

Y4 - Overview

	Autumn 1		Autumn 2		Spring 1		Spring 2		Summer 1		Summer 2	
Unit	1	2	3	4	5	6	7	8	9	10	11	12

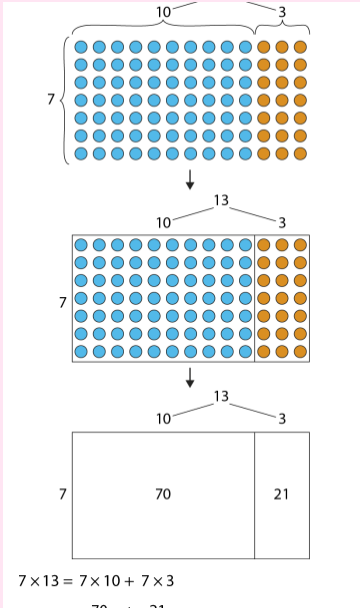
Unit 6	Understand and represent multiplicative structures (1 week)
Ready to progress	4MD-1 Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size. 4MD-2 Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication. 4MD-3 Understand and apply the distributive property of multiplication.
NCETM documents	TEACHING POINT 1 AND 2 https://www.ncetm.org.uk/media/qdif4n2k/ncetm_spine2_segment10_y4.pdf#page=25
Small steps	1.To explain what each factor represents in a multiplication equation. 2.To explain how each part of a multiplication and division equation relates to a story. 3.To explain the role and impact of zero in multiplication and division expressions. 4.To partition one of the factors in a multiplication equation using representations. 5.To explain which factor is the most efficient to partition when solving a multiplication problem.
Links	<u>Classroom Slides UP TO 68</u> https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.ncetm.org.uk%2Fmedia%2Fasyjebai%2Fcp-year-4-unit-6-understanding-and-manipulating-multiplicative-relationships.pptx&wdOrigin=BROWSELINK <u>Oak</u> - https://www.thenationalacademy/teachers/programmes/maths-primary-ks2/units/understand-and-represent-multiplicative-structures/lessons?sid-2707c8=m8ASnVgwbC&sm=0&src=3 <u>Whitrose-</u> https://assets.whitroseeducation.com/new-schemes/Y4%20Autumn%20Block%204%20SOL%20Multiplication%20and%20division%20A.pdf
Reasoning	Missing Numbers 72 = × Which pairs of numbers could go in the boxes? Explain what each factor represents in the multiplication equation. Making Links Eggs are bought in boxes of 12. You need 140 eggs. How many boxes will you need to buy? How can you use your understanding of division and multiplication to solve this? What does each number represent in this story? Use a Fact If 63 ÷ 9 = 7, what is: 126 ÷ 9 = ? 252 ÷ 7 = ? How do these calculations help you understand the division process? How does the fact about 63 ÷ 9 impact your solution? Making Links How can you use factor pairs to solve this calculation: 13 × 12 (13 × 3 × 4, 13 × 3 × 2 × 2, 13 × 2 × 6) What does each partition represent in the multiplication problem? Which one is most efficient to use? Prove It What goes in the missing box? 6 × 4 = + 12 Prove your answer. How does this equation represent the impact of multiplying and partitioning the factor 6? How Close Can You Get? ___ ___ × 7 Using the digits 3, 4, and 6, how close can you get to 4500? What is the largest product? What is the smallest product? How do you think about multiplying by 7 and partitioning the factors to find these answers? Always, Sometimes, Never? Is it always, sometimes, or never true that an even number that is divisible by 3 is also divisible by 6? Is it always, sometimes, or never true that the sum of four even numbers is divisible by 4? How does the role of zero in multiplication or division impact these answers? Use the Inverse Use the inverse to check if the following calculations are correct: 23 × 4 = 92 117 ÷ 9 = 14 How does using the inverse help you verify the accuracy of these operations? Size of an Answer Will the answer to the following calculations be greater or less than 300? 152 × 2 = 78 × 3 = 87 × 3 = 4 × 74 = How can you partition the factors in these problems to estimate the answers? What role does zero or splitting the factors play in solving these?

