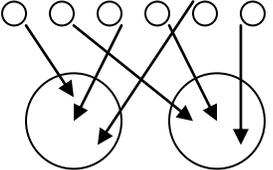
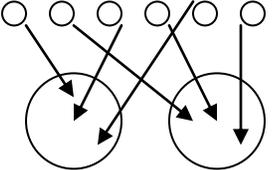




## Newdale Primary school Maths Calculation Policy – Division

Rec	Year 1	Year 2	Year 3
<p>Sharing and group objects equally in practical contexts.</p> <p>Counting on and back in 2s, 5s and 10s.</p> <p>Use pictures to record what they have done</p> <p>Introduce idea of <u>grouping</u> –</p> <p><i>A car has 4 wheels, how many cars can you make if you have 8 wheels? Two cars</i></p>  <p style="text-align: right;">and</p> <p><i>6 sweets are put into groups of 3. How many groups will you make?</i></p>  <p style="text-align: right;">and</p> <p>Consolidate grouping and then introduce idea of <u>sharing</u> – Sharing objects practically. <i>I have 6 cakes and 2 children. How many cakes will they each get?</i></p> 	<p>KPI: Solve one-step problems, involving division by calculating the answer using concrete objects and pictorial representations with the support of the teacher.</p> <p>Counting on and back in 2s, 5s and 10s.</p> <p>To be able to half numbers to 20 mentally.</p> <p>Recognise, find and name a half as one of two equal parts of an object, shape or quantity.</p> <p>Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.</p> <p><i>Division at this stage should initially continue to be practical and exploratory so that the concept of division is embedded and that the children are confident in the manipulation of numbers, before moving on to pictorial and written.</i></p> <p>Consolidate grouping and then introduce idea of <u>sharing</u> – Sharing objects practically. <i>I have 6 cakes and 2 children. How many cakes will they each get?</i></p> 	<p>KPI: Calculate mathematical statements for division within the multiplication tables and write them using the <math>\div</math> and = signs.</p> <p>Know that division is the inverse of multiplication</p> <p>Understand that division must be done in the order of the question.</p> <p>Solve problems involving division, involving materials and known facts, including problems in context.</p> <p>Know division facts corresponding to the 2, 10 and 5 times tables</p> <p>Record using the correct division symbols <math>\div</math> and know that <math>\div 2</math> is the same as halving.</p> <p>Recognise, find, name and write fractions <math>\frac{1}{3}</math>, <math>\square</math>, <math>\frac{2}{4}</math> and <math>\frac{3}{4}</math> of a length, shape, set of objects or a quantity.</p> <p>Record using the <math>\div</math> symbol, with practical apparatus to continue to support the calculation and remove its abstract nature.</p> <p>Use practical apparatus to support investigations such as</p> <ul style="list-style-type: none"> <li>• How many groups of 2 are there in 16?</li> <li>• What is 33 shared between 3?</li> </ul> <p><u>Grouping/Repeated addition on a numberline</u></p> <p><math>20 \div 5 =</math></p> <hr style="width: 100%;"/> <p style="text-align: center;">0      5      10      15      20</p> <p>“There are 4 groups of 5 in 20”</p>	<p>KPI: Recall and use division facts corresponding to the 2,3, 4,5,8 and 10 times tables.</p> <p>Use numbers that will generate remainders.</p> <p>Use vocab of division</p> <ul style="list-style-type: none"> <li>• Remainder</li> <li>• Dividend (The amount that you want to divide up.</li> <li>• Divisor (number you divide by)</li> <li>• Quotient (The answer after you divide one number by another dividend <math>\div</math> divisor = quotient)</li> </ul> <p><u>E.g. <math>12</math> (dividend) <math>\div</math> <math>3</math> (Divisor) = <math>4</math> (quotient)</u></p> <p>Write and calculate mathematical statements for division using the <math>\times</math> facts known, using mental and progressing to written methods.</p> <p>Recognise that tenths arise from <math>\div</math> dividing an object into 10 equal parts and <math>\div</math> 1 digit numbers or quantities by 10.</p> <p>Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.</p> <p>Use multiplication facts to support division – <u>rearranging the divisor</u></p> <p><math>30 \div 5 = 6</math> ‘What do I know?’ <math>5 \times 6 = 30</math></p> <p>Use partitioning to divide numbers. Underline the <u>divisor</u>. e.g. <math>48 \div \underline{3} = 16</math></p> <p>‘What do I know about the divisor, 3 x tables? What is the</p>



# Newdale Primary school Maths Calculation Policy – Division

“6 shared between 2 is 3”

Remainders introduced as ‘Left overs’

