

## Stages in Multiplication

### Multiplication – Early Stages (EYFS)

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.

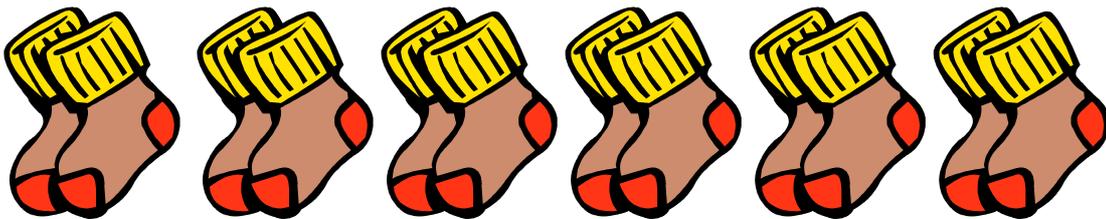


‘Three apples for you and three apples for me. How many apples altogether?’

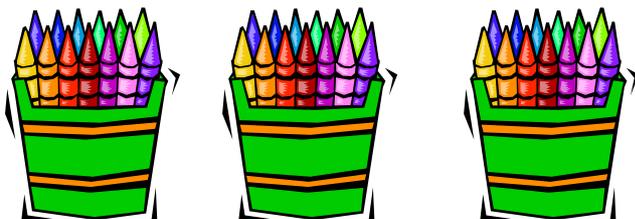
### Multiplication – Year One

- **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 10<sup>th</sup> 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.

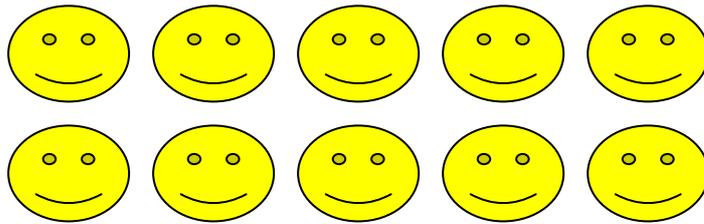


‘Six pairs of socks.  
How many socks altogether? 2, 4, 6, 8, 10, 12’

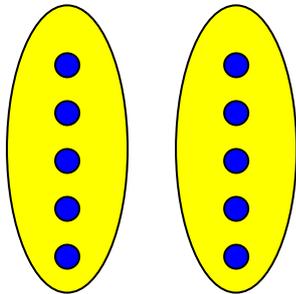


‘Three pots of ten crayons. How many crayons altogether? 10, 20, 30’

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 Y1.

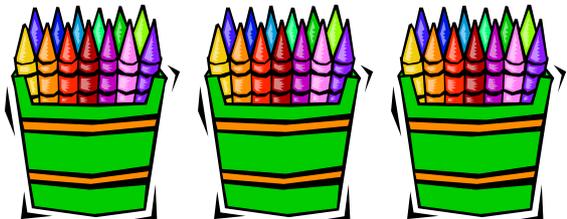
## Multiplication - Year Two

- 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 year'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):



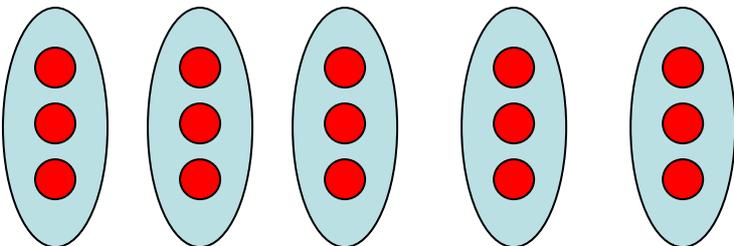
'3 groups of 10 crayons'

'How many crayons altogether?'

' $10 + 10 + 10 = 30$ '

'3 groups of 10' '3 times ten'

' $3 \times 10 = 30$ ' ' $10 \times 3 = 30$ '



'5 groups of 3' '5 lots of 3' ' $3 + 3 + 3 + 3 + 3 = 15$ '

'5 times 3' '3 multiplied by 5' ' $5 \times 3 = 15$ ' ' $3 \times 5 = 15$ '

Using arrays to support multiplication:

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



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

'6 rows of 5'

'6 groups of 5'

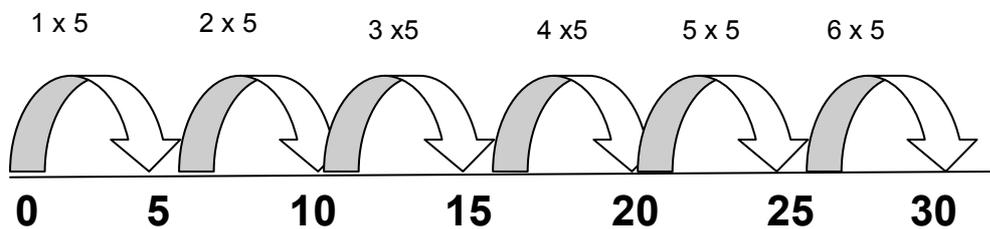
'5 groups of 6'

' $5 \times 6 = 30$ '

' $6 \times 5 = 30$ '

Using 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.

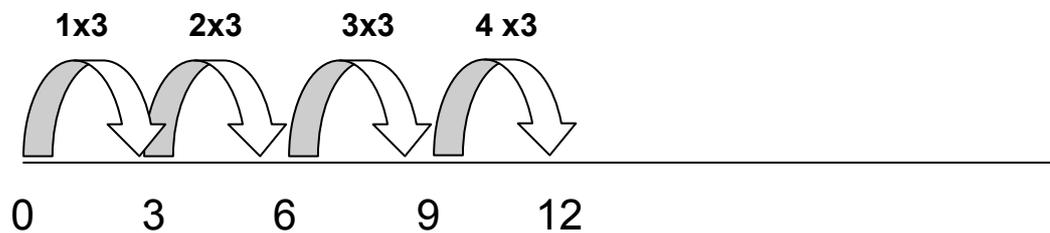
## Multiplication - Year Three

- **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 year's guidance before moving on.

