# Maths Level 1 – Multiplication

1 of 21 – Welcome

Welcome to this session on multiplication.

By the end of this session you should be able to:

* Multiply whole numbers using a range of strategies
* Multiply decimals of up to two decimal places by 10, 100 and 1000

2 of 21 – Multiplication

Multiplication is a method for adding a number to itself a number of times.

This is also called repeated addition.

For example 2 + 2 + 2 + 2 = 8 is the same as 2 multiplied by 4 = 8.

When you are multiplying numbers it doesn’t matter which order they are in.

For example, 2 times 4 equals 8 is the same as 4 times 2 equals 8.

3 of 21 – Question 1

Match these repeated addition examples; **4 + 4 + 4**, **5 + 5 + 5 + 5**, **3 + 3 + 3 + 3 + 3** and **2 + 2 + 2 + 2 + 2 + 2**, to the multiplications below:

1. 3 times 4
2. 5 times 3
3. 5 times 4
4. 6 times 2

The correct answers are:

**4 + 4 + 4** is the same as 3 times 4.

**5 + 5 + 5 + 5** is the same as 5 times 4.

**3 + 3 + 3 + 3 + 3** is the same as 5 times 3.

**2 + 2 + 2 + 2 + 2 + 2** is the same as 6 times 2.

4 of 21 – Question 2

Match these multiplication examples; **4 times 6**, **3 times 7**, **2 times 8** and **6 times 3**, to the repeated additions below:

1. 3 + 3 + 3 + 3 + 3 + 3
2. 8 + 8
3. 7 + 7 + 7
4. 6 + 6 + 6 + 6

The correct answers are:

**4 times 6** is the same as 6 + 6 + 6 + 6.

**3 times 7** is the same as 7 + 7 + 7.

**2 times 8** is the same as 8 + 8.

**6 times 3** is the same as 3 + 3 + 3 + 3 + 3 + 3.

5 of 21 – Question 3

How can the following repeated addition example be expressed as a multiplication?

9 + 9 + 9 + 9

Work out your answer and then compare it with the correct answer below.

The correct answer is: 4 times 9 or 9 times 4.

6 of 21 – Multiplication

When you multiply numbers you use the multiplication sign, which looks like an x.

We use different words to describe multiplication, including ‘times’, ‘lots of’, ‘sets of’ and ‘multiplied by’.

For example, **3 times by 6 equals 18** can also be described as:

* 3 times 6 = 18
* 3 lots of 6 = 18
* 3 sets of 6 = 18
* 3 multiplied by 6 = 18

7 of 21 – Multiplication and division

Multiplication is the opposite action of division. Therefore, when you carry out a multiplication you can check your answer using division.

For example, we know that 3 times 7 is 21.

Therefore, 21 ÷ 7 = 3 and 21 ÷ 3 = 7.

8 of 21 – Question 4

Which two division sums could be used to check the multiplication sum 3 times by 6 equals 18?

Choose both that apply:

1. 18 ÷ 6 = 3
2. 6 ÷ 3 = 2
3. 18 ÷ 3 = 6
4. 3 ÷ 6 = 0.5

The correct answers are A and C, 18 ÷ 6 = 3 and 18 ÷ 3 = 6.

9 of 21 – Question 5

Suzy is using the division 24 ÷ 4 = 6 to check her workings for its opposite multiplication.

Which is the sum she is checking?

1. 4 times 6 equals 24
2. 24 times 4 equals 96
3. 6 times 24 equals 144

The correct answer is A, 4 times 6 equals 24.

10 of 21 – Multiplying by 10

When you multiply a number by 10, you move all the digits **one place to the left**.

The number becomes 10 times bigger.

Let’s look at this example: 1.65 multiplied by 10 is 16.5.

**Step 1**

Start by placing 1.65 into the place value table, like the example below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tens | Units | Decimal Point | Tenths | Hundredths |
|  | 1 | Point | 6 | 5 |

In the table above, the 1 is in the units column, the 6 is in the tenths column and the 5 is in the hundredths column.

