
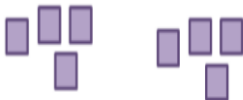
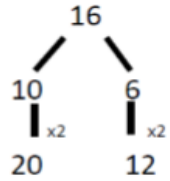
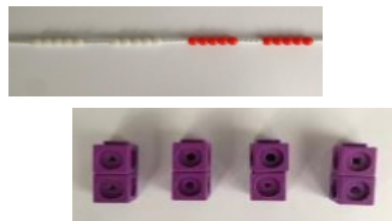
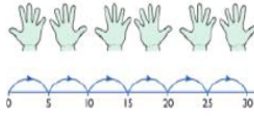
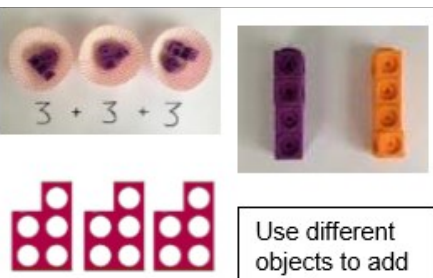

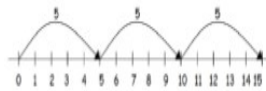



Progression in Multiplication leading to a written

Year Group Expectations

[Mental strategies additional to Progression.]

Objective and strategy	Concrete	Pictorial	Abstract
<p><b>Doubling</b></p>	<p>Use practical activities to show how to double a number.</p>  <p>double 4 is 8 <math>4 \times 2 = 8</math></p>	<p>Draw pictures to show how to double a number.</p> <p>Double 4 is 8</p> 	 <p>Partition a number and then double each part before recombining it back together.</p>
<p><b>Counting in multiples</b></p>	 <p>Count in multiples supported by concrete objects in equal groups.</p>	 <p>Use a number line or pictures to continue support in counting in multiples.</p> <p>When counting, say the objects after each group i.e 5 fingers, 10 fingers, 15 fingers etc it makes it easier to answer a question such as, How many fingers? How many hands?</p>	<p>Count in multiples of a number aloud.</p> <p>Write sequences with multiples of numbers.</p> <p>2, 4, 6, 8, 10</p> <p>5, 10, 15, 20, 25, 30</p>
<p><b>Repeated addition</b></p>	 <p>Use different objects to add equal groups.</p>	<p>There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?</p>  <p>2 add 2 add 2 equals 6</p>  <p><math>5 + 5 + 5 = 15</math></p>	<p>Write addition sentences to describe objects and pictures.</p>  <p><math>2 + 2 + 2 + 2 + 2 = 10</math></p> <p>2 is the number in the group 5 is the number of groups</p>

Year 1

Fluency -

Mental/fluency –counting in multiples of 2,5,10 along our fingers. Working out odd and even numbers.

Problems— 1 step problems using small quantities of concrete objects :begin to understand doubling numbers and quantities. Make connections with number patterns and counting in 2,5 and 10s.

Year 2

Fluency –recall and use multiplication facts for 2,5,10 multiplication tables.. Recognising odd and even numbers.

Know that multiplication of two numbers can be done in any order.

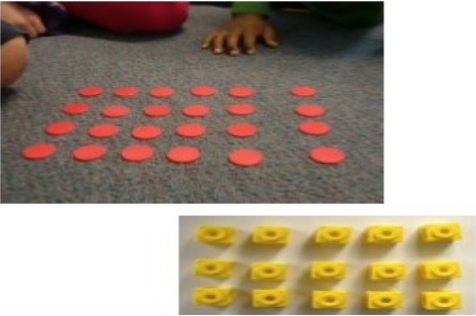
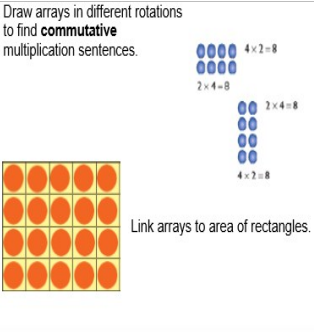

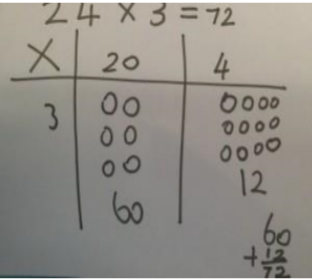
Written methods-

Can solve a multiplication number sentence within the x tables using correct signs.

