

Planning Overview
Year 1 Multiplication and Division

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.

1NF-2 Count forwards and backwards in multiples of 2, 5 and 10, up to 10 multiples, beginning with any multiple, and count forwards and backwards through the odd numbers.

	Teaching and Learning
Introduction	<p>What do children already know? Have children experienced working with money? Numicon? Can they add two things that are the same? Have they noticed the special case where the 2 parts are the same during part whole model work in composition? Have they used the terms doubles and halves in practical play-based activities?</p> <p>How can they show this with resources or on paper? What happens when you add two of something together? Have key words on card displayed or on the tables, double, half, 2 lots, odd, even, more, less, bigger, smaller, equal. What language are they able to use when you ask open ended questions?</p> <p>How can you share a number between 2?</p> <p>Talk to the children about doubling and halving. Can you show me double 2? What do you notice when you are doubling/halving?</p> <p>Do any children already make links to odd and even numbers taught in PV beyond 20?</p>
Doubling	<p>Use a mirror to show doubling with practical objects. Make a tower of 3 put a mirror next to it, what do you see now?</p> <p>Take a number (numeral, tower, numicon piece) and double it.</p> <p>Sort pictures into doubles/not doubles.</p> <p>What do you need to add to this picture to make it a double?</p> <div style="background-color: #008080; color: white; text-align: center; padding: 2px; margin: 10px 0;">Mastery</div> <p><i>Ask pupils to use concrete objects to answer questions such as:</i></p> <ul style="list-style-type: none"> ■ What is double 4? ■ What is half of 6? <p>Complete range of closed questions to ensure the children are secure. Do they know any doubles facts off by heart? (part of Number ELG at end of Reception)</p>

	<p>Link these to doubling Function Machines – If 10 came out, what went in?</p> <p>Investigate patterns within doubles using numicon or Cuisenaire rods. Look at the numbers on either side.</p> <p>What’s the same? What’s different? Double 1 = 2 Double 2 = 4 Double 3 = 6 Double 4 = 8</p>  <p>Can you explain with Numicon why all the numbers don’t appear on the right-hand side?</p> <p>Can children explain that as the starting number increases by one the right-hand side increases by 2. Can they explain that the answers are all even?</p>
<p>Halving</p>	<p>Practical – Sets of objects like sweets, which sets can we share equally between two? Show on part whole models.</p> <p>Link to Numicon and investigate halving the different Numicon plates. Sort them into plates that can be halved and those that can’t. What do you notice? Which numbers do they represent? Why do you think these are called odd? Why are the even plates called even?</p> <p>Complete Half of 6 etc</p> <div style="background-color: #008080; color: white; text-align: center; padding: 2px;">Mastery</div> <p><i>Ask pupils to use concrete objects to answer questions such as:</i></p> <ul style="list-style-type: none"> ■ What is double 4? ■ What is half of 6? <p>Complete range of closed questions to ensure the children are secure. Do they know any facts off by heart?</p> <p>Link these to halving Function Machines – If 5 came out, what went in?</p> <div style="background-color: #008080; color: white; text-align: center; padding: 2px;">Mastery with Greater Depth</div> <p>Captain Conjecture says, ‘I can double any number, but I can only halve some numbers.’ Do you agree? Explain your reasoning.</p> 

<p>Counting in twos, fives and tens.</p>	<p>This is part of the place value curriculum but will need to be recapped here so that children can apply this to solve problems efficiently.</p> <p>Count to 20 – Raise and lower arms as counting – louder on raised numbers e.g. raise right hand for the even numbers. Highlight on 100 square to look at pattern. Look at same pattern as you move a counter on Gattegno chart too.</p> <p>Build adding 2s using counters/numicon/objects that come in pairs e.g. bike wheels, pairs of shoes and discuss pattern. Why isn't 3 in our twos count?</p> <p>Use counting in 2s to find totals for sets of objects e.g. socks more efficiently by grouping them into pairs.</p> <p>Repeat for pictures of objects – circling pairs and counting in 2s.</p> <p>Complete number sequences going up in 2s.</p> <p>Repeat the above steps for 5s and 10s</p> <p>Make links between the multiples in the different sequences e.g. investigate link between 5s and 10s using numicon</p> <div style="background-color: #008080; color: white; text-align: center; padding: 2px; margin: 10px 0;">Mastery</div> <p>Anna is counting in fives: 5, 10, <input type="text"/>, 20, <input type="text"/>, <input type="text"/>, ...</p> <p>Fill in the missing numbers.</p> <p>Anna says if she keeps on counting in fives she will say the number 54. Is she right or wrong?</p> <p>Can you explain?</p> <div style="background-color: #008080; color: white; text-align: center; padding: 2px; margin: 10px 0;">Mastery with Greater Depth</div> <p>If you counted back from 50 in tens, would you say 0?</p> <p>Can you explain?</p> <hr style="width: 40%; margin-left: 0;"/> <p>If I start on 0 and count on in fives will I say the number 55?</p> <p>If I start on 4 and count on in twos will I say the number 17?</p> <p>If I start at 10 and count on in tens will I say 100?</p>
<p>Making equal groups</p>	<p>Introduce language of 'groups of'</p> <p>Split sets of objects into groups. Which groups are equal?</p>

