Multiplication Prior Assessment Question 8:

Objective: I am beginning to use the expanded column method for multiplication.

NC NMD 4: multiply two-digit and three-digit numbers by a one-digit number using formal written layout

Assessment Question:

Multiplication + Division	I feel	
a) 34 x 6	b = b) 52 x 3 =	

<u>Teacher Input Ideas:</u>

Place 34×6 on the board for the children to discuss how they attempted question 8a. Give the children time to discuss how they worked this out and what methods they used. Some children may suggest that they used the bar model and partitioning to work this out: Such as 30×6 and then 4×6 . Ask the children how easy this was to work out mentally. Did the children have to make any jottings to help them remember the amounts for 30×4 and then 4×6 , so that this could be added together. Why was this tricky to add back together mentally? Do you think mental methods are the most efficient for this sum?

Some children may have other informal written methods that they used. Encourage the children to share these and discuss how efficient they are.

Model how to layout the sum as the expanded multiplication method below to help us to calculate quickly and to support with adding the partitioned parts back together. Such as for 14×4 .



Discuss that this can be worked out mentally, however as an introduction to using paper to help us to calculate this is used to help to see the link.

The children should be confident with written subtraction and addition therefore should be used to laying out the sum in place value columns. This time though we are x by the unit for each amount. Talk through what is happening at each stage. The image of partitioning the amounts may also help the children to see the link. Discuss that this method helps when the amounts that need adding together are trickier to do mentally when we combine the partitioned amounts. For example 40 + 16 can be done mentally quite quickly. For other examples this will be trickier to do , so by placing the amounts in place value columns, we can add then back together using the column method at the end.

Repeat with other examples form the purple sheet to help the children .

Once children show understanding here, model with amounts that are trickier to add together mentally such as:

нто	
34	
x 6	
24	(4 × 6 =24)
180	(30 × 6 = 180)
245	

Ensure that the children understand place value and understand that it is 7×30 and not 7×3 . Labelling the columns will help children to see this.

Model to the children that when we add them back together, we can use the column addition method to do this quickly.

You may want to discuss which order the amounts can be multiplied. In the first example the tens were multiplied by the units first as we often do with mental calculation. In the second example the units were multiplied by each other first. When the children are ready to move onto short method in future lessons, the children will need to understand why we often start with the units as we do with subtraction and addition.

Practice Activities:

<u>Purple Practice:</u> Most suited for children who made errors in Question 8 of the prior learning assessment and will benefit from using visual support and scaffolds to introduce them to a written method.

This activity models how to use the expanded multiplication method to introduce the children a written method. The task also shows a link between the mental methods the children have been securing, moving the children on to a written method. The task includes a scaffold for the use of the expanded method and visual images to help the children to understand how partitioning is still used for written calculations.

For these questions, the scaffold starts with the children multiplying the tens by the units first, as they have been learning for mental methods. The children may benefit from completing mastery question 1, once they have completed the purple task to explore how they can multiply the units by the units first as well. This will then help the children who are ready to complete the green activity.

<u>Green Practice:</u> Most suited for children who demonstrate understanding of partitioning in Question 8 of the prior learning assessment, however are not yet using a more formal approach to written methods.

The green activity provides support for children ready to use the expanded column method. They amounts are already partitioned for the children so that they can calculate the answer to each amount. Encourage the children to add the amounts back together to find the answer. The amounts are 2 digit amounts and the children should understand that we can multiply the units first and then the tens as we do when using the addition and subtraction column method. <u>Yellow Practice</u>: Most suited for children who show understanding of using the expanded multiplication method and are ready to apply this knowledge to calculating sums with 3 digits.

The yellow activity provides support for children ready to use the expanded column method for 3 digit amounts. The amounts are already partitioned for the children so that they can calculate the answer to each amount. Encourage the children to add the amounts back together to find the answer. The children should understand that we can multiply the units first and then the tens as we do when using the addition and subtraction column method.

<u>Mastery:</u>

The first part of the mastery task encourages the children to explore the order in which the amounts can be multiplied when using the expanded column method. Encourage the children to understand that the tens can be multiplied first or the units. This will support the children before moving on to the short method.

The second question provides the children with the opportunity to apply their knowledge of times table facts for multiplying by 3. The children should use their knowledge that 10×3 is 30 therefore 30×3 will be 90. They should understand that at least 30 lots of 3 can be multiplied and then take this knowledge further to work out that $33 \times 3 = 99$ and therefore this is the highest possible amount before 100 is created. Some children may start by multiplying anything by 3 using a mental or written method. If so, encourage the children through questioning to think of sensible starting points:

- Key questions:
- Where shall I start? Shall I work systematically and start by multiplying 3 by 1, then by 2 and then by 3? Why not?
- What facts do we know for the 3 x timetable? How will these help us? Where is a more sensible place to start? Explain why.

