

# Multiplication at Milverton



	Concrete	Pictorial	Abstract												
<b>EYFS</b>	<b>Doubling (x2)</b>														
	<p>Making equal groups Use practical activities to show how to double a number.</p>	<p>Draw a variety of representations to show how to double a number.</p> <p>Double 4 is 8</p>	<p>Count aloud Using number sentences and beginning to calculate mentally.</p> <div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="border: 1px solid blue; border-radius: 50%; padding: 10px; margin: 5px;">6 + 6 =</div> <div style="border: 1px solid blue; border-radius: 50%; padding: 10px; margin: 5px;">Double 9</div> <div style="border: 1px solid blue; border-radius: 50%; padding: 10px; margin: 5px;">4 + 4 =</div> <div style="border: 1px solid blue; border-radius: 50%; padding: 10px; margin: 5px;">14 = Double ..</div> <div style="border: 1px solid blue; border-radius: 50%; padding: 10px; margin: 5px;">5 + ... = 10</div> <div style="border: 1px solid blue; border-radius: 50%; padding: 10px; margin: 5px;">8 = half of ...</div> </div>												
<b>Year 1</b>	<b>Single digit multiplication (x2 x5 x10)</b>														
	<p><u>Counting in multiples</u> Count in multiples supported by concrete objects in equal groups.</p>	<p><u>Counting in multiples</u> Children pictorially represent the groups counted. They can use arrays, pictures or number lines.</p>	<p><u>Counting in multiples</u> Counting in multiples aloud Write sequences with multiples of numbers.</p> <p>2,4,6,8,10</p> <p>5,10,15,20,25,30</p>												
<b>Repeated addition</b>															
<p>Make arrays on grids with counting objects</p>	<p>Repeated images e.g. how many legs?</p>	<p>Using Arrays</p>	<p>Counting in multiples</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> <tr> <td>3</td> <td>6</td> <td></td> <td>12</td> <td>15</td> <td></td> </tr> </table> <p>Sequences of numbers</p>	3	3	3	3	3	3	3	6		12	15	
3	3	3	3	3	3										
3	6		12	15											



		Concrete	Pictorial	Abstract
Year 2	<b>Single digit multiplication (x2 x5 x10 x3)</b>			
	<p>Repeated grouping/repeated addition  <math>3 \times 4</math>  <math>4 + 4 + 4</math>                      There are 3 equal groups, with 4 in each group.</p>	<p>Children to represent the practical resources in a picture and use a bar model, number lines or arrays.</p> <p>There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?</p>	<p>Counting in multiples</p> <p><math>3 \times 4 = 12</math>  <math>4 + 4 + 4 = 12</math></p> <p>Know and complete tables questions</p> <p><math>3 \times 9 =</math>  <math>5 \times 7 =</math>  <math>10 \times 4 =</math></p>	
<b>Use arrays to show commutativity</b>				
<p>Use arrays to show commutativity. Children use counters and other objects to show multiplication sentences.</p>	<p>Children to represent the arrays pictorially.</p>	<p>Children to be able to DESCRIBE an array to EXPLAIN a range of calculations.</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid blue; border-radius: 50%; padding: 10px; background-color: #e0f0ff;"> <math>10 = 2 \times 5</math> </div> <div style="border: 1px solid blue; border-radius: 50%; padding: 10px; background-color: #e0f0ff;"> <math>12 = 3 \times 4</math> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="border: 1px solid blue; border-radius: 50%; padding: 10px; background-color: #e0f0ff;"> <math>5 \times 9 = \dots</math> </div> <div style="border: 1px solid blue; border-radius: 50%; padding: 10px; background-color: #e0f0ff;"> <math>25 = 5 \times \dots</math> </div> </div>		



### Concrete

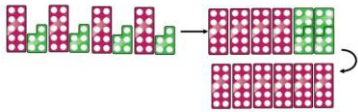
### Pictorial

### Abstract

#### Multiply 2 digit by 1 digit

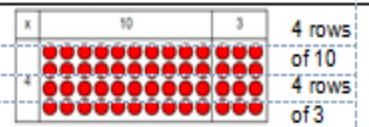
##### Partition to multiply

Use Numicon, Cuisenaire rods or Base 10.  
 $4 \times 15$

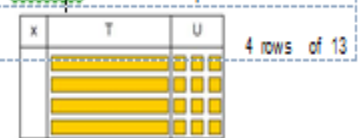


##### Grid Method

Show the link with arrays to first introduce the grid method.



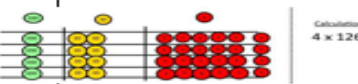
Move on to using Base 10 to move towards a more compact method.



