

YEAR 4

M3d: Can multiply 2-digit and 3-digit numbers by 1-digit numbers using short multiplication.



= Teacher's Notes

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Assessing Understanding

Probing questions for teachers

- Which of these would you use a written method for? Why?
- Talk me through this calculation. What steps do you need to take to get the answer? How do you know what you have to do first?

	72
x	4

- Show how you could work these out without a calculator:

$$13 \times 6 =$$

$$53 \times 4 =$$

$$85 \times 2 =$$

$$5 \times 34 =$$

Explain your choice of method for each.

Assessing Understanding

Probing questions for teachers

- Can you work out missing digits within a written multiplication calculation?
- Ask pupils to carry out multiplications using partitioning, the grid method and the formal written method.
- How would partitioning help you calculate 23×5 ?
- How do you multiply by a multiple of 10? How about 20? 30? 40?

Key Vocabulary

lots of, groups of, times, multiply, multiplication, multiplied by, multiple of, product, once, twice, three times..., ten times..., times as, repeated addition array, row, column, double, near double, inverse, calculate, calculation, number sentence, mental calculation, method, strategy, jotting, answer, right, correct, wrong, sign, operation, symbol, equation, formal method, mental method.
What could we try next? How did you work it out?

Multiplying Using Efficient Methods

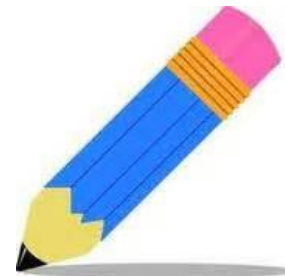
Remember, when we look at a calculation we should always ask:

Can I do it in my head?

Do I need to make any jottings?

Do I need a written method?

Sometimes numbers are too large or there are too many numbers to calculate in our head. We need a reliable **written method** to help us. Let's take a look at some **written methods** for multiplication...



Partitioning

We can use **partitioning**.

How would you do 13×4 ?

First we partition 13 into 10 and 3.

We need to multiply 10 and 3 by 4.

$$\begin{array}{r} 3 \times 4 = 12 \\ 10 \times 4 = 40 \\ \hline 52 \end{array}$$

Therefore $13 \times 4 = 52$

Partitioning

Try these calculations, using **partitioning**.

$$15 \times 3$$

$$28 \times 4$$

$$34 \times 5$$

Remember to:

- Partition the 2-digit number.
- Write out the two quantities.
- Multiply the ones.
- Multiply the tens.
- Put the parts back together to get the answer.

Problem Solving and Reasoning

In a school hall there are 8 rows of chairs. In each row there are 14 chairs. How many chairs are there in the hall altogether?



Grid Method

The **grid method** uses the **partitioning** you were just doing but is written down in a **grid**.

It looks like this:

$$13 \times 4 =$$

x	10	3
4	40	12

$$\begin{array}{r} 40 \\ + 12 \\ \hline 52 \end{array}$$

Grid Method for Multiplying by a Single Digit

$13 \times 4 =$

Write 10 above the first box.

X	10	3	
4	<table border="1"><tr><td> </td><td> </td></tr></table>		

Write 3 above the second box.

Write 4 at the side of the grid.

Now multiply the number at the top of each box by the number at the side.

$So\ 13 \times 4 = 52$

Then add the numbers in the grid
 $40 + 12 = 52$

$$\begin{array}{r} 40 \\ + 12 \\ \hline \underline{52} \end{array}$$

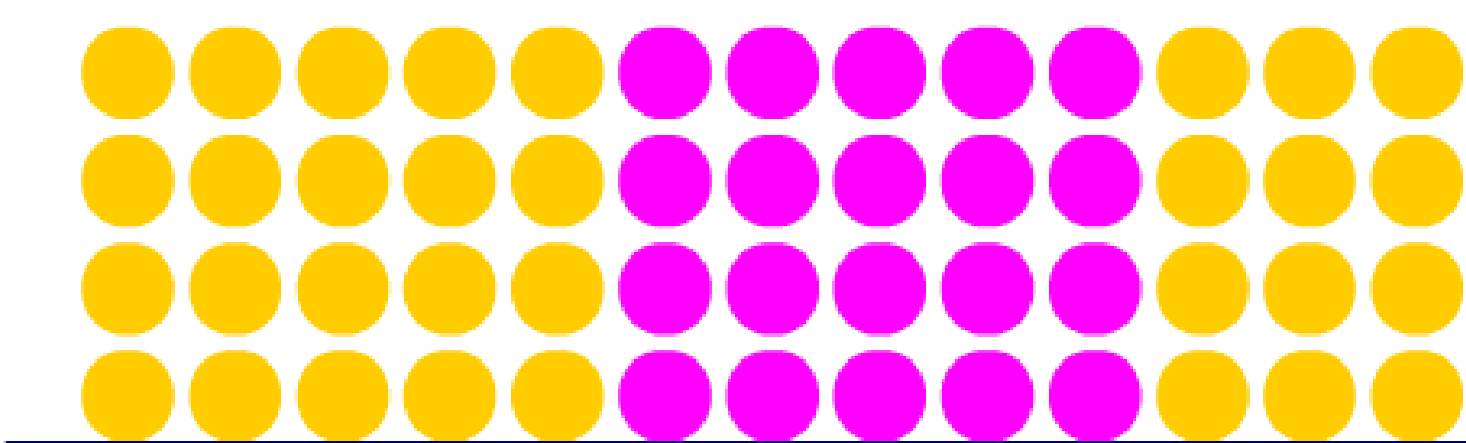
X	10	3	
4	<table border="1"><tr><td>40</td><td>12</td></tr></table>	40	12
40	12		