Know that the first number is the number within the group and the second is the number of groups.

Problems -Solving problems involving multiplication using materials, arrays repeated addition, mental methods and multiplication facts including problems in contexts

Pre-scaling problems Eg draw a line twice as big linking to Doubling.

Objective and strategy	Concrete	Pictorial	Abstract																																																																																													
<p>Arrays showing commutitive multiplication</p>	<p>Create arrays using counters/ cubes to show multiplication sentences.</p> 	<p>Draw arrays in different rotations to find commutative multiplication sentences.</p>  <p>Link arrays to area of rectangles.</p>	<p>Use an array to write multiplication sentences and reinforce repeated addition.</p>  <p> <math>5 + 5 + 5 = 15</math>  <math>3 + 3 + 3 + 3 + 3 = 15</math>  <math>5 \times 3 = 15</math>  <math>3 \times 5 = 15</math> </p>																																																																																													
<p>Grid method</p>	<p>Show the link with arrays to first introduce the grid method.</p> <table border="1"> <tr> <td>x</td> <td>10</td> <td>3</td> </tr> <tr> <td>4</td> <td colspan="2">[4 rows of 10 red dots]</td> </tr> <tr> <td></td> <td colspan="2">[4 rows of 3 red dots]</td> </tr> </table> <p>4 rows of 10 4 rows of 3</p> <p>Move on to using Base 10 to move towards a more compact method.</p> <table border="1"> <tr> <td>x</td> <td>T</td> <td>U</td> </tr> <tr> <td>4</td> <td colspan="2">[4 rows of 13 yellow blocks]</td> </tr> </table> <p>4 rows of 13</p> <p>Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows.</p> <table border="1"> <tr> <td></td> <td>[1 green dot]</td> <td>[1 yellow dot]</td> <td>[1 red dot]</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table> <p>Calculations: <math>4 \times 126</math></p> <p>Fill each row with 126.</p> <table border="1"> <tr> <td></td> <td>[1 green dot]</td> <td>[2 yellow dots]</td> <td>[6 red dots]</td> </tr> <tr> <td></td> <td>[1 green dot]</td> <td>[2 yellow dots]</td> <td>[6 red dots]</td> </tr> <tr> <td></td> <td>[1 green dot]</td> <td>[2 yellow dots]</td> <td>[6 red dots]</td> </tr> <tr> <td></td> <td>[1 green dot]</td> <td>[2 yellow dots]</td> <td>[6 red dots]</td> </tr> </table> <p>Calculations: <math>4 \times 126</math></p> <p>Add up each column, starting with the ones making any exchanges needed.</p> <table border="1"> <tr> <td></td> <td>[1 green dot]</td> <td>[2 yellow dots]</td> <td>[6 red dots]</td> </tr> <tr> <td></td> <td>[1 green dot]</td> <td>[2 yellow dots]</td> <td>[6 red dots]</td> </tr> <tr> <td></td> <td>[1 green dot]</td> <td>[2 yellow dots]</td> <td>[6 red dots]</td> </tr> <tr> <td></td> <td>[1 green dot]</td> <td>[2 yellow dots]</td> <td>[6 red dots]</td> </tr> </table> <p>Then you have your answer.</p>	x	10	3	4	[4 rows of 10 red dots]			[4 rows of 3 red dots]		x	T	U	4	[4 rows of 13 yellow blocks]			[1 green dot]	[1 yellow dot]	[1 red dot]														[1 green dot]	[2 yellow dots]	[6 red dots]		[1 green dot]	[2 yellow dots]	[6 red dots]		[1 green dot]	[2 yellow dots]	[6 red dots]		[1 green dot]	[2 yellow dots]	[6 red dots]		[1 green dot]	[2 yellow dots]	[6 red dots]		[1 green dot]	[2 yellow dots]	[6 red dots]		[1 green dot]	[2 yellow dots]	[6 red dots]		[1 green dot]	[2 yellow dots]	[6 red dots]	<p>Children can represent the work they have done with place value counters in a way that they understand.</p> <p>They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as shown below.