Unit 6	Understanding and manipulating multiplicative relationships
Problem solving	CLICK HERE
Glossary	- Factor - A factor is a whole number which divides exactly into another whole number. - Product - A product is the result of two or more numbers being multiplied. - Commutative - In addition and multiplication, numbers may be added or multiplied together in any order. This is called commutativity. - Dividend - The dividend is the number being divided. - Divisor - The divisor is a number that will divide exactly. - Quotient - The quotient is the results of the dividend being divided by the divisor. - Multiples - A multiple is the product of a number and an integer. - Partition - Partitioning is the act of splitting an object or value down into smaller parts. - Distributive Law - The distributive law says that multiplying a number by a group of numbers added together is the same as doing each multiplication separately.
Stem sentences	The product of ____ and ____ is equal to the product of ____ and ____. _____ times is equal to _____ times . The product in the multiplication equation has the same value as the dividend in the matching division equation. The factors in the multiplication equation have the same value as the divisor and quotient in the matching division equation. When zero is a factor, the product is zero. We should never write a calculation where the divisor is zero. When the dividend is zero, the quotient is zero. _____ is equal to ____ plus____, so _____ times ____ is equal to ____ times____ plus _____ times ____ . _____ is equal to ____ minus____,so _____ times ____ is equal to ____ times ____ minus _____ times ____ .
Representations	$3 \times 5 = 15$ $5 \times 3 = 15$ $15 \div 5 = 3$ Linking addition/subtraction of one multiple to partitioning – part-part-whole and equations: 5×8 8 8 8 8 8 $5 = 4 + 1$ $5 \times 8 = 4 \times 8 + 1 \times 8$ $= 32 + 8$ $= 40$ <i>'Five is equal to four plus one, so five times eight is equal to four times eight plus one times eight.'</i> $4 = 5 - 1$ $4 \times 8 = 5 \times 8 - 1 \times 8$ $= 40 - 8$ $= 32$ <i>'Four is equal to five minus one, so four times eight is equal to five times eight minus one times eight.'</i> Linking addition/subtraction of one multiple to partitioning – stacked number lines: 0 1 2 3 4 5 0 8 16 24 32 40 Adding one multiple: 0 8 16 24 32 40 $+8$  $5 \times 8 = 4 \times 8 + 8$ Subtracting one multiple: 0 8 16 24 32 40 -8  $4 \times 8 = 5 \times 8 - 8$

