
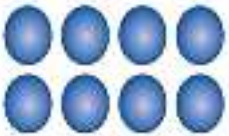


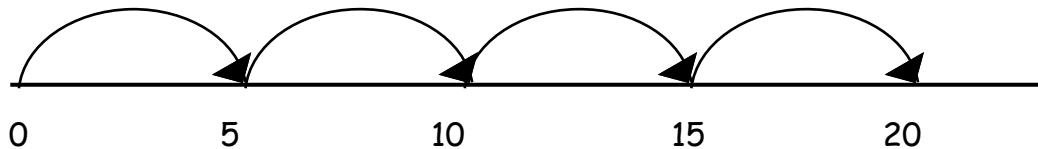
Stage	Progression for Multiplication
1	<p>Uses developing mathematical ideas and methods to solve practical problems involving counting and comparing in a real or role-play context.</p> <p>a. Counts in steps of two, five or ten and is beginning to count on in steps of three. (For guidance see NNS Models and Images chart - '<i>Understanding multiplication and division</i>').</p> <p>b. Responds, in practical situations, to questions such as: <i>How many socks in two pairs?</i> <i>How many 10p coins are here? How much money is that?</i></p>
2	<p><u>DEVELOPING UNDERSTANDING:</u></p> <p>a. Use related vocabulary and symbols to describe and record multiplication number sentences.</p> <p>b. Repeated addition Five added together six times is.....</p> <div style="text-align: center;">  <p>or</p> $5 + 5 + 5 + 5 + 5 + 5$ <p>or</p> $6 \times 5 \text{ (read as 6 lots of 5) etc...}$ </div> <p>c. Describing an array</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center;">  </div> <div style="margin-left: 20px;"> $2 \times 4 = 8 \text{ (read as 2 lots of 4)}$ </div> </div> <div style="margin-top: 10px;"> $4 \times 2 = 8 \text{ (read as 4 lots of 2)}$ </div> <p>Begin to interpret situations as multiplication calculations, and explain reasoning, for example: <i>How many wheels are there on three cars?</i></p>

MENTAL METHODS:

The methods illustrated here are based on partitioning as they lead into the later stages of this progression. However, partitioning is just one of the range of mental strategies that are expected to be taught.

With developing recall of multiplication facts, steps in mental multiplication can be recorded by jumping on an empty number line.

a. $4 \times 5 = 20$ (read as 4 lots of 5)

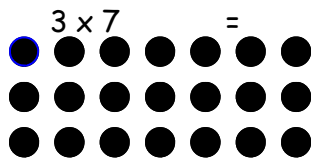


Partitioning:

b. Use known facts to work out unknown facts.

For example: use knowledge of 2 and 5 times tables to work out multiples of 7.

3×7 (3 lots of 7)



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c. Progressing to larger numbers

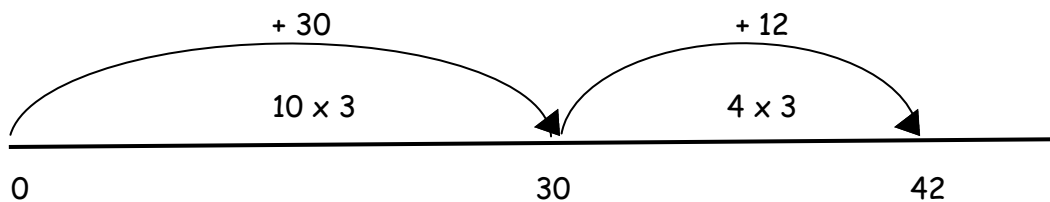
$14 \times 3 =$

$10 \times 3 = 30$

$4 \times 3 = 12$

$30 + 12 = 42$

Children may find it useful to represent this on a number line as below



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WRITTEN METHODS:

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.

INFORMAL EXPANDED METHOD: This leads the children to the more compact standard written method, developing an understanding of its structure and efficiency.

This expanded method links directly to the mental method shown previously; it is an alternative way of recording the same steps.

- a. Short multiplication TU x U
 38×7

X	7
30	210
8	56
	266

N.B. it is better to place the number with the most digits in the left hand column of the grid, as shown above, as it is easier to add the partial products and also links to the expectations for addition at this stage.

- b. Short multiplication HTU x U
 346×9

X	9
300	2700
40	360
6	54
	3114
	11

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- c. Short multiplication U.t x U
 4.6×7

X	7
4.0	28.0
0.6	4.2
	32.2

- d. Long multiplication TU x TU
 72×38

X	30	8	
70	2100	560	2660
2	60	16	+ 76
			2736

N.B. As a checking strategy you may encourage children to add the columns as well as the rows.

- e. Short multiplication ThHTU x U

- f. Short multiplication U.th x U
 4.73×4

X	4
4.00	16.00
0.70	2.80
0.03	0.12
	18.92

- g. Long multiplication HTU x TU
 372×24

X	20	4	
300	6000	1200	7200
70	1400	280	1680
2	40	8	+ 48
			8928

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EXPANDED WRITTEN METHODS:

Reduce the recording showing the links to the grid method -
Short Multiplication including decimals.

$$\begin{array}{r}
 2346 \\
 \times 9 \\
 \hline
 54 \quad (9 \times 6) \\
 360 \quad (9 \times 40) \\
 2700 \quad (9 \times 300) \\
 +18000 \quad (9 \times 2000) \\
 \hline
 21114 \\
 \hline
 111
 \end{array}$$

$$\begin{array}{r}
 4.73 \\
 \times 4 \\
 \hline
 0.12 \quad (4 \times 0.03) \\
 2.80 \quad (4 \times 0.7) \\
 16.00 \quad (4 \times 4) \\
 \hline
 18.92
 \end{array}$$

Reduce the recording showing the links to the grid method - long multiplication.

1

**The calculations in brackets illustrate how the numbers in the columns were derived. There is no expectation that children should record these steps as part of their working.*

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COMPACT WRITTEN METHOD:

Short multiplication

$$\begin{array}{r}
 4346 \\
 \times 8 \\
 \hline
 34768 \\
 \hline
 234
 \end{array}$$

Long multiplication

$$\begin{array}{r}
 352 \\
 \times 27 \\
 \hline
 2464 \\
 7040 \\
 \hline
 9504 \\
 \hline
 1
 \end{array}$$

Points to Consider

- In algebra consider using BODMAS to order calculations:

B Brackets first
O Orders (ie Powers and Square Roots, etc.)
DM Division and Multiplication (left-to-right)
AS Addition and Subtraction (left-to-right)