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# Multiplication & Division Calculation Policy

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Highlands Primary School

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Mrs A Monteiro

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# Multiplication and division

## EYFS:

Children will learn to solve problems, including doubling, halving and sharing.

EYFS end of year expectations	Concrete	Pictorial	Abstract	Using and applying
<p>Solves problems, including doubling, halving and sharing (ELG). (Numbers)</p>	<p>Using objects to show double.</p>  <p>Using objects to show half and to share.</p> 	<p>Drawing pictures to show double and to half or 'share'.</p> 		<p>If Megan has 3 toys and Maheen has 3 toys, how many toys do they have altogether?</p>




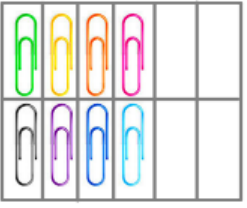
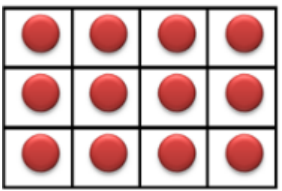
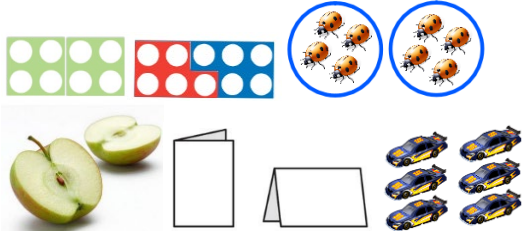
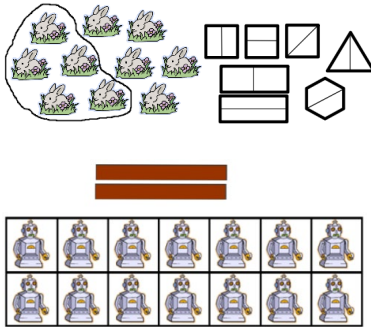
## Multiplication and division

### Key Stage 1:




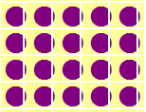
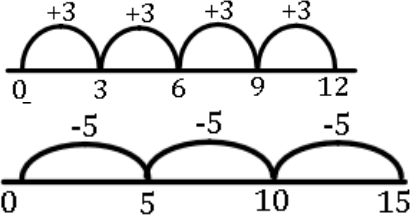
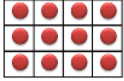



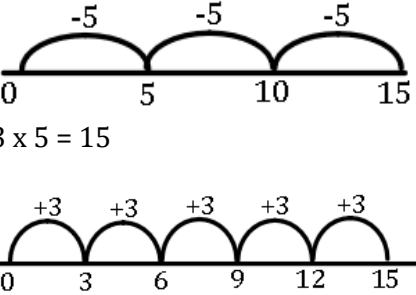
- The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources (for example, concrete objects and measuring tools).
- By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency.

End of year expectations	Rapid recall	Mental calculation	Language	Using and applying
<b>Year 1</b>		Count on and back in 2, 5 and 10.	Groups of Array Counting in Sharing Double Half Quarter	Solve simple one-step problems that involve using concrete objects and pictorial representations.
<b>Year 2</b>	Identifying odd and even numbers. Recall multiples of 2, 5 and 10 and related division facts.	Count in steps of 3 from 0 and in tens from any number, forward or backward.	Odd, even, Repeated addition/subtraction Grouping/ sharing Inverse Multiply Multiple(s) of Divide Division Commutative Calculate Equivalent	Solve one-step problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.  They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face.

