




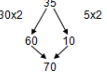

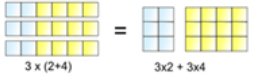
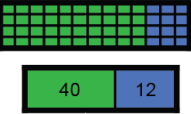
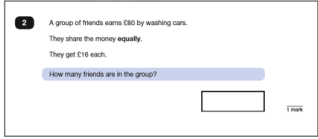






## Multiplication KS2

<p><b>KS1</b></p>	<p>Pupils should memorise and reason with numbers in 2, 5 and 10 times tables. They should see ways to represent odd and even numbers and know how they are represented in tables. This will help them to understand the pattern in numbers.</p> <p>Pupils should begin to understand multiplication as scaling in terms of double and half (e.g. that tower of cubes is double the height of the other tower).</p> <p>Commutative law shown on array. Repeated addition can be shown mentally on a number line. Inverse relationship between multiplication and division. Use an array to explore how numbers can be organised into groups.</p>	
<p>Year</p>	<p>3</p>	<p>4</p>
<p>Layers of vocabulary</p>  <p><b>Appendix 1a</b> Beck's Tiers of Vocabulary <b>Appendix 1b:</b> Vocabulary book</p>	<p><b>Basic to subject specific (Beck's Tiers):</b> lots of, groups of <math>\times</math>, times, multiply, multiplication, multiplied by multiple of, product once, twice, three times... ten times... times as (big, long, wide... and so on) repeated addition array row, column double, halve share, share equally one each, two each, three each...</p> <p><b>Instructional vocabulary:</b> carry on, continue repeat what comes next? predict describe the pattern, describe the rule find, find all, find different, investigate choose, decide, collect</p>	<p><b>Basic to subject specific (Beck's Tiers):</b> lots of, groups of times, multiply, multiplication, multiplied by multiple of, product once, twice, three times... ten times... times as (big, long, wide... and so on) repeated addition array row, column double, halve, factor, multiple</p> <p><b>Instructional vocabulary:</b> carry on, continue, repeat what comes next? predict describe the pattern, describe the rule pattern, puzzle, calculate, calculation, mental calculation, method, jotting, answer right, correct, wrong what could we try next? how did you work it out? number sentence sign, operation, symbol, equation</p>
<p>NC 2014</p>	<p>Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including 2 digit numbers times 1 digit numbers progressing to formal written methods.</p>	<p>Multiply 2 digit and 3 digit numbers by a 1 digit number using formal written layout. Solve problems involving multiplying and adding.</p>






# Multiplication KS2

<p>Developing Conceptual/ Procedural Understanding</p>	<p><b>Building tables</b></p>  <p>For example, build tables using counting stick-forwards and backwards and with missing jumps</p> <p><b>Using known facts</b> If <math>3 \times 2 = 6</math>, then <math>30 \times 2 = 60</math>, <math>60 \div 3 = 20</math> and <math>30 = 60 \div 2</math>.</p> <p><b>Associativity</b> <math>(2 \times 3) \times 4 = 2 \times (3 \times 4)</math> <math>6 \times 4 = 24</math>      <math>2 \times (3 \times 4) = 2 \times 12 = 24</math></p> 	<p><b>Partitioning strategy to double</b> Double 35</p>  <p><b>Place value materials to represent calculations</b></p> <p><b>Partitioning</b> Informal recording of partitioned numbers <math>15 \times 5 = 75</math></p> <p><math>10 \times 5 = 50</math> <math>5 \times 5 = 25</math></p> <p><math>27 \times 3 = 81</math></p> <p><math>20 \times 3 = 60</math> <math>7 \times 3 = 21</math> "20 multiplied by 3 equals 60 and 7 multiplied by 3 equals 21. 60 add 21 equals 81."</p>	<p><b>Grid method</b> <math>23 \times 8 =</math> <math>20 \times 8 = 160</math> <math>3 \times 8 = 24</math> <math>23 \times 8 = 184</math></p> <table border="1" data-bbox="829 365 961 414"> <tr><td>x</td><td>20</td><td>3</td></tr> <tr><td>8</td><td></td><td></td></tr> </table> <p><b>Short multiplication</b> Expanded</p> $\begin{array}{r} 23 \\ \times 8 \\ \hline 160 \\ 184 \end{array}$ <p>leading to compact</p> $\begin{array}{r} 23 \\ \times 8 \\ \hline 184 \\ 2 \end{array}$ <p><b>Representing problems</b> A group of aliens live on Planet Xert. Tinions have three legs, Quinions have four legs. The group has 22 legs altogether. How many Tinions and Quinions might there be? Is there more than one solution?</p>	x	20	3	8			<p><b>Building tables</b></p>  <p>For example, build tables using counting stick-forwards and backwards and with missing jumps</p> <p><b>Using known facts</b> If <math>2 \times 3 = 6</math> then <math>200 \times 3 = 600</math> and <math>600 \div 3 = 200</math></p> <p><b>Distributivity</b> <math>3 \times (2 + 4) = 3 \times 2 + 3 \times 4</math> So the '3' can be 'distributed' across the '2 + 4' into 3 times 2 and 3 times 4</p>  <p>leading to</p> $13 \times 4 = 10 \times 4 + 3 \times 4 = 52$ 	<p><b>Place value materials to represent calculations</b></p> <p><b>Grid method</b> (if needed for conceptual understanding)</p> $346 \times 9$ <table border="1" data-bbox="1354 430 1533 479"> <tr><td>x</td><td>300</td><td>40</td><td>6</td></tr> <tr><td>9</td><td></td><td></td><td></td></tr> </table> <p><b>Short multiplication</b> Expanded</p> $\begin{array}{r} 346 \\ \times 9 \\ \hline 54 \quad (9 \times 6) \\ 360 \quad (9 \times 40) \\ 2700 \quad (9 \times 300) \\ \hline 3114 \end{array}$ <p>leading to compact</p> $\begin{array}{r} 346 \\ \times 9 \\ \hline 3114 \\ 45 \end{array}$	x	300	40	6	9				<p><b>Representing problems</b></p> <p>Multiply a number by itself and then make one factor one more and the other one less. What do you notice? Does this always happen?</p> <p>Eg <math>4 \times 4 = 16</math>      <math>6 \times 6 = 36</math> <math>5 \times 3 = 15</math>      <math>7 \times 5 = 35</math> Try out more examples to prove your thinking.</p>   <p>Place <math>&lt;</math>, <math>&gt;</math>, or <math>=</math> in these number sentences to make them correct.</p> <p><math>50 \times 4</math>  <math>4 \times 50</math> <math>4 \times 50</math>  <math>40 \times 5</math> <math>200 \times 5</math>  <math>3 \times 300</math></p>
x	20	3																		
8																				
x	300	40	6																	
9																				
Known facts	Recall and use $\times$ and $\div$ facts for the 3, 4 and 8 $\times$ tables		Recall $\times$ and $\div$ facts for $\times$ tables up to $12 \times 12$ .																	
Essential knowledge	Review $2 \times$ , $5 \times$ and $10 \times$	Double 2 digit numbers	4 $\times$ and 8 $\times$ tables		10 $\times$ bigger															
	4 $\times$ table	3 $\times$ table	3 $\times$ , 6 $\times$ and 12 $\times$ tables		Double larger numbers and decimals															
	8 $\times$ table	6 $\times$ table	3 $\times$ and 9 $\times$ tables		11 $\times$ and 7 $\times$ tables															

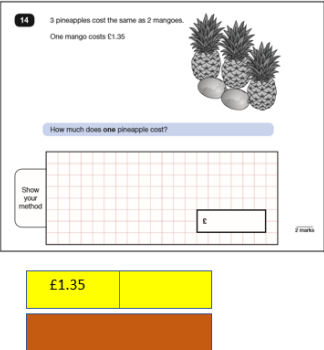


# Multiplication KS2

Year	5	6																	
Layers of vocabulary  <b>Appendix 1a</b> Beck's Tiers of Vocabulary <b>Appendix 1b:</b> Vocabulary book	<p><b>Basic to subject specific (Beck's Tiers):</b> lots of, groups of times, multiply, multiplication, multiplied by multiple of, product once, twice, three times... ten times... times as (big, long, wide... and so on) repeated addition array row, column double, halve share, share equally factor, multiple, prime, composite</p> <p><b>Instructional vocabulary:</b> carry on, continue, repeat what comes next? predict describe the pattern, describe the rule find, find all, find different investigate</p>	<p><b>Basic to subject specific (Beck's Tiers):</b> lots of, groups of times, multiply, multiplication, multiplied by multiple of, product once, twice, three times... ten times... times as (big, long, wide... and so on) repeated addition array row, column double, halve share, share equally factor, multiple, prime, composite</p> <p><b>Instructional vocabulary:</b> carry on, continue, repeat what comes next? predict describe the pattern, describe the rule find, find all, find different investigate</p>																	
NC 2014	Multiply numbers up to 4 digits by a 1 or 2 digit number using a formal written method, including long multiplication for 2 digit numbers Solve problems involving multiplication and division including using knowledge of factors and multiples, squares and cubes Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign Solve problems involving multiplication and division including scaling by simple fractions and problems involving simple rates	Multiply multi-digit numbers up to 4 digits by a 2 digit whole number using the formal written method of long multiplication. Solve problems involving addition, subtraction, multiplication and division.																	
Developing Conceptual/ Procedural Understanding	<p><b>Building tables</b></p>  <p>For example, apply tables knowledge to multiples of 10, 100 and 1000 using counting stick- forwards and backwards and with missing jumps</p> <p><b>Using known facts</b> If <math>2 \times 3 = 6</math> then <math>2000 \times 3 = 6000</math> and <math>200 \times 30 = 6000</math></p> <p><b>Place value materials to represent</b></p> <p><b>Grid method</b> (if needed for conceptual understanding)  <math>28 \times 27</math></p> <table border="1" data-bbox="520 1209 609 1253"> <tr><td>x</td><td>20</td><td>8</td></tr> <tr><td>20</td><td></td><td></td></tr> <tr><td>7</td><td></td><td></td></tr> </table> <p>Addition to be done mentally or across followed by column addition</p> <p><b>Long multiplication</b> Expanded  <math>28</math>  <math>\times 27</math>  <math>56 (7 \times 8)</math></p>	x	20	8	20			7			<p>leading to compact</p> $\begin{array}{r} 28 \\ \times 27 \\ \hline 196 \\ 560 \\ \hline 756 \end{array}$ <p>Extend to HTU x TU or ThHTU x TU as appropriate</p> <p><b>Representing problems</b> 40 cupcakes cost £3.60, how much do 20 cupcakes cost? How much do 80 cupcakes cost? How much do 10</p>	<p><b>Building tables</b></p>  <p>For example, apply tables knowledge to decimals using counting stick- forwards and backwards and with missing jumps</p> <p><b>Using known facts</b> If <math>2 \times 3 = 6</math> then <math>0.2 \times 3 = 0.6</math> and <math>0.02 \times 3 = 0.06</math></p> <p><b>Long multiplication</b> Use expanded method first if needed to build conceptual understanding</p> $\begin{array}{r} 5172 \\ \times 27 \\ \hline 36204 \end{array}$	<p><b>If place value is secure, use grid method for decimal multiplication</b>  <math>0.75 \times 6</math></p> <p><math>0.7 \times 6 = 4.2</math>  <math>0.05 \times 6 = 0.3</math>  <math>0.75 \times 6 = 4.5</math></p> <p><b>Make explicit links between decimals and money</b></p> <table border="1" data-bbox="1606 1347 1831 1421"> <tr><td>x</td><td>0.7</td><td>0.05</td></tr> <tr><td>6</td><td></td><td></td></tr> </table> <p><b>Representing problems</b></p>	x	0.7	0.05	6		
x	20	8																	
20																			
7																			
x	0.7	0.05																	
6																			



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	<p><b>calculations</b></p> <p><b>Short multiplication</b> Use expanded method first if needed to build conceptual understanding</p> $\begin{array}{r} 4346 \\ \times 8 \\ \hline 34768 \\ 234 \end{array}$	$\begin{array}{r} 140 (7 \times 20) \\ 160 (20 \times 8) \\ \hline 400 (20 \times 20) \\ \hline 756 \end{array}$	cupcakes cost?	$\begin{array}{r} 103440 \\ 1 \\ \hline 139644 \end{array}$	<p>Amy is given the calculation <math>5413 \times 600</math>. She says "I can do this without a written method." Write down the mental steps you think Amy could do.</p> 
Known facts	Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers Recall prime numbers up to 19 Recognise and use square and cube numbers and the notation for squared ( $^2$ ) and cubed ( $^3$ )			Identify common factors, common multiples and prime numbers	
Essential knowledge	4x and 8x tables	100, 1000 times bigger	Multiplication facts up to $12 \times 12$		Partition to multiply mentally
	3x, 6x and 12x tables; 3x and 9x tables	10, 100, 1000 times smaller	Apply place value to derive multiplication facts, e.g. $3 \times 4 = 12$ so $3 \times 0.4 = 1.2$		Double larger numbers and decimals
	11x and 7x tables	Double larger numbers and decimals			