Multiplication – understanding of multiplying by 10, 100 and 1000.

Objective: I can multiply amounts by 10, 100 and 1000

NC: NMD 7: multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.

Teacher Input Ideas:

Before teaching strategies for mental and written multiplication, you want to ensure that children can use knowledge of place value to x by 10, 100, 1000 etc.

Assessment task:

Place these questions on to the board or read aloud, giving the children about 5 to 10 seconds for each one.

1) 7 x 100
2) 15 x 10
3) 40 x 100
4) 25 x 1000
5) 105 x 10
6) 345 x 100
7) 1.5 x 10
8) 6.9 x 100
9) 12.09 x 10
10) 178.90 x 100
11) 0.089 x 10
12) 0.076 x 1000

From these questions and the children's explanations, group the children based on their needs and select activities based on these.

When the children are explaining, ensure that they use the correct terminology to explain and that they show understanding that the digits move columns as we are increasing the numbers by ten each time. Encourage the children to see the link between multiplying by 10, then 100 and then 1000. Why do the digits move columns? Why in some examples does this then create a zero at the end? Can we always just add a zero? Why is it incorrect to say this?

Explain how our number system works by grouping in ten and this is why when we multiply by ten all of the digits can move one place to the left. Encourage the children

to explain that when we multiply by 100, they then move one more time. Why do the digits move 2 columns when multiplying by 100?

Encourage the children to model and explain their understanding of place value, including numbers that contain zeroes already and decimal amounts. The purple and green resource sheets provided may want be used whilst modelling and some children will benefit from having their own copy of this to join in.

hundreds of thousands	tens of thousands	thousands	hundreds	tens	ones	tenths	hundredths

Practice Activities

Purple Practice: most suited for children who have little understanding of x by 10, 100 and 1000 or have made several errors in Q1-6 in the mini assessment at the start of the lesson.

The children are given whole amounts to multiply by 10, 100 or 1000 to develop their understanding of place value and what happens when we multiply by 10,100 and 1000. They have 3 blocks so that they can work out x by 10 first, then 100 and then 1000 so that they can see what happens to the number each time and develop their understanding as to why the digits move that many places. Additionally, the children may want to use the place value chart provided in the purple activity to help explain what is happening to the digits. For a further challenge, the children can write their final amounts in words.

Green Practice: most suited for children who have understanding of multiplying whole numbers by 10, 100 and 1000, however made errors in Q7-12(decimal amounts) in the mini assessment at the start of the lesson. The green activity is laid out the same as the purple activity, however the amounts the children are provide with contain decimal numbers. The children are required to multiply these by 10, 100 and 1000. The children can also use the support sheet in the green task if they are finding this tricky.

<u>Yellow Practice</u> most suited for children who are ready to consolidate multiplying whole amounts and decimal amounts by 10, 100 and 1000.

This activity is presented as a game. The children need to select a purple block and then a yellow block to multiply by. Children to explore different combinations of the sums that they can make. This activity is more challenging as the children are required to work out how many places they need to move the digits for each sum, rather than working out 10 lots, then 100, then 1000, where the children can spot patterns.

Challenge: children can round the decimal amounts to the nearest whole number and to one decimal place from the cards to apply rounding skills. They can then x these amounts by 10, 100 or 1000 and talk about the changes rounding has made to the numbers.

<u>Mastery</u>: problem solving, fluency and reasoning

For the mastery task, the children are presented with two questions. The first part of the task requires the children to apply knowledge of measure and also apply a written addition method when adding decimals. The children should spot that they need to add the 2 amounts together and then convert this from kilometres to metres by multiplying the amounts by 1000.

The second part of the task requires the children to explore a variety of possible starting numbers, where they can apply their knowledge of multiplying by 100/1000. Encourage the children to spot that the number has been multiplied by 1000, therefore if they move the digits to the right instead (divide) that they can work out what the starting number may have been. The children should then think of numbers with odd digits where the 5 is in the tens place such as 3957. The children should then move this 3 places to the right to understand that the 5 has to be in the hundredths place. From this the children should explore the position of other odd digits. The children may have other strategies for attempting this question, so encourage the children to explain their answers and how they got there.

To assess the progress made in the lesson/lessons, you may want to ask the children 12 questions similar to the questions at the start of the lesson.

Answers:

Purple:

1)	8	80	800	8000
2)	15	150	1500	15000
3)	40	400	4000	40000
4)	105	1050	10500	105000
5)	252	2520	25200	252000
6)	350	3500	35000	350000
7)	98	980	9800	98000
8)	610	6100	61000	610000

Green:

1)	250	2500	25000	250000
2)	12	120	1200	12000
3)	18.5	185	1850	18500
4)	10.10	101	1010	10100
5)	16.08	160.8	1608	16080
6)	2.03	20.3	203	2030
7)	13.04	130.4	1304	13040
8)	989.12	9891.2	98912	989120
9)	3.621	36.21	362.1	3621

Mastery:

1) 6420 metres
2) Possible answers: (accept any odd digit number where 5 is in the hundredths place)

1.357	1.359	1.753	1.759	1.953	1.957
3.157	3.159	3.751	3.759	3.951	3.957
7.153	7.159	7.351	7.359	7.951	7.953
9.153	9.157	9.351	9.357	9.751	9.753

BRICKWORK
Mathematics

Purple Activity

LO: I can multiply by 10, 100 and 1000.

Look at the amount in the yellow block. Multiply each amount by 10, 100 and 1000.

		×10	×100	×1000
1)	8			
2)	15			
3)	40			
4)	105			
5)	252			
6)	350			
7)	98			
8)	610			

BRICKWORK Mathematics

Purple and Practice

Practical resource

ones	
tens	
hundreds	
thousands	
tens of thousands	
hundreds of thousands	

BRICKWORK Mathematics

Green Activity

LO: I can multiply by 10, 100 and 1000.

Look at the amount in the purple block. Multiply each amount by 10, 100 and 1000.

		×10	×100	×1000
1)	250			
2)	12			
3)	18.5			
4)	10.10			
5)	16.08			
6)	2.03			
7)	13.04			
8)	989.12			
9)	3.621			

BRICKWORK Mathematics

Green Practice

Resource sheet

hundreds of thousands	tens of thousands	thousands	hundreds	tens	ones	tenths	hundredths	thousandths

BRICKWORK Mathematics

Yellow Activity

LO: I can multiply by 10, 100 and 1000.

×10	×100	×1000
0.5	26	650
0.03	16.28	15
4	3600	7289
258	1.261	0.891
0.050	60	12.03

BRICKWORK Mathematics

Mastery

Solving problems, fluency and reasoning

1) Kai ran 2.75km on Monday and 3.67 km on Tuesday. How many metres did he run in total?

metres

2) Kiana thought of a number that used different odd digits. She multiplied it by 100 and then by 10. A 5 is now in the tens place. Think of 3 examples of what her number could have been before she multiplied it.