**Step 2**

To multiply by 10, move all the digits one place value to the left, like the example below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tens | Units | Decimal Point | Tenths | Hundredths |
| 1 | 6 | Point | 5 |  |

In the table above, the 1 is now in the tens column, the 6 is now in the units column and the 5 is in the tenths column.

You can see in the example that all the digits move one place to the left.

11 of 21 – Multiplying by 100

When you multiply a number by 100 you move all the digits **two places to the left**.

The number becomes 100 times bigger.

Let’s look at the example: 6.36 times 100 is 636.

**Step 1**

Start by placing 6.63 into the place value table, like the example below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Hundreds | Tens | Units | Decimal Point | Tenths | Hundredths |
|  |  | 6 | Point | 3 | 6 |

In the table above, the 6 is in the units column, the 3 is in the tenths column and the 6 is in the hundredths column.

**Step 2**

To multiply by 100, move all the digits two place values to the left, like the example below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Hundreds | Tens | Units | Decimal Point | Tenths | Hundredths |
| 6 | 3 | 6 |  |  |  |

In the table above, the 6 is now in the hundreds column, the 3 is now in the tens column and the 6 is now in the units column.

You can see in the example that all the digits move two places to the left.

12 of 21 – Multiplying by 1000

When you multiply a number by 1,000, you move all the digits **three places to the left**.

The number becomes 1,000 times bigger.

Let’s look at the example: 3.87 times 1,000 is 3870.

**Step 1**

Start by placing 3.87 into the place value table, like the example below:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Thousands | Hundreds | Tens | Units | Decimal Point | Tenths | Hundredths |
|  |  |  | 3 | Point | 8 | 7 |

In the table above, the 3 is in the units column, the 8 is in the tenths columns and the 7 is in the hundredths column.

**Step 2**

To multiply by 1,000, move all the digits three place values to the left, like the example below:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Thousands | Hundreds | Tens | Units | Decimal Point | Tenths | Hundredths |
| 3 | 8 | 7 | 0 |  |  |  |

In the table above, the 3 is now in the thousands column, the 8 is now in the hundreds column, the 7 is now in the tens column and there is a zero in the units column.

You can see in the example that all the digits move three places to the left.

13 of 21 – Question 6

Calculate the sum 4.76 times by 10. You can use the place value table to help you if you wish.

Work out your answer and then compare it with the correct answer below.

The correct answer is: 47.6.

14 of 21 – Question 7

Calculate the sum 7.21 times by 1000. You can use the place value table to help you if you wish.

Work out your answer and then compare it with the correct answer below.

The correct answer is: 7210.

15 of 21– Question 8

Calculate the sum 9.6 times by 100. You can use the place value table to help you if you wish.

Work out your answer and then compare it with the correct answer below.

The correct answer is: 960.

16 of 21 – Multiplication methods

There are different subtraction methods that you can use. There is no method that is considered ‘right’ or ‘better’; you should use the method that works best for you.

In this session we will be learning about:

* The splitting method
* The grid method
* The traditional method

17 of 21 – Splitting method of multiplication

The splitting method of multiplication is useful when you need to do mental calculations, as it breaks down large numbers into smaller parts.

Here is an example of the splitting method using the question: what is 36 times 3?

**Step 1**

Split 36 into tens and units: 36 = 30 + 6.

**Step 2**

Multiply each number by 3: 30 times 3 is 90 and 6 times 3 is 18.

**Step 3**

Add the numbers together: 90 + 18 = 108.

Watch the following video to learn more about the splitting method of multiplication:

[Mental Multiplication – Split Strategy](https://www.youtube.com/embed/hjo4bNsglkM?autoplay=1&rel=0&start=0&modestbranding=1&showinfo=0&theme=light&fs=0&probably_logged_in=0)

18 of 21 – Grid method of multiplication

The grid method of multiplication uses the same principles as the splitting method but places the numbers in a grid.

For example, if we were to calculate 13 times 24 equals 312 using the grid method, it would look like the table below:

|  |  |  |
| --- | --- | --- |
| Times | 10 | 3 |
| 20 |  |  |
| 4 |  |  |

**Step 1**

Split 13 into tens and units and put these along the top of the grid.

