# The Ultimate Times Tables Resource Pack Teacher Guide

## How to use this resource, and best practice advice for teaching times tables at primary school

Years 1 to 6

THIRD SPACE LEARNING

# About this resource

The Ultimate Times Tables Resource Pack is designed to support primary school teachers to embed a thorough understanding of times tables in their school.

## What's included

There are six packs; one for each year group from Year 1 to Year 6. Within each pack you will find:

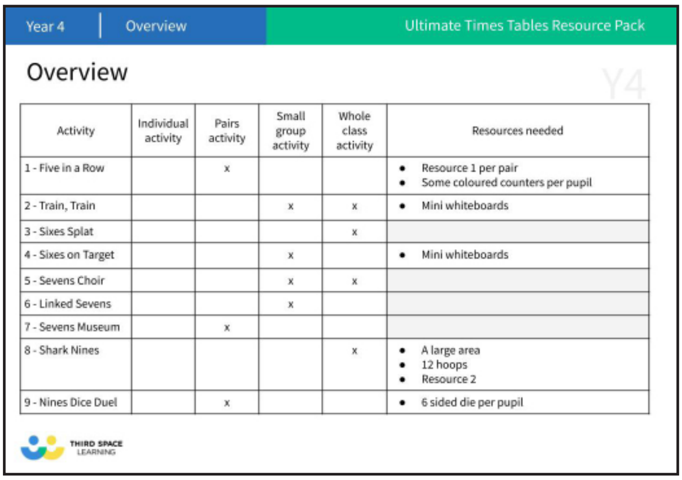
- ☑ This teacher guide which outlines the key pedagogical approaches to teaching times tables throughout the primary phase.
- ☑ Games and activities appropriate for that year to do inside and outside of the classroom (presented in slides and teacher notes format).
- ☑ A list of partner activities that could be sent home for parents to use.
- ☑ 15 times tables tests per year group with associated tracking / self-assessment and answers to support pupils and help teachers pinpoint their gaps.

## Teacher Guide (resource for you)

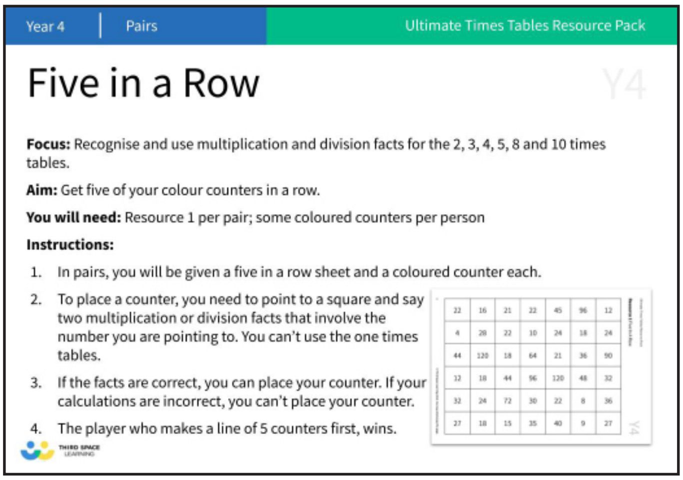
Your first 'stop' in this resource should be the pedagogy information on page 6 of this guide which outlines the key approaches to teaching multiplication. This section also provides examples of the different ways multiplication can be represented and explains how these can be used to support children in developing a conceptual understanding and, ultimately, true fluency.

## Times Tables Games and Activities

The games and activities slides provide a child friendly explanation of each activity along with examples where necessary. The notes section includes any notes for the teacher and key questions to ask during the activity to help draw out and develop children's conceptual understanding. The games and activities teacher notes provide a brief outline of each activity, teacher notes, questions and extension activities that can be referred to when needed.