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Unit 6	Apply the distributive law to multiplication (1 WEEK)
Ready to progress	4MD-1 Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size. 4MD-2 Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication. 4MD-3 Understand and apply the distributive property of multiplication.
NCETM documents	TEACHING POINT 3 https://www.ncetm.org.uk/media/qdif4n2k/ncetm_spine2_segment10_y4.pdf#page=25
Small steps	1.To use knowledge of the distributive law to solve two-part addition problems efficiently. 2.To use knowledge of the distributive law to solve two-part subtraction problems efficiently. 3.To use knowledge of the distributive law to calculate products using known times tables. 4.To use knowledge of the distributive law to calculate products beyond known times tables efficiently. 5.To use knowledge of the distributive law to solve problems in different contexts efficiently.
Links	<u>Classroom Slides 68 TO 77</u> https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.ncetm.org.uk%2Fmedia%2Fasyjebai%2Fcp-year-4-unit-6-understanding-and-manipulating-multiplicative-relationships.pptx&wdOrigin=BROWSELINK <u>Oak</u> - https://www.thenationalacademy/teachers/programmes/maths-primary-ks2/units/apply-the-distributive-law-to-multiplication/lessons?sid-8a93da=sGQurUKcDO&sm=0&src=3 <u>Whiterose</u> - https://assets.whiteroseeducation.com/new-schemes/Y4%20Autumn%20Block%204%20SOL%20Multiplication%20and%20division%20A.pdf
Reasoning	Missing Numbers 72 = × Which pairs of numbers could go in the boxes? Explain what each factor represents in the multiplication equation. How does the distributive law help break this down into smaller, easier calculations? Making Links Eggs are bought in boxes of 12. You need 140 eggs. How many boxes will you need to buy? How can you use your understanding of division and multiplication, along with the distributive law, to solve this? What does each number represent in this story? Use a Fact If 63 ÷ 9 = 7, what is: 126 ÷ 9 = ? 252 ÷ 7 = ? How do these calculations help you understand the division process? How does the fact about 63 ÷ 9 help you use the distributive law to simplify similar problems? Making Links How can you use factor pairs to solve this calculation: 13 × 12 (13 × 3 × 4, 13 × 3 × 2 × 2, 13 × 2 × 6) What does each partition represent in the multiplication problem? Which one uses the distributive law most effectively? Which strategy is most efficient? Prove It What goes in the missing box? 6 × 4 = + 12 Prove your answer. How does this equation represent the impact of multiplying and partitioning the factor 6? How does the distributive law help you break down this multiplication? How Close Can You Get? ___ ___ ___ × 7 Using the digits 3, 4, and 6, how close can you get to 4500? What is the largest product? What is the smallest product? How can the distributive law help you efficiently calculate these products using the factors of 7? Always, Sometimes, Never? Is it always, sometimes, or never true that an even number that is divisible by 3 is also divisible by 6? Is it always, sometimes, or never true that the sum of four even numbers is divisible by 4? How does the distributive law apply to your reasoning here, especially when considering even numbers or divisibility? Use the Inverse Use the inverse to check if the following calculations are correct: 23 × 4 = 92 117 ÷ 9 = 14 How does using the inverse, along with the distributive law, help you verify the accuracy of these operations? Size of an Answer Will the answer to the following calculations be greater or less than 300? 152 × 2 = 78 × 3 = 87 × 3 = 4 × 74 = How can you use the distributive law to estimate the answers more efficiently? What role does partitioning the factors play in simplifying these problems?

Unit 6	Apply the distributive law to multiplication (1 WEEK)				
Problem solving	CLICK HERE 				
Glossary	- Factor - A factor is a whole number which divides exactly into another whole number. - Product - A product is the result of two or more numbers being multiplied. - Multiples - A multiple is the product of a number and an integer. - Partition - Partitioning is the act of splitting an object or value down into smaller parts. - Distributive Law - The distributive law says that multiplying a number by a group of numbers added together is the same as doing each multiplication separately. - Common factors - When we compare lists of factors of two or more numbers, any factors that are the same are the common factors. - Partition - Partitioning is the act of splitting an object or value down into smaller parts. - Partial product - A partial product is any of the multiplication results we get leading up to an overall multiplication result. - Polygon - A polygon is a 2D shape made up of 3 or more straight lines.				
Stem sentences					
Representations	 $7 \times 13 = 7 \times 10 + 7 \times 3$ $70 + 21 = 91$ Working flexibly and efficiently – example 1: <table><tr><th colspan="2">$6 \times 18 = ?$</th></tr><tr><td>$6 \times 18 = 6 \times 10 + 6 \times 8$ $= 60 + 48$ $= 108$</td><td>$6 \times 18 = 6 \times 20 - 6 \times 2$ $= 120 - 12$ $= 108$</td></tr></table>	$6 \times 18 = ?$		$6 \times 18 = 6 \times 10 + 6 \times 8$ $= 60 + 48$ $= 108$	$6 \times 18 = 6 \times 20 - 6 \times 2$ $= 120 - 12$ $= 108$
$6 \times 18 = ?$					
$6 \times 18 = 6 \times 10 + 6 \times 8$ $= 60 + 48$ $= 108$	$6 \times 18 = 6 \times 20 - 6 \times 2$ $= 120 - 12$ $= 108$				

