
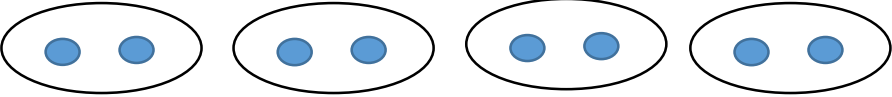
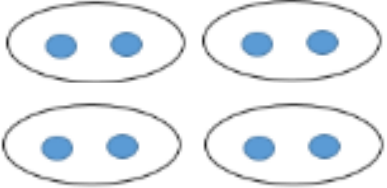


# Multiplication and Division – Year 1

**Key Vocabulary:** groups of, lots of, times, array, altogether, multiply, count, share, share equally, one each, two each..., group, groups of, lots of

Objectives	Representations	Problem Solving
<p><b>Recall/ Mental</b> Count in multiples of twos, fives and tens (From Number and Place Value)</p>	<p>Use concrete objects, pictorial representations and arrays.</p> <p><b>Multiplication word problems</b> Eg: How many fingers do 2 boys have altogether?</p>  <p>There are 2 sweets in each bag. How many sweets are there altogether?</p>  <p>Concrete objects could be put into arrays to enable children to make further connections.</p> <p>Eg</p>  <p><math>2 \times 4 = 8</math></p>	<p>Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.</p>

## Division word problems

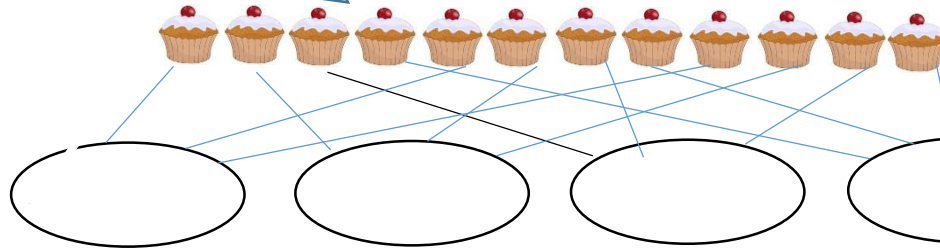
Begin by using sharing for division. Remainders can be introduced once children are secure.  
Division word problems.

Eg: Sam made 12 cakes for his 4 friends. How many cakes did each friend get?

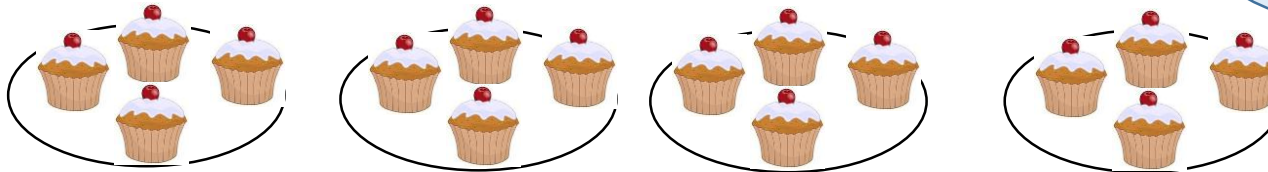


Step 1 – Count out 12 cakes

Step 2 – share the cakes  
between 4 (plates could be  
used)

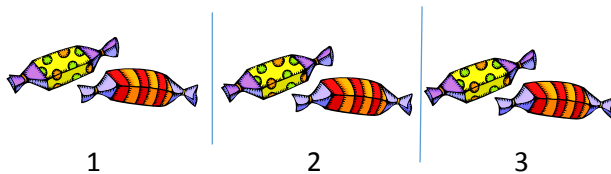


Step 3 – Count  
the number of  
cakes on each  
plate



Once children are secure with sharing then grouping can be introduced. Ensure correct vocabulary is used so misconceptions are not introduced.

