



# Number: Multiplication and Division

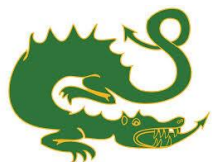
## MULTIPLICATION AND DIVISION FACTS

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Count in multiples of twos, fives and tens	Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward	Count from 0 in multiples of 3, 4, 8, 50 and 100	Count in multiples of 6, 7, 9, 25 and 1 000	Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000	
	Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers	Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables	Recall multiplication and division facts for multiplication tables up to $12 \times 12$		
	Show that multiplication numbers can be done in any order (commutative) and division cannot.				
	<b>Missing numbers</b> $10 = 5 \times \blacksquare$ What number could be written in the box?	<b>Missing numbers</b> $24 = ? \times ?$ Which pairs of numbers could be	<b>Missing numbers</b> $72 = ? \times ?$ Which pairs of numbers could be	<b>Missing numbers</b> $6 \times 0.9 = ? \times 0.03$ Which numbers could be written in the boxes?	



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	<p><b>Making links</b> I have 30p in my pocket in 5p coins. How many coins do I have?</p>	<p>written in the boxes?</p> <p><b>Making links</b> Cards come in packs of 4. How many packs do I need to buy to get 32 cards?</p>	<p>written in the boxes?</p> <p><b>Making links</b> Eggs are bought in boxes of 12. I need 140 eggs; how many boxes will I need to buy?</p>	<p><b>Making links</b> Apples weigh about 170 g each. How many apples would you expect to get in a 2 kg bag?</p>	
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MENTAL CALCULATIONS					
		<p>Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for:</p> <ul style="list-style-type: none"> <li>two-digit numbers times one-digit numbers</li> </ul>	<p>Use place value, known and derived facts to multiply and divide mentally, including:</p> <ul style="list-style-type: none"> <li>multiplying by 0 and 1</li> <li>dividing by 1</li> <li>multiplying together three single-digit numbers.</li> </ul>	<p>Multiply and divide numbers mentally, drawing upon known facts.</p>	<p>Perform mental calculations, including with mixed operations and large numbers</p>
		<p><b>Use a fact</b></p> <p><math>20 \times 3 = 60</math>. Use this fact to work out</p> <p><math>21 \times 3 =</math>    <math>22 \times 3 =</math> <math>23 \times 3 =</math>    <math>24 \times 3 =</math></p>	<p><b>Use a fact</b></p> <p><math>63 \div 9 = 7</math> Use this fact to work out</p> <p><math>126 \div 9 =</math> <math>252 \div 7 =</math></p>	<p><b>Use a fact</b></p> <p><math>3 \times 75 = 225</math> Use this fact to work out</p> <p><math>450 \div 6 =</math> <math>225 \div 0.6 =</math></p> <p>To multiply by 25 you multiply by 100 and then divide by 4. Use this strategy to solve</p> <p><math>48 \times 25</math>      <math>78 \times 25</math></p>	<p><b>Use a fact</b></p> <p><math>12 \times 1.1 = 13.2</math> Use this fact to work out</p> <p><math>15.4 \div 1.1 =</math> <math>27.5 \div 1.1 =</math></p>



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				4.6 x 25	
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## WRITTEN METHOD CALCULATIONS

	Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication ( $\times$ ), division ( $\div$ ) and equals (=) signs.	Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.	Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.	Multiply numbers up to 4 digits by a one or two digit number using a formal written method, including long multiplication for two-digit numbers.	Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.
				Divide numbers up to 4 digits by a one-digit number using the formal written method of short	Divide numbers up to 4 digits by a two-digit whole number using the formal written method of short division where



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				Division and interpret remainders appropriately for the context.	appropriate for the context.
					When dividing, interpret remainders appropriately for the context.
					Use written division methods where the answer has up to two decimal places.
<p><b>Practical:</b> If we put two pencils in each pencil pot how many pencils will we need?</p>	<p><b>Prove It:</b> Which four number sentences link these numbers? 3, 5, 15?  Prove it.</p>	<p><b>Prove It:</b> What goes in the missing box? <math>x \quad ? \quad ?</math> 4 80 12  Prove it.</p> <p><b>How close can you get?</b>  <math>? \quad ? \times ?</math>  Using the digits 2, 3 and 4 in the calculation above how close can you get to 100? What is the largest</p>	<p><b>Prove It:</b> What goes in the missing box? <math>6?? \times 4 = 512</math>  Prove it.</p> <p><b>How close can you get?</b>  <math>??? \times 7</math>  Using the digits 3, 4 and 6 in the calculation above how close can you get to 4500? What is the largest product? What is</p>	<p><b>Prove It:</b> What goes in the missing box? <math>12?2 \div 6 = 212</math> <math>14?4 \div 7 = 212</math> <math>22?3 \div 7 = 321 \text{ r } 6</math> <math>323 \times ?1 = 13243</math>  Prove it.</p>	<p><b>Prove It:</b> What goes in the missing box? <math>18?4 \div 12 = 157</math> <math>38?5 \div 18 = 212.5</math> <math>33?2 \div 8 = 421.5</math> <math>38 \times ?.7 = 178.6</math>  Prove it.</p> <p><b>Can you find?</b> Can you find the smallest number that can be added to or subtracted from 87.6 to make it exactly divisible by 8/7/18?</p>