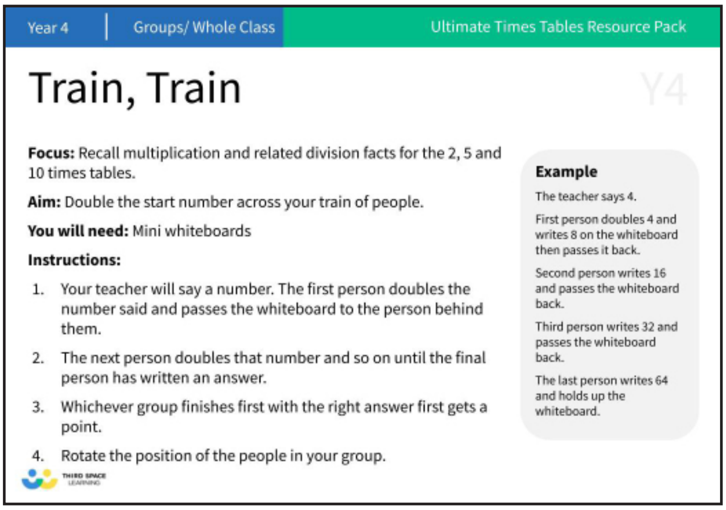



| Activity | Individual activity | Pairs activity | Small group activity | Whole class activity | Resources needed |
|---|---|---|---|---|---|
| 1 - Five in a Row | | x | | | • Resource 1 per pair<br>• Some coloured counters per pupil |
| 2 - Train, Train | | | x | x | • Mini whiteboards |
| 3 - Sixes Splat | | | | x | |
| 4 - Sixes on Target | | | x | | • Mini whiteboards |
| 5 - Sevens Choir | | | x | x | |
| 6 - Linked Sevens | | | x | | |
| 7 - Sevens Museum | | x | | | |
| 8 - Shark Nines | | | | x | • A large area<br>• 12 hoops<br>• Resource 2 |
| 9 - Nines Dice Duel | | x | | | • 6 sided die per pupil |




At the start of the slides, there is an overview of each activity to show what the type of activity and resources needed.

The activities are designed so that they can be picked up and used throughout the school day, and most can fit within a 'spare' 10 minutes. There are examples of the activities where appropriate.




Most activities can easily be used more than once, and they can all be adapted for other times tables.

Each activity is accompanied by a suggestion of how it can be extended to further develop understanding.

The teacher notes include the same information as the slides but are intended to be used solely as a reference guide, not presented to the class.

The partner activities contain a list of partner activities with associated resources that could be sent home for parents to complete with pupils.

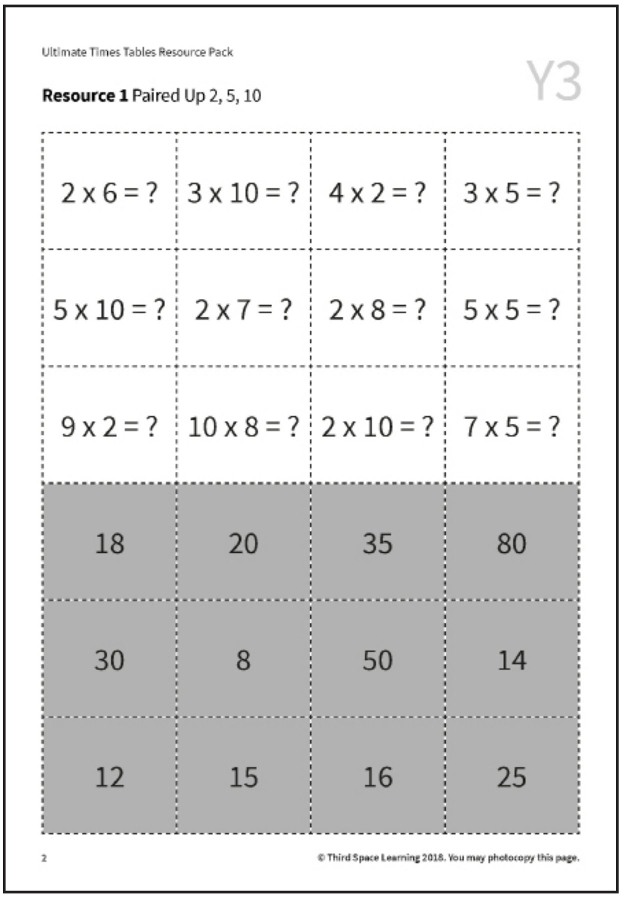
### A note on the games and activities

Within the resource we deliberately use a mixture of digits e.g. 7 and words e.g. seven, to enable children to become familiar with both variations. You'll also notice that the pupil slides only include illustrations when they support conceptual understanding. In line with the principles of teaching for mastery we have avoided any purely 'decorative' illustrations.

# Times Tables Resources (printable sheets)

Some of the games and activities require resources to support them. Most of these you'll have in your classroom – such as number squares or counters. We have also included a number of printable resource where required.

