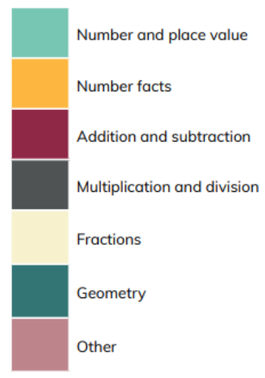
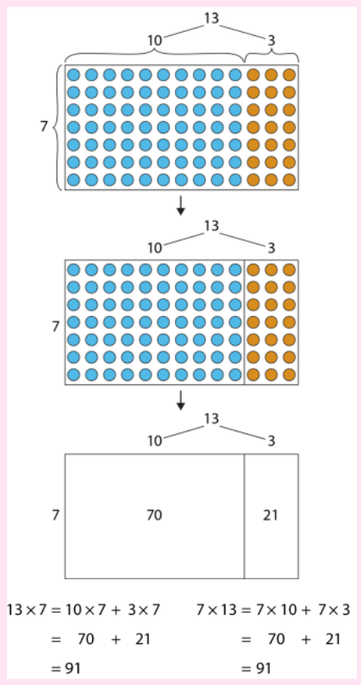
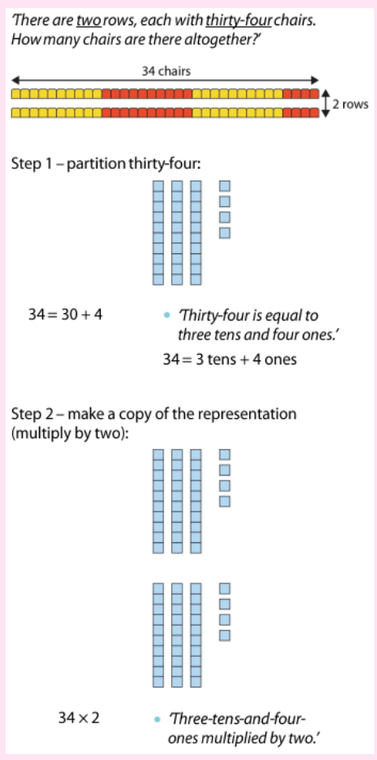
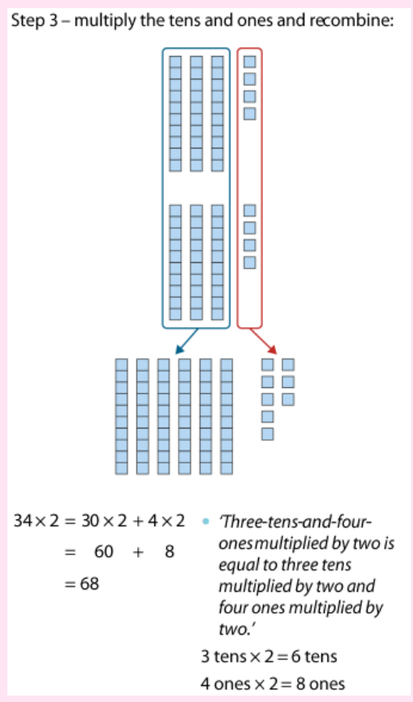
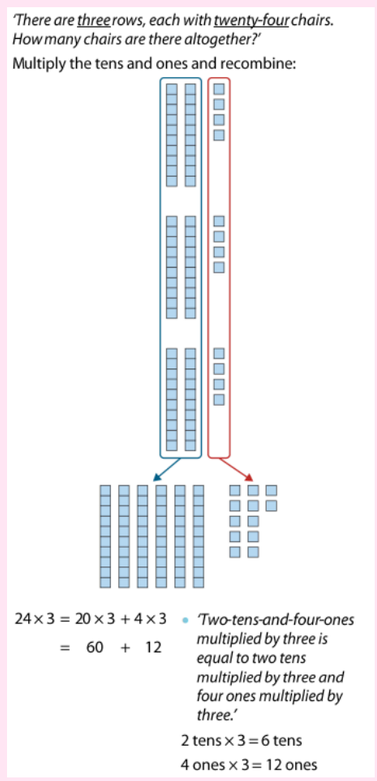
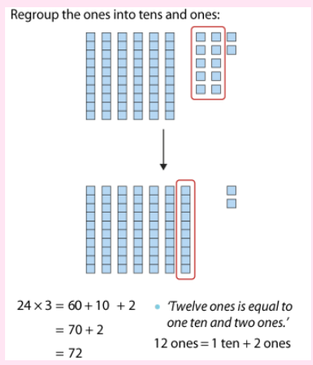
Y5- Overview