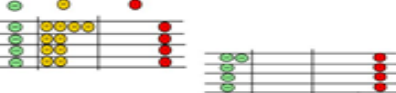
Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows.



Fill each row with 126.



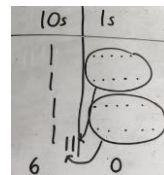
Add up each column, starting with the ones making any exchanges needed.



Then you have your answer.

##### Partition to multiply

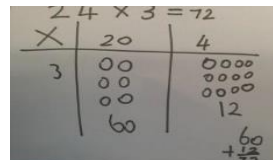
Children to represent the concrete manipulatives pictorially.



##### Grid Method

Children can represent the work they have done with place value counters in a way that they understand.

They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as shown below.



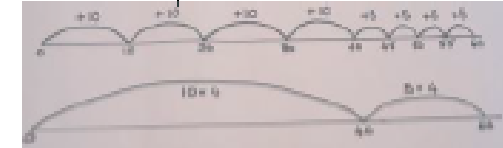
##### Partition to multiply

Children encouraged to show the steps they have taken

$$\begin{array}{r} 4 \times 15 \\ \swarrow \searrow \\ 10 \quad 5 \end{array}$$

$$\begin{array}{l} 10 \times 4 = 40 \\ 5 \times 4 = 20 \\ 40 + 20 = 60 \end{array}$$

##### A number line can also be used



##### Grid Method

Start with multiplying by one digit numbers and showing the clear addition alongside the grid.

x	30	5
7	210	35

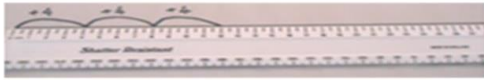
$$210 + 35 = 245$$

# Multiplication at Milverton

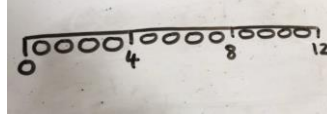


## Multiplication Facts (x3 x6 x4 x8)

Number lines to show repeated groups-  
 $3 \times 4$



Represent this pictorially alongside a number line  
e.g



Abstract number line showing three jumps of four.

$$3 \times 4 = 12$$



Known facts/ instant recall2

## Multiply 3 digit by 1 digit

Place Value Counters and/or

Base 10

$$126 \times 3$$

Hundreds	Tens	Units
1	2	6
3	6	18

Children to represent the counters/base 10 pictorially:

They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as year 3.

Grid method

x	100	20	6
3	300	60	18

$$300 + 60 + 18$$

Children move from grid method to Expanded and finally on to Formal column method. Expanded and formal method can be taught side by side.

Ensure children consider place value and line the numbers up accurately.

$$\begin{array}{r} 126 \\ \times 3 \\ \hline 18 \text{ (3 x 6)} \\ 60 \text{ (3 x 20)} \\ 300 \text{ (3 x 100)} \\ \hline 378 \end{array}$$

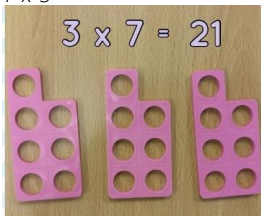
$$\begin{array}{r} 126 \\ \times 3 \\ \hline 378 \\ \hline 1 \end{array}$$

Year 4

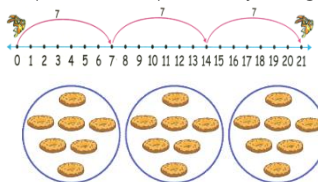
## Multiplication Facts (x7 x9 x11 x12)

Number lines, Numicon or Cuisenaire rods to show repeated groups or

$$7 \times 3$$



Represent this pictorially alongside a number line e.g



Abstract number line

Known facts/ instant recall

There are  groups of donuts.

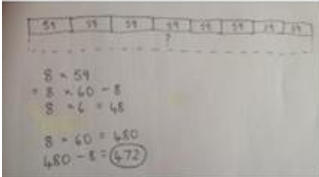
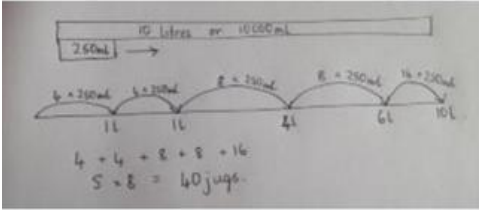
$$\square + \square + \square = 21$$

