



Berkeley Primary School Written Calculation Policy Multiplication

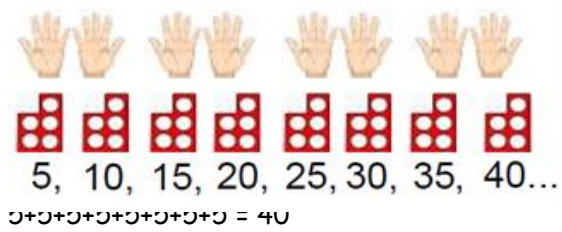
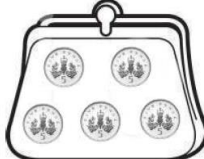
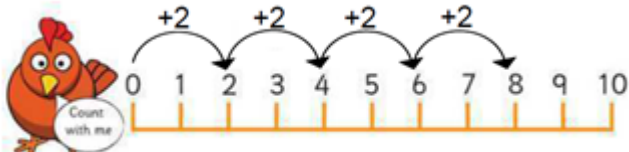
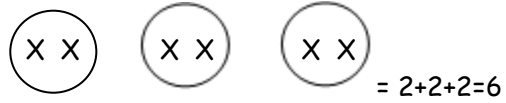


Stage	EXAMPLES	VOCABULARY	HOW IT WILL LOOK IN WRITTEN FORM	NOTES	Big Maths NC 2014
1	What is double 2? Double 2 equals 4. $2 + 2 = 4$	Double More	Mostly pictorial representations: Ladybird spots for doubling numbers to 10.  Counting pairs e.g. How many socks are there in two pairs? 	By the end of Reception, children are expected to understand the concept of doubling and to be able to double a number up to 10. Before doubling can be introduced, children need to have a secure knowledge of counting, number facts and addition in order to double. Children are then introduced to the concept of doubling through practical games and activities, including the use of the outdoor areas. Children act out 'doubling' by physically add two equal groups together to find out the 'doubles' answer. Resources A range of objects to count e.g. counters, small toys, buttons, cubes, pegs etc, Pairs of socks or gloves, fingers, songs	Reception



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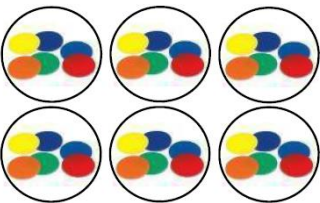
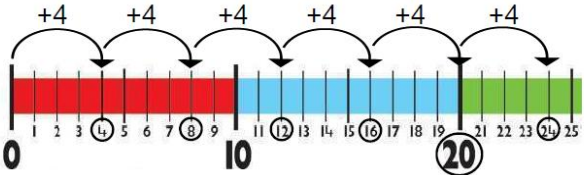
Stage	EXAMPLES	VOCABULARY	HOW IT WILL LOOK IN WRITTEN FORM	NOTES	Big Maths NC 2014
2	There are 2 wheels on a bike and there are 5 bikes. How many wheels are there? There are 10 crayons in each box. How many are there altogether?  support problem solving and encourage the application of counting in steps of / repeated addition)	ones groups groups of lots of doubling double counting on repeated addition times	Use of concrete apparatus for the children to physically count and see.  How much money do I have? $5 + 5 + 5 + 5 + 5 = 25p$ The are 5 lots of 5p  Number tracks and number lines can be used to add on and count in steps.  	Children will develop some understanding of multiplication through grouping small quantities and repeated addition of small groups of numbers. They will then begin to count in steps of either 2, 5 or 10. The use of concrete objects will enable them to grasp this concept more quickly. The children will use number lines to count on in steps and will solve simple problems by using counting on / repeated addition. Resources A range of objects to count e.g. counters, small toys, buttons, cubes, pegs, coins etc, pairs of socks or gloves, number lines fingers, songs. Numicon, Dienes or place value counters to count in 10s.	BM Steps 1 - 4 Year 1



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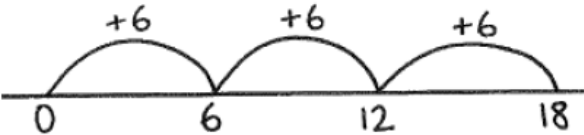
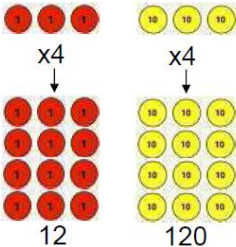