The third question provides the opportunity for the children to spot where an error has been made when the expanded method has been used. Th children should find the error using their knowledge of place value and prove why Ahmed is incorrect. They should then suggest how he can work out the answer.

<u>Answers</u>

Purple:

a) 56	b) 68		c) 45
d) 84	e) 80		f) 57
2) 17 × 4 = 68	15 x 5 = 7	5	21 × 4 = 84
Green:			
1) 108	2) 182	3) 110	4) 174
5) 102	6) 123	7) 140	8) 188
Yellow:			
a) 336	ь) 330	c)870	d) 480
e) 420	f) 955	g) 875	h)896

Mastery:

- 1) The children should have the answer of 68 for both sums.
- 2) 3 x 33 = 99
- 3) The children should show understanding that the answer should be 204 as the sum should have been calculated as $4 \times 6 = 24$ and $30 \times 6 = 180$. Ahmed has made an error as he has calculated 3×6 not 30×6 .



Purple Activity

LO: I can use a written method to multiply 2 digit amounts by a 1 digit amount.

1) Use the expanded multiplication method to work out these sums.



BRICKWORK Mathematics Green Activity

LO: I can use the expanded column method for multiplication.

Use the expanded multiplication method to work out these sums.

1)	H T O 1 8 x 6 + (8 × 6) (10 × 6)	2) H	T O 2 6 7 + (6 × 7) (20 × 7)
3)	H T 0 2 2 x 5 (2 x 5) + (20 x 5)	4) H ×	T 0 2 9 6 + (9 × 6) + (20 × 6)
5)	H T 0 3 4 x 3 (4 x 3) (30 x 3)	6) H	T O 4 1 3 + (1 × 3) (40 × 3)
7)	$ \begin{array}{c} H T 0 \\ 3 5 \\ \times 4 \\ + (5 \times 4) \\ (30 \times 4) \end{array} $	 8) H × © Copyright 2018 	T 0 4 7 4 (7×4) (40×4) Brickwork Mathematics



Green Activity

LO: I can use the expanded column method for multiplication.

Use the expanded multiplication method to work out these sums.

1)	H T O 1 8 x 6 + (8 × 6) (10 × 6)	2)	H T O 2 6 x 7 + (6 x 7) (20 x 7)
3)	H T 0 2 2 x 5 (2 x 5) + (20 x 5)	4)	H T 0 2 9 x 6 (9 x 6) + (20 x 6)
5)	H T O 3 4 × 3 +	6)	H T O 4 1 × 3 +
7)	H T 0 3 5 × 4 +	8)	H T 0 4 7 × 4 +

0 x 6)



Yellow Activity

LO: I can multiply 3 digit numbers by a 1 digit number using the expanded written method.

a) H T O 1 1 2 × 3			2) H 1 ×	Т 0	0 5 4	
•	(2 × 3) (10 × 3) (100 × 3)				+	
^{b)} H T 0 1 6 5 × 2		f) H 1 ×	Т 9	0 1 5	
•	(5 x 2) (60 x 2) (100 x 2)		_		•	
c) H T O 1 4 5 × 6		g) H 1 ×	T 2	0 5 7	
•			_			
^{d)} H T O 1 6 O × 3			h) H 1 ×	1	2 8	
•			_		•	



Yellow Activity

LO: I can multiply 3 digit numbers by a 1 digit number using the expanded written method.

 Use the expanded a) H T O 1 1 2 x 3 	d multiplication met	hod 1 e)	to wor H 1 ×	rk o T O	0 5 4	ese sums.
•	(2 × 3) (10 × 3) (100 × 3)					(5 × 4) • (0 × 4) (100 × 4)
^{b)} H T O 1 6 5 × 2		f)	H 1 ×	т 9	0 1 5	
•	(5 × 2) (60 × 2) (100 × 2)					(1 × 5) (90 × 5) (100 × 5)
^{c)} 1 4 5 × 6		g)	H 1 ×	Т 2	0 5 7	
•	(5 × 6) (40 × 6) (100 × 6)					(5 × 7) (20 × 7) (100 × 7)
^{d)} H T O 1 6 O × 3		h)	H 1 ×	Т 1	0 2 8	
•	(0 × 3) (60 × 3) (100 × 3)					(2x 8) + (10 x 8) (100 x 8)
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