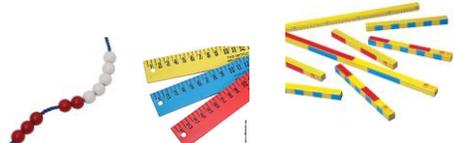
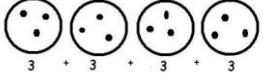
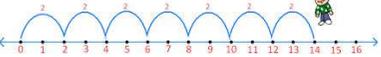


**Salford C of E Primary School – Progression in Multiplication**

Year group	Objective	Method	Practical methods	Pictorial/written methods	Vocabulary	Mental recall
EYFS	Repeated grouping Counting in pairs Doubling	Practical / recorded using ICT (eg digital photos / pictures on IWB)	Toys, Beads, Rhymes, Counters, objects, number lines, stories, role play, number lines- hopping on   Counting pairs	Drawings of problems   Begin to record using marks they can explain 	Double, pair, twos, fives, tens, group, set	Chanting of counting in 2s

Salford C of E Primary School – Progression in Multiplication

<p>Y1</p>	<p>Consolidation of EYFS</p> <p>Begin to understand multiplication through grouping small quantities,</p> <p>Solve one-step problems involving multiplication</p> <p>Make connections between arrays and number patterns</p> <p>Double numbers and quantities</p> <p>Count in multiples of twos, fives and tens</p>	<p>Practical / recorded using ICT</p> <p>Informal written methods</p> <p>Horizontal recording</p>	<p>long number lines, tapes, 100 square, counting sticks, Dienes, coins, cubes, bead strings, peg boards</p>  <p>counting on in groups of...</p>   <p>counting groups of objects</p>  <p>arranging objects in arrays</p>	<p>Pictures to represent working out</p>  <p>Jumps along a number line in 2s</p> 	<p>As previous.</p> <p>Count on in..., lots of, groups of pattern,</p>	<p>Consolidation of EYFS</p> <p>Chanting of counting in 2s, 5s 10s</p> <p>Double pairs to 10, then 20</p>
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Salford C of E Primary School – Progression in Multiplication

Y2

Consolidation of Y1

Count in steps of 2, 3, and 5 from 0, and in 10s from any number, forward and backward

Recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (x) and equals (=) signs

Show that multiplication of two numbers can be done in any order (**commutativity**)

Solve problems involving multiplication using materials, arrays, repeated addition, mental methods, and multiplication facts, including problems in contexts.

Connect the 10 x multiplication table to place value

Relate multiplication to grouping discrete and continuous quantities, to arrays and to repeated addition.

Use **commutativity** and inverse relations to develop multiplicative reasoning (for example,  $4 \times 5 = 20$  and  $20 \div 5 = 4$ ).

Practical

Informal written methods

Horizontal recording

Counting sticks, bead strings, number lines, 100 squares, Dienes, objects in groups and arrays



Counting groups of...

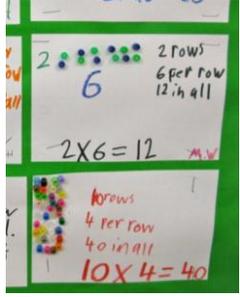
1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

Counting on in...



Arranging objects in arrays

Arrays



Repeated addition in groups



Horizontal recording as repeat addition and using x and =

$2 \times 5 = 10$

“ Multiplying 2 is like adding lots of 2’s ”  $2+2+2+2+2$

Multiplying by 10 using place value

Tens	Units
	8
8	0

As previous.

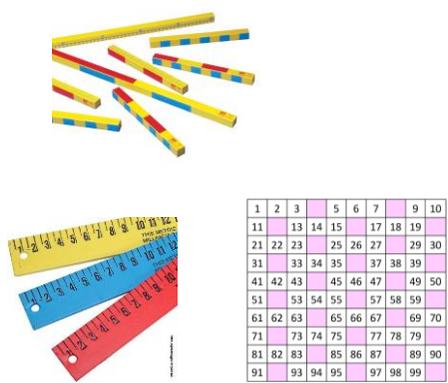
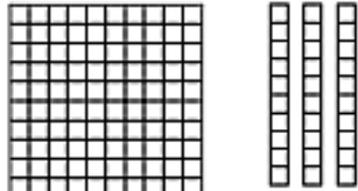
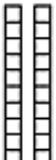
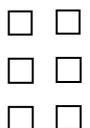
odd, even, every other, how many times, multiple of, sequence, times, multiply, multiplied by, multiple of, once, twice, three times, four times, five times... ten times... as (big, long, wide and so on), repeated addition, array, row, column, double

Consolidation of Y1

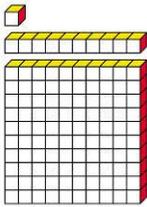
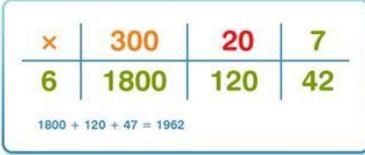
Count in steps of 2, 3, and 5 from 0, and in 10s from any number, forward and backward

Recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

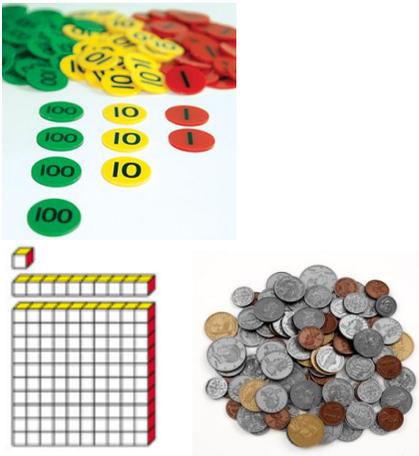
Salford C of E Primary School – Progression in Multiplication

<p>Y3</p>	<p>Consolidation of Y2</p> <p>Count from 0 in multiples of 4, 8, 50 and 100</p> <p>Connect the 2, 4 and 8 multiplication tables through doubling.</p> <p>Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables</p> <p>Multiply TU x U using mental methods and progressing to formal written methods</p> <p>Solve problems, including missing number problems, involving multiplication including positive integer <b>scaling</b> problems and <b>correspondence</b> problems in which n objects are connected to m objects</p> <p>Pupils develop efficient mental methods, for example, using commutativity and <b>associativity</b> (for example, <math>4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240</math>) and multiplication facts to derive related facts (for example, <math>3 \times 2 = 6</math>, <math>30 \times 2 = 60</math>).</p>	<p>Practical</p> <p>Informal written methods</p> <p>Horizontal recording</p> <p>Formal written method</p>	<p>Counting sticks, dienes, number lines, hundred square, tape measures,</p>  <p><math>13 \times 12 =</math></p> <p>10                      3</p>  <p>10</p>  <p>2</p> 	<p>Partitioning</p> <p><math>32 \times 6 =</math>  <math>30 \times 6 = 180</math>  <math>2 \times 6 = 12</math>  <math>180 + 12 = 192</math></p> <p>Written method: grid method</p> <table border="1" data-bbox="1232 359 1556 454"> <tr> <td><b>x</b></td> <td><b>30</b></td> <td><b>5</b></td> </tr> <tr> <td><b>7</b></td> <td><b>210</b></td> <td><b>35</b></td> </tr> </table> <p><math>210 + 35 = 245</math></p> <p>Introduce formal written method (expanded form):</p> $\begin{array}{r} 36 \\ \times 5 \\ \hline 30 \\ 150 \\ \hline 180 \end{array}$	<b>x</b>	<b>30</b>	<b>5</b>	<b>7</b>	<b>210</b>	<b>35</b>	<p>As previous.</p> <p>Count on in hundreds, multiplication, product</p>	<p>Count from 0 in multiples of 4, 8, 50 and 100</p> <p>Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables</p> <p>Multiply TU x U using mental methods</p>
<b>x</b>	<b>30</b>	<b>5</b>										
<b>7</b>	<b>210</b>	<b>35</b>										

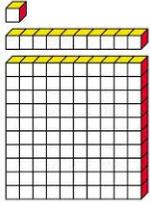
Salford C of E Primary School – Progression in Multiplication