# Multiplication and division

Year 1	Concrete	Pictorial	Conceptual	Using & applying
Multiplication and division as repeated addition and subtraction	<p>Using familiar objects and resources.</p>  <p>Finding 'groups of' with repeated addition and subtraction.</p> 	<p>Repeated images E.g. How many legs?</p> 	$2+2+2$  $5+5+5+5$	<p><b>Making links</b> If one teddy has two apples, how many apples will three teddies have?</p>
<p>Represent repeated addition as an array.</p> <p>Begin to use arrays to find repeated subtraction.</p>	<p>Make arrays on grids with counting objects</p> 	<p>Understand visual representations of arrays</p> 	$2+2+2$  $5+5+5+5$  $12-3-3-3-3=0$	<p>Here are 10 lego people If 2 people fit into the train carriage, how many carriages do we need?</p> <p>Practical If we put two pencils in each pencil pot how many pencils will we need?</p>
<p>Doubling and halving numbers within 20 (as repeated addition and subtraction).</p>	<p>Using familiar objects and resources.</p> 	<p>Using a variety of models and images.</p> 	<p>Using number sentences and beginning to calculate mentally.</p> $6 + 6 =$ Double 9 = 14 = Double ... Half of 18 = ... $\frac{1}{2}$ of $\square = 5$ 10 = half of... $7 = 14 - \square$ $4 + \square = 8$	<p>Class 1 has 8 girls. Class 2 has <b>double</b> the number of girls. How many girls are there in Class 2?</p>

# Multiplication and division

Year 2	Concrete	Pictorial	Conceptual	Using and applying
<p>Use arrays to make or draw multiplications and find the corresponding division facts.</p> <p>Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (<math>\times</math>), division (<math>\div</math>) and equals (=) sign</p>	<p>Make arrays on grids using counting objects.</p>   <p>Identify arrays in everyday objects.</p> 	<p>Array images</p>  <p>Repeated addition and subtraction along a number line.</p> 	<p>Using number sentences and beginning to calculate mentally.</p>  <p><math>3 \times 4 = 12</math> <math>12 \div 4 = 3</math></p> <p>Missing number problems.</p>  <p><math>20 = \square \times 5</math>     <math>3 = \square \div 6</math></p>	<p>I had 20 lollies. I put them into <b>groups</b> of 5. How many groups were there?</p> <p>I had 20 lollies. I <b>shared</b> them between 5 people. How many lollies did each person get?</p> <p>I saved 5p <b>each</b> week for 6 weeks. How much did I save altogether?</p> <p>If I save 5p <b>each</b> week, how many weeks will it take me to save 40p?</p>
<p>Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.</p>	<p>Make arrays on grids using counting objects.</p>  <p><math>2 \times 4 = 8</math></p> <p>Rotating arrays to find other multiplications.</p>  <p><math>4 \times 2 = 8</math></p>	<p>Repeated addition and subtraction along a number line.</p>  <p><math>3 \times 5 = 15</math> <math>5 \times 3 = 15</math></p>	<p>Using number sentences and beginning to calculate mentally.</p> <p><math>3 \times 5 = 15</math> <math>5 \times 3 = 15</math> <math>15 \div 5 = 3</math> <math>15 \div 3 = 5</math></p>	<p>There are 24 parents coming to watch our class assembly. How many different ways can you arrange the chairs? (In equal rows).</p>

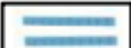

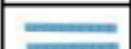

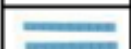











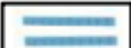

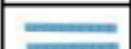

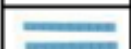



























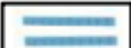

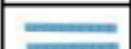

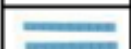



















## Multiplication and division

### Lower Key Stage 2:


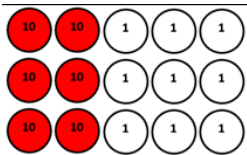
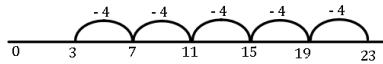
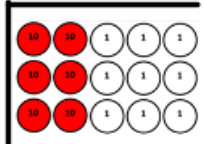
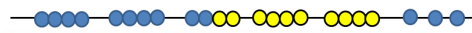
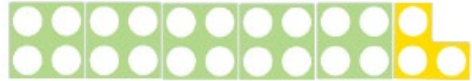

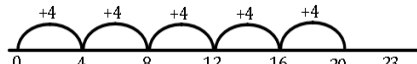
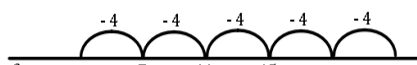
- The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.
- At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.

