

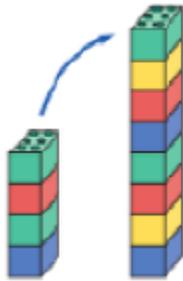
# Fierte Multi-Academy Trust Calculation policy - multiplication

Key language: double, times, multiplied by, the product of, groups of, lots of, equal group

## Concrete

Doubling – Children will understand doubling as making a number twice as big using a range of equipment.

Double 4 is 8.



## Pictorial

Double 4 is 8



Children draw a picture to represent the objects doubled.

## Abstract

$$4 + 4 = 8$$

$$2 \times 4 = 8$$

**Just know it!** – Children will learn double facts off by heart 1-5 and then to 10.

Children begin to explore concept by grouping into equal groups.

E.g. 2 candles on each cake, pairs of socks.

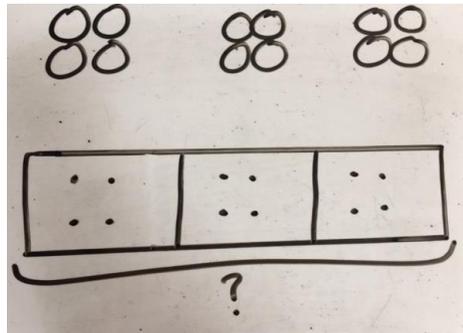


Repeated grouping/repeated addition

$$3 \times 4$$

$$4 + 4 + 4$$

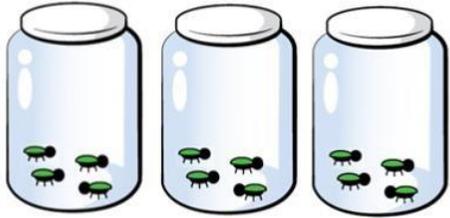
Children to represent the practical resources in a picture and then use a bar model.



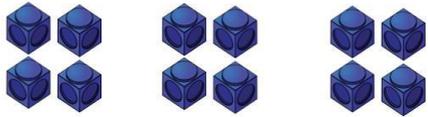
Children to then record as repeated addition and then move onto multiplication.

$$4 + 4 + 4 = 12$$

$$3 \times 4 = 12$$



“There are 3 equal groups, with 4 in each group.”



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

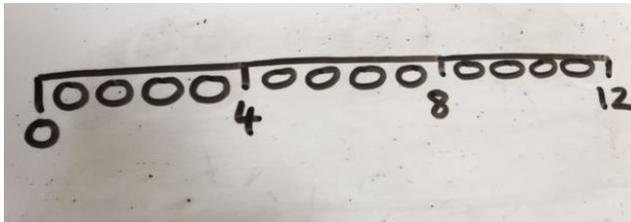


These rods can be used

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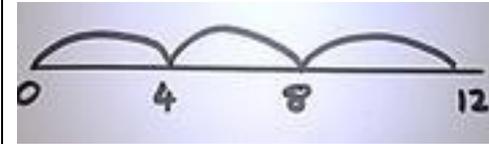
Represent this pictorially alongside a number line e.g.:



**Just know it!** – Children will begin to count in 2s, 5s and 10s and learn these by heart. Moving on to learn other x table facts.

Abstract number line showing three jumps of four.

$$3 \times 4 = 12$$



too.

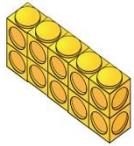


Use arrays to illustrate commutativity. Counters and other objects can also be used.

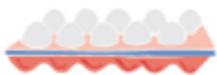
$$2 \times 5 = 5 \times 2$$



2 lots of 5



5 lots of 2



$$2 \times 5 = 10$$

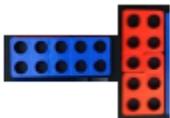
$$5 \times 2 = 10$$



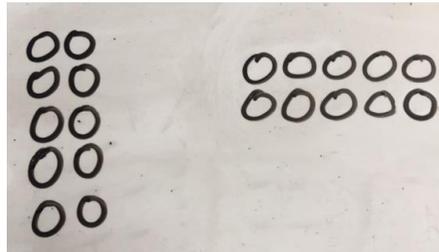
$$4 \times 2 = 8$$

$$2 \times 4 = 8$$

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



Children to represent the arrays pictorially.