Stage	EXAMPLES	VOCABULARY	HOW IT WILL LOOK IN WRITTEN FORM	NOTES	Big Maths NC 2014
3	I have 3 pairs of shoes – how many shoes do I have altogether? 5 multiplied by 4 is ... Which of these numbers are in the 5 times table? How do you know? 72 45 53 80 69 95	Multiple Multiplication Tables facts Groups of Lots of Times Counting on Repeated addition	Record multiplication calculations using $\times$ symbol; use objects, counting and repeated addition to solve. e.g. $6 \times 6 = 6 \text{ groups of } 6$  $6+6+6+6+6+6=36$ $6 \times 6 = 36$ e.g. $6 \times 4 = 6 \text{ lots of } 4$  $4+4+4+4+4+4 = 24$ $6 \times 4 = 24$ Recording as a pictorial representation: e.g. $3 \times 4 =$ $\begin{array}{ccc} \times & \times & \times \\ \times & \times & \times \end{array} = 4 + 4 + 4 = 12$	At this stage the children will still be doing a lot of concrete work and may also still use pictorial representations but with values other than $\times 2$, $\times 5$ and $\times 10$. Again, their experience of 'multiplication' still has many connections to repeated addition. Children should begin to recall, from memory, multiplication facts for the 2, 5 and 10 times tables. Resources Counters, cubes, Numicon, coins, number lines	BM Steps 1 - 4 Years 1 and 2



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Stage	EXAMPLES	VOCABULARY	HOW IT WILL LOOK IN WRITTEN FORM	NOTES	Big Maths NC 2014
4	I have four 20p coins. How much money have I got? Harry's sunflower is 9cm tall. Alex's is 4 times taller. How tall is Alex's sunflower? 9 multiplied by 3.	Multiple Multiplication Tables facts Groups of Lots of Times Counting on Repeated addition Array Row Column	Recording as a pictorial representation - an array: e.g. $\begin{array}{cccccc} \times & \times & \times & \times & \times & \times \\ \times & \times & \times & \times & \times & \times \\ \times & \times & \times & \times & \times & \times \end{array}$ $6+6+6 = 3 \times 6 = 18$ $3+3+3+3+3 = 18$ Blank number lines to count up: $3 \times 6 = 6+6+6 = 18$  To move on to the next stage children will need to develop their understanding of multiplying larger numbers:   Place value counters can be used to demonstrate this idea.  $4 \times 2 = 8$ $4 \times 20 = 80$	Children are moving away from the need for concrete apparatus and are able to use informal methods of recording (pictures, arrays and the number line) to solve multiplication calculations. Resources Number lines, number grids, place value counters.	BM Steps 5 - 8 Years 2 and 3



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5	What is double 16? What is the product of 25 and 6? Harry's sunflower is 89cm tall. Alex's is 3 times taller. How tall is Alex's sunflower?	Lots of Groups of Times Multiplication Multiply Multiplied by, Multiple of twice, 3 times etc.. Repeated addition, Array Row Column Double Product Tables facts Partition Recombine	Grid method (TO x O) (partitioning): Use place value resources to support initially 40 10 10 10 10 10 10 10 10 10 10 10 10 120 2 1 1 1 1 1 1 1 1 6 to lead to: $42 \times 3 =$ 3 40 2 120 6 = 126 Encourage children to make estimations first using rounding ie $40 \times 3 = 120$ so my answer will be slightly more than this.	Children should use doubling strategies and place value facts to help multiply by 10 or 100. Calculations can be done with either least or most significant digit first) Resources Numicon, place value counters, Dienes, number lines, number grids, coins,	BM Steps 9 - 14 Year 3 and 4