These range from digit cards for use in an active maths game to a fun board game that children can play together.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**Resource 1** Paired Up 2, 5, 10

Y3

| | | | |
|---|---|---|---|
| 2 x 6 = ? | 3 x 10 = ? | 4 x 2 = ? | 3 x 5 = ? |
| 5 x 10 = ? | 2 x 7 = ? | 2 x 8 = ? | 5 x 5 = ? |
| 9 x 2 = ? | 10 x 8 = ? | 2 x 10 = ? | 7 x 5 = ? |
| 18 | 20 | 35 | 80 |
| 30 | 8 | 50 | 14 |
| 12 | 15 | 16 | 25 |

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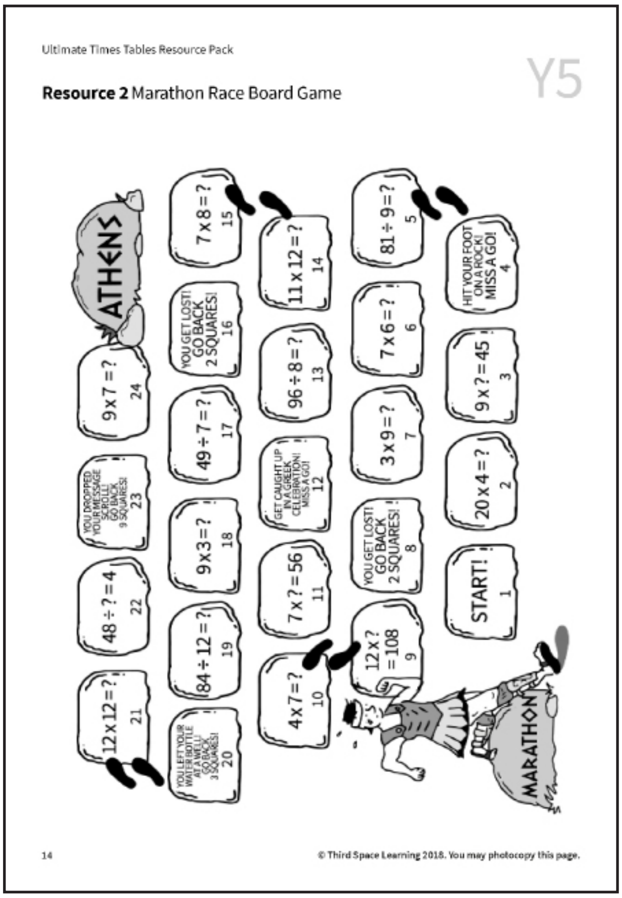
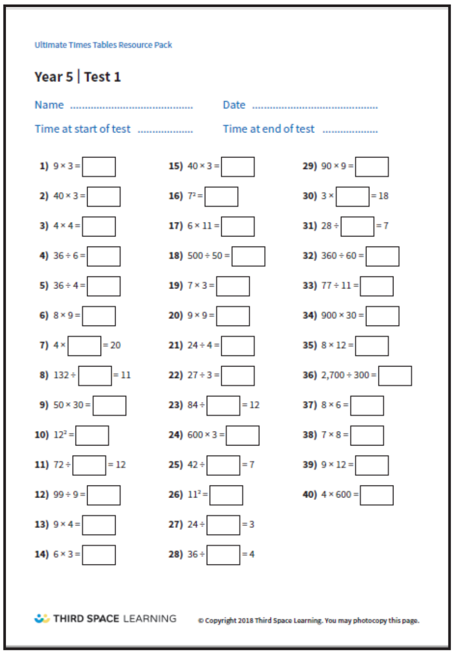


# Times Tables Tests (printable sheets)

Each year group's pack contains 15 tests. These are designed to be used on a rolling basis - work through the tests in order, and then start the suite of tests again. They can be used on a daily or weekly basis, depending on your schedule and school.

Each test should take **3** minutes.

After children have marked their test, they should be encouraged to use the Assessment 'how did you do' grids for each test. They should shade in the squares containing the question numbers which they got **correct**. By doing this, they will create a handy visual representation of their strengths and gaps in learning. They can also be used by the teacher to help assess the class as a whole, informing future planning and ensuring the teaching covers any common areas of weakness.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**Year 5 | Test 1**

Name ........................ Date ........................

Time at start of test .......... Time at end of test ..........