Continue to use **number lines** and **arrays** to support multiplication, as appropriate (see Y2 guidance).

$$4 \times 3 = 12$$



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

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

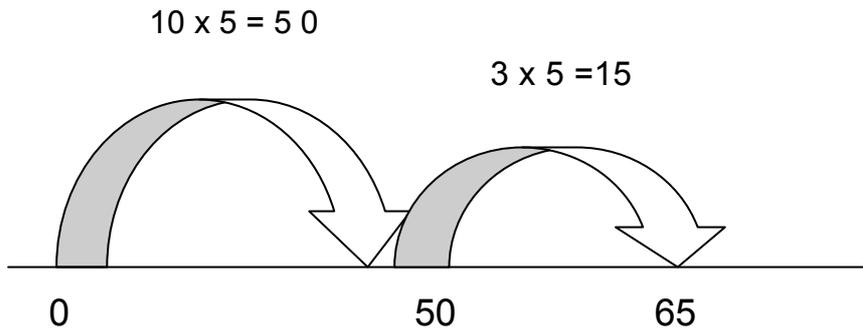
$$10 \times 5 = 50$$

$$3 \times 5 = 15$$

$$50 + 15 = 65$$

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

$$80 + 24 = 104$$

'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**:

$$13 \times 8 = 104$$

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

Include an addition symbol when adding partial products.



## Multiplication- Year Four

- 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 year's guidance before moving on.

Continue to use **empty number lines**, as appropriate (see Y3 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):

$$36 \times 4 = 144$$

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

( $4 \times 6 = 24$ )  
( $4 \times 30 = 120$ )

Include an addition symbol when adding partial products.

Refine the recording in preparation for formal short multiplication:

$$36 \times 4 = 144$$

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

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

$$36 \times 4 = 144$$

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

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 Y4.

**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:

$$127 \times 6 = 762$$

<b>x</b>	100	20	7
6	600	120	42

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

This leads to **expanded short multiplication**:

$$127 \times 6 = 762$$

$$\begin{array}{r} 127 \\ \times 6 \\ \hline 42 \quad (6 \times 7) \\ + 120 \quad (6 \times 20) \\ \hline 600 \quad (6 \times 100) \\ \hline \underline{762} \end{array}$$

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

$$\begin{array}{r} 127 \\ \times 6 \\ \hline 762 \\ \hline \end{array}$$

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 - Year Five

- **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 year's guidance before moving on.

Build on the work covered in Y4 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):

$$23 \times 13 = 299$$

$$\begin{array}{r} 23 \\ \times 13 \\ \hline + 69 \quad (3 \times 23) \\ 230 \quad (10 \times 23) \\ \hline \underline{299} \end{array}$$

Use the language of place value to ensure understanding.

Add the partial products.

Extend to larger two-digit numbers:

$$56 \times 27 = (50 + 6) \times (20 + 7) = 1512$$

<b>x</b>	50	6	
20	1000	120	1120
7	350	42	392
			1512

Add the partial products  $(1000 + 120) + (350 + 42) = 1512$

### Expanded long multiplication (two-digit numbers multiplied by two-digit numbers):

$$56 \times 27 = 1512$$

$$\begin{array}{r} 56 \\ \times 27 \\ \hline 42 \quad (7 \times 6) \\ 350 \quad (7 \times 50) \\ + 120 \quad (20 \times 6) \\ \hline 1000 \quad (20 \times 50) \\ \hline 1512 \\ \hline \end{array}$$

This expanded method is linked to the grid method

This leads into...

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

**56 x 27 = 1512**

$$\begin{array}{r} 56 \\ \times 27 \\ \hline 392 \\ + 1120 \\ \hline 1512 \\ \hline 1 \end{array}$$

Use the language of place value to ensure understanding.

In this example there are digits that have been 'carried' over in the partial products.

Add the partial products.

**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:

**124 x 26 = 3224**

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

Use the language of place value to ensure understanding.

Add the partial products.

The prompts (in brackets) can be omitted if children no longer need them.

Extend with short and long multiplication of decimal numbers (initially in the context of money and measures), returning to an expanded method first, if necessary (see Y6 guidance).

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

## Multiplication - Year Six

- **Multiply multi-digit numbers (including decimals) up to 4 digits by a two-digit whole numbers**

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

Continue to practise and develop the **formal short multiplication** method and **formal long multiplication** method with larger numbers and decimals throughout Y6. Return to an expanded forms of calculation initially, if necessary (see Y5 guidance).

The **grid method** (decimal number multiplied by a two-digit number):

$$53.2 \times 24 = 1276.8$$

<b>x</b>	<b>50</b>	<b>3</b>	<b>0.2</b>	
<b>20</b>	<b>1000</b>	<b>60</b>	<b>4</b>	<b>1064.0</b>
<b>4</b>	<b>200</b>	<b>12</b>	<b>0.8</b>	<b>212.8</b>
				<b>1276.8</b>

The **formal written method of long multiplication**:

$$\begin{array}{r}
 53.2 \\
 \times 24.0 \\
 \hline
 212.8 \quad (53.2 \times 4) \\
 1064.0 \quad (53.2 \times 20) \\
 \hline
 1276.8
 \end{array}$$

It is an option to include  $.0$  in this example, but not essential.

The prompts (in brackets) can be omitted if children no longer need them.

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

Our aim is that by the end of Y6 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.