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Stage	EXAMPLES	VOCABULARY	HOW IT WILL LOOK IN WRITTEN FORM	NOTES	Big Maths NC 2014																															
6	What is the product of 125 and 4? Multiply 34 by 8. Calculate 345 x 9	Lots of Groups of Times Multiplication Multiply Multiplied by, Multiple of Array Row Column Double Product Tables facts Partition Recombine Grid method ... times as big, long etc	Grid method (HTO x O and TO x O). (Place value counters could still be used to support as above) e.g. $223 \times 8 =$ <table><tr><td></td><td>200</td><td>20</td><td>3</td><td></td></tr><tr><td>8</td><td>1600</td><td>160</td><td>24</td><td>= 1600</td></tr><tr><td></td><td></td><td></td><td></td><td>+ 160</td></tr><tr><td></td><td></td><td></td><td></td><td><u>24</u></td></tr><tr><td></td><td></td><td></td><td></td><td><u>1784</u></td></tr></table> Leading to an expanded column method <table><tr><td>223</td></tr><tr><td>$\times 8$</td></tr><tr><td><u>24</u> (8x3)</td></tr><tr><td>160 (8 x 20)</td></tr><tr><td><u>1600</u> (8 x 200)</td></tr><tr><td>1784</td></tr></table> Children may find it helpful to record the calculations they are doing in order to keep track.		200	20	3		8	1600	160	24	= 1600					+ 160					<u>24</u>					<u>1784</u>	223	$\times 8$	<u>24</u> (8x3)	160 (8 x 20)	<u>1600</u> (8 x 200)	1784	Children use the same methods as above. However children should now use the least significant digit first (inline with addition policy). They should be carrying the following types of calculation: TO x O and HTO x O. Resources Dienes, place value counters.	BM Steps 9 - 15 Year 4 and 5
	200	20	3																																	
8	1600	160	24	= 1600																																
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7	What is the product of 125 and 4? Multiply 34 by 8. Calculate 345 x 9	Lots of Groups of Times Multiplication Multiply Multiplied by, Multiple of Array Row Column Double Product Tables facts Partition Recombine Grid method ... times as big, long etc	Leading to short multiplication $\begin{array}{r} 223 \\ \times 8 \\ \hline 1784 \\ \hline \end{array}$ Encourage children to make estimations first using rounding ie $200 \times 8 = 1600$ so my answer will be more than 1600.	They should be carrying the following types of calculation: TO x O and HTO x O.	BM Steps 9 - 15 Year 4 and 5



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Stage	EXAMPLES	VOCABULARY	HOW IT WILL LOOK IN WRITTEN FORM	NOTES	Big Maths NC 2014
8	Double 75. What is the product of 125 and 4? Calculate 4346 x 9	Lots of Groups of Times Multiplication Multiply Multiplied by, Multiple of Array Row Column Double Product Tables facts Partition Recombine Grid method ... times as big, long etc Product Cubed Squared Scaling	Short multiplication - an extension to the above for ThHTO x O $\begin{array}{r} 3223 \\ \times 8 \\ \hline 25784 \\ \text{1 1 2} \end{array}$ <i>Encourage children to make estimations first ie $3000 \times 8 = 24000$ and $200 \times 8 = 1600$ so my answer will be approximately 25600.</i>	Children in Year 6 should use the methods as those in Year 5 continuing to use least significant digit first Children should be extended to working with ThHTO x O and TO x TO and HTO x TO. <i>Continue to develop skills in estimation.</i>	BM Steps 16 - 19 Year 5 and 6



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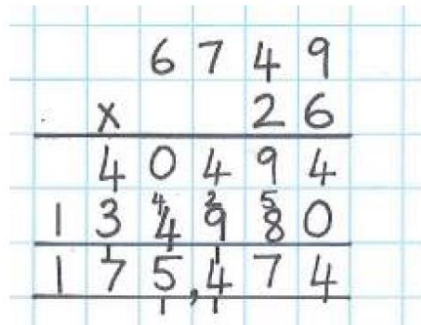
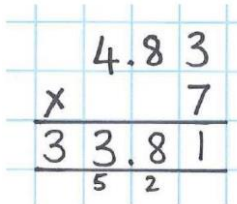