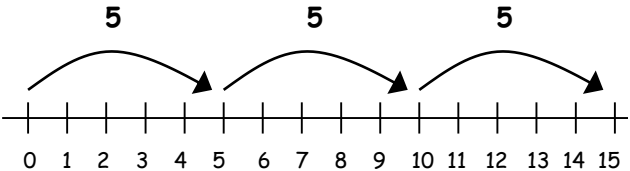
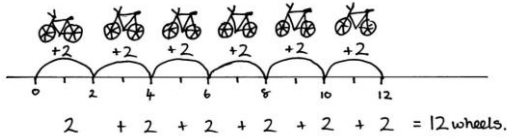
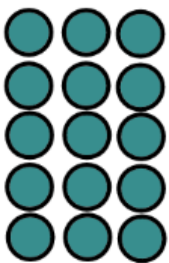
Eg: How many groups of 2 can be made from these sweets?



Children put the sweets into groups of 2 and then count how many groups there are.

# Multiplication and Division – Year 2

**Key Vocabulary:** groups of, lots of, times, array, altogether, multiply, count, share, share equally, one each, two each..., group, equal groups of, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times... divide, divided by, divided into, division, grouping, number line, left, left over

Objectives	Representations	Problem Solving
<p><b>Recall/ Mental</b></p> <p>count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward (from Number and Place Value)</p> <p>recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers</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><b>Written</b></p> <p>Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x),</p>	<p>Children should begin to recall multiplication facts for 2, 5 and 10 times tables through practice in counting and understanding of the operation.</p> <p><b>Multiply using arrays and repeated addition (using at least 2s, 5s and 10s)</b></p> <p>Eg: 3 times 5 is <math>5 + 5 + 5 = 15</math> or 3 lots of 5 or <math>5 \times 3</math></p> <p>Repeated addition can be shown easily on a number line.</p> <p><math>5 \times 3 = 5 + 5 + 5</math></p>  <p>If I have 6 bicycles how many wheels would there be?</p>  <p><math>2 + 2 + 2 + 2 + 2 + 2 = 12 \text{ wheels.}</math></p> <p><math>6 \times 2 = 12</math></p> <p><b>Arrays</b></p> <p>Eg:</p>  <p><math>5 \times 3 = 3 + 3 + 3 + 3 = 15</math></p> <p><math>3 \times 5 = 5 + 5 + 5 = 15</math></p> <div data-bbox="1120 606 1803 909" style="border: 1px solid blue; border-radius: 50%; padding: 10px; width: fit-content; margin: 20px auto;"> <p>Starting from zero, make equal jumps up on a number line to work out multiplication facts and write multiplication statements using x and = signs.</p> </div>	<p>solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts</p>

division ( $\div$ ) and equals (=) signs

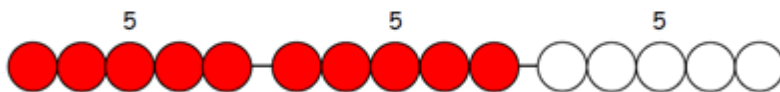
To represent division as repeated subtraction

To record division calculations with remainders using a number line (TU  $\div$  U)

Use arrays to help teach children to understand the commutative law of multiplication, and give examples such as  $3 \times \underline{\quad} = 6$ .

Use practical apparatus:

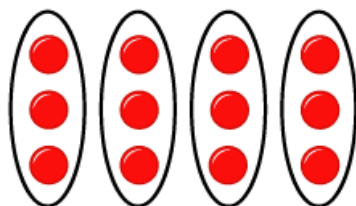
$$5 \times 3 = 5 + 5 + 5$$



### Division

Group and share, using the  $\div$  and = sign. Use objects, arrays, diagrams and pictorial representations, and grouping on a number line.

### Using Arrays



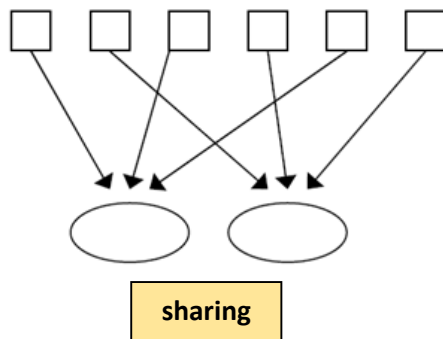
$$12 \div 3 = 4$$

This represents  $12 \div 3$ , posed as: how many groups of 3 are in 12?