*There are 7 cakes and 2 children.  
How many cakes will they each get?  
How many will be left over?*

**Introduce  $\div$  notation once division has been embedded.**

**Mastery check:**

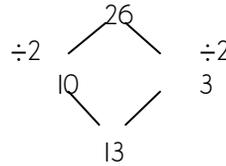
Sarah is filling party bags with sweets. She has 20 sweets altogether and decides to put 5 in every bag. How many bags can she fill?	How else could 20 sweets be put into bags so that every bag had the same number of sweets?  How many bags would be packed each time?
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I can see 10 wheels. How many bicycles?	Toy aeroplanes have 5 wheels.  How many wheels would you need to make different numbers of aeroplanes?
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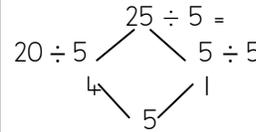
See NCETM for more examples

Use partitioning as a strategy for halving

Half 26 =  $20 \div 2 + 6 \div 2$



Use partitioning to divide by 3, 5 and 10, using known multiplication facts to support. ,



Remainders renamed from ‘Left overs’ to formal **remainder** with **r** notation.

**Mastery check:**

Two friends share 12 sweets equally between them. How many do they each get? Write this as a division number sentence.  Make up two more sharing stories like this one.	Two friends want to buy some marbles and then share them out equally between them. They could buy a bag of 13 marbles, a bag of 14 marbles or a bag of 19 marbles. What size bag should they buy so that they can share them equally?  What other numbers of marbles could be shared equally?  Explain your reasoning.
Chocolate biscuits come in packs (groups) of 5. Sally wants to buy 20 biscuits in total. How many packs will she need to buy? Write this as a division number sentence.  Make up two more grouping stories like this one.	Complete: Half of 12 is $\square$ $\frac{1}{2}$ of 12 is $\square$ $\frac{1}{2}$ of 20 = $\square$ $\frac{1}{2}$ of 20 = $\square$

Complete: Half of $\square$ is 6 $\frac{1}{2}$ of $\square$ is 6 $\frac{1}{2}$ of $\square$ = 5 $\frac{1}{2}$ of $\square$ = 15 20 children are in a class and $\frac{1}{2}$ are girls. How many are boys?	Complete: Half of $\square$ is 6 $\frac{1}{2}$ of $\square$ is 6 $\frac{1}{2}$ of $\square$ = 5 $\frac{1}{2}$ of $\square$ = 15
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See NCETM for more examples

largest fact I know about the 3x table which will help me to solve this problem?’

“I know that  $3 \times 10 = 30$   
I can partition 4-8 into 30 and 18 now”

Encourage the use of jottings to support this.

$30 \div 3 = 10$   
 $18 \div 3 = 6$

“So  $48 \div 3 = 16$ ”

**Mastery check:**

The following problems can be solved by using the calculation $8 \div 2$ . True or false? <ul style="list-style-type: none"> <li>■ There are 2 bags of bread rolls that have 8 rolls in each bag. How many rolls are there altogether?</li> <li>■ A boat holds 2 people. How many boats are needed for 8 people?</li> <li>■ I have 8 pencils and give 2 pencils to each person. How many people receive pencils?</li> <li>■ I have 8 pencils and give 2 away. How many do I have left?</li> </ul>	Sam is planting onions in the vegetable plot in his garden. He arranges the onions into rows of 4 and has two left over. He then arranges them into rows of 3 and has none left over. How many onions might he have had?  Explain your reasoning.
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See NCETM for more examples