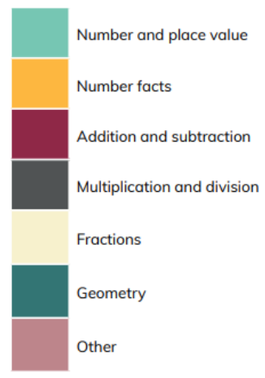


Spring 1	Multiplication by partitioning leading to short multiplication (2 by 1-digit) (2 weeks)
Ready to progress	) RtPs 5NPV-1 Know that 10 tenths are equivalent to 1 one, and that 1 is 10 times the size of 0.1. Know that 100 hundredths are equivalent to 1 one, and that 1 is 100 times the size of 0.01. Know that 10 hundredths are equivalent to 1 tenth, and that 0.1 is 10 times the size of 0.01. 5NPV-2 Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and non-standard partitioning. 5NPV-3 Reason about the location of any number with up to 2 decimals places in the linear number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each. 5NPV-4 Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts.
NCETM documents	TEACHING POINTS 1 AND 2 https://www.ncetm.org.uk/media/0jwnhlyk/ncetm_spine2_segment14_y4.pdf#page=4
Small steps	• To multiply a 2-digit number by a 1-digit number using partitioning and representations (one regroup). • To multiply a 2-digit number by a 1-digit number using partitioning and representations (two regroups). • To multiply a 2-digit number by a 1-digit number using partitioning. • To multiply a 2-digit number by a 1-digit number using expanded multiplication (no regroups). • To multiply a 2-digit number by a 1-digit number using short multiplication (no regroups). • To multiply a 2-digit number by a 1-digit number using expanded multiplication (regrouping 1s to 10s). • To multiply a 2-digit number by a 1-digit number using short multiplication (regrouping 1s to 10s). • To multiply a 2-digit number by a 1-digit number using expanded multiplication (regrouping 10s to 100s). • To multiply a 2-digit number by a 1-digit number using short multiplication (regrouping 10s to 100s). • To estimate and multiply a 2-digit number by a 1-digit number using expanded and short multiplication.
Links	NCETM to slide 81-https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.ncetm.org.uk%2Fmedia%2Fangc5q52%2Fcp-year-5-unit-4-short-multiplication-and-short-division.pptx&wdOrigin=BROWSELINK OAK https://www.thenational.academy/teachers/programmes/maths-primary-ks2/units/multiplication-by-partitioning-leading-to-short-multiplication-3-by-1-digit/lessons?sid-187lae=JonLDdSD7F&sm=0&src=3 WHITE ROSE https://assets.whiteroseeducation.com/new-schemes/Y5%20Spring%20Block%201%20SOL%20Multiplication%20and%20division%20B.pdf Mastery with greater depth https://www.ncetm.org.uk/media/lp0o2lgv/mastery_assessment_y5.pdf
Reasoning	Always, Sometimes, Never? Is it always, sometimes, or never true that when you multiply a 2-digit number by a 1-digit number using partitioning and representations, you will need to regroup? Try examples where you do and don't need to regroup. When does regrouping happen and why? Which is Correct? Which of these multiplication calculations is correct based on the method of partitioning (one regroup)? A) 34 × 5 = 150 B) 28 × 4 = 112 C) 46 × 3 = 148 Explain how you can use partitioning and one regroup to verify the correct answer. Use the Inverse Use the inverse to check if this calculation is correct when using expanded multiplication (no regroups): 47 × 6 = 282 What division could you do to verify your answer? How does using the inverse help check your solution? Size of an Answer The product of a 2-digit number and a 1-digit number, when using short multiplication (regrouping 1s to 10s), is between 300 and 400. What could the numbers be? Can you find two or more possible pairs of numbers that fit this condition?

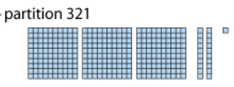
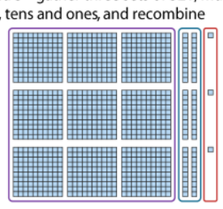
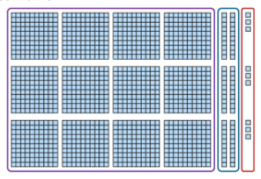
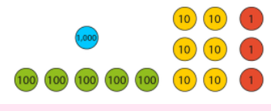
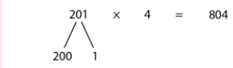
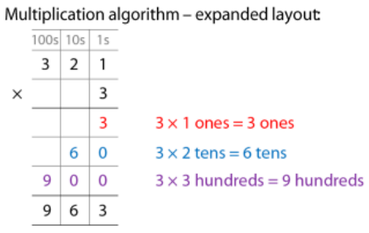
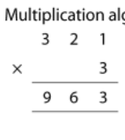
Multiplication by partitioning leading to short multiplication (2 by 1-digit)
(2 weeks)

Problem solving	Click on me
Glossary	• Array - An array is the layout of items (such as objects, numbers, etc.) arranged in rows and/or columns. • Product - The result of two or more values multiplied together. • Regroup - The process of unitising and exchanging between place values is known as regrouping • Product - The result of two or more numbers multiplied together. • Regrouping - The process of unitising and exchanging between place values. • Partial product - Any of the multiplication results we get leading up to an overall multiplication result. • Short multiplication - A way of recording using columns to set out and calculate a multiplication. • Factor - A number that divides exactly into another number. • Expanded multiplication - Expanded multiplication is a way of recording a calculation focusing on partitioning one or more factors and showing partial products. • Expanded multiplication - Expanded multiplication is a way of recording the steps focusing on partitioning one or more factors and showing partial products. • Estimation - To find a value that is close enough to the right answer, usually with some thought or calculation involved is known as estimation.
Stem sentences	If there are ten or more ones, we must regroup into tens and ones. If there are ten or more tens, we must regroup the tens into hundreds and tens.
Representations	    

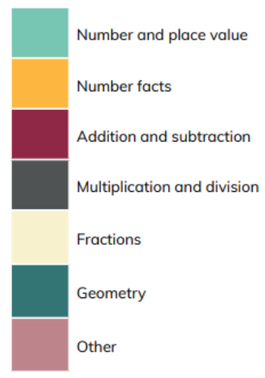
Y5- Overview



Spring 1	Multiplication by partitioning leading to short multiplication (3 by 1-digit) (1 week)
Ready to progress	RtPs 5NPV-1 Know that 10 tenths are equivalent to 1 one, and that 1 is 10 times the size of 0.1. Know that 100 hundredths are equivalent to 1 one, and that 1 is 100 times the size of 0.01. Know that 10 hundredths are equivalent to 1 tenth, and that 0.1 is 10 times the size of 0.01. 5NPV-2 Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and non-standard partitioning. 5NPV-3 Reason about the location of any number with up to 2 decimals places in the linear number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each. 5NPV-4 Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts.
NCETM documents	TEACHING POINTS 3 and 4 https://www.ncetm.org.uk/media/0jwnh1yk/ncetm_spine2_segment14_y4.pdf#page=4
Small steps	• To multiply a 3-digit number by a 1-digit number using partitioning. • To multiply a 3-digit number by a 1-digit number with no regroups. • To multiply a 3-digit number by a 1-digit number with one or two regroups. • To multiply a 3-digit number by a 1-digit number with multiple regroups. • To use estimation to support accurate calculation.
Links	NCETM to slide 54-https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.ncetm.org.uk%2Fmedia%2Fangc5q52%2Fcp-year-5-unit-4-short-multiplication-and-short-division.pptx&wdOrigin=BROWSELINK OAK https://www.thenational.academy/teachers/programmes/maths-primary-ks2/units/multiplication-by-partitioning-leading-to-short-multiplication-2-by-1-digit/lessons?sid-e51f89=ZWqXSKqY4m&sm=0&src=3 WHITE ROSE https://assets.whiteroseeducation.com/new-schemes/Y5%20Spring%20Block%201%20SOL%20Multiplication%20and%20division%20B.pdf Mastery with greater depth https://www.ncetm.org.uk/media/1p0o2lgv/mastery_assessment_y5.pdf
Reasoning	Always, Sometimes, Never? Is it always, sometimes, or never true that when you multiply a 2-digit number by a 1-digit number, you need to regroup? Try different examples with and without regrouping. What makes the regrouping necessary? Which is Correct? Which of these multiplication calculations is correct? A) 34 × 5 = 150 B) 28 × 4 = 112 C) 46 × 3 = 148 Use a method of your choice to check each one and explain. Use the Inverse Use the inverse to check if this calculation is correct: 47 × 6 = 282 What division could you do to verify your answer? Size of an Answer The product of a 2-digit number and a 1-digit number is between 300 and 400. What could the numbers be? Can you find two or more possible pairs that fit this condition?

	Multiplication by partitioning leading to short multiplication (3 by 1-digit) (1 week)
Problem solving	Click on me
Glossary	• Partition - Splitting an object or value down into smaller parts. • Partial product - Any of the multiplication results we get leading up to an overall multiplication result • Expanded multiplication - A way of recording the steps of a calculation focusing on partitioning one or more factors and showing partial products. • Short multiplication - A way of recording using columns to set out and calculate a multiplication. • Factors - Numbers we can multiply together to get another number. • Regroup - The process of unitising and exchanging between place values is known as regrouping.
Stem sentences	If there are ten or more hundreds, we must regroup the hundreds into thousands and hundreds.
Representations	321 × 3 Step 1 – partition 321  321 = 300 + 20 + 1 321 = 3 hundreds + 2 tens + 1 one Steps 2 and 3 – gather three sets of 321, multiply the hundreds, tens and ones, and recombine  3 hundreds × 3 = 9 hundreds 2 tens × 3 = 6 tens 1 one × 3 = 3 ones 321 × 3 = 300 × 3 + 20 × 3 + 1 × 3 = 900 + 60 + 3 = 60 Dienes representation of 423 × 3: Step 1 – partition 423 423 = 400 + 20 + 3 423 = 4 hundreds + 2 tens + 3 ones Steps 2 and 3 – gather three sets of 423, multiply the hundreds, tens and ones and recombine  4 hundreds × 3 = 12 hundreds 2 tens × 3 = 6 tens 3 ones × 3 = 9 ones 423 × 3 = 400 × 3 + 20 × 3 + 3 × 3 = 1200 + 60 + 9 Step 4 - regroup the hundreds into thousands and hundreds 12 hundreds = 1 thousand + 2 hundreds 423 × 3 = 1000 + 200 + 60 + 9 = 1269  Place-value counter representation of 521 × 3: Step 1 – partition 521: 521 = 500 + 20 + 1 521 = 5 hundreds + 2 tens + 1 one Steps 2 and 3 – gather three sets of 521, multiply the hundreds, tens and ones and recombine:  5 hundreds × 3 = 15 hundreds 2 tens × 3 = 6 tens 1 one × 3 = 3 ones 521 × 3 = 500 × 3 + 20 × 3 + 1 × 3 = 1500 + 60 + 1 Step 4 - regroup the hundreds into thousands and hundreds 15 hundreds = 1 thousand + 5 hundreds 521 × 3 = 1000 + 500 + 60 + 3 = 1563  Example 1:  200 × 4 = 800 1 × 4 = 4 800 + 4 = 804 Example 2: 427 × 3 = 400 × 3 + 20 × 3 + 7 × 3 = 1200 + 60 + 21 = 1281 Multiplication algorithm – expanded layout:  Multiplication algorithm – compact layout: 