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

$$10 = 2 \times 5$$

$$5 \times 2 = 10$$

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

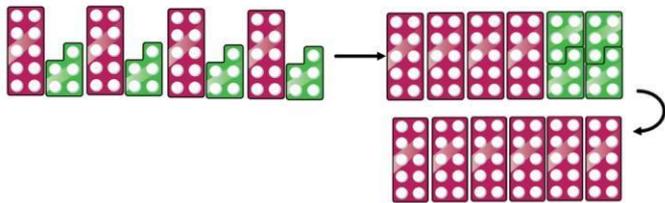
$$10 = 5 + 5$$

If I know... Children recognise and use factor pairs and commutativity in mental calculations.

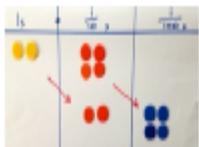
If I know  $10 \times 8 = 80$  then ...



Partition to multiply using Numicon, base 10 or

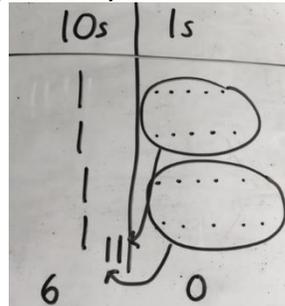


Cuisenaire rods.  $4 \times 15$

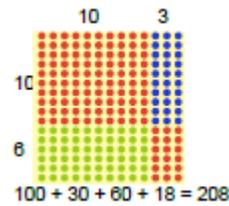


If I know  $4 \times 6$  then  $0.4 \times 6$  is ten times smaller  
 $0.4 \times 0.6$  is ten times smaller again.

Children to represent the concrete manipulatives pictorially.



$$\begin{array}{r} 43 \times 6 \\ 40 \times 6 + 3 \times 6 \end{array} \quad \begin{array}{l} 40 \times 6 = 240 \\ 3 \times 6 = 18 \\ 43 \times 6 = 258 \end{array}$$

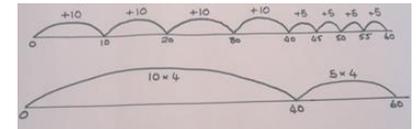


Children to be encouraged to show the steps they have taken.

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

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

A number can also be used



line be

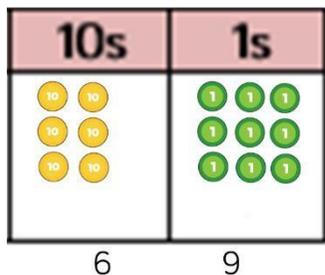
43 x 6 by partitioning

X	40	3
6	240	18

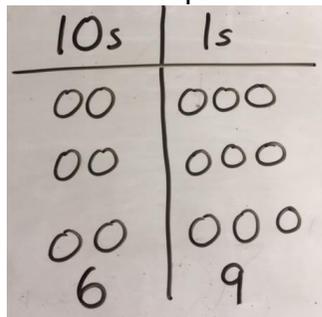
**Developing mental methods**

Use place value, know and derived facts to multiply and divide mentally including multiplying by 0 and 1; multiplying together three numbers.  
 "If I know  $4 \times 6 = 24$  then  $40 \times 60$  is ten times bigger."

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



Children to represent the counters pictorially.

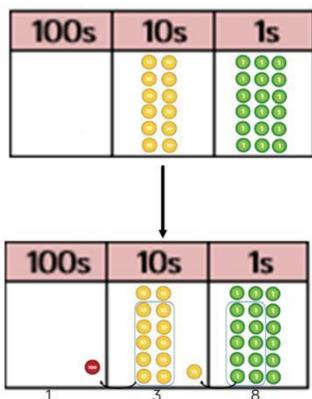


Children to record what it is they are doing to show understanding.  $3 \times 23$        $3 \times 20 =$

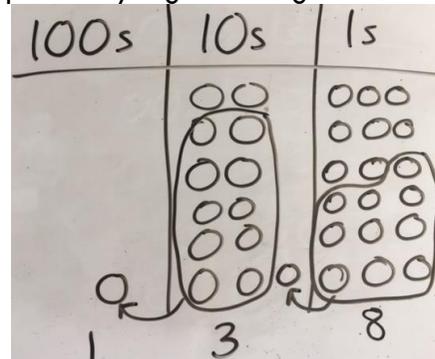
$$\begin{array}{r}
 60 \\
 20 \quad 3 \\
 \hline
 23 \\
 \times 3 \\
 \hline
 69
 \end{array}$$

$3 \times 3 = 9$   
 $60 + 9 = 69$

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



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



Formal written method

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

x	200	40	3	
30	6000	1200	90	= 7290
6	1200	240	18	= 1458 +
				<u>8748</u>

Grid method linked to formal written method.

Developing mental methods – identify multiples and factors including finding all factor pairs of a number and common factors of two numbers establish whether a number up to 100 is prime.

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  $6 \times 124$ .

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

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

Answer: 3224

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