Begin to make sure groups are equal – link back to doubles which is 2 equal groups – now going to make different quantities of equal groups

Represent 3 groups of 5 with resources such as numicon or counters. Just focus on the language and representation initially rather than finding the total.

Give an accurate 'groups of' sentence for a given representation

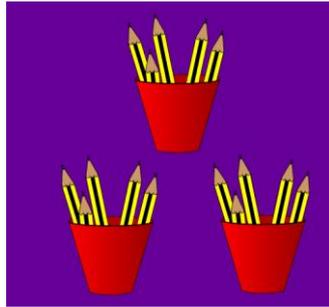


Image taken from Gordon's Multiplication game on Topmarks

<https://www.topmarks.co.uk/Flash.aspx?f=multiplication>

Draw a representation for a 'groups of' statement.

Move onto finding the total by using objects or drawing pictures to support the calculation and counting in ones to find the answer.

Extend to word problems in contexts where the term 'groups of' is not used specifically. You may want to adapt the mastery question to focus on 2s, 5s and 10s.

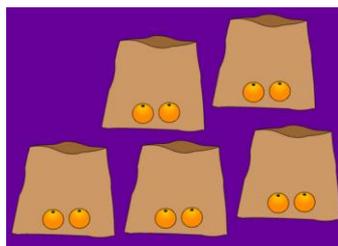
Mastery

Ali buys 3 bags of apples. Each bag has 4 apples in it.
How many apples does he buy?

Applying counting in 2s 5s and 10s to solve 'groups of' problems

Look at the specific situation where the groups being made are groups of 2, 5 or 10. Link the idea of groups of problems with the idea of counting in different multiples. Count in these steps rather than counting in ones to calculate the answer more efficiently.

How many oranges in the bags?



Look at word problems where children can count in different multiples to solve them. How many fingers are there on 5 gloves? What multiple can you count in to help you? How can you keep track of the number of gloves?

If I knock down all the skittles each time and I have 3 goes, what will my score be?



Mastery

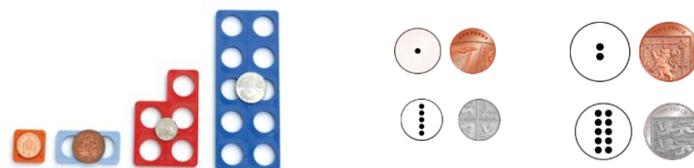
Show pupils pictures or groups of objects like the examples below. Ask questions such as 'How many biscuits are there altogether?' 'How many cherries are there altogether?'

Observe how pupils count the objects. Do they count in twos, fives etc. or do they count in ones?

Applying counting in 2s 5s and 10s and unitising to solve money problems

Introduce the children to just the 1p 2p 5p and 10p coins if they have not done the Y1 money unit yet. This is the first time that a single object will represent a whole group – a concept known as unitising. i.e. a 5p coin represents 5 pennies but you can't see the fiveness of 5p by looking at the single coin. Make sure children understand the equivalence of each coin to that many pennies.

Some children may find it useful to attach coins to numicon or to have tokens with dots on initially so that this fiveness can still be seen.



(Money token images taken from NCETM – professional development materials)

Introduce money word problems involving repeated groups of 2p 5p and 10p coins.

How can you buy a 10p toy using only one type of coin? Can you think of more than one solution?

Chews cost 2p each. How much do three chews cost?