</p> 	<p>Start with multiplying by one digit numbers and showing the clear addition alongside the grid.</p> <table border="1"> <tr> <td>x</td> <td>30</td> <td>5</td> </tr> <tr> <td>7</td> <td>210</td> <td>35</td> </tr> </table> <p><math>210 + 35 = 245</math></p> <p>Moving forward, multiply by a 2 digit number showing the different rows within the grid method.</p> <table border="1"> <tr> <td></td> <td>10</td> <td>8</td> </tr> <tr> <td>10</td> <td>100</td> <td>80</td> </tr> <tr> <td>3</td> <td>30</td> <td>24</td> </tr> </table> <table border="1"> <tr> <td>x</td> <td>1000</td> <td>300</td> <td>40</td> <td>2</td> </tr> <tr> <td>10</td> <td>10000</td> <td>3000</td> <td>400</td> <td>20</td> </tr> <tr> <td>8</td> <td>8000</td> <td>2400</td> <td>320</td> <td>16</td> </tr> </table>	x	30	5	7	210	35		10	8	10	100	80	3	30	24	x	1000	300	40	2	10	10000	3000	400	20	8	8000	2400	320	16
x	10	3																																																																																														
4	[4 rows of 10 red dots]																																																																																															
	[4 rows of 3 red dots]																																																																																															
x	T	U																																																																																														
4	[4 rows of 13 yellow blocks]																																																																																															
	[1 green dot]	[1 yellow dot]	[1 red dot]																																																																																													
	[1 green dot]	[2 yellow dots]	[6 red dots]																																																																																													
	[1 green dot]	[2 yellow dots]	[6 red dots]																																																																																													
	[1 green dot]	[2 yellow dots]	[6 red dots]																																																																																													
	[1 green dot]	[2 yellow dots]	[6 red dots]																																																																																													
	[1 green dot]	[2 yellow dots]	[6 red dots]																																																																																													
	[1 green dot]	[2 yellow dots]	[6 red dots]																																																																																													
	[1 green dot]	[2 yellow dots]	[6 red dots]																																																																																													
	[1 green dot]	[2 yellow dots]	[6 red dots]																																																																																													
x	30	5																																																																																														
7	210	35																																																																																														
	10	8																																																																																														
10	100	80																																																																																														
3	30	24																																																																																														
x	1000	300	40	2																																																																																												
10	10000	3000	400	20																																																																																												
8	8000	2400	320	16																																																																																												