Pupils should also show that the same array can represent  $12 \div 4 = 3$  if grouped horizontally

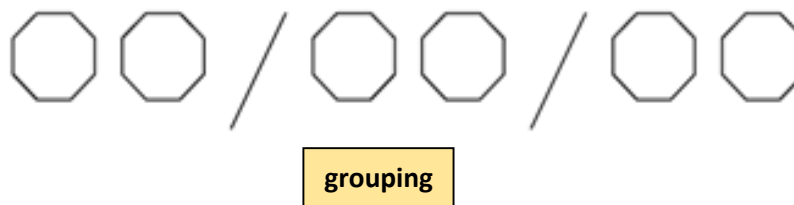
### Know and understand sharing and grouping:

6 sweets shared between 2 people, how many do they each get?



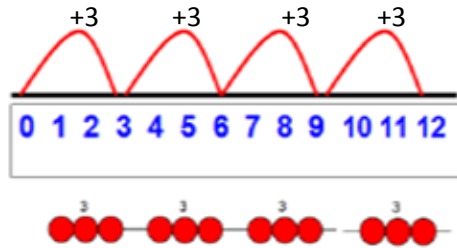
Children should be taught to recognise whether problems require sharing or grouping.

There are 6 sweets, how many people can have 2 sweets each?



## Grouping using a number line:

Group from zero in equal jumps of the divisor to find out "how many groups of \_ in \_?". Pupils could use a bead string or practical apparatus to work out problems like „A CD costs £3. How many CDs can I buy with £12?" **This is an important method to develop understanding of division as grouping.**



Pose  $12 \div 3$  as "How many groups of 3 are in 12?"

$$12 \div 3 = 4$$

### Videos:

Multiple Representations of Multiplication

<https://www.youtube.com/watch?v=YPWmOVt8vgw&list=UUVb98bWNgEmk02R7enUrmFA>

The Commutative Law for Multiplication

<https://www.youtube.com/watch?v=VGkijVfnGYI&list=UUVb98bWNgEmk02R7enUrmFA>

Sharing and Grouping (whole class)

<http://vimeo.com/83485518>

Sharing and Grouping (pairs)

<http://vimeo.com/83485658>

# Multiplication and Division – Year 3

**Key Vocabulary:** groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times, \_times as big as, once, twice, three times..., share, share equally, one each, two each..., group, equal groups of, divide, divided by, divided into, division, grouping, number line, left, left over, partition, grid method, multiple, product, tens, units, value, inverse, short division, 'carry', remainder, multiple

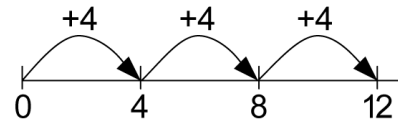
Objectives	Representations	Problem Solving						
<p><b>Recall/ Mental</b>  <i>count from 0 in multiples of 4, 8, 50 and 100</i>                      (copied from Number and Place Value)</p> <p>recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables</p> <p>write and calculate 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 (appears also in Written Methods)</p>	<p>Introduce the grid method for multiplication of TU x U.</p> <p>Eg <math>14 \times 6</math></p> <table border="1" data-bbox="365 608 728 675"> <tr> <td>X</td> <td>10</td> <td>4</td> </tr> <tr> <td>6</td> <td>60</td> <td>24</td> </tr> </table> <p><math>60 + 24 = 84</math></p> <p>Introduce the grid method with children physically making an array to represent the calculation (e.g. make 6 lots of 14 with 10s and 1s place value counters), then translate this to grid method format (see video clip).</p> <div data-bbox="936 523 1863 762" style="border: 1px solid black; border-radius: 50%; padding: 10px; margin: 10px auto; width: fit-content;"> <p>To begin with, children should be encouraged to link a multiplication calculation to an array. This knowledge will support with the development of the grid method.</p> </div> <div data-bbox="1137 767 1778 1090" style="text-align: center;"> </div> <div data-bbox="365 1090 1872 1334" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Children will need to be secure with partitioning to be able to carry this out successfully. They will need to be able to multiply multiples of 10 by a single digit (eg <math>30 \times 3</math>).</p> <p>For multiplication facts not known they should use repeated addition or other taught mental strategies (e.g. by commutative law, working out near multiples and adjusting, using doubling etc.) Strategies to support this are repeated addition using a number line, bead bars and arrays:</p> </div>	X	10	4	6	60	24	<p>solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects</p>
X	10	4						
6	60	24						

show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot

### Written

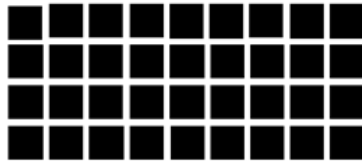
write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods

To record division calculations with remainders using a number line (TU ÷ U) (HTU ÷ U)

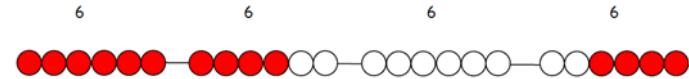


### Videos:

Multiplication – Lower Key Stage 2



$$9 \times 4 = 36$$



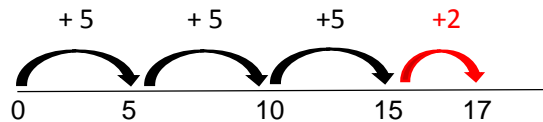
<https://www.youtube.com/watch?v=qyTRtoqYi7Q&list=PLQqF8sn28L9yj34NpXK7Yffze7ZoXTiix>

### Division:

#### Grouping on a number line

Children continue to work out unknown division facts by using repeated addition on a number line.

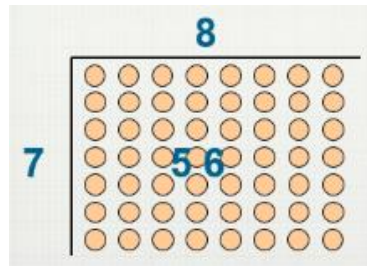
Eg  
 $17 \div 5 = 3 \text{ r } 2$



They are also now taught the concept of **remainders**, as in the example. This should be introduced practically and with arrays, as well as being translated to a number line. Children should work towards calculating some basic division facts with remainders mentally for the 2s, 3s, 4s, 5s, 8s and 10s, ready for "carrying" remainders across within the short division method.

#### Using Arrays

Eg  $56 \div 7 = 8$



#### Short Division

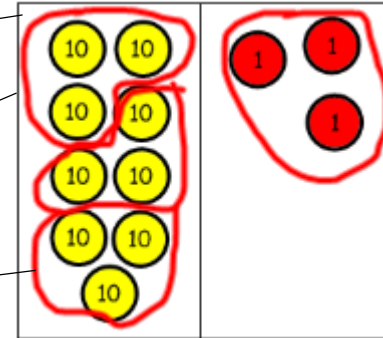
Eg  $93 \div 3 =$

Once children are secure with grouping and can demonstrate on number lines, they are then able to move onto short division. This should be introduced in a visual way, using place value counters and where there is no remainder.

**Step 1** – Draw the bus stop with the number that is ‘divided by’ (divisor) on the outside and the number that is being divided (dividend) on the inside.

$$\begin{array}{r} 33 \\ 3 \overline{)93} \end{array}$$

**Step 2** – Under this draw the number of columns needed for the calculation (in this case 2). Use place value counters to partition 93 into 9 tens and 3 units.



**Step 3** – Group the place value counters into the number that is being divided by (in this case 3).

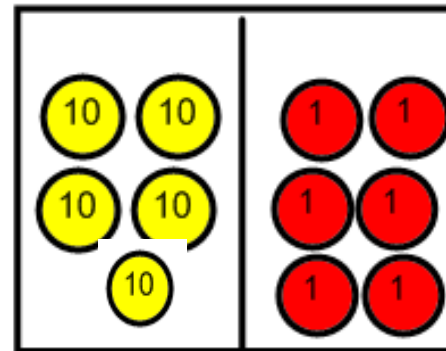
**Step 4** – Write the number of groups in the written algorithm.