$10 \times 4 = 40$

$3 \times 4 = 12$

Representing the Grid Method with Counters

$$13 \times 4 =$$



$$13 \times 4 = 52$$

Problem Solving and Reasoning

In an allotment there are 7 rows of cabbages. In each row there are 12 cabbages. How many cabbages are there in the allotment altogether?



Linking the Grid Method to Short Multiplication

32 x 4 =

x	30	2
4	120	8

$$\begin{array}{r}
 120 \\
 + \quad 8 \\
 \hline
 \mathbf{128}
 \end{array}$$

	3	2	
x		4	
1	2	0	(30 x 4)
		8	(2 x 4)
1	2	8	

	3	2
x		4
1	2	8

$2 \times 4 = 8$

$30 \times 4 = 120$
 $120 + 8 = 128$

Linking the Grid Method to Short Multiplication

The grid method can be used to multiply 3-digit numbers by a 1-digit number:

$$354 \times 6 =$$

X	300	50	4
6	1800	300	24

$$\begin{array}{r}
 1800 \\
 300 \\
 + \quad 24 \\
 \hline
 2124
 \end{array}$$

Linking the Grid Method to Short Multiplication

$$238 \times 4 =$$

	2	3	8	
x			4	
		3	2	(8x4)
	1	2	0	(30x4)
	8	0	0	(200x4)
	9	5	2	

Now try multiplying a 3-digit number by a 1-digit number using **short multiplication**.

	2	3	8
			4
	9	5	2
	1	3	

$$238 \times 4 = 952$$

Reasoning

$$\begin{array}{r} \square \quad 3 \quad 8 \\ \times \quad \quad \quad 2 \\ \hline 8 \quad 7 \quad \square \end{array}$$

What digits are missing in this calculation?
How do you know?

Problem Solving and Reasoning

In a stamp collection book there are 123 stamps on a page. The book has 9 pages. How many stamps are there in the book?



Problem Solving and Reasoning

When you multiply a 2-digit number by a 1-digit number the answer is always a 3-digit number. Is this always, sometimes or never true? Explain your answer.





Get children to solve a range of multiplication calculations, multiplying 2-digit numbers and 3-digit numbers by a single digit number.

Problem Solving and Reasoning

Two chocolate bars cost 80p.
How much would 8 bars cost?
How about 3 bars?



M3d. Activities

- Give pupils time to use partitioning, the grid method and formal written method of short multiplication for a range of questions
- Get them to see the links between the three methods.
- For children who have errors in place value, get them to use place value counters and build the array in order to link with the numbers in the grid method.
- Use examples that have been completed wrong and get children to correct them.
- Use calculations with missing amounts in – can children use their knowledge of the methods to find the missing amounts?
- Apply the three methods when solving worded multiplication problems.

M3d. Your Turn

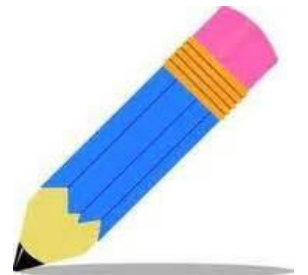
Test 1

1. $58 \times 9 =$

2.

	5_
x	9
	486

3. $846 \times 7 =$



M3d. Your Turn

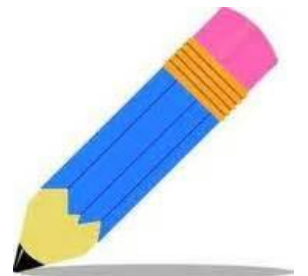
Test 2

1. $957 \times 8 =$

2.

	71
x	—
	426

3. $85 \times 9 =$



M3d. Your Turn

Test 3

1. $33 \times 8 =$

2.

	<u> </u> 4
x	8
	512

3. $589 \times 5 =$