End of year expectations	Rapid recall	Mental calculation	Language	Using and applying
Year 3	Recall multiples of 2, 5 and 10 and related division facts.  Begin to recall multiples of 3, 6 and 4 and 8 and related division facts.	Count from 0 in multiples of 4, 8, 50 and 100.	Grid method Product Short division Remainder	Pupils should solve simple problems in contexts, including missing number problems, deciding which of the four operations to use and why, including measuring and scaling contexts, and correspondence problems in which m objects are connected to n objects (e.g. 3 hats and 4 coats, how many different outfits; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).
Year 4	Recall multiplication and division facts for multiplication tables up to 12 × 12	Count in multiples of 6, 7, 9, 25 and 1000  Multiply 3 numbers $U \times U \times U$  Recall factor pairs for a given number  Multiply by 0 and 1 and divide by 1	Factor Factor pair Quotient Divisor	Pupils should solve <b>two-step</b> problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as three cakes shared equally between 10 children.

# Multiplication and division



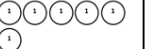
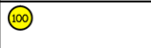

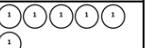


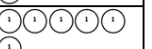


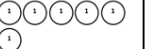
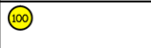

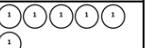


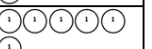


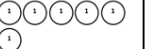
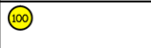

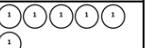


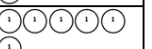
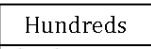
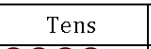
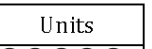

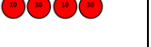


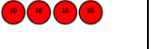

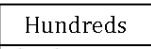
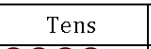
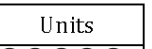

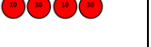


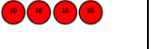

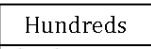
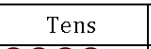
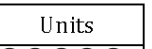

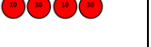


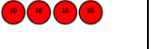

Year 3	Concrete	Pictorial	Conceptual	Using & applying																																				
<p><b>TU x U</b></p> <p>Extending understanding of arrays (TU x U), progressing to formal written methods</p>	<p>Using counting objects and resources.</p> <p><math>23 \times 4 = 92</math></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Tens</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Tens</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table> <p>Begin to link to inverse operations:  <math>92 \div 4 = 23</math></p>	Tens	Units									Tens	Units									<p>Use arrays to link to grid multiplications.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Tens</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>x</td> <td>20</td> <td>3</td> </tr> <tr> <td>4</td> <td>80</td> <td>12</td> </tr> </table> <p><math>80 + 12 = 92</math></p> <p>Children can also write the expanded calculations within the grid e.g. <math>4 \times 20 = 80</math> and <math>4 \times 3 = 12</math>.</p>	Tens	Units									x	20	3	4	80	12	<p>Using number sentences.</p> <p><math>18 \times 4 = \square</math></p> <p><math>31 \times 3 = \square</math></p> <p>Missing number problems.</p> <p><math>\square \times 41 = 123</math></p> <p><math>7 \times \square = 84</math></p>	<p>Year 3 went on a trip. There were 6 groups with 14 children in each group. How many children went on the trip in total?</p> <p>Use the digits 2, 3, 4, 5 and 6. Make a multiplication (U x TU) e.g. <math>2 \times 53 =</math></p> <p>Find different totals can you find?</p> <p>How many multiplications have the <i>same</i> total?</p>
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# Multiplication and division