Once children are secure with short division and have a full understanding of remainders then they can move onto short division with remainders within the calculation but not in the final answer,

Eg  $56 \div 4$

Carry out steps 1 and 2 as in previous example.

$$\begin{array}{r} 4 \\ 4 \overline{)56} \end{array}$$



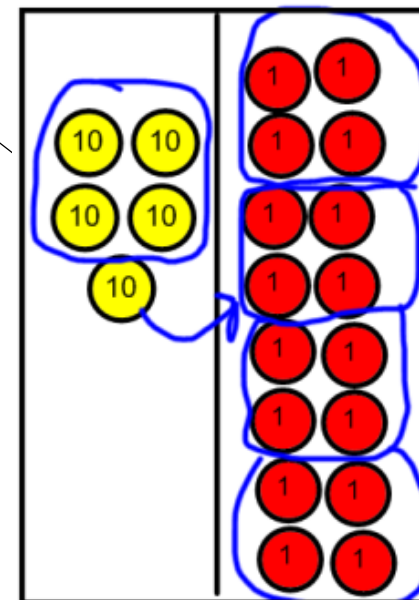


In step 3, children will need to 'exchange' a ten for ten ones.

This should be shown in the written algorithm as the remainder being 'carried' into the next digit.

*If needed, children should use the number line to work out individual division facts that occur which they are not yet able to recall mentally.*

$$\begin{array}{r} 14 \\ 4 \overline{) 56} \\ \underline{4} \phantom{0} \\ 16 \\ \underline{16} \\ 0 \end{array}$$



**Videos:** (Y4 examples but can be adapted to suit Year 3)

Representing division with place value counters <http://vimeo.com/83485661>

Using place value counters and recording division <http://vimeo.com/83485662>

# Multiplication and Division – Year 4

**Key Vocabulary:** groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, array, column, row, commutative, groups of, sets of, lots of, equal groups, times, multiply, times as big as, once, twice, three times... partition, grid method, total, multiple, product, sets of, share, share equally, one each, two each..., group, equal groups of, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, "carry", remainder, multiple, inverse, divisible by, factor

Objectives	Representations	Problem Solving																												
<p><b>Recall/ Mental</b> Count in multiples of 6, 7, 9, 25 and 1000 (copied from Number and Place Value)</p> <p>Recall multiplication and division facts for multiplication tables up to <math>12 \times 12</math></p> <p>Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers</p> <p>Recognise and use factor pairs and commutativity in mental calculations (appears also in Properties of Numbers)</p>	<p><b>Multiplication</b> Continue to develop the grid method for multiplication of TU X U and HTU x U (Use Place Value Counters for arrays if needed – see Y3)</p> <p><b>Eg. <math>136 \times 5 = 680</math></b></p> <table border="1" data-bbox="358 667 1039 788"> <tr> <td>X</td> <td>100</td> <td>30</td> <td>6</td> </tr> <tr> <td>5</td> <td>500</td> <td>150</td> <td>30</td> </tr> </table> <div style="text-align: right; margin-right: 100px;"> <math display="block">\begin{array}{r} 500 \\ 150 \\ + 30 \\ \hline 680 \end{array}</math> </div> <div style="text-align: center; border: 1px solid black; border-radius: 50%; padding: 10px; width: fit-content; margin: 10px auto;"> <p>Encourage children to use a column to add correctly</p> </div> <p>When children are secure with the grid method, introduce short multiplication.</p> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p>Step 1 – expanded short multiplication. This enables the child to represent the method of recording in a column format, but showing the working. Establish links between this and the grid method.</p> <p><b>Eg <math>38 \times 7 = 266</math></b></p> <math display="block">\begin{array}{r} 38 \\ \times 7 \\ \hline 56 \\ \underline{210} \\ 266 \end{array}</math> </div> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p>Step 2 – short multiplication. Only when children are confident and accurate multiplying 2 and 3-digit numbers by a single digit using expanded short multiplication, <b>and</b> are already confident in "carrying" for written addition, should they be moved onto this method.</p> <p><b>Eg <math>327 \times 4 = 1308</math></b></p> <table border="1" data-bbox="1433 1268 1724 1492"> <tr> <td></td> <td>3</td> <td>2</td> <td>7</td> <td></td> </tr> <tr> <td>X</td> <td></td> <td></td> <td>4</td> <td></td> </tr> <tr> <td></td> <td>1</td> <td>3</td> <td>0</td> <td>8</td> </tr> <tr> <td></td> <td></td> <td>1</td> <td>2</td> <td></td> </tr> </table> </div> </div>	X	100	30	6	5	500	150	30		3	2	7		X			4			1	3	0	8			1	2		<p>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 such as n objects are connected to m objects</p>
X	100	30	6																											
5	500	150	30																											
	3	2	7																											
X			4																											
	1	3	0	8																										
		1	2																											