Stage	EXAMPLES	VOCABULARY	HOW IT WILL LOOK IN WRITTEN FORM	NOTES	Big Maths NC 2014																																																				
9	Fill in the missing numbers to make these calculations true. x = 864 x x = 864	Lots of Groups of Times Multiplication Multiplied by, Multiple of Array Row Column Double Product Tables facts Partition Recombine Grid method ... times as big, long etc Product Cubed Squared Scaling	The Grid method and Expanded method e.g. 76 x 58 = <table><tr><td></td><td>70</td><td>6</td><td></td></tr><tr><td>50</td><td>3500</td><td>300</td><td>= 3800</td></tr><tr><td>8</td><td>560</td><td>48</td><td>= 608</td></tr><tr><td></td><td></td><td></td><td><u>4408</u></td></tr></table> <table><tr><td>76</td></tr><tr><td>x 58</td></tr><tr><td><u>48</u> (8x6)</td></tr><tr><td>560 (8x70)</td></tr><tr><td>300 (50x6)</td></tr><tr><td>3500 (50x70)</td></tr><tr><td><u>4408</u></td></tr><tr><td>11</td></tr></table> Leading to: Long Multiplication: <table><tr><td></td><td></td><td></td><td>7</td><td>6</td></tr><tr><td></td><td></td><td></td><td>5</td><td>8</td></tr><tr><td></td><td></td><td></td><td>6</td><td>0</td><td>8</td></tr><tr><td></td><td></td><td>3</td><td>8</td><td>0</td><td>0</td></tr><tr><td></td><td>4</td><td>4</td><td>0</td><td>8</td><td></td></tr></table> Encourage children to make estimations first ie 70 x 50 = 3500 and 80 x 60 = 4800 so my answer will lie between these.		70	6		50	3500	300	= 3800	8	560	48	= 608				<u>4408</u>	76	x 58	<u>48</u> (8x6)	560 (8x70)	300 (50x6)	3500 (50x70)	<u>4408</u>	11				7	6				5	8				6	0	8			3	8	0	0		4	4	0	8		Calculations will involve HTO x TO; TO x TO	Year 5 and 6
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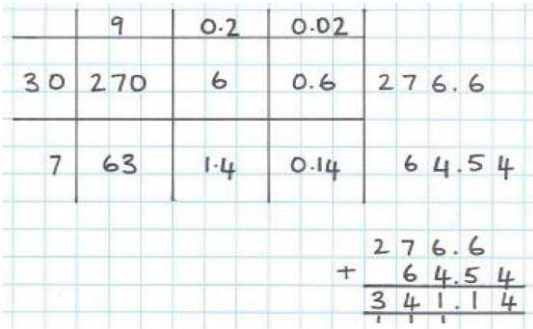
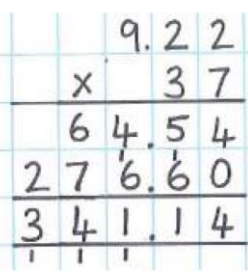


Stage	EXAMPLES	VOCABULARY	HOW IT WILL LOOK IN WRITTEN FORM	NOTES	Big Maths NC 2014								
10		As Stage 9	Long multiplication - used consistently for the above and for larger numbers e.g. $6749 \times 26 = 175474$ 	Continue to develop skills in estimation.	Year 5 and 6								
11	A 5p coin has a thickness of 1.7 mm. Ahmed makes a tower of 5p coins worth 40p. Write down the calculation you would use to find the height of the tower.	As Stage 9	Short multiplication for decimals (The grid method could be used initially to reinforce place value) e.g. $4.83 \times 7 =$ <table border="1" data-bbox="799 1101 1055 1169"><tr><td></td><td>4</td><td>0.8</td><td>0.03</td></tr><tr><td>7</td><td>28</td><td>5.6</td><td>0.21</td></tr></table> = 28 5.6 0.21 <u>33.81</u> 1 Leading to: 		4	0.8	0.03	7	28	5.6	0.21	Extend these ideas to working with decimals. Multiply decimal numbers with up to 2 decimal places by a single digit number.	Year 5 and 6
	4	0.8	0.03										
7	28	5.6	0.21										



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12		As Stage 9	Long multiplication for decimals (The grid method could be used initially to reinforce place value)   Encourage children to make estimations first using rounding ie $9 \times 30 = 270$ and $9 \times 40 = 360$. My answer will lie in between these and will have two decimal places.	Extend these ideas to working with decimals. Multiply decimal numbers with up to 2 decimal places by a single or two-digit number.	Year 6