

Multiplication

	Rapid Recall/Mental Calculations	Written	Problem solving		Non – statutory guidance																	
Y 1	Count in multiples of twos, fives and tens	Solve one-step problems using concrete objects, pictorial representations and arrays (with the support of the teacher)	Practical/recorded using ICT Pictures/Symbolic There are five cakes in each bag. How many cakes are there in three bags?	Visual (e.g. modelled using bead strings) $5 \times 3$ or $3 \times 5$ [five, three times] or [three groups of five] 	Arrays $5 \times 2$ or $2 \times 5$ 	<b>Doubling numbers/quantities</b> counting in twos, fives and tens from different multiples to develop their recognition of patterns in the number system (for example, odd and even numbers).																
Y 2	Recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.	Calculate statements for multiplication within the multiplication tables and write them using the multiplication and equals signs. Show that multiplication of two numbers can be done in any order (commutative)	Solve problems involving multiplication using materials, arrays, repeated addition, mental methods and multiplication facts, including problems in contexts	Pictures/Symbolic There are four apples in each box. How many apples in six boxes? 	Repeated addition $5 \times 3$ or $3 \times 5$ 	Arrays $6 \times 4$ or $4 \times 6$ 	Pupils ... practise to become fluent in the 2/5/10 multiplication tables and connect them to each other. They connect the 10x table to place value, and the 5x table to divisions on the clock face. They begin to use other multiplication tables and recall facts, including using related division facts to perform written and mental calculations.															
Y 3	Recall and use multiplication facts for the 3, 4 and 8 multiplication tables. (Multiply whole numbers by 10)	Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including $TU \times U$ , using mental and progressing to <b>formal written methods (short multiplication)</b>	Solve problems, including missing number problems, involving multiplication and division, including integer scaling problems and correspondence problems	Grid method: $36 \times 4 = 144$ <table border="1" style="display: inline-table; margin-right: 20px;"><tr><td>X</td><td>30</td><td>6</td></tr><tr><td>4</td><td>120</td><td>24</td></tr></table> $\begin{array}{r} 120 \\ + 24 \\ \hline 144 \end{array}$	X	30	6	4	120	24	$36 \times 4 = 144$ $\begin{array}{r} 36 \\ \times 4 \\ \hline (4 \times 6) 24 \\ (4 \times 30) 120 \\ \hline 144 \end{array}$	<b>Short multiplication:</b> $36 \times 4 = 144$ $\begin{array}{r} 36 \\ \times 4 \\ \hline 144 \\ 2 \end{array}$	<b>Through doubling, they connect the 2/4/8 multiplication tables.</b> Pupils develop efficient mental methods, using commutativity (eg $4 \times 12 = 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$ ) and multiplication and division facts (eg using $3 \times 2 = 6$ , $6 \div 3 = 2$ & $2 = 6 \div 3$ ) to derive related facts ( $30 \times 2 = 60$ , $60 \div 3 = 20$ & $20 = 60 \div 3$ ).									
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Y 4	Recall multiplication facts to $12 \times 12$ . Use place value, known & derived facts to multiply mentally, including $x$ by 0 and 1, multiplying together three numbers. Recognise/use factor pairs and commutativity in mental calculations. (Multiply whole numbers by 10 and 100)	<b>TU and HTU x U</b> using formal written layout ( <b>short multiplication</b> ) (Use estimation to check answers to calculations)	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	TU x U (see year 3) Grid method: $342 \times 7 = 2394$ <table border="1" style="display: inline-table; margin-right: 20px;"><tr><td>x</td><td>300</td><td>40</td><td>2</td></tr><tr><td>7</td><td>2100</td><td>280</td><td>14</td></tr></table> $\begin{array}{r} 2100 \\ 280 \\ + 14 \\ \hline 2394 \end{array}$	x	300	40	2	7	2100	280	14	$\begin{array}{r} 342 \\ \times 7 \\ \hline (7 \times 2) 14 \\ (7 \times 40) 280 \\ (7 \times 300) 2100 \\ \hline 2394 \end{array}$	<b>Short multiplication:</b> $342 \times 7 = 2394$ $\begin{array}{r} 342 \\ \times 7 \\ \hline 2394 \\ 21 \end{array}$	Practise mental methods and extend this to HTU numbers to derive facts, for example $200 \times 3 = 600$ into $600 \div 3 = 200$ . Write statements about equality of expressions (e.g. $39 \times 7 = 30 = 7 + 9 \times 7$ and $(2 \times 3) \times 4 = 2 \times (3 \times 4)$ ). Combine knowledge of facts and arithmetic rules to solve mental/written calculations (e.g. $2 \times 6 \times 5 = 10 \times 6 = 60$ ).							