## Written

Multiply two-digit and three-digit numbers by a one-digit number using formal written layout

To record division calculations using formal written method with remainders (HTO ÷ O)

## Division

Continue to develop short division. (see Year 3 for individual steps)

Pupils must be secure with the process of short division for dividing 2-digit numbers by a single digit (**those that do not result in a final remainder** —see steps in Y3), but must understand how to calculate remainders, using this to “carry” remainders within the calculation process.

Pupils move onto dividing numbers with up to **3-digits** by a single digit, however problems and calculations provided should **not result in a final answer with remainder** at this stage.

**Example without remainders within calculation:**

$363 \div 3 =$

1 2 1  
3 | 3 6 3

The diagram shows three columns of base ten blocks. The first column contains three 100 blocks. The second column contains six 10 blocks. The third column contains three 1 blocks.

**Example with remainders within calculation:**

$345 \div 3 =$

1 1 5  
3 | 3 4 5

The diagram shows three columns of base ten blocks. The first column contains three 100 blocks. The second column contains four 10 blocks. The third column contains five 1 blocks. A red line points from the 10 block in the second column to the 10 block in the third column, illustrating the exchange of a ten for ten ones.

Remember to ‘exchange’ a ten for ten ones and show this in written algorithm as ‘carrying’ to the next digit as a remainder.

When the answer for the **first column** is zero ( $1 \div 5$ , as in example), children could initially write a zero above to acknowledge its place, and must always “carry” the number (1) over to the next digit as a remainder.

$$\begin{array}{r} 037 \\ 5 \overline{)185} \end{array}$$

**Videos:**

Multiplication – Lower Key Stage 2 (links to place value counters as shown in Y3) <http://vimeo.com/70319240>

Representing division with place value counters <http://vimeo.com/83485661>

Using place value counters and recording division <http://vimeo.com/83485662>

# Multiplication and Division – Year 5

**Key Vocabulary:** groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, \_times as big as, once, twice, three times..., partition, grid method, total, multiple, product, inverse, share, share equally, one each, two each..., group, equal groups of, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, "carry", remainder, multiple, divisible by, factor, inverse, square, factor, integer, decimal, short/long multiplication, 'carry', quotient, prime number, prime factors, composite number (non-prime)