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		product? What is the smallest product?	the smallest product?		
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MULTIPLES, FACTORS, PRIME, SQUARE AND CUBE NUMBERS					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			Recognise and use factor pairs commutativity in mental calculations.	Identify multiples and factors, including finding all factor pairs of a number and common factors between two numbers.	Identify common factors, common multiples of any number.
				Know the definition of: <ul style="list-style-type: none"> <li>• A prime number</li> <li>• Prime factors</li> <li>• Composite (non-prime) numbers.</li> </ul>	Identify prime numbers.
				Establish whether a number is prime and	Know square numbers up to 12 x 12.



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				recall prime numbers up to 19.	
				Recognise and use square and cube numbers, using the correct notation for both.	Identify and calculate cube numbers.
<p><b>Spot the mistake</b> Use a puppet to count but make some deliberate mistakes. e.g. 2 4 5 6 10 9 8 6 See if the pupils can spot the deliberate mistake and correct the puppet</p>	<p><b>True or false?</b> When you count up in tens starting at 5 there will always be 5 units.</p>	<p><b>True or false?</b> All the numbers in the two times table are even.  <i>There are no numbers in the three times table that are also in the two times table.</i></p>	<p><b>Always, sometimes, never?</b> Is it always, sometimes or never true that an even number that is divisible by 3 is also divisible by 6.  <i>Is it always, sometimes or never true that the sum of four even numbers is divisible by 4?</i></p>	<p><b>Always, sometimes, never?</b> Is it always, sometimes or never true that multiplying a number always makes it bigger?  <i>Is it always, sometimes or never true that prime numbers are odd?</i>  Is it always, sometimes or never true that when you multiply a whole number by 9, the sum of its digits is also a multiple of 9?  <i>Is it always, sometimes or never</i></p>	<p><b>Always, sometimes, never?</b> Is it always, sometimes or never true that dividing a whole number by a half makes the answer twice as big?  <i>Is it always, sometimes or never true that when you square an even number, the result is divisible by 4?</i>  Is it always, sometimes or never true that multiples of 7 are 1 more or 1 less than prime numbers?</p>



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				<i>true that a square number has an even number of factors?</i>	
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Order of Operation					
					Use their knowledge of the order of operations to carry out calculations involving the four operations (BODMAS).
					<p><b>Which is correct?</b></p> <p>Which of these number sentences is correct?</p> <p><math>3 + 6 \times 2 = 15</math>  <math>6 \times 5 - 7 \times 4 = 92</math></p>

Order of Operation					
	Estimate the answer to a calculation and use inverse	Estimate the answer to a calculation and use inverse	Estimate the answer to a calculation and use inverse	Estimate the answer to a calculation and use inverse	Estimate the answer to a calculation and use inverse





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	operations to check answers.	operations to check answers.	operations to check answers.	operations to check answers.	operations to check answers..
	<b>Use the inverse</b> Use the inverse to check if the following calculations are correct: $12 \div 3 = 4$ $3 \times 5 = 14$	<b>Use the inverse</b> Use the inverse to check if the following calculations are correct: $23 \times 4 = 82$ $117 \div 9 = 14$	<b>Use the inverse</b> Use the inverse to check if the following calculations are correct: $23 \times 4 = 92$ $117 \div 9 = 14$	<b>Use the inverse</b> Use the inverse to check if the following calculations are correct: $4321 \times 12 = 51852$ $507 \div 9 = 4563$	<b>Use the inverse</b> Use the inverse to check if the following calculations are correct: $2346 \times 46 = 332796$ $27.74 \div 19 = 1.46$

## Problem Solving

Solve one-step problems involving multiplication and division through using concrete objects, pictorial representations and arrays with the support of the teacher.	Solve problems involving multiplication and division; using materials, arrays, repeated addition, mental methods and division facts. This should include problems in contexts.	Solve problems, including missing number problems, involving multiplication and division.	Solve problems involving multiplication and division with numbers that have two digits.	Solve multiplication and division problems involving factors, multiples, squares and cubes.	Solve multi-step problems involving all four of the operations.
				Solve problems involving all four operations and a combination of them.	Solve problems involving scale factors of different shapes.



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Vocabulary					
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times lots of groups of multiply repeated addition array divide divided by sharing grouping sharing equally column row	multiplied by multiple of product divided into inverse	multiples remainder equation inverse operation divisor factor	factor pair divisible by	divisibility common factor prime factor factorise long multiplication short division	common multiple quotient order of operations BIDMAS/BODMAS prime numbers