## Newdale Primary school Maths Calculation Policy – Division

Year 4	Year 5	Year 6
<p>KPI: Know division facts corresponding to 12 x 12.</p> <p>Use place value, known and derived facts to divide mentally, including dividing by 1.</p> <p>Divide any integer/whole number up to 1000 by 10 e.g. <math>900 \div 10 = 90</math> because the digits move one place to the right</p> <p>Understand how fractions relate to division <math>1/3</math> of 12 is the same as <math>12 \div 3</math></p> <p>Solve problems involving increasingly harder fractions to calculate quantities and fractions to divide quantities, including non-unit fractions where the answer is a whole number.</p> <p>Recognise that hundredths arise when dividing an object by 100 and dividing tenths by 10.</p> <p>Find the effect of dividing a 1 or 2 digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.</p> <p>Begin to recognise that division is non-commutative/must be done in the correct order.</p> <p>Know that a number divided by 0 does not change.</p> <p>Introduce blank arrays to support division for <math>HTU \div U =</math></p>	<p>KPI: Solve problems involving division where larger numbers are used by decomposing them into their factors.</p> <p>Use the relationship between multiplication and division and multiplication facts to 12 x 12</p> <p>Mentally divide up to 10,000 by 10 and 100.</p> <p>Divide whole numbers and those involving decimals by 10, 100 and 1000.</p> <p>Divide numbers up to 4 digits by a 1 digit number, using the formal written method for short division and interpret remainders in the context of the question.</p> <p>Solve problems involving a combination of division, multiplication, addition and subtraction, understanding the meaning of the equals sign.</p> <p><u>Find remainders and express it as a fraction or decimal.</u> e.g. <math>22 \div 5 = 4 \text{ r } 2</math> <math>= 4 \frac{2}{5} = 4 \frac{4}{10} = 4.4</math></p> <p><u>Short division</u> <math>132 \div 5</math> <math>\underline{\phantom{0}26} \text{ r } 2</math> <math>5 \overline{) 132}</math></p> <p><u>Long Division of HTU Taught when short division is embedded and concept understood.</u></p> <p><math>432 \div 15</math> <math>\underline{\phantom{0}28}</math> <math>15 \overline{) 432}</math> <math>\underline{300} \quad 20 \times 15</math> <math>\phantom{0}132</math> <math>\underline{120} \quad 8 \times 15</math> <math>\phantom{00}12</math></p>	<p>KPI: Divide numbers up to 4 digits by a 2 digit whole number using the formal written method of long division.</p> <p>Divide numbers up to 4 digits by a 2 digit whole number and interpret remainders as whole number remainders, fractions or by rounding, as appropriate for the context.</p> <p>Associate fractions with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. 3/8)</p> <p>Use written division methods in cases where the answer has up to 2 decimal places.</p> <p>Express remainders as fractions and decimals.</p> <p>Explain the effect of dividing by 1000</p> <p>Divide proper fractions by whole numbers e.g. <math>1/3 \div 2 = 1/6</math></p> <p>Children progress to decimal notation.</p> <p>Remainder to also be recorded as a fraction or decimal.</p> <p>Ensure children have a good understanding of place value</p> <p><u>Long Division</u></p> <p><math>\underline{\phantom{0}29}</math> <math>16 \overline{) 144}</math> <math>\underline{32}</math> bring 4 down <math>\phantom{0}144</math> <math>\underline{-64}</math> (<math>16 \times 9 = 144</math>) <math>\phantom{00}0</math></p>



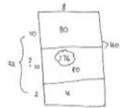
# Newdale Primary school Maths Calculation Policy – Division

### Using the blank array

Suppose you want to figure out  $176 \div 8$ . We can set this up as an array with the value of one side missing.



Using known multiplication facts the value of the missing side can be built up.



So the child can see that 22 lots of 8 is the same as 176.

Introduce short division when the divisor is less than 12.

Have a look at the calculation:  $8,640 \div 15$

$$\begin{array}{r} 15 \overline{) 8640} \\ \underline{15} \phantom{0} \\ 11 \phantom{0} \end{array}$$

15 into 8 doesn't go, so look at the next digit.

$$\begin{array}{r} 5 \\ 15 \overline{) 8640} \\ \underline{75} \phantom{0} \\ 11 \phantom{0} \end{array}$$

15 goes into 86 five times, so put a 5 above the 6.  
 $15 \times 5 = 75$

Take that 75 away from the 86 to get your remainder.  
 $86 - 75 = 11$

$$\begin{array}{r} 57 \\ 15 \overline{) 8640} \\ \underline{75} \phantom{0} \\ 114 \\ \underline{105} \phantom{0} \\ 9 \phantom{0} \end{array}$$

Next, carry the 4 down to make 114.

15 goes into 114 seven times, so put a 7 above the 4.  
 $15 \times 7 = 105$

Take 105 from the 114 to get your remainder.  
 $114 - 105 = 9$

$$\begin{array}{r} 576 \\ 15 \overline{) 8640} \\ \underline{75} \phantom{0} \\ 114 \\ \underline{105} \phantom{0} \\ 90 \\ \underline{90} \\ 0 \end{array}$$

Carry the 0 down to make 90

15 goes into 90 exactly 6 times, so put a 6 above the 0

$15 \times 6 = 90$

$$8,640 \div 15 = 576$$

<http://downloads.bbc.co.uk/skillswise/maths/mal2pape/factsheet/mal2pape-ll-f-long-division.pdf>

$$\begin{array}{r} \phantom{0}64r18 \\ 21 \overline{) 1362} \\ \underline{102} \phantom{0} \\ 34 \\ \underline{28} \phantom{0} \\ 60 \\ \underline{63} \\ 18 \end{array}$$

bring 2 down  
(21x4 = 84)