Objectives	Representations	Problem Solving																																																																																																									
<p><b>Recall/ Mental</b> Use multiplication and division facts (12x12) to be able to multiply and divide multiples of 10.</p> <p>Multiply and divide numbers mentally drawing upon known facts</p> <p>Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000</p> <p><b>Written</b> 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</p> <p>Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and</p>	<p><b>Multiplication</b> - Continue to develop short multiplication (see Year 4) for multiplication by a one-digit number.</p> <p>Eg <math>3652 \times 8 = 29216</math></p> <div style="display: flex; align-items: center;"> <table border="1" style="border-collapse: collapse; text-align: center; margin-right: 20px;"> <tr><td></td><td>3</td><td>6</td><td>5</td><td>2</td></tr> <tr><td>x</td><td></td><td></td><td></td><td>8</td></tr> <tr><td colspan="5"><hr/></td></tr> <tr><td>2</td><td>9</td><td>2</td><td>1</td><td>6</td></tr> <tr><td></td><td>5</td><td>4</td><td></td><td></td></tr> </table> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; background-color: #e0f0ff;"> <p>To be successful when calculating in this way, it is good practice for children to estimate first. An example in this case is: <math>3652</math> is between <math>3000</math> and <math>4000</math>, therefore <math>8 \times 3000 = 24\,000</math> and <math>8 \times 4000 = 32\,000</math>. The answer must be between <math>24\,000</math> and <math>32\,000</math>.</p> </div> </div> <p>For multiplication by a 2-digit number, long multiplication can be introduced.</p> <div style="display: flex; align-items: center;"> <table border="1" style="border-collapse: collapse; text-align: center; margin-right: 20px;"> <tr><td></td><td></td><td>1</td><td>8</td></tr> <tr><td>x</td><td></td><td>1</td><td>3</td></tr> <tr><td colspan="4"><hr/></td></tr> <tr><td></td><td></td><td>5</td><td>4</td></tr> <tr><td></td><td></td><td>2</td><td></td></tr> <tr><td>1</td><td>8</td><td>0</td><td></td></tr> <tr><td colspan="4"><hr/></td></tr> <tr><td>2</td><td>3</td><td>4</td><td></td></tr> <tr><td>1</td><td></td><td></td><td></td></tr> </table> <div style="border: 1px solid black; padding: 5px;"> <p>First row. Say <math>3 \times 8 = 24</math>. Carry the 2 for twenty, then <math>3 \times 1 = 3</math>, add the carried 2 which is 5.</p> <p>Second row. Say this is <math>10 \times</math> the top number so we always put a zero down first in the units column. Then <math>1 \times 8 = 8</math>. <math>1 \times 1 = 1</math>.</p> </div> </div> <p>(The grid could be used to introduce long multiplication, as the relationship can be seen in the answers in each row.)</p> <table border="1" style="border-collapse: collapse; text-align: center; margin-bottom: 20px;"> <tr><td></td><td>10</td><td>8</td></tr> <tr><td>10</td><td>100</td><td>80</td></tr> <tr><td>3</td><td>30</td><td>24</td></tr> </table> <p>Moving onto more complex numbers.</p> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>x</td><td></td><td></td><td>1</td><td>6</td></tr> <tr><td colspan="5"><hr/></td></tr> <tr><td></td><td>7</td><td>4</td><td>0</td><td>4</td></tr> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>0</td></tr> <tr><td colspan="5"><hr/></td></tr> <tr><td>1</td><td>9</td><td>7</td><td>4</td><td>4</td></tr> </table>		3	6	5	2	x				8	<hr/>					2	9	2	1	6		5	4					1	8	x		1	3	<hr/>						5	4			2		1	8	0		<hr/>				2	3	4		1					10	8	10	100	80	3	30	24		1	2	3	4	x			1	6	<hr/>						7	4	0	4	1	2	3	4	0	<hr/>					1	9	7	4	4	<p>solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes</p> <p>solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign</p> <p>solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates</p>
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interpret remainders appropriately for the context

### Videos:

Multiplication – Upper Key Stage 2 <http://vimeo.com/70318365>

Rapid Recall of Multiplication Facts

[https://www.youtube.com/watch?v=BcljRLZzMaw&list=PLQqF8sn28L9wjDm8uJEJcRCDDoY6raPE\\_&index=2](https://www.youtube.com/watch?v=BcljRLZzMaw&list=PLQqF8sn28L9wjDm8uJEJcRCDDoY6raPE_&index=2)

### Division

**Short division with remainders:** Now that pupils are introduced to examples that give rise to remainder answers, division should have a real life problem solving context, where **pupils consider the meaning of the remainder and how to express it**, ie. as a fraction, a decimal, or as a rounded number or value, depending upon the context of the problem.

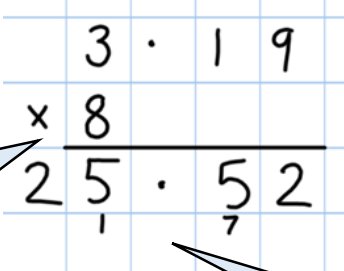
$$\begin{array}{r} 0663r5 \\ 8 \overline{)5309} \end{array}$$

The answer to  $5309 \div 8$  could be expressed as 663 and five eighths,  $663 r 5$ , as a decimal, or rounded as appropriate to the problem

See Y6 for how to carry through short division to give a decimal answer for those who are confident.