1) 9 × 3 = ___
2) 40 × 3 = ___
3) 4 × 4 = ___
4) 36 ÷ 6 = ___
5) 36 ÷ 4 = ___
6) 8 × 9 = ___
7) 4 × ___ = 20
8) 132 ÷ ___ = 11
9) 50 × 30 = ___
10) $12^2$ = ___
11) 72 ÷ ___ = 12
12) 99 ÷ 9 = ___
13) 9 × 4 = ___
14) 6 × 3 = ___
15) 40 × 3 = ___
16) $7^2$ = ___
17) 6 × 11 = ___
18) 500 ÷ 50 = ___
19) 7 × 3 = ___
20) 9 × 9 = ___
21) 24 ÷ 4 = ___
22) 27 ÷ 3 = ___
23) 84 ÷ ___ = 12
24) 600 × 3 = ___
25) 42 ÷ ___ = 7
26) $11^2$ = ___
27) 24 ÷ ___ = 3
28) 36 ÷ ___ = 4
29) 90 × 9 = ___
30) 3 × ___ = 18
31) 28 ÷ ___ = 7
32) 360 ÷ 60 = ___
33) 77 ÷ 11 = ___
34) 900 × 30 = ___
35) 8 × 12 = ___
36) 2,700 ÷ 300 = ___
37) 8 × 6 = ___
38) 7 × 8 = ___
39) 9 × 12 = ___
40) 4 × 600 = ___

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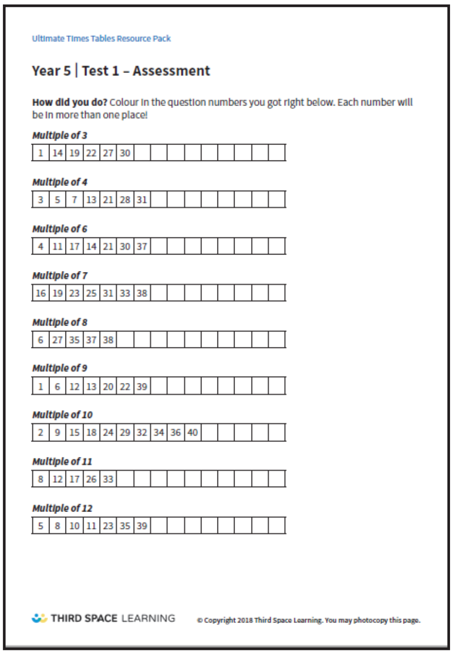
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**Year 5 | Test 1 – Assessment**

**How did you do?** Colour in the question numbers you got right below. Each number will be in more than one place!

***Multiple of 3***

| 1 | 14 | 19 | 22 | 27 | 30 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

***Multiple of 4***

| 3 | 5 | 7 | 13 | 21 | 28 | 31 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

***Multiple of 6***

| 4 | 11 | 17 | 14 | 21 | 30 | 37 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

***Multiple of 7***

| 16 | 19 | 23 | 25 | 31 | 33 | 38 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

***Multiple of 8***

| 6 | 27 | 35 | 37 | 38 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

***Multiple of 9***

| 1 | 6 | 12 | 13 | 20 | 22 | 39 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

***Multiple of 10***

| 2 | 9 | 15 | 18 | 24 | 29 | 32 | 34 | 36 | 40 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

***Multiple of 11***

| 8 | 12 | 17 | 26 | 33 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

***Multiple of 12***

| 5 | 8 | 10 | 11 | 23 | 35 | 39 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

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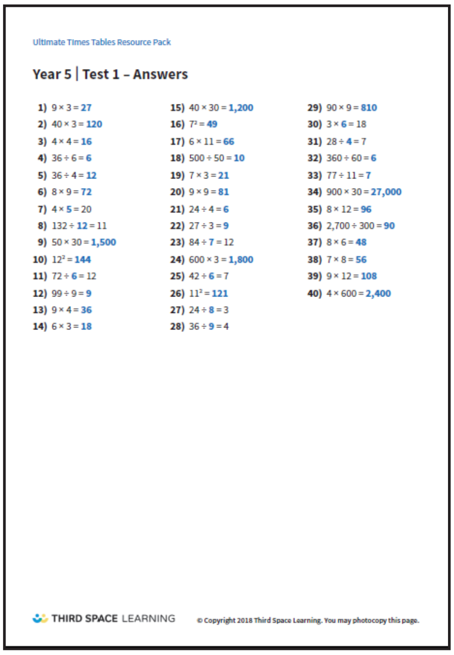
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**Year 5 | Test 1 – Answers**