Y5- Overview



Spring 1	Division by partitioning leading to short division (2 and 3-digits by 1-digit) (3 weeks)
Ready to progress	RtPs 5NPV-1 Know that 10 tenths are equivalent to 1 one, and that 1 is 10 times the size of 0.1. Know that 100 hundredths are equivalent to 1 one, and that 1 is 100 times the size of 0.01. Know that 10 hundredths are equivalent to 1 tenth, and that 0.1 is 10 times the size of 0.01. 5NPV-2 Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and non-standard partitioning. 5NPV-3 Reason about the location of any number with up to 2 decimals places in the linear number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each. 5NPV-4 Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts.
NCETM documents	WHOLE DOCUMENT https://www.ncetm.org.uk/media/cu1an3e2/ncetm_spine2_segment15_y4.pdf#page=4
Small steps	• To divide a 2-digit number by a 1-digit number using partitioning and representations (no remainders). • To divide a 2-digit number by a 1-digit number using partitioning (with regrouping). • To divide a 2-digit number by a 1-digit number using representations with exchanging and remainders. • To divide a 2-digit number by a 1-digit number using short division (no regrouping). • To divide a 2-digit number by a 1-digit number using short division (with regrouping). • To divide a 2-digit number by a 1-digit number using short division (with regrouping and remainders). • To divide a 3-digit number by a 1-digit number using partitioning and representations (no remainders). • To divide a 3-digit number by a 1-digit number using partitioning and representations (one regroup). • To divide using partitioning and representations (multiple regroups and remainder). • To divide a 3-digit number by a 1-digit number using short division. • To divide using short division with regrouping and remainders. • To use short division when the hundreds digit is smaller than the divisor. • To use efficient division strategies to solve problems. • To solve problems involving multiplication and division. • To solve problems involving multiplication and division in a range of contexts
Links	NCETM 55 TO THE END-https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.ncetm.org.uk%2Fmedia%2Fangc5q52%2Fcp-year-5-unit-4-short-multiplication-and-short-division.pptx&wdOrigin=BROWSELINK OAK https://www.thenational.academy/teachers/programmes/maths-primary-ks2/units/division-by-partitioning-leading-to-short-division-2-and-3-digits-by-1-digit/lessons?sid-4447c4=eUKXxH4qTW&sm=0&src=3 WHITE ROSE https://assets.whiteroseeducation.com/new-schemes/Y5%20Spring%20Block%201%20SOL%20Multiplication%20and%20division%20B.pdf Mastery with greater depth https://www.ncetm.org.uk/media/lp0o2lgv/mastery_assessment_y5.pdf
Reasoning	Always, Sometimes, Never? Is it always, sometimes, or never true that when you divide a 2-digit number by a 1-digit number, there will be a remainder? Try dividing several 2-digit numbers by a 1-digit number (both with and without remainders). What determines whether there will be a remainder? Which is Correct? Which of these division calculations is correct? A) 48 ÷ 6 = 8 B) 56 ÷ 8 = 7 C) 72 ÷ 9 = 8 Use a method of your choice (partitioning, short division, etc.) to check each one and explain why or why not it's correct. Use the Inverse Use the inverse to check if this calculation is correct: 56 ÷ 7 = 8 What multiplication could you do to verify your answer? Explain how the inverse helps check the result. Size of an Answer The quotient of a 3-digit number divided by a 1-digit number is between 50 and 75. What could the numbers be? Can you find two or more possible pairs that fit this condition using partitioning or short division strategies? Extra Problem (For Practice) To solve problems involving division with remainders, use partitioning: Divide 96 by 4 using partitioning. How can you represent this division using groups? Will there be a remainder? If so, how do you handle it?

