

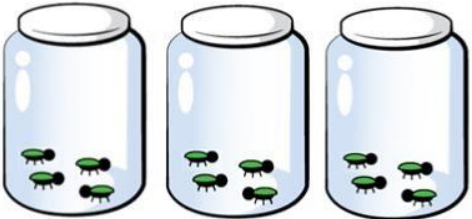

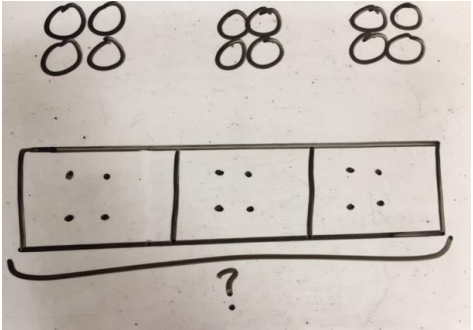
# Calculation policy: Multiplication

Key language:

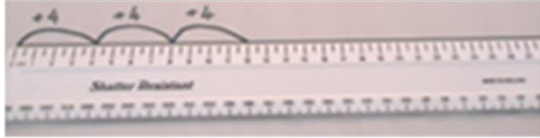
Repeated addition, double, times, multiplied by, the product of, groups of, lots of, equal groups, commutative.



Calculation Policy adapted from White Rose Maths Hub Progression in Calculations – supported with a rich use of vocabulary and discussion throughout using 'stem sentences'

Concrete/ Build it	Pictorial /Draw it	Abstract / Write it/ Say it
<p>Repeated grouping/repeated addition</p> $4 \times 3$ $4 + 4 + 4$  <p>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.</p> 	$4 \times 3 = 12$ $4 + 4 + 4 = 12$

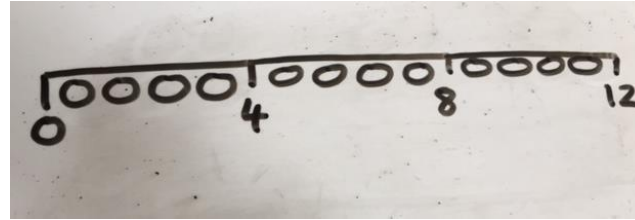
Number lines to show repeated groups-



$$4 \times 3$$

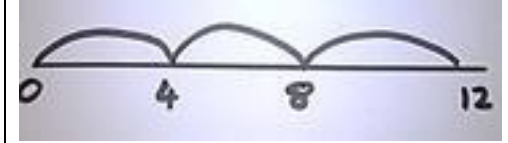
Cuisenaire rods can be used too.

Represent this pictorially alongside a number line  
e.g.:



Abstract number line showing three jumps of four.

$$4 \times 3 = 12$$

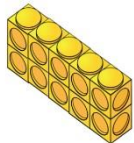


Use arrays to illustrate commutativity counters and other objects can also be used.

$$2 \times 5 = 5 \times 2$$

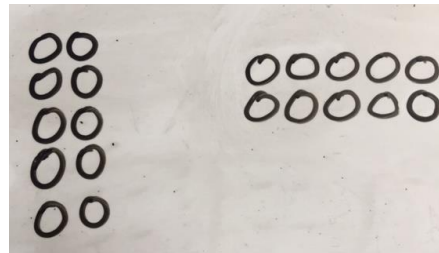


2 lots of 5



5 lots of 2

Children to represent the arrays pictorially.



Children to be able to use an array to write a range of calculations e.g.

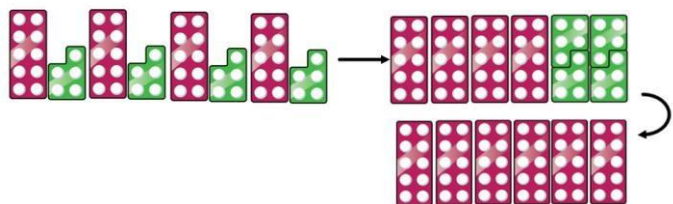
$$10 = 2 \times 5$$

$$5 \times 2 = 10$$

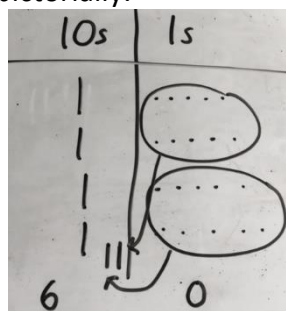
$$2 + 2 + 2 + 2 + 2 = 10$$

$$10 = 5 + 5$$

Partition to multiply using Numicon, base 10 or Cuisenaire rods.  $15 \times 4$



Children to represent the concrete manipulatives pictorially.