1) 9 × 3 = **27**
2) 40 × 3 = **120**
3) 4 × 4 = **16**
4) 36 ÷ 6 = **6**
5) 36 ÷ 4 = **12**
6) 8 × 9 = **72**
7) 4 × **5** = 20
8) 132 ÷ **12** = 11
9) 50 × 30 = **1,500**
10) $12^2$ = **144**
11) 72 ÷ **6** = 12
12) 99 ÷ 9 = **9**
13) 9 × 4 = **36**
14) 6 × 3 = **18**
15) 40 × 30 = **1,200**
16) $7^2$ = **49**
17) 6 × 11 = **66**
18) 500 ÷ 50 = **10**
19) 7 × 3 = **21**
20) 9 × 9 = **81**
21) 24 ÷ 4 = **6**
22) 27 ÷ 3 = **9**
23) 84 ÷ **7** = 12
24) 600 × 3 = **1,800**
25) 42 ÷ **6** = 7
26) $11^2$ = **121**
27) 24 ÷ **8** = 3
28) 36 ÷ **9** = 4
29) 90 × 9 = **810**
30) 3 × **6** = 18
31) 28 ÷ **4** = 7
32) 360 ÷ 60 = **6**
33) 77 ÷ 11 = **7**
34) 900 × 30 = **27,000**
35) 8 × 12 = **96**
36) 2,700 ÷ 300 = **90**
37) 8 × 6 = **48**
38) 7 × 8 = **56**
39) 9 × 12 = **108**
40) 4 × 600 = **2,400**

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# Pedagogy Guide for teaching times tables

### Progression in teaching multiplication

Children should be encouraged to investigate, see, understand and use the many connections between different multiplication tables. By doing this, they demonstrate true fluency and ultimately reduce the amount of ‘facts’ they need to store. This facilitates the goal of being fluent in the 1-12 times tables in time for the multiplication check in Year 4.

To help with this, it is strongly suggested that the multiplication tables are introduced in the following order.

| Key Stage 1 | | | Year 3 | | | Year 4 | | | | | Year 5 and 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2x | 5x | 10x | 4x | 8 x | 3 x | 6x | 7 x | 9 x | 11x | 12x | Continue to build fluency, and linked facts, including Powers of 10 (e.g. 30 x 40) and decimals in Year 6 (e.g. 0.3 x 3) |
| [See note below] | | | (linked to 2 x) | (linked to 2x and 4 x) | (linked to 2x) | (linked to 3 x) | (linked to 6 x) | (linked to 10 x) | (linked to 10 x) | (linked to 10 x and 2 x) | |

### Times tables in Key Stage 1

In Year 1, times tables are introduced using the terms ‘lots of’ and ‘groups of’ only – there is no use of the multiplication symbol or writing formal multiplication sentences.

In Year 2, continue to build fluency and introduce multiplication and division symbols and link multiplication and division facts.

## Representing multiplication in different ways

When exploring any multiplication table, it is important that children are continually exposed to the different ways in which multiplication can be represented.

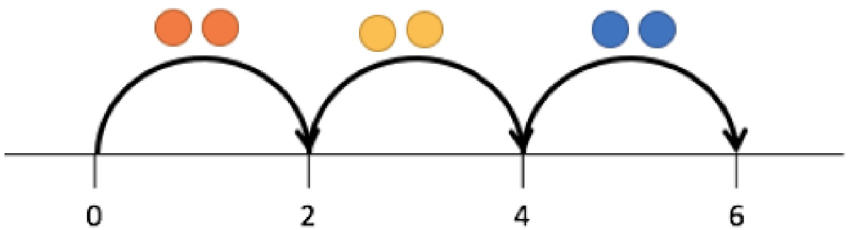
The two main representations for multiplication are **repeated addition** and **arrays**. These two representations are linked to each other.

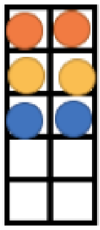
## Repeated addition

Multiplication can be represented as repeated addition, which can be shown on a number line.

Counters and other manipulatives, alongside tens frames can be used.

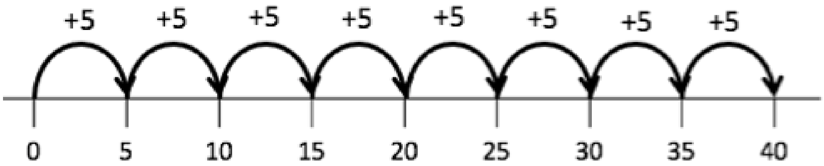
3 x 2 = 6




Or, if children are secure with one-to-one correspondence and counting in multiples, they can be used without the manipulatives.