# Multiplication and Division – Year 6

**Key Vocabulary:** groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, array, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times... partition, grid method, total, multiple, product, inverse, square, factor, integer, decimal, short / long multiplication, "carry", equal groups of, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, "carry", remainder, multiple, divisible by, factor, inverse, tenths, hundredths, decimal, common factor, common multiple

Objectives	Representations	Problem Solving
<p><b>Recall/ Mental</b></p> <p>Use multiplication and division facts (12x12) to derive decimal multiplication and division facts.</p> <p>Perform mental calculations, including with mixed operations and large numbers</p> <p>Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. <math>\frac{3}{8}</math>) (copied from Fractions)</p> <p>Multiply one-digit numbers with up to two decimal places by whole numbers (copied from Fractions – also includes written methods)</p>	<p><b>Multiplication</b> Short and long multiplication as in Year 5.</p> <p>Multiplying decimals with up to 2 d.p by a single digit.</p> <p>Eg <math>3.19 \times 8 = 25.52</math></p> <div style="text-align: center;">  </div> <p><b>Videos:</b> Rapid Recall of Multiplication Facts <a href="https://www.youtube.com/watch?v=BcljRLzZMaw&amp;list=PLQqF8sn28L9wjDm8uJEJcRCDDoY6raPE_index=2">https://www.youtube.com/watch?v=BcljRLzZMaw&amp;list=PLQqF8sn28L9wjDm8uJEJcRCDDoY6raPE_index=2</a></p>	<p>solve problems involving addition, subtraction, multiplication and division</p> <p><i>solve problems involving similar shapes where the scale factor is known or can be found</i> (copied from Ratio and Proportion)</p>

## Written

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 two-digit whole number using the formal written method of short division where appropriate for the context divide numbers up to 4 digits by a two-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

*Use written division methods in cases where the answer has up to two decimal places*  
(copied from Fractions (including decimals))

## Division

### Short Division:

$$\begin{array}{r} 8 \overline{) 6497.000} \\ \underline{8} \phantom{000} \\ 8 \phantom{000} \\ \underline{8} \phantom{000} \\ 0 \phantom{000} \\ \underline{0} \phantom{000} \\ 0 \phantom{000} \\ \underline{0} \phantom{000} \\ 0 \phantom{000} \end{array}$$

Add a decimal point after the units if there is still a remainder.

Short division with remainders: Pupils should continue to use this method, but with numbers to at least 4 digits, and understand how to express remainders as fractions, decimals, whole number remainders, or rounded numbers. Real life problem solving contexts need to be the starting point, where pupils have to consider the most appropriate way to express the remainder.

Calculating a decimal remainder: In this example, rather than expressing the remainder as r 1, a decimal point is added after the units because there is still a remainder, and the one remainder is carried onto zeros after the decimal point (to show there was no decimal value in the original number). Keep dividing to an appropriate degree of accuracy for the problem being solved.

### Long Division

Long Division by chunking for dividing by 2 digits:

Introduce chunking.

Eg:  $648 \div 36$  Step 1: estimate: 10 - 20

$$36 \times 10 = 360$$

$$36 \times 20 = 720$$

648 is between 360 and 720 so the estimate is between 10 and 20.

(Estimating will help children to reduce the number of subtractions being made.)

$$\begin{array}{r} 18 \\ 36 \overline{) 648} \\ \underline{- 360} \quad (10 \times 36) \\ 288 \\ \underline{- 180} \quad (5 \times 36) \\ 108 \\ \underline{- 72} \quad (2 \times 36) \\ 36 \\ \underline{- 36} \quad (1 \times 36) \\ 0 \end{array}$$

Step 2: Create a 'useful' list to help with subtractions. In this example we know the answer lies between 10 and 20 so there is no need to go up to  $20 \times 36$ . If we know  $10 \times 36$  then we know  $5 \times 36$  is half of this amount.

Step 3: Begin taking chunks of 36 away. Use useful list to help. Write in brackets how many 'lots' are being subtracted (always put the number of lots first then the number being multiplied).

Step 4: Count up how many 'lots' or 'chunks' of 36 have been subtracted. Write the answer above the division box.

Where remainders occur, pupils should express them as fractions, decimals or use rounding, depending upon the problem.