Children to be encouraged to show the steps they have taken.

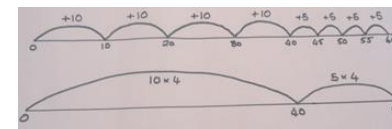
$$4 \times 15$$

$$\begin{array}{r} 10 \ 5 \\ 4 \times 15 \\ \hline 10 \ 5 \end{array}$$

$$10 \times 4 = 40$$

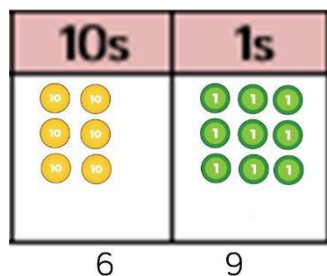
$$5 \times 4 = 20$$

$$40 + 20 = 60$$

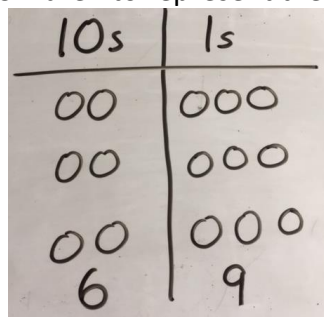


A number line can also be used

Formal column method with place value counters (base 10 can also be used.)  $23 \times 3$



Children to represent the counters pictorially.



Children to record what it is they are doing to show understanding.  $23 \times 3$

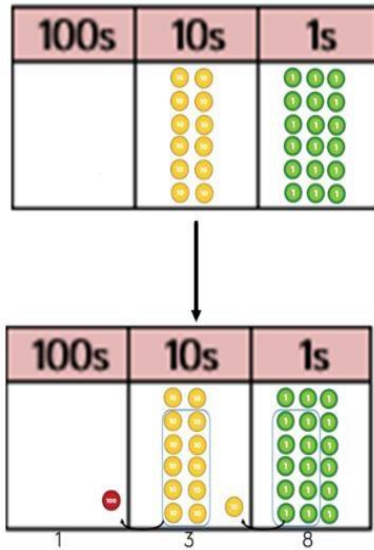
$$20 \times 3 = 60$$

$$3 \times 3 = 9$$

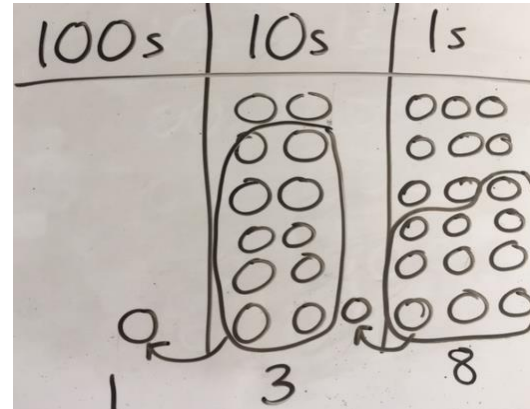
$$60 + 9 = 69$$

$$\begin{array}{r} 23 \\ \times 3 \\ \hline 69 \end{array}$$

Formal column method with place value counters.  $23 \times 6$



Children to represent the counters/base 10, pictorially e.g. the image below.



Formal written method

$$\begin{array}{r}
 6 \times 23 = \\
 23 \\
 \times 6 \\
 \hline
 138 \\
 \hline
 1 \quad 1
 \end{array}$$

When children start to multiply  $3d \times 3d$  and  $4d \times 2d$  etc., they should be confident with the abstract:

To get 744 children have solved  $124 \times 6$

To get 2480 they have solved  $124 \times 20$ .

$$\begin{array}{r}
 1 \quad 2 \quad 4 \\
 \times \quad 2 \quad 6 \\
 \hline
 7 \quad 4 \quad 4 \\
 \phantom{7} \phantom{4} \phantom{4} \phantom{0} \\
 2 \quad 4 \quad 8 \quad 0 \\
 \hline
 3 \quad 2 \quad 2 \quad 4 \\
 \hline
 1 \quad 1
 \end{array}$$

Answer: 3224

Conceptual variation; different ways to ask children to solve  $23 \times 6$

23	23	23	23	23	23
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?

Mai had to swim 23 lengths, 6 times a week. How many lengths did she swim in one week?

With the counters, prove that  $23 \times 6 = 138$

Find the product of  $23 \times 6$

$$23 \times 6 =$$

$$\boxed{\quad} = 6 \times 23$$

$$\begin{array}{r} 6 \\ \times 23 \\ \hline \end{array} \qquad \begin{array}{r} 23 \\ \times 6 \\ \hline \end{array}$$

What is the calculation? What is the product?

100s	10s	1s
		