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Unit 6	Understand what happens when a number is multiplied or divided by 10 and 100 (3 WEEKS)
Ready to progress	4MD-1 Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size. 4MD-2 Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication. 4MD-3 Understand and apply the distributive property of multiplication.
NCETM documents	WHOLE DOCUMENT https://www.ncetm.org.uk/media/g30d2vg5/ncetm_spine2_segment13_y4.pdf#page=4
Small steps	1.To explain the relationship between multiplying a number by 10 and multiples of 10. 2.To understand that multiplying by 10 makes a number ten times the size. 3.To use place value to explain placing a zero after the final digit when we multiply whole numbers by 10. 4.To understand that dividing a number by 10 makes it one-tenth times the size. 5.To use place value to explain removing the zero in the ones from a multiple of ten when we divide by 10. 6.To explain the relationship between multiplying a number by 100 and multiples of 100. 7.To explain the use of placeholders when multiplying whole numbers by 100. 8.To explain the removal of placeholders when dividing whole numbers by 100. 9.To use knowledge of the composition of 100 to multiply and divide by 100 in different ways. 10.To explain how making a factor 10 times the size affects the product. 11.To explain how making the dividend 10 times the size affects the quotient. 12.To explain how making a factor 100 times the size affects the product. 13.To explain how making the dividend 100 times the size affects the quotient. 14.To scale known multiplication facts by 100. 15.To scale division facts derived from multiplication facts by 100
Links	Classroom Slides 77 TO THE END https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.ncetm.org.uk%2Fmedia%2Fasyjebai%2Fcp-year-4-unit-6-understanding-and-manipulating-multiplicative-relationships.pptx&wdOrigin=BROWSELINK Oak - https://www.thenationalacademy/teachers/programmes/maths-primary-ks2/units/apply-the-distributive-law-to-multiplication/lessons?sid-8a93da=sGQurUKcDO&sm=0&src=3 Whiterose - https://assets.whiteroseeducation.com/new-schemes/Y4%20Autumn%20Block%204%20SOL%20Multiplication%20and%20division%20A.pdf
Reasoning	Missing Numbers 72 = × Which pairs of numbers could go in the boxes? Explain how multiplying by 10 or 100 would affect the size of the product. How does place value play a role here? Making Links Eggs are bought in boxes of 12. I need 140 eggs. How many boxes will I need to buy? How can you use your knowledge of place value to multiply or divide by 10 or 100 to solve this problem? Use a Fact If 63 ÷ 9 = 7, what is: 126 ÷ 9 = ? 252 ÷ 7 = ? How can scaling the division facts by 10 or 100 help you solve these problems more efficiently? Making Links How can you use factor pairs to solve this calculation: 13 × 12 (13 × 3 × 4, 13 × 3 × 2 × 2, 13 × 2 × 6) What does scaling the factors by 10 or 100 do to the product? Prove It What goes in the missing box? 6 × 4 = + 12 How does multiplying by 10 or 100 change the result in a similar equation? How Close Can You Get? Using the digits 3, 4, and 6, fill in the boxes: ___ ___ ___ × 10 How close can you get to 4500? What is the largest product? What is the smallest product? Always, Sometimes, Never? Is it always, sometimes, or never true that an even number divisible by 10 is also divisible by 100? What happens when you divide a number by 10 or 100? Use the Inverse Check: 23 × 10 = 230 117 ÷ 10 = 11.7 How does using multiplication and division facts by 10 or 100 help you verify these calculations? Size of an Answer Will the answer to the following calculations be greater or less than 300? 152 × 10 = 78 × 10 = 87 × 10 = 4 × 100 = How does multiplying by 10 or 100 scale the answer in each case?