<p>Y4</p>	<p>Consolidation of Y3</p> <p>Count in multiples of 6, 7, 9, 25 and 1000</p> <p>Recall multiplication facts for multiplication tables up to 12 x 12</p> <p>Use place value, known and derived facts to multiply mentally, including: multiplying by 0 and 1 and multiplying together three numbers</p> <p>Recognise and use factor pairs and <b>commutativity</b> in mental calculations</p> <p>Multiply TU x U using formal written layout</p> <p>Multiply HTU x U using formal written layout</p> <p>Solve problems involving multiplying and adding, including using the <b>distributive law</b> to multiply two digit numbers by one digit, integer scaling problems and harder <b>correspondence</b> problems such as n objects are connected to m objects.</p>	<p>Practical</p> <p>Informal written methods</p> <p>Formal written method</p>	<p>Dienes, place value counters, coins</p>   	<p>Written method: grid method (to be used when introducing)</p>  <p>Formal written method (expanded form)</p> $\begin{array}{r} 327 \\ \times 6 \\ \hline 1962 \end{array}$ <p>Formal written method (compact form)</p> $\begin{array}{r} 327 \\ \times 6 \\ \hline 1962 \\ \phantom{0} 4 \end{array}$	<p>As previous.</p> <p>factor</p>	<p>As previous with increasing fluency</p> <p>Count in multiples of 6, 7, 9, 25 and 1000</p> <p>Recall multiplication facts for multiplication tables up to 12 x 12</p> <p>Use place value, known and derived facts to multiply mentally, including: multiplying by 0 and 1 and multiplying together three numbers</p> <p>Recognise and use factor pairs and commutativity in mental calculations</p>
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Salford C of E Primary School – Progression in Multiplication

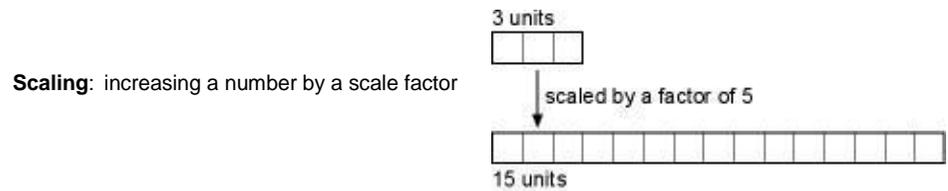
<p><b>Y5</b></p>	<p>Consolidation of Y4</p> <p>Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers</p> <p>Know and use the vocabulary of prime numbers, prime factors and composite (non- prime) numbers</p> <p>Establish whether a number up to 100 is prime and recall prime numbers up to 19</p> <p>ThHTU x U using a formal written method</p> <p>ThHTU x TU using a formal written method, including long multiplication for two-digit numbers</p> <p>Multiply numbers mentally drawing upon known facts</p> <p>Multiply whole numbers and those involving decimals by 10, 100 and 1000</p> <p>Recognise and use square numbers and cube numbers, and the notation for squared (<sup>2</sup>) and cubed (<sup>3</sup>)</p> <p>Solve problems involving multiplication including using their knowledge of factors and multiples, squares and cubes</p> <p>Solve problems involving multiplication.</p>	<p>Practical</p> <p>Informal written methods</p> <p>Formal written method</p>	<p>Dienes, place value counters, coins</p> 	<p>Written method: grid method (to be used when introducing)</p> <table border="1" data-bbox="1227 185 1628 237"> <tr><td></td><td>1 000</td><td>600</td><td>20</td><td>4</td></tr> <tr><td>6</td><td>6 000</td><td>3 600</td><td>120</td><td>24</td></tr> </table> $\begin{array}{r} 6000 \\ 3600 \\ 120 \\ + 24 \\ \hline 9744 \end{array}$ <table border="1" data-bbox="1227 437 1628 515"> <tr><td></td><td>1000</td><td>600</td><td>20</td><td>4</td></tr> <tr><td>30</td><td>30 000</td><td>18 000</td><td>600</td><td>120</td></tr> <tr><td>6</td><td>6 000</td><td>3 600</td><td>120</td><td>24</td></tr> </table> $\begin{array}{r} 30000 \\ 18000 \\ 6000 \\ 3600 \\ 600 \\ 120 \\ 120 \\ + 24 \\ \hline 58464 \\ \hline \end{array}$ <p>Formal written method (expanded form)</p> <table data-bbox="1227 938 1496 1326"> <tr> <td><math>\begin{array}{r} 1624 \\ \times 6 \\ \hline 24 \\ 120 \\ 3600 \\ \hline 6000 \\ 9744 \end{array}</math></td> <td><math>\begin{array}{r} 1624 \\ \times 26 \\ \hline 24 \\ 120 \\ 3600 \\ \hline 6000 \\ 80 \\ 400 \\ 12000 \\ \hline 20000 \\ 42224 \\ \hline 111 \end{array}</math></td> </tr> </table> <p>Formal written method (compact form)</p> <table data-bbox="1227 1369 1496 1552"> <tr> <td><math>\begin{array}{r} 1624 \\ \times 6 \\ \hline 9744 \\ \hline \end{array}</math></td> <td><math>\begin{array}{r} 1624 \\ \times 26 \\ \hline 9744 \\ \hline 32480 \\ \hline 42224 \\ \hline 111 \end{array}</math></td> </tr> </table>		1 000	600	20	4	6	6 000	3 600	120	24		1000	600	20	4	30	30 000	18 000	600	120	6	6 000	3 600	120	24	$\begin{array}{r} 1624 \\ \times 6 \\ \hline 24 \\ 120 \\ 3600 \\ \hline 6000 \\ 9744 \end{array}$	$\begin{array}{r} 1624 \\ \times 26 \\ \hline 24 \\ 120 \\ 3600 \\ \hline 6000 \\ 80 \\ 400 \\ 12000 \\ \hline 20000 \\ 42224 \\ \hline 111 \end{array}$	$\begin{array}{r} 1624 \\ \times 6 \\ \hline 9744 \\ \hline \end{array}$	$\begin{array}{r} 1624 \\ \times 26 \\ \hline 9744 \\ \hline 32480 \\ \hline 42224 \\ \hline 111 \end{array}$	<p>As previous.</p> <p>Factorise, prime, prime factor</p>	<p>As previous with increasing fluency</p> <p>Multiply numbers mentally drawing upon known facts eg 300 x 6 = 1800</p>
	1 000	600	20	4																															
6	6 000	3 600	120	24																															
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**Salford C of E Primary School – Progression in Multiplication**