Year 3

Fluency -

recall and use 3,4 and 8 multiplication facts

Fluency-Mental - Through doubling connect the 4 and 8 x facts. Commutative law- if know  $3 \times 4 = 12$   $4 \times 3 = 12$  Also division facts can be derived for multiplication facts Develop efficient mental methods using commutativity and associativity laws[ eg  $4 \times 12 \times 5 = 4 \times 5 \times 12$   $20 \times 12 = 240$ ] Derive related facts from known multiplication facts  $30 \times 4 = 120$   $120$  divided by  $3 = 4$

Written calculations- multiplying 2 digit by 1 digit

x = signs and missing numbers Continue using a range of equations as in Year 2 but with appropriate numbers.

Problems- solving problems deciding which operation to use. These include measuring and scaling contexts.[eg-4x as high]

Correspondence problems in which n objects are connected to m objects

Year 4

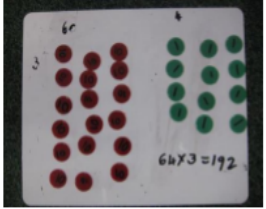
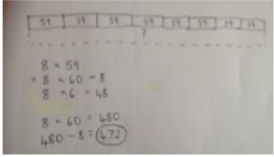
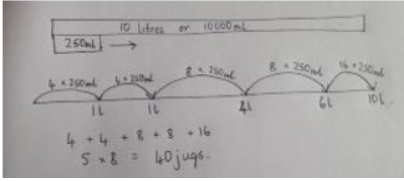
Fluency-

Recall and use all number multiplication facts Recognise factor pairs and commutativity in mental calculations

Mental- -use known and derived facts to multiply mentally including x by 0 or 1; Multiplying together 3 numbers. Use associative law  $[2 \times 3] \times 4 = 2 \times [3 \times 4]$  Use distributive law splitting into tens and units and x both or other groupings eg  $62 \times 4 = 50 \times 4 + 12 \times 4$

Written calculations multiply 2 and 3 digit numbers by a 1 digit number .

Problems -Solving problems involving multiplication and adding, Including using the distributive law,[eg-  $3 \times 67$   $[3 \times 60] + [3 \times 7]$ ] to multiply 2 digit numbers by 1 digit number, integer scaling problems and harder correspondence problems such as n objects are connected to m objects. Solve 2 step problems in context, choosing the appropriate operation.

Objective and strategy	Concrete	Pictorial	Abstract
<p>Column method</p>	<p>Children can continue to be supported by place value counters at the stage of multiplication.</p>  <p>It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.</p>	<p>Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.</p>  	<p>If ready, link the grid method to short method, showing where the different parts come from. Reminding children to use columns</p> $\begin{array}{r} 38 \\ \times 7 \\ \hline 56 \\ 210 \\ \hline 266 \end{array} \quad \begin{array}{l} [8 \times 7] \\ [30 \times 7] \end{array}$ <p>When ready introduce compact</p> $\begin{array}{r} 38 \\ \times 7 \\ \hline 266 \\ 5 \end{array}$ <p>Introduce long Multiplication, writing out each calculation vertically— write x by the side only if necessary. Compare with grid method.</p> $\begin{array}{r} 32 \\ \times 24 \\ \hline 8 \quad (4 \times 2) \\ 120 \quad (4 \times 30) \\ 600 \quad (20 \times 2) \\ 768 \quad (20 \times 30) \end{array}$ <p>Lead to a more compact Method— carrying number underneath</p> <p><u>Long multiplication</u></p> $\begin{array}{r} 124 \times 26 \\ \times \quad 26 \\ \hline 744 \\ 2480 \\ \hline 3224 \end{array}$

**Year 5**

Fluency— Recall and use all number multiplication facts Identify multiples and factors, including finding all factors pairs of a number and common factors or two numbers. Establish whether a number up to 100 is prime and recall prime numbers up to 19.

Mental -use known and derived facts to calculate multiplication number sentences. [ factorizing] Multiply whole numbers and those involving decimals by 10,100,1000 Use Squared and cubed numbers

Written calculations-multiply up to 4 digit numbers by a 1 or 2 digit number.

Problems -olving problems involving multiplication and division including scaling by simple fractions and problems involving simple rates Solve problems involving all operations and combinations of these, including understanding the meaning of the equal sign. Solve problems multiplication and division including their knowledge of factors and multiples squares and cubes.

**Year 6**

Fluency -Recall and use all number multiplication facts Identify common multiples, common factors and prime number.

Mental -use known and derived facts to calculate multiplication number sentences- increasingly larger numbers [ factorizing] Use Squared and cubed numbers

Written calculations—multiply multi digit number by 2 digit numbers using formal written method.

Use their knowledge of order of operations to carry out Calculations.

Problem s- Solving problems involving multiplication and division including scaling by simple fractions and problems involving simple rates Solve problems involving all operations and combinations of these, including understanding the meaning of the equal sign. Solve problems multiplication and division including their knowledge of factors and multiples squares and cubes.