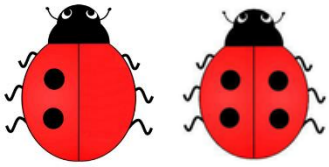
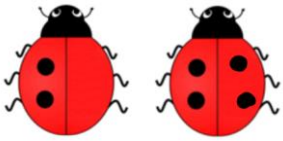
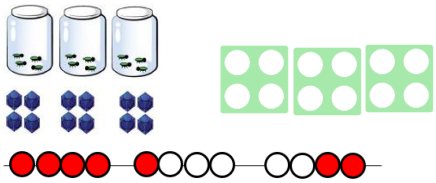
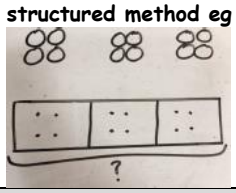
Fourfields Community Primary School

Calculation: Multiplication

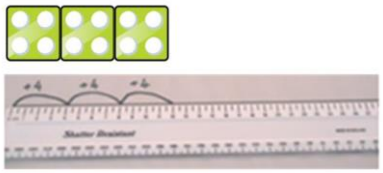
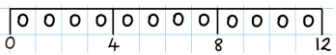
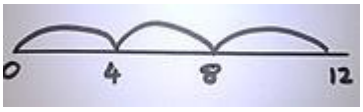
'By end of' indicates the expected standard for children achieving age-related expectations.

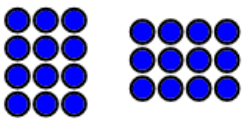
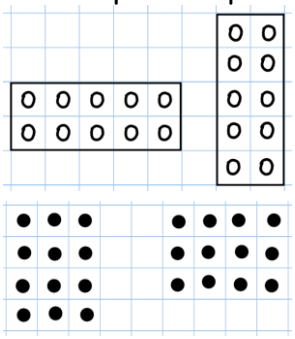
<table>
<tr><th>By</th><th>Concrete</th><th>Pictorial</th><th>Abstract</th></tr>
<tr><td>End Yr FS</td><td>Solve problems including doubling, halving and sharing in practical contexts.
  </td><td>  </td><td>Counting 2s

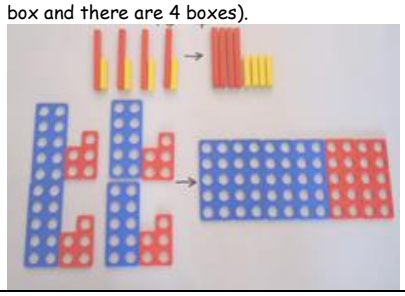
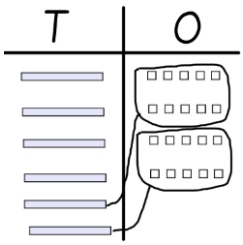
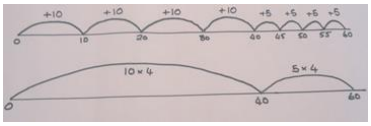
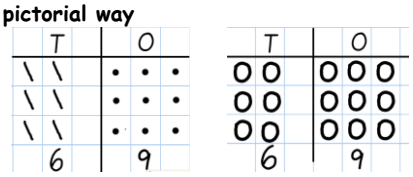
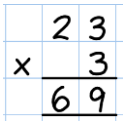
2 + 2 = 4</td></tr>
<tr><td rowspan="2">End Yr 1</td><td colspan="3">NC Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.</td></tr>
<tr><td>Repeated grouping / repeated addition
(doesn't have to be restricted to cubes)
3 lots of 4 or three fours
3 x 4 or 4 + 4 + 4
 
Begin to use number lines (see below)</td><td>Children to represent the practical resources in a picture eg

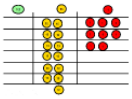
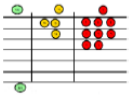
Use of a bar model for a more structured method eg
  </td><td>Focus on repeated addition in recorded work
4 + 4 + 4 =

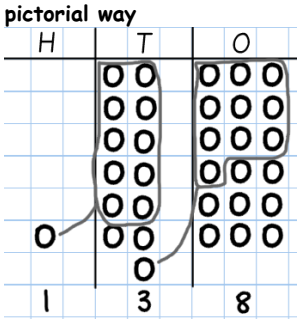
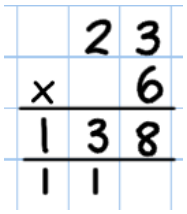
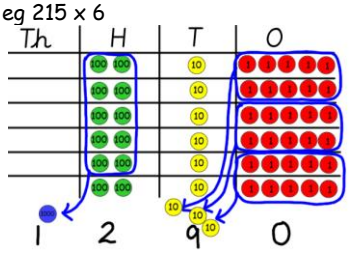
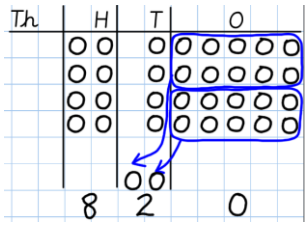
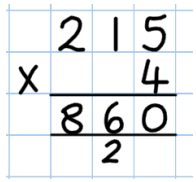
Begin to model and expose children to the multiplication sign
3 x 4 =