Unit 6

Understand what happens when a number is multiplied or divided by 10 and 100
(3 WEEKS)

Problem solving

CLICK HERE

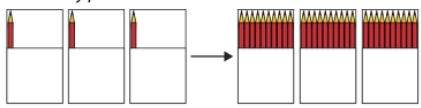
- Glossary
- Multiple - A multiple is the result of multiplying a number by another whole number.
 - Digit - A digit is one of the symbols of a number system. In our number system we use the digits 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9
 - Scaling - Scaling is when a given quantity is made ___ times the size.
 - Inverse - Inverse means the opposite in effect or the reverse of
 - Placeholder - A placeholder is where we use the digit zero to hold a place in a number and maintain place value.
 - Magnitude - The magnitude of a number is its distance from zero.

Stem sentences

For every one pencil of Emily's Jamie has ten.
___ multiplied by ten is equal to ___
___ is ten times the size of ___
To find ten times as many , multiply by ten.
All multiples of ten have a ones digit of zero
When a number is multplied by 10, the product is a multiple of 10.
To multiply a whole number by ten, place a zero after the final digit of that number.
Think of _____ and make it 10 times the size.
Think of _____ and multiply by 10.
_____ divided by ten is equal to _____ .
To find the inverse of 10 times as many, divide by 10.
To divide a multiple of ten by ten, remove the zero from the ones place.
Think of _____ and make it a hundred times the size.
Think of _____ and multiply by 100.
_____ multiplied by one hundred is equal to _____
_____ is one hundred times the size of _____
_____ people is one hundred times as many as _____ people. There are _____ people in the cinema.
To find one hundred times as many, multiple by one hundred.
All multiples of one hundred have both a tens and ones digit of zero.
When a number is multiplied by one hundred, the product is a multiple of one hundred.
To multiply a whole number by 100, place two zeros after the final digit of that number.
_____ divided by one hundred is equal to _____
To find the inverse of one hundred times as many, divide by one hundred.
To divide a multiple of one hundred by one hundred, remove two zeros (from the tens and ones place.)
Multiplying by one hundred is equivalent to multiplying by ten, and then multiplying by ten again.
Dividing by one hundred is equivalent to dividing by ten, and then dividing by ten again.
If one factor is made ten times the size, the product will be ten times the size.
If the dividend is made ten times the size, the quotient will be ten times the size.
If the dividend is made one hundred times the size, the quotient will be one hundred times the size.

Representations

Multiplicand = 3; multiplier = 10:
*'Emily has three pencils; Jamie has ten times as many.
How many pencils does Jamie have?'*



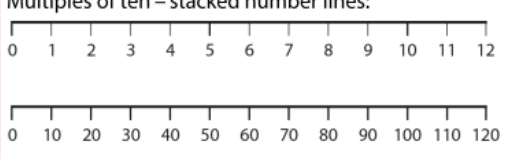
- 'For every one pencil of Emily's, Jamie has ten.'*
- 'Think of "3" and make it ten times the size.'*
- 'Think of "3" and multiply by ten.'*

3×10

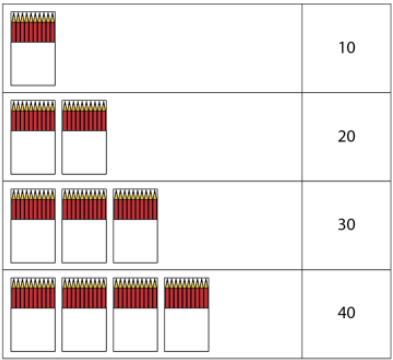
'Three multiplied by ten is equal to thirty.'

