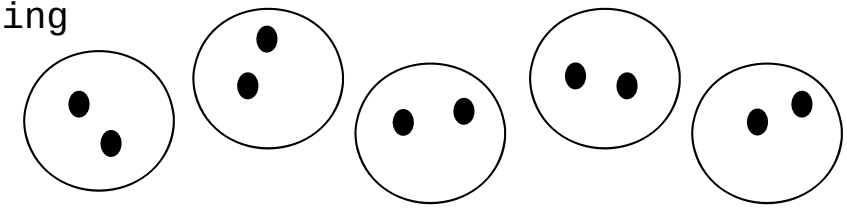
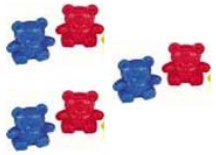
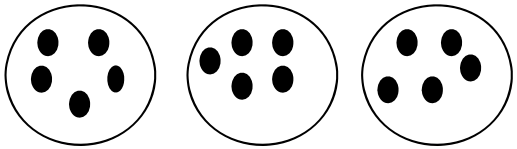
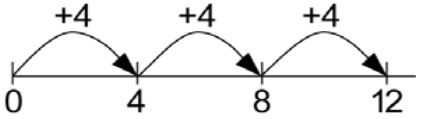
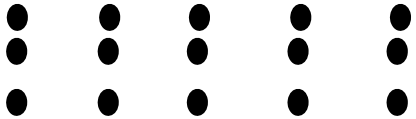
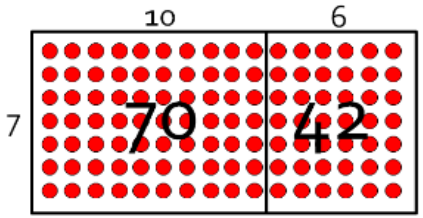
Written Calculation Strategy: Multiplication

Progression	Exemplification	Notes
Step 1 Grouping objects	Grouping  5 lots of 2 equals 10 Children need lots of opportunities to make equal groupings of objects.   Practical problem solving involving grouping equal amounts. Example: *One bike has 2 wheels, how many wheels do 3 bikes have?*  3 x 2 = 6	*Children start grouping in sets of 2s, 10s and 5s. *Introduce the term *groups* when grouping equal amounts. *Children are taught early multiplication through practical problem solving activities involving equal groups. (see example)
Step 2 Understand multiplication as repeated addition	Repeated addition  Ensure that children understand that multiplication is commutative (i.e. 3x5=5x3) 5 + 5 + 5 = 15 Repeated addition can be calculated using a number line  3 X 4 = 12	*Children should know the commutative nature of multiplication, i.e. if 5 lots of 2 equals 10 then 2 lots of 5 equal 10. * Children need to understand the concept of multiplication as:- (a) repeated addition (b) represented

<table>
<tr><td></td><td></td><td>as an array</td></tr>
<tr><td><u>Step 3</u>
Using arrays.</td><td>Arrays
 
5 x 3 =
3 x 5 = 15
Use arrays to demonstrate the relationship between multiplication and
Children need to understand how arrays link to multiplication through repeated addition
 
Demonstrate how arrays provide a link into a future step of multiplication, grid</td><td>*Children are taught how to use arrays to model multiplication calculations. This will help to support the development of grid method.

*Use arrays to demonstrate inverse relationships
6 x 7 = 42
42 ÷ 6 = 7</td></tr>
<tr><td><u>Step 4</u>
Partitioning</td><td>Partitioning to multiply.

38 x 5 = (30 x 5) + (8 x 5)
= 150 + 40
= 190

47 x 6 = (40 x 6) + (7 x 6)
= 240 + 42
=282</td><td>*Children are taught how to use informal jottings to multiply by partitioning into T0.</td></tr>
</table>

<table>
<tr>
<td><u>Step 5</u>

Grid method</td>
<td>

T0 X 0 47 X 8 =

<table>
<tr><td>X</td><td>40</td><td>7</td></tr>
<tr><td>8</td><td>320</td><td>56</td></tr>
</table>
320
+

T0 X T0 76 x 38 =

<table>
<tr><td>X</td><td>70</td><td>6</td></tr>
<tr><td>30</td><td>210
0</td><td>180</td></tr>
<tr><td>8</td><td>560</td><td>48</td></tr>
</table>
2100
180
560
+ 48
2888

Partition the 2 digit number into T and 0 and multiply both numbers by the single digit number. Add the

Partition the numbers into T and U and multiply each number by the other. Add the products.</td>
<td>*Children continue to use resources particularly if their multiplication facts are not in place.

*Grid method provides an effective strategy for multiplying decimals.</td>
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<tr>
<td><u>Step 6</u>
Short multiplication</td>
<td>Progression →

T0 x 0

23
x 3
69

HT0 x 0

349
x 8
2792

Decimals

4.9
x 3
14.7</td>
<td>*Short multiplication is multiplication by a single digit.</td>
</tr>
</table>

Step 7 Long multiplication	Long multiplication T0 x T0 72 x 72 x 38 576 2160 2736 Extend by introducing HTO x TO and HTO x HTO and then decimals. Children will be taught to use long multiplication to multiply decimals with up to 3 decimal places	