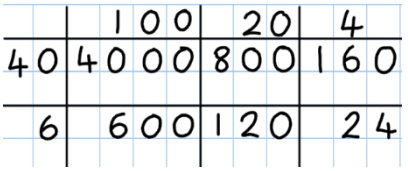
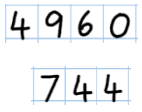
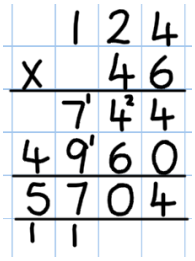
□ = 3 x 4</td></tr>
<tr><td rowspan="2">End Yr 2</td><td colspan="3">NC Calculate mathematical statements for multiplication and division within the multiplication tables (2, 5 and 10) and write them using the multiplication (×), division (÷) and equals (=) signs. Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot. Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.</td></tr>
<tr><td>Use number lines to show repeated groups
  </td><td>Make own pictorial representation
  </td><td>Abstract number line
3 x 4 = 12
  </td></tr>
<tr><td></td><td>Use arrays to show commutativity (using a range of resources)
2 x 5 = 5 x 2

3 x 4 = 4 x 3
  </td><td>Make own pictorial representation
  </td><td>Children use the array to write a range of calculations
2 x 5 = 10
5 x 2 = 10
2 + 2 + 2 + 2 + 2 = 10
5 + 5 = 10
10 = 2 x 5
5 x 2 = 2 x 5</td></tr>
</table>

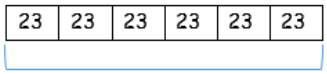
<table>
<tr><td>End Yr 3</td><td colspan="3">NC Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods. Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.</td></tr>
<tr><td></td><td>Partition to multiply (using Numicon, Base 10, place value counters)
15 x 4 (set a context so the children understand which is the multiplier and which is the multiplicand eg There are 15 chocolates in each box and there are 4 boxes).
  </td><td>Represent the apparatus in a pictorial way 15 x 4 =
  </td><td>Children to be encouraged to show the steps taken
4 x 15
10 5
10 x 4 = 40
5 x 4 = 20
40 + 20 = 60
A number line can also be used
  </td></tr>
<tr><td></td><td>Grid method leading to formal column method with base 10 or place value counters (at the first stage with no regrouping)
3 x 23 (set the context)
Make 23, 3 times. See how many ones, then how many tens.
 </td><td>Children to represent the apparatus in a pictorial way
  </td><td>Children to record what it is they are doing to show understanding
3 x 23
20 3
3 x 20 = 60
3 x 3 = 9
60 + 9= 69
  </td></tr>
<tr><td></td><td>Formal column method (progressing to regrouping with ones or tens and then both) 6 x 23 (set the context)

Step 1: Get 6 lots of 23
 
Step 2: 6 x 3 = 18. Can I regroup? Yes. Ten ones for one ten…
 
Step 3: 6 x 2 tens and my extra ten is 13 tens. Can I regroup? Yes. Ten tens for one hundred…

Step 4: What do I have in each column?</td><td>Children to represent the apparatus in a pictorial way
  </td><td>The aim is to get the formal method but the children need to understand how it works
6 x 23 =
 
(understanding 6 x 3 ones add 6 x 2 tens)
6 x 3 = 18
6 x 20 = 120
120 + 18 = 138</td></tr>
<tr><td>End Yr 4</td><td colspan="3">NC Multiply two-digit and three-digit numbers by a one-digit number using formal written layout. Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.</td></tr>
<tr><td></td><td>Build upon work in year 3 to multiply 2-digit by 1-digit and 2-digit by 2-digit
eg 215 x 6
  </td><td>215 x 6
  </td><td>215 x 6
 
(understanding 4 x 5 ones add 4 x 1 ten add 4 x 2 tens)
4 x 5 = 20
4 x 10 = 40
4 x 200 = 800</td></tr>
</table>

End Yr 5	**NC** Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers. Multiply and divide numbers mentally drawing upon known facts. Solve problems involving multiplication including using their knowledge of factors and multiples, squares and cubes. Solve problems involving multiplication including understanding the meaning of the equals sign. Solve problems involving multiplication, including scaling by simple fractions and problems involving simple rates.	
	Build upon work in year 4 to multiply 4-digit by 1 or 2-digit number eg 124 x 26 When children start to multiply by 2, 3 and 4 digits they need to be confident with the abstract. 124 x 26 The grid method will not be used routinely, but **in special circumstances** it may be used alongside practical apparatus to help children with their understanding of the formal method. 6 x 124 = 744 40 x 124 = 4960  	124 x 46  Ensure regrouping is within the square. Understanding this as 6 x 124 = 744 40 x 124 = 4960
End Yr 6	**NC** Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. Solve problems involving addition, subtraction, multiplication and division.	
	Build upon work in year 5 to multiply 4-digit by 1 or 2-digit number.	

Conceptual variation: different ways to ask children to solve 6 x 23



With the counters, prove that 6 x 23 = 138

True or false

6 x 23 = 32 x 6

Mai had to swim 23 lengths, 6 times a week. How many lengths did she swim in one week?

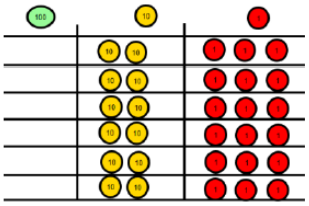
Tom saved 23p three days a week. How much did he save in 2 weeks?

Find the product of 6 and 23.

6 x 23 =

$$\begin{array}{r} 6 \\ \times\ 23 \\ \hline \end{array} \qquad \begin{array}{r} 23 \\ \times\ 6 \\ \hline \end{array}$$

What's the calculation?
What's the answer?



Vocabulary:

• multiply /by • times • repeated addition	• lots of • groups of • group in	• product • multiplicand • multiplier • multiple of	• array • written method