	<p>Sweets cost 5p each, Emma says that the total of her sweets was 19p. Can she be correct?</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center; background-color: #00a0a0; color: white; padding: 2px;">Mastery</p> <p>Show 19p using only 2p, 5p and 10p coins.</p> <p>Find three different ways to do it.</p> <div style="display: flex; justify-content: center; gap: 20px;">    </div> </div> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center; background-color: #00a0a0; color: white; padding: 2px;">Mastery with Greater Depth</p> <p>Using only 2p, 5p and 10p coins, can you show 20p?</p> <p>In how many different ways can you do this?</p> <p>Are you sure you have got them all?</p> <p>Explain how you know.</p> </div>
<p>Repeated addition</p>	<p>Introduce repeated addition as a way to represent equal groups – link back to doubles notation</p> <p>Represent $5+5+5$ using numicon or counters moving onto drawing pictures.</p> <p>Record repeated addition sentence for a given picture or sets of objects.</p> <p>Use repeated addition sentences to show how you calculated answers to word problems.</p>
<p>Arrays</p>	<p>Introduce arrays as a special organised way of making groups. Show how there are groups going across and down.</p> <p>Look at arrays in the environment e.g. egg boxes, bun tins, numicon Can you write the number sentences to describe them?</p> <p>Can you make an array to represent a groups of statement or repeated addition number sentence?</p> <p>Can you use an array to solve a word problem?</p> <p>Link arrays to repeated additions and simple word stories like those in the table below.</p> <p>Coloured dot stickers can be good for representing arrays.</p>

	Word problem	Array	Calculation	Answer
	How many wheels on 4 bikes?		$2+2+2+2$	8
			$2+2$	4
			$2+2+2+2+2+2$	
	6 bags of apples, 2 in each bag			12
<p style="text-align: center;">Mastery</p> <p><i>Show pupils pictures or groups of objects like the examples below. Ask questions such as 'How many biscuits are there altogether?' 'How many cherries are there altogether?'</i></p> <p><i>Observe how pupils count the objects. Do they count in twos, fives etc. or do they count in ones?</i></p> <div style="text-align: center;">  </div>				
<p>Division by Sharing</p>	<p>Link back to the sharing between two as halving at the beginning of the unit.</p> <p>Encourage children to solve practical problems involving sharing between more than 2 people.</p> <p>Make sure they check that the groups are equal at the end to check that they have shared equally.</p> <p>The answer will be the amount in one group.</p> <p>What do you notice about the numbers that we could share equally between 5 people? and 10?</p>			
<p>Division by Grouping</p>	<p>Return to the idea of equal groups from earlier using practical apparatus.</p> <p>I have 20 cubes and I put them into equal groups of 10. How many equal groups can I make? What other equal groups can I make?</p> <p>I have 8 socks, how many pairs could I make?</p> <p>Now consider a problem where you could draw a picture to show the answer. The answer is the number of groups</p>			

	<p>I want to give you all 2 stickers for your brilliant work. I have 10 stickers on each sheet. How many children can have 2 stickers each from this sheet? Draw the children and their stickers</p> <p>Draw an array to show how you would solve the problem.</p> <p>I am thinking of a number between 10 and 20. I can share it equally between 2. What could my number be?</p> <p>Which numbers can't it be? Why?</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center; background-color: #00838f; color: white; padding: 2px;">Mastery</p> <p>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?</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center; background-color: #00838f; color: white; padding: 2px;">Mastery</p> <p>I can see 10 wheels. How many bicycles?</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center; background-color: #00838f; color: white; padding: 2px;">Mastery with Greater Depth</p> <p>How else could 20 sweets be put into bags so that every bag had the same number of sweets?</p> <p>How many bags would be packed each time?</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; background-color: #00838f; color: white; padding: 2px;">Mastery with Greater Depth</p> <p>Toy aeroplanes have 5 wheels.</p> <p>How many wheels would you need to make different numbers of aeroplanes?</p> </div>
<p>Consolidation and Problem Solving</p>	<p>Range of problems linked to multiplication, division and odds/evens Are children solving problems efficiently? Can they select the most effective resource to help them?</p> <p>Nrich</p> <ul style="list-style-type: none"> • Biscuit decorations – complete practically – what will be on the ___ biscuit? • Share bears • Doubling fives • Lots of Biscuits (link to text <i>The Doorbell Rang</i> by Pat Hutchins) <p>Maths Challenges for Able Pupils Fireworks – change to 2 and 5 star trails – 20 stars in total</p>

Fireworks

Emma had some fireworks.
Some made 3 stars.
Some made 4 stars.



Altogether Emma's fireworks made 19 stars.
How many of them made 3 stars?
Find two different answers.

What if Emma's fireworks made 25 stars?
Find two different answers.