$$\square \times \square = 21$$

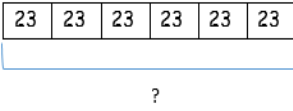


# Multiplication at Milverton



Year 5	<b>Column multiplication (4 digit by 2 digit) (TO xTO) (ThHTO x O) (HTO x O)</b>																
	<p>Children working at this level are expected to have secured the use of place value counters to multiply by a one digit number. Therefore, they should proceed to pictorial methods.</p> <p>When children start to multiply <math>3d \times 3d</math> and <math>4d \times 2d</math> etc., they should be confident with the abstract:                  To get 744 children have solved <math>6 \times 124</math>.                  To get 2480 they have solved <math>20 \times 124</math>.</p>	<p>Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.</p>  	<p>Multiply by a 4 digit number showing the different rows within the grid method. (see year 3 and 4)</p> <table border="1" style="margin-bottom: 10px;"> <tr> <td>X</td> <td>1000</td> <td>300</td> <td>40</td> <td>2</td> </tr> <tr> <td>10</td> <td>10000</td> <td>3000</td> <td>400</td> <td>20</td> </tr> <tr> <td>8</td> <td>8000</td> <td>2400</td> <td>320</td> <td>16</td> </tr> </table> <p>Moving to Expanded/formal column method</p> $  \begin{array}{r}  231 \\  1342 \\  \times 18 \\  \hline  13420 \\  10736 \\  \hline  24156 \\  \hline  \end{array}  $	X	1000	300	40	2	10	10000	3000	400	20	8	8000	2400	320
X	1000	300	40	2													
10	10000	3000	400	20													
8	8000	2400	320	16													

Year 6	<b>Efficient written method (multiply multi digit number up to 4 digits by two digit whole number)</b>	
	$  \begin{array}{r}  124 \\  \times 26 \\  \hline  744 \\  2480 \\  \hline  3224 \\  \hline  \end{array}  $ <p>(6 x 124)</p> $  \begin{array}{r}  2480 \\  3224 \\  \hline  11 \\  \hline  \end{array}  $ <p>(20 x 124)</p>	$  \begin{array}{r}  1735 \\  \times 43 \\  \hline  5205 \\  7005 \\  \hline  74605 \\  \hline  \end{array}  $ <p>(3 x 1735)</p> $  \begin{array}{r}  69400 \\  2122 \\  \hline  74605 \\  \hline  \end{array}  $ <p>(40 x 1735)</p>

<b>Conceptual Variation; different ways to ask children to solve 6 x 23</b>									
	<p>Mai had to swim 23 lengths, 6 times a week.                  How many lengths did she swim in one week?                  With the counters, prove that <math>6 \times 23 = 138</math></p>	<p>Find the product of 6 and 23</p> $  \begin{array}{r}  6 \times 23 = \\  \square = 6 \times 23 \\  \begin{array}{r}  6 \quad 23 \\  \times 23 \quad \times 6 \\  \hline  \end{array}  \end{array}  $	<p>What is the calculation?                  What is the product?</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="background-color: #f0f0f0;">100s</td> <td style="background-color: #f0f0f0;">10s</td> <td style="background-color: #f0f0f0;">1s</td> </tr> <tr> <td style="width: 30px; height: 30px;"></td> <td style="width: 30px; height: 30px; text-align: center;">                 ●●●●                  ●●●●                  ●●●●             </td> <td style="width: 30px; height: 30px; text-align: center;">                 ●●●●●●                  ●●●●●●                  ●●●●●●                  ●●●●●●             </td> </tr> </table>	100s	10s	1s		●●●● ●●●● ●●●●	●●●●●● ●●●●●● ●●●●●● ●●●●●●
100s	10s	1s							
	●●●● ●●●● ●●●●	●●●●●● ●●●●●● ●●●●●● ●●●●●●							

# Multiplication at Milverton



## Vocabulary for Multiplication & Division

### Years 1 and 2:

groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times... share, share equally, one each, two each..., group, groups of, lots of, array, share, share equally, one each, two each..., group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over

### Year 3 and 4:

lots of, groups of, times, multiply, multiplication, multiplied by, multiple of, product, once, twice, three times... ten times...times as (big, long, wide... and so on), repeated addition, array, row, column, double, halve, share, share equally, one each, two each, three each...group in pairs, threes... tens, equal groups of, divide, division, divided by, divided into, remainder, factor, quotient, divisible by, inverse

### Years 5 and 6:

lots of, groups of, times, multiply, multiplication, multiplied by, multiple of, product once, twice, three times... ten times...times as (big, long, wide... and so on), repeated addition array, row, column, double, halve, share, share equally, one each, two each, three each...group in pairs, threes... tens, equal groups of, divide, division, divided by, divided into, dividend, divisor, remainder, factor, quotient, divisible by, inverse, fraction