Split 24 into tens and units and put these down the side of the grid.

**Step 2**

Multiply each number in the row by each number in the column, like the example below:

|  |  |  |
| --- | --- | --- |
| Times | 10 | 3 |
| 20 | 200 | 60 |
| 4 | 40 | 12 |

In the table above, 10 times 20 equals 200, 3 times 20 equals 60, 10 times 4 equals 40 and 3 times 4 equals 12. The answers have been placed in the cells where the column and row are the numbers which have been multiplied together.

**Step 3**

Add up the numbers in each row and write them to the right of the grid, like the example below:

|  |  |  |  |
| --- | --- | --- | --- |
| Times | 10 | 3 | Total |
| 20 | 200 | 60 | 260 |
| 4 | 40 | 12 | 52 |

The table above shows that 200 + 60 = 260 and 40 + 12 = 52.

**Step 4**

Add the numbers outside of the grid together.

In this example, 260 + 52 = 312.

This is the answer.

Watch the following video to learn more about the grid method of multiplication:

[Multiplication Grid Method](https://www.youtube.com/embed/3xDJDFmDrlg?autoplay=1&rel=0&start=0&modestbranding=1&showinfo=0&theme=light&fs=0&probably_logged_in=0)

19 of 21 – Traditional method of multiplication

The traditional method of multiplication, also called long multiplication, is useful when multiplying large numbers.

For example, if we were to calculate 612 times 24 using the traditional method, it would look like the table below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | 6 | 1 | 2 |
| Times |  |  | 2 | 4 |
|  | 2 | 4 | 4 | 8 |
|  |  |  |  |  |
|  |  |  |  |  |

In the table above, there are five columns and five rows. The number 612 has been put on the first row, the 6 is in the third column, the 1 is in the fourth column and the 2 is in the fifth column. The number 24 has been put on the second row, the 2 is in the fourth column, the 4 is in the fifth column and times is in the first column (this shows that these two numbers are the ones being multiplied).

**Step 1**

First, multiply 612 by 4, and write the answer 2448 underneath the calculation. In the example above, the number 2448 has been put on the third row, the 2 is in the second column, the 4 is in the third column, the 4 is in the fourth column and the 8 is in the fifth column.

**Step 2**

Next you need to multiply 612 by 20, and write the answer 12,240 on the next row, like the example below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | 6 | 1 | 2 |
| Times |  |  | 2 | 4 |
|  | 2 | 4 | 4 | 8 |
| 1 | 2 | 2 | 4 | 0 |
|  |  |  |  |  |

To make this easier, write a zero in the units column, and then work out 612 times 2 equals 1224. Write this number one column over to the left (this makes it the same as multiplying by 20).

In the table above, the number 12,240 has been put on the fourth row, the 1 is in the first column, the 2 is in the second column, the 2 is in the third column, the 4 is in the fourth column and the 0 is in the fifth column.

**Step 3**

Add the two numbers together 2,448 + 12,240 = 14,688 and put the answer in the table, like the example below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | 6 | 1 | 2 |
| Times |  |  | 2 | 4 |
|  | 2 | 4 | 4 | 8 |
| 1 | 2 | 2 | 4 | 0 |
| 1 | 4 | 6 | 8 | 8 |

In the table above, the number 14,688 has been added to the last row of the table.

Watch the following video to learn more about the traditional method of multiplication:

[Long multiplication in simple steps](https://www.youtube.com/embed/CSd3Ue8QRyg?autoplay=1&rel=0&start=0&modestbranding=1&showinfo=0&theme=light&fs=0&probably_logged_in=0)

20 of 21 – Task

Download the accompanying **Multiplication PDF** and answer all of the questions.

Remember to complete and save your work on the PDF document.

You can use the multiplication methods that you prefer.

21 of 21 – End

Well done. You have completed this session on multiplication.

You should now be able to:

* Multiply whole numbers using a range of strategies
* Multiply decimals of up to two decimal places by 10, 100 and 1000

If you are unsure or have any questions about any of these topics, make a note and speak to your tutor for more help.