$3 \times 10 = 30$

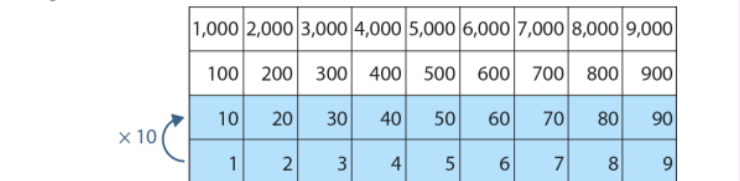
Multiples of ten – stacked number lines:



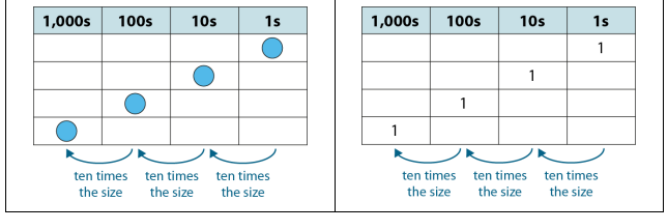
Multiples of ten – contextual:



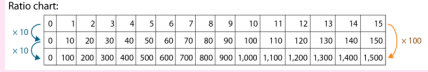
Gattegno chart:



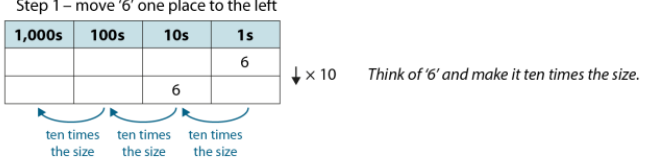
Place-value chart – movement is magnitude (ten times the size):



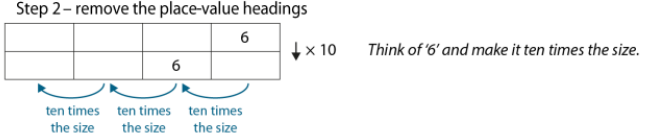
Ratio chart:



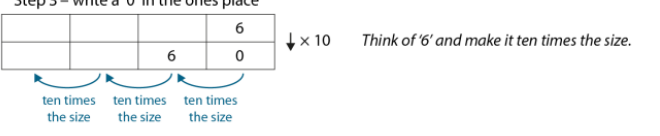
Step 1 – move '6' one place to the left



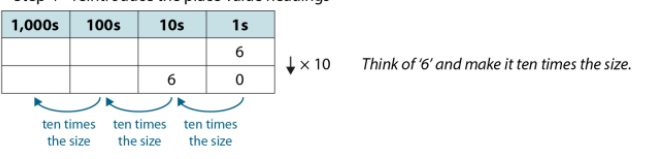
Step 2 – remove the place-value headings



Step 3 – write a '0' in the ones place

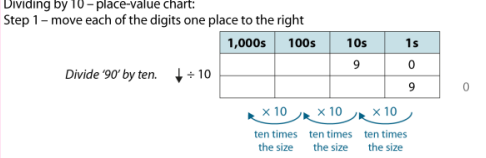


Step 4 – reintroduce the place-value headings

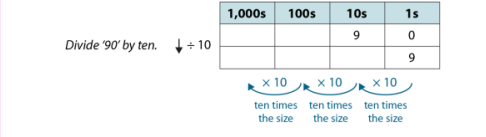


Dividing by 10 – place-value chart:

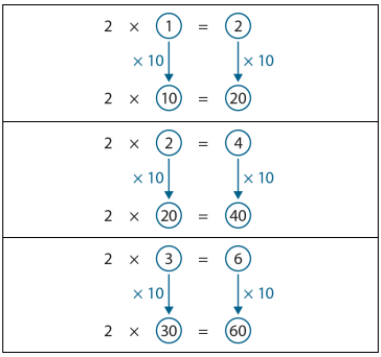
Step 1 – move each of the digits one place to the right



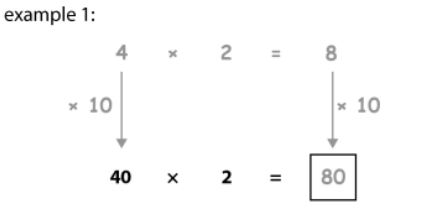
Step 2 – remove zero



Making the second factor ten times the size – set 2:



Making the first factor 10 times the size – example 1:



Making the dividend ten times the size:

