PROGRESSION IN CALCULATIONS

MULTIPLICATION

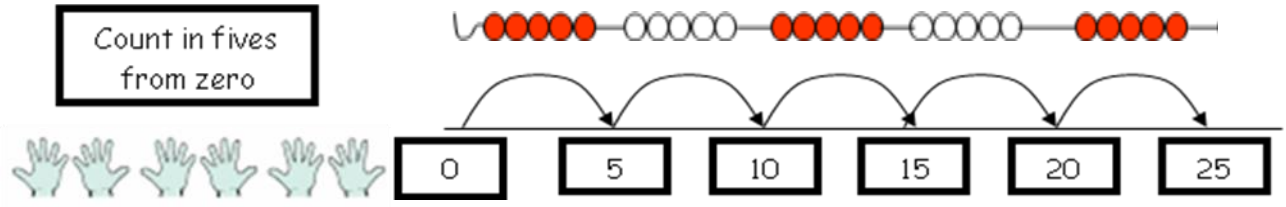
Mental Skills KS1

- Count in steps of 2, 3, 5, 10
- Double numbers up to double 10

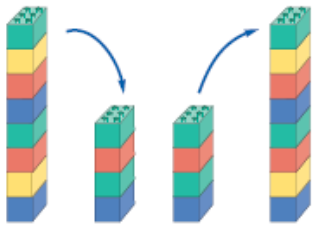
Vocabulary

multiplication product
once, twice, three times
double groups of
repeated addition lots of
array, row, column multiply
times multiple

Count in fives from zero



Knows multiplication tables to 10 x 10 and can use known facts to work out new ones



Know doubles and corresponding halves

MULTIPLICATION

Children are taught to understand multiplication as repeated addition. It can also describe an array.

<table>
<tr>
<td>Year R (ARE)</td>
<td>Counting in 2's and 10's
 
Two wheels Four wheels Six wheels</td>
<td>Using number names, and counting pairs of objects</td>
</tr>
<tr>
<td rowspan="3">Year 1 (ARE)</td>
<td>4 lots of 2
Each child has two eyes. How many eyes do four children have?
 
2 + 2 + 2 + 2</td>
<td>Use pictures and equipment to count 2s.</td>
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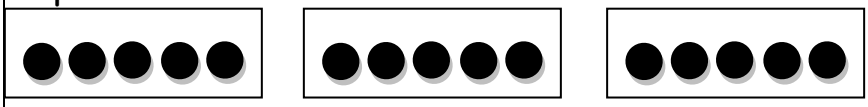
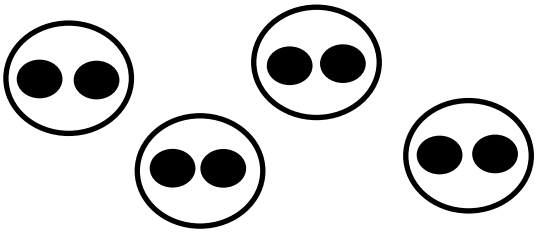
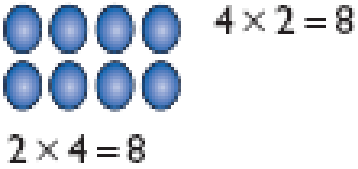
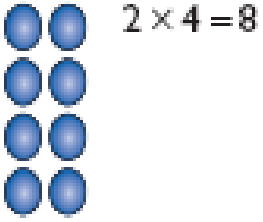
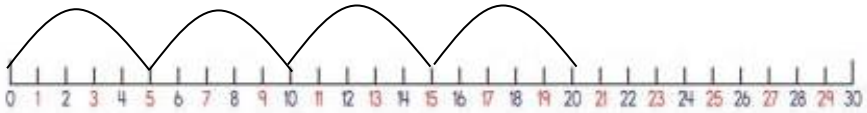
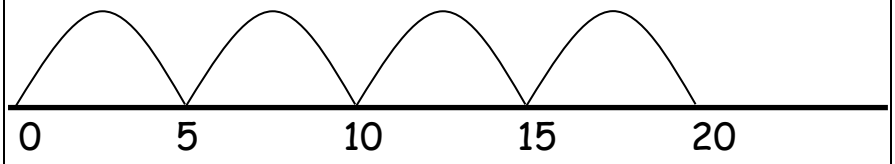
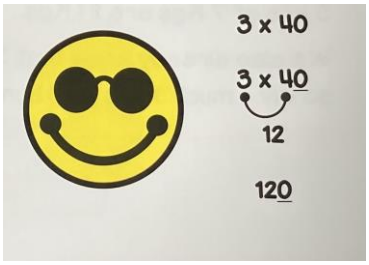
<tr>
<td>3 x 5 =
There are 5 cakes in a pack. How many cakes in 3 packs?
  </td>
<td>Dots or tally marks are often drawn in groups. This shows 3 groups of 5.</td>
</tr>
<tr>
<td>2 + 2 + 2 + 2 = 8
4 x 2 = 8
2 multiplied by 4
4 lots of 2
  </td>
<td>Children begin to recognise multiplication as repeated addition.</td>
</tr>
<tr>
<td>Year 2 (ARE)</td>
<td>2 x 4 =
A chew costs 2p. How much do 4 chews cost?
 
4 × 2 = 8
2 × 4 = 8
 
2 × 4 = 8
4 × 2 = 8</td>
<td>Drawing an array gives children an image of the answer. It also helps develop the understandin g that 2 x 4 is the same as 4 x 2.</td>
</tr>
</table>

Year 2 (ARE)	Numberline: 4 x 5 = There are 4 cats. Each cat has 5 kittens. How many kittens are there altogether?  4 x 5 =  	Children can represent arrays on a numberline counting on in equal steps. This shows 4 jumps of 5. This can also be done on an blank number line, reinforcing links with multiplication and repeated addition. This shows 4 jumps of 5.
Year 3 (ARE)	60 x 3 = 180 *use time tables facts 6 x 3 = 18, then make ten times bigger*  	In preparation for the next step, children will work to multiply multiples of 10 by a single digit using 'Smile Multiplication'.
Year 3 (ARE)	2 digit by 1 digit (expanded column multiplication) 23 x 4 = 23 x 4 12 (3 x 4) 80 (20 x 4) 92	Pupils will partition two digit numbers and use knowledge of 'smile multiplication' laying out the calculation in an expanded column.

End of Year 4 (ARE)	**Short muliplication** **342 x 7 =** 3 4 2 x 7 2 3 9 4 2 1	Pupils will multiply two and three digit numbers using the formal layout.
Year 5 & 6 (ARE)	Short Multiplication **2342 x 7 =** 2 3 4 2 x 7 1 6 3 9 4 2 2 1 Long Multiplication **124 x 26 =** $^{1}1\,^{2}2\ 4$ x 2 6 7 4 4 2 4 8 0 3 2 2 4 1 1	In year 5 children will multiply 4 digit numbers by both one and two digit numbers using formal written methods. In year 6, short multiplication will include multiplying decimal numbers by whole numbers.

Mental Skills KS2

- **Quickly recall all multiplication facts up to 12 x12 (Year 4 ARE)**
- Multiply by 10, 100, 1000 and understand the effect (*appropriate to year group)*
- Double numbers by partitioning and recombining e.g. 45 x 2 = 80 + 10 = 90
- Use partitioning and distributive law e.g. 13 x 4 = (10 + 3) x 4 = 40 + 12
- Use place value, e.g. 60 x 8 = 480 from 6 x 8 (*from year 4 upwards, using larger numbers and decimals in higher year groups)*