Division by partitioning leading to short division (2 and 3-digits by 1-digit)
(3 weeks)

Problem solving

Click on me

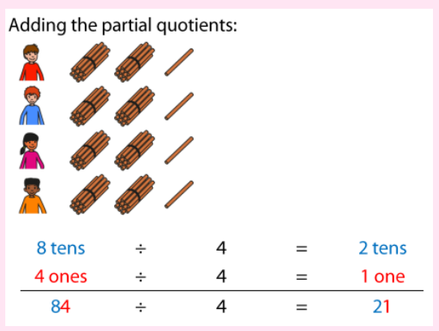
Glossary

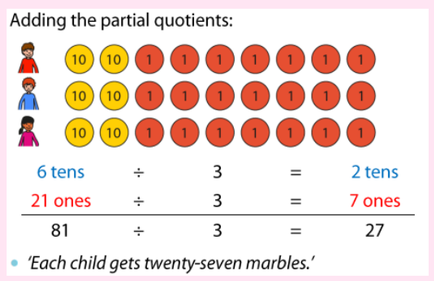
- Dividend - The amount that you want to divide up.
- Divisor - The number you divide by.
- Partial quotient - Part of an answer to a division equation.
- Partition - Splitting an object or value into smaller parts.
- Quotient - The result after division has taken place.
- Remainder - An amount left over after division.
- Partition / partitioning - Splitting a number into smaller parts.
- Regroup / regrouping - The process of unitising and exchanging between place values.
- Short division - Is a formal method of division often used when dividing any number by a one digit number.
- Partition - Partition means splitting a number into smaller parts
- Multiplication - The basic idea of multiplication is repeated addition.
- Division - Division is splitting into equal parts or groups. It is the result of "fair sharing".
- Inverse - Inverse means the opposite in effect. The reverse of
- Operation - Operation is a mathematical process.
- Inverse - Inverse means the opposite in effect. The reverse of

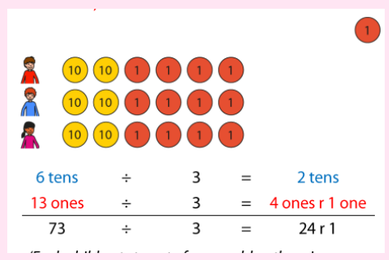
Stem sentences

If dividing the tens gives a remainder of one or more tens, we must exchange the remaining tens for ones.

Representations







Example 1 – both of the digits are multiples of the divisor (and no remainder):

93 ÷ 3 = ?

93 = 9 tens + 3 ones
9 tens ÷ 3 = 3 tens
3 ones ÷ 3 = 1 one

so

93 ÷ 3 = 31

Example 2 – tens digit *is not* a multiple of the divisor (and no overall remainder):

64 ÷ 4 = ?

64 = 6 tens + 4 ones
6 tens ÷ 4 = 1 ten r 2 tens
2 tens + 4 ones = 24 ones
24 ones ÷ 4 = 6 ones

so

64 ÷ 4 = 16

Example 3 – neither the tens digit nor the two-digit number are multiples of the divisor:

75 ÷ 2 = ?

75 = 7 tens + 5 ones
7 tens ÷ 2 = 3 tens r 1 ten
1 ten + 5 ones = 15 ones
15 ones ÷ 2 = 7 ones r 1 one

so

75 ÷ 2 = 37 r 1

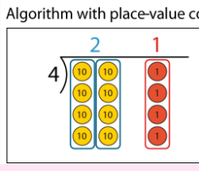
10s 1s

2
4) 8 4

8 tens ÷ 4 = 2 tens

'Eight tens divided by four is equal to two tens.'

Algorithm with place-value counters – summary:



8 tens ÷ 4 = 2 tens
4 ones ÷ 4 = 1 one

- *'Eight tens and four ones divided between four is equal to two tens and one one.'*
- *'Each child gets twenty-one sticks.'*

Comparing horizontal equations with the short-division algorithm:

84	÷	4	=	21	2 1 / 4) 8 4
dividend	÷	divisor	=	quotient	quotient / divisor) dividend