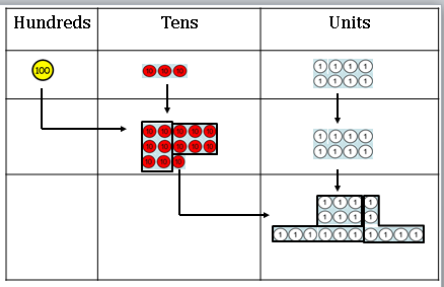
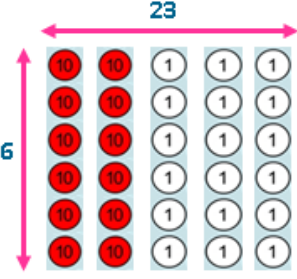
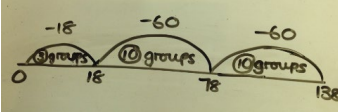
Year 3	Concrete	Pictorial	Conceptual	Using & applying						
<p><b>TU ÷ U</b></p> <p>Sharing and grouping to create an array.</p> <p>(<i>Not</i> exchanging from tens to units at this stage).</p>	<p>Using counting objects and resources.</p>  <p><math>69 \div 3 = 23</math></p>  <p>Check using multiplication inverse: <math>23 \times 3 = 69</math></p>	<p>Repeated subtraction on a number line.</p>  <p>Extending divisions to resemble written method of short division.</p> <p style="text-align: center;">23</p>  <p>3</p> <p><math>69 \div 3 = 23</math></p>	<p>Short division.</p> $\begin{array}{r} 23 \\ 3 \overline{)69} \end{array}$ <p>Check using multiplication inverse:</p> <table border="1" data-bbox="1332 502 1612 598"> <tr> <td>x</td> <td>20</td> <td>3</td> </tr> <tr> <td>3</td> <td>60</td> <td>9</td> </tr> </table> <p><math>60 + 9 = 69</math></p>	x	20	3	3	60	9	<p>69 children were <b>grouped</b> equally onto 3 buses for a trip. How many children went on each bus?</p> <p>3 children <b>shared</b> £69 equally. How much did they each receive?</p> <p>How many different divisions can you make? <math>36 \div ? = ?</math></p>
x	20	3								
3	60	9								
<p>Understand the concept of remainders after division.</p>	<p>Using resources.</p> <p><math>23 \div 4 = 5 \text{ r}3</math></p>   	<p>Repeated addition and subtraction along a number line.</p> <p><math>23 \div 4 = 5 \text{ r}3</math></p>  	<p>Begin to solve mentally.</p> <p><math>23 \div 4 = \square</math> <math>31 \div 6 = \square</math></p> <p>Missing number problems.</p> <p><math>\square \div 3 = 4 \text{ r}1</math> <math>17 \div \square = 3 \text{ r}2</math></p>	<p>A farmer had 33 eggs. He put them into boxes of 6. How many <b>full</b> boxes did he have? How many eggs did he have left over?</p> <p>If he put them into boxes of 12, how many would be left over now?</p> <p>Use each number in the 4x table. Make it with counters then share it into 3 groups. Write the remainder each time. What patterns do you notice?</p>						
<b>Year 4</b>	<b>Concrete</b>	<b>Pictorial</b>	<b>Conceptual</b>	<b>Using and applying</b>						



# Multiplication and division

<p><b>HTU x U</b></p> <p>multiply 2-digit and 3-digit numbers by a 1-digit number using formal written layout</p>	<p>Crossing <b>one</b> boundary.</p> <p><math>126 \times 3 =</math></p> <table border="1"> <thead> <tr> <th>Hundreds</th> <th>Tens</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Hundreds	Tens	Units										<p>Beginning with grid multiplication.</p> <table border="1"> <tr> <td><b>x</b></td> <td>100</td> <td>20</td> <td>6</td> </tr> <tr> <td>3</td> <td>300</td> <td>60</td> <td>18</td> </tr> </table> <p><math>300 + 60 + 18</math></p>	<b>x</b>	100	20	6	3	300	60	18	<p>Expanded method (if children need this)</p> $\begin{array}{r} 126 \\ \times 3 \\ \hline 18 \text{ (3 x 6)} \\ 60 \text{ (3 x 20)} \\ \underline{300} \text{ (3 x 100)} \\ 378 \end{array}$ <p><i>If children are ready, move onto compact vertical method.</i></p> $\begin{array}{r} 126 \\ \times 3 \\ \hline 378 \\ 1 \end{array}$	<p>In one week, 163 people visited the museum each day. How many people visited in total?</p> <p>My sister and I were raising money for charity. We collected £127 every day for 6 days. We <b>shared</b> the money <b>equally</b> between two different charities. How much money did each charity receive?</p>
	Hundreds	Tens	Units																					
																								
																								
																								
<b>x</b>	100	20	6																					
3	300	60	18																					
<p>Extending to crossing <b>two</b> boundaries.</p> <p><math>247 \times 3 =</math></p> <table border="1"> <thead> <tr> <th>Hundreds</th> <th>Tens</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Hundreds	Tens	Units										<p>Beginning with grid multiplication.</p> <table border="1"> <tr> <td><b>x</b></td> <td>200</td> <td>40</td> <td>7</td> </tr> <tr> <td>3</td> <td>600</td> <td>120</td> <td>21</td> </tr> </table> <p><math>600 + 120 + 21</math></p>	<b>x</b>	200	40	7	3	600	120	21	<p>Expanded method (if children need this)</p> $\begin{array}{r} 247 \\ \times 3 \\ \hline 21 \text{ (3 x 7)} \\ 120 \text{ (3 x 40)} \\ \underline{600} \text{ (3 x 200)} \\ 741 \end{array}$ <p><i>If children are ready, move onto compact vertical method.</i></p> $\begin{array}{r} 247 \\ \times 3 \\ \hline 741 \end{array}$	<p>Use the digits 1, 2, 3 and 5. Make a multiplication U x HTU. How many different products are there? What are the largest and smallest products possible?</p> <p>U x HTU = 820. How many ways can you solve this?</p>	
Hundreds	Tens	Units																						
																								
																								
																								
<b>x</b>	200	40	7																					
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# Multiplication and division

			$\begin{array}{r} \times \quad 3 \\ 741 \\ \hline 12 \end{array}$	
<b>Year 4</b>	<b>Concrete</b>	<b>Pictorial</b>	<b>Conceptual</b>	<b>Using and applying</b>
<b>TU ÷ U</b>  (Where exchanging is required)	Grouping and sharing using place value counters. Exchanging counters which cannot be grouped.	Result of grouping/sharing counters during 'concrete' stage.	Short division methods.	A school ordered 432 pencils. They were put into packs of 5. How many packs were made? How many pencils were left over?
<b>HTU ÷ U</b>  (Where exchanging is required)	$138 \div 6 = 23 \text{ r } 0$ 	Chunking on a number line.  $138 \div 6 = 23$  <u>Key Facts</u> $1 \times 6 = 6$ $2 \times 6 = 12$ $5 \times 6 = 30$ $10 \times 6 = 60$	$\begin{array}{r} 023 \\ 6 \overline{)138} \\ \underline{12} \phantom{0} \\ 18 \\ \underline{18} \\ 0 \end{array}$ $138 \div 6 = 23$  $432 \div 5$ becomes	Robbie has 150 stickers. He kept 12 and shared the rest equally between 6 friends. How many stickers did each of his friends get?
	Check using multiplication inverse.  		$\begin{array}{r} 86 \text{ r } 2 \\ 5 \overline{)432} \\ \underline{40} \phantom{0} \\ 32 \\ \underline{30} \\ 2 \end{array}$ Answer: 86 remainder 2	436 children need to be put into teams for sports day. How many different ways could the children be grouped equally?  How many divisions can you make which have a remainder of 3? What patterns do you notice?  Which numbers between 100 and 150 have a remainder of 1 when they are divided by 2, 3, 4, 5, and 6?

# Multiplication and division




























## Upper Key Stage 2:

- The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.
- At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems.
- By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.

End of year expectations	Rapid recall	Mental calculation	Language	Using and applying
Year 5	Related decimal facts for tables E.g. $6 \times 7 = 42$ $0.6 \times 7 =$ $0.7 \times 6 =$ $4.2 \div 7 =$ etc.	Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000.  $\div \times 10, 100$ or 1000 including decimals  Recognise all factor pairs of a number and identify common factors of two numbers  know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers  recognise and use square numbers and cube numbers, and the notation for squared ( $^2$ ) and cubed ( $^3$ )	Prime number Composite number Common factors Square / cube numbers	Solve problems involving multiplication and division including using their 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.

# Multiplication and division

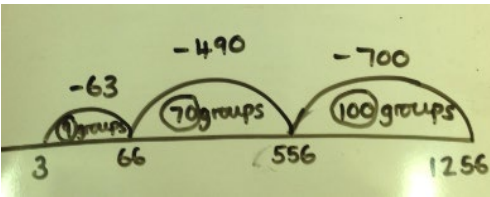
Year 6		<p>Perform mental calculations, including with mixed operations and large numbers</p> <p>E.g. <math>3 \times 700 + 115 =</math></p> <p>Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.</p> <p>identify common factors, common multiples and prime numbers</p> <p>use their knowledge of the order of operations to carry out calculations involving the four operations</p>		<p>Use their knowledge of the order of operations to carry out calculations involving the four operations.</p> <p>Solve addition and subtraction multi-step. Problems in contexts, deciding which operations and methods to use and why.</p> <p>Solve problems involving addition, subtraction, multiplication and division including interpreting remainders appropriately within the context of the problem.</p>
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Year 5	Concrete	Pictorial	Conceptual	Using and applying																				
<p>Multiply numbers up to <b>four digits by a 1 or 2-digit</b> number using a formal written method, including <b>long multiplication for 2-</b></p>	<p>Refer to Year 4 (HTU x U) and extend the process of using place value counters to ThHTU x U</p> <p>(Year 4) Crossing <b>one</b> boundary. <math>126 \times 3 =</math></p> <table border="1" data-bbox="385 1166 792 1377"> <thead> <tr> <th>Hundreds</th> <th>Tens</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Hundreds	Tens	Units										<p>Use grid method HTU x U and extend to ThHTU x U</p> <p>(Year 4) Beginning with grid multiplication.</p> <table border="1" data-bbox="840 1098 1160 1193"> <tr> <td>x</td> <td>100</td> <td>20</td> <td>6</td> </tr> <tr> <td>3</td> <td>300</td> <td>60</td> <td>18</td> </tr> </table> <p><math>300 + 60 + 18</math></p>	x	100	20	6	3	300	60	18	<p>Refer to Year 4 expanded vertical method (HTU x U) and extend to ThHTU x U</p> $\begin{array}{r} 126 \\ \times 3 \\ \hline 18 \text{ (3 x 6)} \\ 60 \text{ (3 x 20)} \\ 300 \text{ (3 x 100)} \\ \hline 378 \end{array}$ <p>Short multiplication.</p>	<p>There are 5 kittens, each weighing 1352g. What is their total mass in Kg?</p> <p>Use the digits 1 to 5. Make a multiplication: ThHTU x U How many products can you make between 5000 and 5500?</p>
Hundreds	Tens	Units																						
																								
																								
																								
x	100	20	6																					
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# Multiplication and division

<p><b>digit numbers</b></p>			$\begin{array}{r} 2741 \\ \times \quad 6 \\ \hline 16446 \\ \phantom{1644}42 \end{array}$ <p>Answer: <math>2741 \times 6 = 16446</math></p>																													
<p><b>TU x TU</b></p>	<p>NB: Children should proceed to pictorial methods alongside methods used in year 4.</p>	<p>Grid method:</p> <p><math>47 \times 36 =</math></p> <table border="1" data-bbox="840 502 1077 639"> <tr> <td>x</td> <td>40</td> <td>7</td> </tr> <tr> <td>30</td> <td>1200</td> <td>210</td> </tr> <tr> <td>6</td> <td>240</td> <td>42</td> </tr> </table> $\begin{array}{r} 1200 \\ 210 \\ 240 \\ + 42 \\ \hline 1692 \end{array}$	x	40	7	30	1200	210	6	240	42	<p>Compact method:</p> $\begin{array}{r} 47 \\ \times 36 \\ \hline 282 \\ \phantom{28}A \\ \hline 1410 \\ \phantom{141}z \\ \hline 1692 \end{array}$ <p>Answer: <math>47 \times 36 = 1692</math></p>	<p>I saved £36 every week for a year. At the end of the year, I gave half of it to charity. How much money did I donate?</p> <p>Try this with several numbers: choose a prime number greater than 3, square it and divide the answer by 12. Look at the remainder. What do you notice? Why does this happen?</p>																			
x	40	7																														
30	1200	210																														
6	240	42																														
<p><b>HTU x TU</b></p>	<p>Follow processes shown above (TU x TU).</p>	<p>Grid method.</p> <p><math>382 \times 23 =</math></p> <table border="1" data-bbox="831 1034 1249 1254"> <thead> <tr> <th>x</th> <th>300</th> <th>80</th> <th>2</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>20 x 300 =</td> <td>20 x 80 =</td> <td>20 x 2 =</td> </tr> <tr> <td>0</td> <td>300 =</td> <td>=</td> <td>40</td> </tr> <tr> <td></td> <td><u>6000</u></td> <td><u>1600</u></td> <td></td> </tr> <tr> <td>3</td> <td>3 x 300 =</td> <td>3 x 80 =</td> <td>3 x 2 =</td> </tr> <tr> <td></td> <td>900 =</td> <td><u>240</u></td> <td><u>6</u></td> </tr> <tr> <td></td> <td><u>900</u></td> <td></td> <td></td> </tr> </tbody> </table> $\begin{array}{r} 6000 \\ 1600 \\ 40 \\ 900 \end{array}$	x	300	80	2	2	20 x 300 =	20 x 80 =	20 x 2 =	0	300 =	=	40		<u>6000</u>	<u>1600</u>		3	3 x 300 =	3 x 80 =	3 x 2 =		900 =	<u>240</u>	<u>6</u>		<u>900</u>			<p>Compact method:</p> $\begin{array}{r} 124 \\ \times 26 \\ \hline 744 \\ \phantom{74}A \\ \hline 2480 \\ \phantom{248}B \\ \hline 3224 \\ \phantom{322}11 \end{array}$ <p>(6 x 124) (20 x 124)</p> <p>Answer: <math>124 \times 26 = 3224</math></p>	<p>There are 24 bottles in a crate. Each bottle has a capacity of 720ml. what is the total amount in litres?</p> <p>Make 5 different 2 digit numbers e.g. 56, 74, 31, 65, 83. Multiply them each by 101. What do you notice? What happens when you multiply each one by 1001?</p>
x	300	80	2																													
2	20 x 300 =	20 x 80 =	20 x 2 =																													
0	300 =	=	40																													
	<u>6000</u>	<u>1600</u>																														
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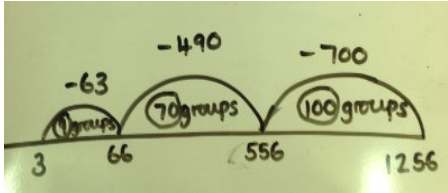
# Multiplication and division

		$\begin{array}{r} 240 \\ + 6 \\ \hline 8786 \\ 1 \end{array}$		
<p><b>ThHTU ÷ U</b> divide numbers up to four digits by a 1-digit number using the formal written method of short division and interpret remainders appropriately for the context</p>	<p>Follow processes shown in Year 4 HTU ÷ U with place value counters</p>	<p>Chunking on a number line.</p> <p>Children should use the key facts box to help them with related facts.</p> <p> <math>10 \times 7 = 70</math>  <math>100 \times 7 = 700</math> </p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p>Key Facts  <math>1 \times 7 = 7</math>  <math>2 \times 7 = 14</math>  <math>5 \times 7 = 35</math>  <math>10 \times 7 = 70</math></p> </div> <p><math>1256 \div 7 =</math></p>  <p>Answer: 179 remainder 3 or <math>179 \frac{3}{7}</math></p>	<p><u>Short division</u>  <math>432 \div 5</math> becomes</p> $\begin{array}{r} 86 \text{ r } 2 \\ 5 \overline{) 432} \\ \underline{40} \phantom{2} \\ 32 \\ \underline{30} \\ 2 \end{array}$ <p>Showing remainder as a whole number:  <math display="block">3 \overline{) 2576} \begin{array}{l} 858 \\ \hline 2 \end{array}</math>         Answer: 858 remainder 2</p> <p>Showing remainder as a fraction:  <math display="block">3 \overline{) 2576} \begin{array}{l} 858 \\ \hline 2 \end{array}</math>         Answer: <math>858 \frac{2}{3}</math></p>	<p>6 people won £8724 on the lottery. They spent £650 on a party to celebrate then shared the rest. How much did they each receive?</p> <p>How many divisions can you create which leave a remainder of <math>\frac{4}{5}</math>, <math>\frac{2}{3}</math>...etc.?</p> <p>Try this with several numbers: choose a prime number greater than 3, square it and divide the answer by 12. Look at the remainder. What do you notice? Why does this happen?</p>

# Multiplication and division

Year 6	Concrete	Pictorial	Conceptual	Using and applying								
Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the efficient written method of long multiplication.	NB: Children should proceed to pictorial methods .	<p>Use grid method for ThHTU xTU (refer to year 5). Grid can also be used to multiply decimal numbers. Use the grid method of multiplication (as below)</p> <p><b>Grid method</b> 372 x 24 is approximately 400 x 20 = 8000 Extend to decimals with up to two decimal places. 3.42 x 6 =</p> <table border="1"> <tr> <td><b>x</b></td> <td><b>3</b></td> <td><b>0.4</b></td> <td><b>0.02</b></td> </tr> <tr> <td><b>6</b></td> <td>18</td> <td>2.4</td> <td>0.12</td> </tr> </table> <p>18.0 2.4 <u>0.12</u> 20.52</p>	<b>x</b>	<b>3</b>	<b>0.4</b>	<b>0.02</b>	<b>6</b>	18	2.4	0.12	<p>Compact method</p> $\begin{array}{r} 1735 \\ \times 43 \\ \hline 5205 \\ 2111 \\ \hline 69400 \\ \hline 74605 \\ \hline \end{array}$ <p>1735 x 43 = 74605</p>	<p>There are 24 bottles in a crate. Each bottle has a capacity of 720ml. what is the total amount in litres?</p> <p>Make 5 different 2 digit numbers e.g. 56, 74, 31, 65, 83. Multiply them each by 101. What do you notice? What happens</p>
<b>x</b>	<b>3</b>	<b>0.4</b>	<b>0.02</b>									
<b>6</b>	18	2.4	0.12									

# Multiplication and division

<p>Divide numbers up to four digits by a 2-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context</p>		<p>Chunking on a number line.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;"> <p>Key Facts  <math>1 \times 7 = 7</math>  <math>2 \times 7 = 14</math>  <math>5 \times 7 = 35</math>  <math>10 \times 7 = 70</math></p> </div> <p>Children should use the key facts box to help them with related facts.</p> <p><math>10 \times 7 = 70</math>  <math>100 \times 7 = 700</math></p> <p><math>1256 \div 7 =</math></p>  <p>Answer: 179 remainder 3 or <math>179 \frac{3}{7}</math></p>	<p>Short division</p> <div style="text-align: center;"> <math display="block">\begin{array}{r} \text{quotient} \\ \text{divisor } 5 \overline{) 847} \text{ dividend} \end{array}</math> </div> <p><math>496 \div 11</math> becomes</p> <div style="text-align: center;"> <math display="block">\begin{array}{r} 45 \text{ r } 1 \\ 11 \overline{) 496} \\ \underline{44} \phantom{0} \\ 56 \\ \underline{55} \\ 1 \end{array}</math> </div> <p>Answer: <math>45 \frac{1}{11}</math></p> <p>Both methods above are necessary at this stage, to deal with the wide range of problems experienced at Stage Six.</p> <p><math>432 \div 15</math> becomes</p> <div style="text-align: center;"> <math display="block">\begin{array}{r} 28 \\ 15 \overline{) 432} \\ \underline{30} \phantom{0} \\ 132 \\ \underline{120} \\ 12 \end{array}</math> </div> <p><math>\frac{42}{15} = \frac{4}{5}</math></p> <p>Answer: <math>28 \frac{4}{5}</math></p>	<p>There are 432 guests at a wedding. Each table at dinner seats 15 people. How many tables are needed?</p> <p>A farmer had 450 eggs. 18 smashed so he put the rest into boxes of 15. How many boxes did he use?</p> <p>How many divisions can you create which result in a recurring decimal? Can you find a pattern in the numbers you used?</p> <p>Choose a 4 digit number and investigate fractional and decimal remainders when you divide by 9. What patterns do you notice?</p>
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