x	300	40	2																			
7	2100	280	14																			
Y 5	Identify multiples/factors, including finding all factor pairs of a number, & common factors of two numbers. Know/use vocabulary of prime numbers, prime factors and composite (non-prime) nos. Establish if a number up to 100 is prime; recall prime numbers to 19. Multiply numbers mentally using known facts. Multiply whole numbers and those involving decimals by 10/100/1000. Recognise square numbers and cubed numbers and notation	<b>Th HTU x U and TU</b> using a formal written method including <b>long multiplication</b> for two-digit numbers (Use estimation to check answers to calculations)	Solve problems involving multiplication and division where larger numbers are used by decomposing them into their factors	Grid plus expanded methods $47 \times 36 = 1692$ <table border="1" style="display: inline-table; margin-right: 20px;"><tr><td>x</td><td>40</td><td>7</td></tr><tr><td>30</td><td>1200</td><td>210</td><td>1410</td></tr><tr><td>6</td><td>240</td><td>42</td><td>282</td></tr><tr><td></td><td></td><td></td><td>1692</td></tr></table> $\begin{array}{r} 47 \\ \times 36 \\ \hline (6 \times 7) 42 \\ (6 \times 40) 240 \\ (30 \times 7) 210 \\ (30 \times 40) 1200 \\ \hline 1692 \end{array}$	x	40	7	30	1200	210	1410	6	240	42	282				1692	<b>Long multiplication:</b> $47 \times 36 = 1692$ $\begin{array}{r} 47 \\ \times 36 \\ \hline 282 \\ 1410 \\ \hline 1692 \end{array}$	<b>Long multiplication:</b> $124 \times 26 = 3224$ $\begin{array}{r} 124 \\ \times 26 \\ \hline 744 \\ 2480 \\ \hline 3224 \\ 11 \end{array}$	Pupils ... apply all the x tables frequently, commit them to memory and use them to make larger calculations. They understand the terms factor, multiple/prime, square/cube numbers & use to construct equiv. statements (e.g. $4 \times 35 = 2 \times 2 \times 35$ ; $3 \times 270 = 3 \times 3 \times 9 \times 10 = 9^2 \times 10$ ).
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Y 6	Perform mental calculations, including with mixed operations/large numbers. Identify common factors/multiples and prime numbers. Use knowledge of order of operations to carry out calculations. Identify value of each digit to 3dp and multiply numbers by 10/100/1000 (answers to 3dp)	Multi-digit numbers (up to 4 digits) x TU whole number using the formal method of <b>long multiplication</b> . Multiply one-digit numbers with up to two decimal places by whole numbers Use estimation to check answers to calculations	Solve problems involving addition, subtraction, multiplication and division	<b>Long multiplication:</b> $1342 \times 26 = 34892$ $\begin{array}{r} 1342 \\ \times 26 \\ \hline 8052 \\ 26840 \\ \hline 34892 \end{array}$ Estimate $1000 \times 30 = 30,000$	$4.7 \times 8 = 37.6$ (estimate $5 \times 8 = 40$ ) $\begin{array}{r} 4.7 \\ \times 8 \\ \hline 37.6 \\ 5 \end{array}$ [Or $47 \times 8$ , then divide the solution by 10.]	Undertake mental calculations with increasingly large numbers and more complex calculations. Continue to use all x tables to calculate statements in order to maintain their fluency. Explore the order of operations using brackets. Common factors can be related to finding equivalent fractions.																