<p><b>Y6</b></p>	<p>Consolidation of Y5</p> <p>ThHTU x TU using the formal written method of long multiplication</p> <p>Identify common factors, common multiples and prime numbers</p> <p>Explore the order of operations using brackets; for example, <math>2 + 1 \times 3 = 5</math> and <math>(2 + 1) \times 3 = 9</math>.</p> <p>Use common factors to find equivalent fractions.</p> <p>Multiply simple pairs of proper fractions, writing the answer in its simplest form (<math>1/2 \times 2/4 = 2/8 = 1/4</math>)</p>	<p>Practical</p> <p>Informal written methods</p> <p>Formal written method</p>	<p>Dienes, place value counters,</p>  	<p>As Year 5</p> <p>Equivalent Fractions:</p> $\frac{3}{5} \times 3 = \frac{9}{5}$ $\frac{5}{5} \times 3 = 15$ <p>Multiplying fractions</p> $\frac{1}{2} \times \frac{3}{8} = \frac{3}{16}$ <p>(multiply numerators) (multiply denominators)</p>	<p>As previous.</p> <p>Common denominator</p>	<p>As previous with increasing fluency</p> <p>Subtract mentally with increasingly large numbers and mixed operations.</p>
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**Glossary:**

**Commutativity:** can be done in any order:  $3 \times 5 = 5 \times 3$ . Multiplication and addition are commutative. Subtraction and division are not.



A scaling model is also used to compare two numbers or amounts involving phrases such as 'so many times as much (or as many)'

**Correspondence:** If you know a fact for one object, this can be used to find further facts, e.g. 1 sandwich costs £2, so 4 sandwiches cost £8

**Associativity:** The property that if the same operation is applied to the same numbers, the answer will be the same.

Addition is associative, e.g.  $1 + (2 + 3) = (1 + 2) + 3$ .

Multiplication is associative, e.g.  $1 \times (2 \times 3) = (1 \times 2) \times 3$ .

Subtraction and division are not associative because, as counter examples,  $1 - (2 - 3) \neq (1 - 2) - 3$  and  $1 \div (2 \div 3) \neq (1 \div 2) \div 3$ .

We can use the associative law to help with multiplication calculations. For example: Find  $5 \times 26$ :

Factorise 26 as  $13 \times 2$ , so we now have  $13 \times 2 \times 5$ . Use the associative law to associate the 2 with the five, rather than with the 13 in order to make the calculation easier.  $(13 \times 2) \times 5 = 13 \times (2 \times 5) = 13 \times 10 = 130$ .

**Distributive law:** The property that you will get the same answer when you: multiply a number by a group of numbers added together, or do each multiplication separately then add them, eg  $3 \times (2 + 4)$  is the same as  $(3 \times 2) + (3 \times 4)$