-digit number (see stage 5 guidance).

**NB** If, at any time, children are making significant errors, return to the previous stage in calculation.

### **Multiplication- Stage 5**

**Recall multiplication facts for multiplication tables up to  $12 \times 12$**

**Multiply two-digit and three-digit numbers by a one-digit number using formal written layout**

NB Ensure that children are confident with the methods outlined in the previous stage's guidance before moving on.

Continue to use empty number lines, as appropriate (see stage 4 guidance). Further develop the grid method for two-digit numbers multiplied by a one-digit number.

$$36 \times 4 = 144$$

X	30	6
4	120	24

$$120 + 24 = 144 \text{ (add the partial products)}$$

**Expanded short multiplication** (two-digit number by a one-digit number):

$$36 \times 4 = 144$$

$$\begin{array}{r} 30 \quad 6 \\ \times \quad 4 \\ \hline 24 \quad (4 \times 6 = 24) \\ + 120 \quad (4 \times 30 = 120) \\ \hline 144 \end{array}$$

Include an addition symbol when adding partial products.

Refine the recording in preparation for the formal short multiplication

$$36 \times 4 = 144$$

$$\begin{array}{r} 36 \\ \times 4 \\ \hline 24 \quad (4 \times 6) \\ + 120 \quad (4 \times 30) \\ \hline 144 \end{array}$$

This leads to **short multiplication (formal method)** of a two-digit number multiplied by a one-digit number:

$$36 \times 4 = 144$$

$$\begin{array}{r} 36 \\ \times 4 \\ \hline 144 \\ 2 \end{array}$$

Use the language of place value to ensure understanding

Ensure that the digit 'carried over' is written under the line in the correct column.

Continue to practise the formal method of short multiplication of a two-digit number by a one -digit number throughout stage 5

**If children are confident**, continue to develop short multiplication with three- digit numbers multiplied by a one-digit number.

**If necessary, return to the grid method and/or expanded method first:**

$$127 \times 6 = 762$$

X	100	20	7
6	600	120	42

$$600 + 120 + 42 = 762 \text{ (add the partial products)}$$

This leads to **expanded short multiplication**:

$$127 \times 6 = 762$$

1	2	7	
X			6
	4	2	(6 x 7)
+ 1	2	0	(6 x 20)
+ 6	0	0	(6 x 100)
7	6	2	

This will lead into **short multiplication (formal method)**:

1	2	7	
X			6
7	6	2	
1	4		

Use the language of place value to ensure understanding

Ensure that the digits 'carried over' are written under the line in the correct column.

**NB** If, at any time, children are making significant errors, return to the previous stage in calculation.

### **Multiplication – Stage 6**

**Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers**

NB Ensure that children are confident with the methods outlined in the previous stage's guidance before moving on. Build on the work covered in stage 5 with the **formal method of short multiplication** (two-digit number multiplied by a one-digit number).



**When children are confident introduce multiplication by a two-digit number.** If necessary, return to the grid method and/or expanded method first.

**Grid method (two-digit number multiplied by a teen- number):**

$$23 \times 13 = (20 + 3) \times (10 + 3) = 299$$

X	20	3
10	200	30
3	60	9

$$\begin{array}{r} 230 \\ + 69 \\ \hline 299 \end{array}$$

Add the partial products  $(200+30) + (60+9) = 299$

**Expanded long multiplication (two-digit numbers multiplied by a teen-number)**

$$23 \times 13 = 299$$

$$\begin{array}{r} 23 \\ \times 13 \\ \hline 9 \quad (3 \times 3) \\ 60 \quad (3 \times 20) \\ + 30 \quad (10 \times 3) \\ \hline 200 \quad (10 \times 20) \\ \hline 299 \end{array}$$

This leads into ...

**Compact long multiplication (formal method):**

$$23 \times 13 = 299$$

$$\begin{array}{r} 23 \\ \times 13 \\ \hline + 69 \\ \hline 230 \\ \hline 299 \end{array}$$

Use the language of place value to ensure understanding

$(3 \times 23)$

$(10 \times 23)$

Add the partial products

Extend to larger two-digit numbers (returning to the grid method and then expanded method if necessary)

**When children are confident** with long multiplication extend with three-digit numbers multiplied by a two-digit number, returning to the grid method first, if necessary:



Our aim is that by the end of stage 7 children use mental methods (with jottings) when appropriate, but for calculations that they cannot do in their heads, they use an efficient formal written method accurately and with confidence.