

DEVELOPING UNDERSTANDING AND MENTAL METHODS

Throughout teaching in mathematics, multiplication is taught wherever possible through real life problem solving situations providing opportunities for children to develop their understanding of multiplication.

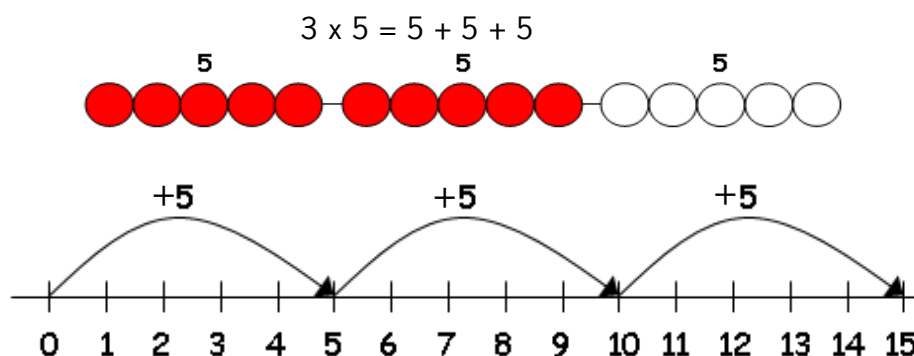
- Begin to approach multiplication in play and problem solving.
- Work on practical problem solving activities involving equal sets or groups.
- Using rhymes, stories and songs the children will count in 2s and 10s. Some children may be able to count in 5s.
- Children will count in multiples using equipment such as cubes and Numicon.
- Children will develop ways of recording calculations using a range of equipment e.g. Numicon, bead string and pegs.

Concrete	Pictorial	Abstract
		$3 \times 2 = 6$ $2 + 2 + 2 = 6$

Y1/Y2

Concrete	Pictorial	Abstract
		$3 \times 4 = 12$

- Repeated addition can be shown on a bead bar / string and also on horizontal or vertical number lines.



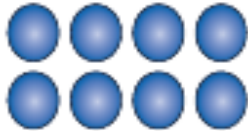
- Children can respond to questions such as:
How many socks are in two pairs?
How many 10p coins are here?



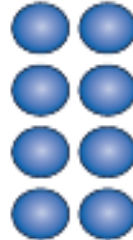
- Five added together 6 times is...?
How much money is that?

Y2/Y3

- Use equipment to demonstrate commutativity e.g. Cuisenaire rods, multilink, counters etc.
- Use arrays to illustrate commutativity.



$$2 \times 4 = 8 \text{ (read as 2 lots of 4)}$$



$$4 \times 2 = 8 \text{ (read as 4 lots of 2)}$$

Concrete	Pictorial	Abstract
<p>2 lots of 5 5 lots of 2</p>		$10 = 2 \times 5$ $5 \times 2 = 10$ $2 + 2 + 2 + 2 + 2 = 10$ $10 = 5 + 5$

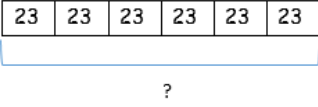







- Children should be encouraged to select an appropriate calculation method, be it mental or written, dependent on the numbers involved in a calculation. To develop this skill, children should be taught to ask themselves, '**Can I do this mentally?**'
- Therefore, it is important that children's mental methods of calculation are practised and secured alongside their learning and development towards a compact written method.
- Children should be encouraged to check their answers after the calculation.

Y3

- Children should be considered to estimate their answer before calculating.
- Equipment such as Numicon, place value counters, Cuisenaire rods, Base 10 should be used to explore partitioning a number to multiply.

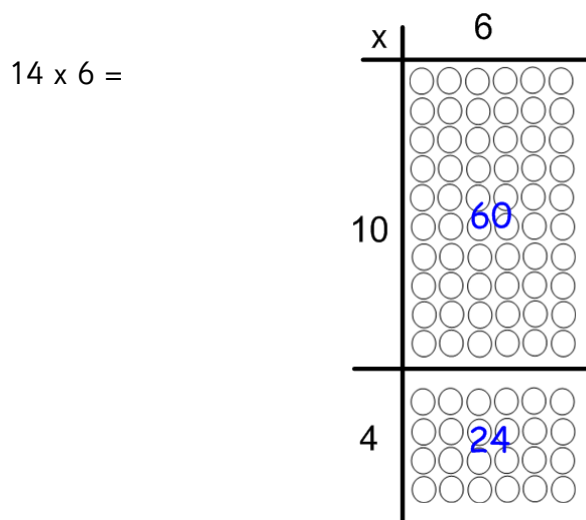
Concrete	Pictorial	Abstract
		4×15 $\begin{array}{r} 10 \ 5 \\ 4 \times 15 \\ \hline 20 \ 20 \\ \hline 60 \end{array}$ $10 \times 4 = 40$ $5 \times 4 = 20$ $40 + 20 = 60$

- Children should explore various ways to solve multiplication calculations.

$6 \times 23 = ?$ 	<p>Mai had to swim 23 lengths, 6 times a week.</p> <p>How many lengths did she swim in one week?</p> <p>With the counters, prove that $6 \times 23 = 138$</p>	<p>Find the product of 6 and 23</p> <p>$6 \times 23 =$</p> <p> = 6×23</p> $\begin{array}{r} 6 \quad 23 \\ \times \quad 23 \\ \hline \end{array}$	<p>What is the calculation? What is the product?</p> <table border="1" data-bbox="1166 353 1501 517"> <thead> <tr> <th>100s</th> <th>10s</th> <th>1s</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	100s	10s	1s			
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Informal Expanded Method

- This leads the children to the more compact standard written method, developing an understanding of its structure and efficiency.
- Children should continue to use arrays to develop the understanding of the grid method.



- It is better to place the number with the most digits in the left hand column of the grid as it is easier to add the partial products.

$78 \times 7 =$

x	7
70	490
8	56
	546

$346 \times 9 =$

x	9
300	2700
40	360
6	54
	<u>3114</u>

Y4

- For those children moving towards the compact written method, recordings need to be reduced to show the links to the grid method.

$$\begin{array}{r}
 38 \\
 \times 7 \\
 \hline
 56 \\
 + 210 \\
 \hline
 266
 \end{array}$$

Y5/Y6

Compact Written Method

$$\begin{array}{r}
 38 \\
 \times 7 \\
 \hline
 266 \\
 \hline
 5
 \end{array}$$

$$\begin{array}{r}
 372 \\
 \times 24 \\
 \hline
 1488 \\
 7440 \\
 \hline
 8928 \\
 1
 \end{array}$$