

Stage 3 – Multiplication

Multiplying by 10, 100, 1000

Children tend to find this concept tricky so it is really important that we ensure children understand this method and can verbally explain it. Always use a place value grid when teaching this method.

M	Hth	Tth	Th	H	T	O	t	h
							●	
							●	

Begin with $\times 10$ with simple one and two digit numbers. $3 \times 10 =$ Ask children to write down the starting number and then the answer when

$\times 10$. What happens to the digits? Continue with this step using simple one and two digit numbers. Children will most likely say 'when you $\times 10$ you just add a zero' – this should **never** be accepted as correct. Explain the misconception – if you add zero, you add nothing. Therefore, the answer does not change. We are making the number ten times bigger so the number moves one column to the left and we use the zero as a **place holder**. We need this because without the grid and column headers we wouldn't know the number had changed. It holds the value of the number. Children need to practice multiplying a range of numbers by 10 including decimals. These should include; one, two, and three digit numbers already containing a place holder eg. 304×10 .

When children are confident with $\times 10$ and can explain how they work it out using the appropriate vocabulary, they can be introduced to $\times 100$ and $\times 1000$. Again, start with one and two digit numbers. Explain that the number is getting 100/1000 times bigger so the numbers move two columns to the left. Why do they move to the left? Discuss how the columns have a larger value to the left and a smaller value to the right. It is really important when decimals are introduced that children know that the decimal point **never** moves. Always move the numbers and use place holders.

The place value grid can also be used to multiply multiples of 10. For example, 30×4 . Children can divide 30 by 10. They can work out 3×4 . They then need to make their answer ten times bigger so 12×10 which they can do on the place value chart. This will need to be practised prior to using the grid method.

Vocabulary

Number
 Numeral
 Multiplication
 Multiplied by
 Multiple
 Doubling
 Array
 Patterns
 Lots of
 Groups of
 Row
 Column
 Multiplication fact
 Multiplication table
 Groups of
 Times
 Repeated addition
 Factor
 Product
 Inverse
 Squared
 Cubed
 Place holder

Grid Method

$57 \times 3 =$

Step 1: Partition the number you are multiplying – set out the grid like this.

Step 2: Start with the tens column – $50 \times 3 =$ Remember you can use the place value grid to help you.

Step 3: Multiply the ones. $7 \times 3 =$

Step 4: Add both answers together.

X	50	7
3		

X	50	7
3	150	21

	H	T	O
	1	5	0
+		2	1
	1	7	1

When children can multiply two and three digit numbers by one digit numbers they can move onto multiplying by a two digit number.

X	20	4
10		
9		

$24 \times 19 =$

Step 1: Partition both numbers and set out in a grid like this.

X	20	4
10	200	40
9	180	36

Make sure the one are next to the right tens numbers. These should be swapped around.

Step 2: Multiply the numbers like you would have done previously so the grid is complete.

Step 3: Add all the numbers together.

	H	T	O
	2	0	0
	1	8	0
		3	6
+		4	0
	4	5	6
	1		



Expanded Written Method

When children are confident with grid method, they should move to expanded written method. Initially, use grid method alongside expanded method so children can relate both.

$$36 \times 4$$

Step 1: Make sure you use place value headers. Always start with the ones – this contradicts grid method but supports short method. Write the calculation you are carrying out at the side in brackets (6×4)

Step 2: Multiply the tens column – ensure you write the calculation in brackets at the side (4×30)

Step 3: Add both numbers to make a total.

$$\begin{array}{r}
 \mathbf{36 \times 4 = 144} \\
 \text{H T O} \\
 36 \\
 \times 4 \\
 \hline
 + 24 \quad (4 \times 6) \\
 120 \quad (4 \times 30) \\
 \hline
 144
 \end{array}$$

2 digit+ by 2digit

When multiplying a number by more than a single digit, it can become confusing because there seems to be a lot going on. Sometimes children can understand this better by using colours as below. This is not essential – but may help children who are missing steps out.

$$63 \times 29 =$$

Step 1: Lay the question out vertically making sure you use place value headers. When writing the number you are multiplying by use two different colours.

Step 2: You need to start with the ones column – how many digits are you multiplying by the ones? 2 so you should have two red brackets.

Step 3: Move onto the tens column – again you are multiplying two digits by the tens column so you should have two blue brackets.

Don't make the mistake of multiplying the tens digit as a ones digit! It is 20 not 2!

Step 4: Add all of the numbers together.

T	H	T	O	
h				
		6	3	
x		2	9	
		2	7	(9x3)
	5	4	0	(9x60)
		6	0	(20x3)
1	2	0	0	(20x60)
1	8	2	7	
	1			

Children should also practice multiplying three digits by one digit using this method.