8 x 5 = 40




5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 40

## Arrays

Arrays are also a key representation for multiplication, and children should be encouraged to physically create and manipulate arrays, both by themselves and alongside repeated addition on the number line.

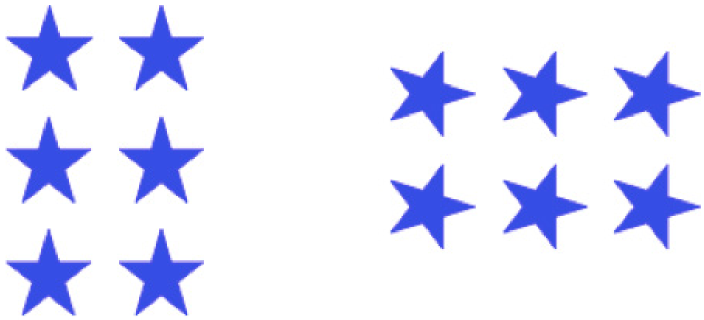
For example,

2 x 3 = 6

5 x 4 = 20

Arrays are also important as they can easily show, by rotating the array, the **commutative property** of multiplication.

2 x 3 = 6 is the same as 3 x 2 = 6



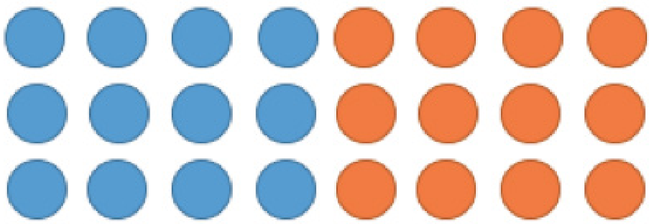
## Doubling

Doubling is a key skill that should be introduced from Year 1 and should continue to be developed with more complex numbers in each year group.

Doubling is important as it is used to relate the 'foundation' multiplication facts (2, 5 and 10 x) with other multiplication facts.

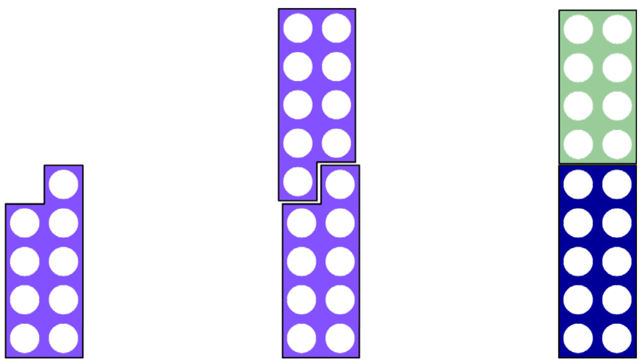
Doubling can be represented in many ways, including arrays:

e.g. double 12 is 24



12 + 12 = 24

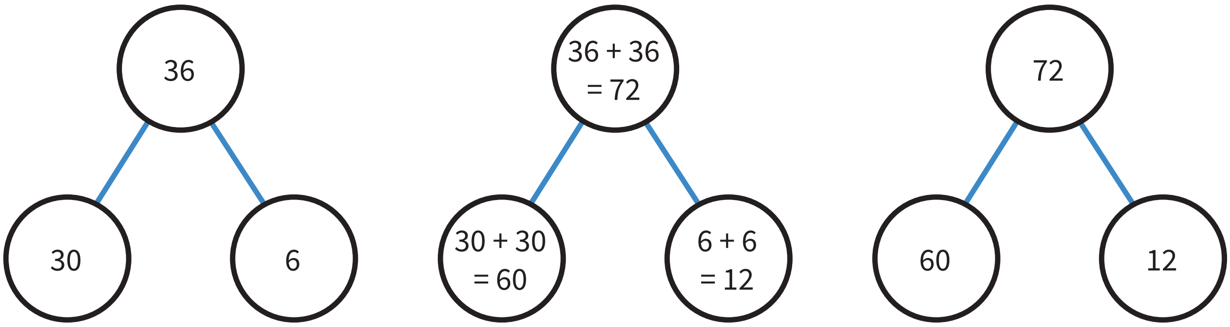
## Number shapes



9 Double 9 = 18

Number shapes are useful for helping children to understand and visualise why the answer to double a number is always even (as odd + odd = even)

Children can also use part-whole models and partitioning to help them double larger numbers. For example, the part-whole model can be used to help children double 36.



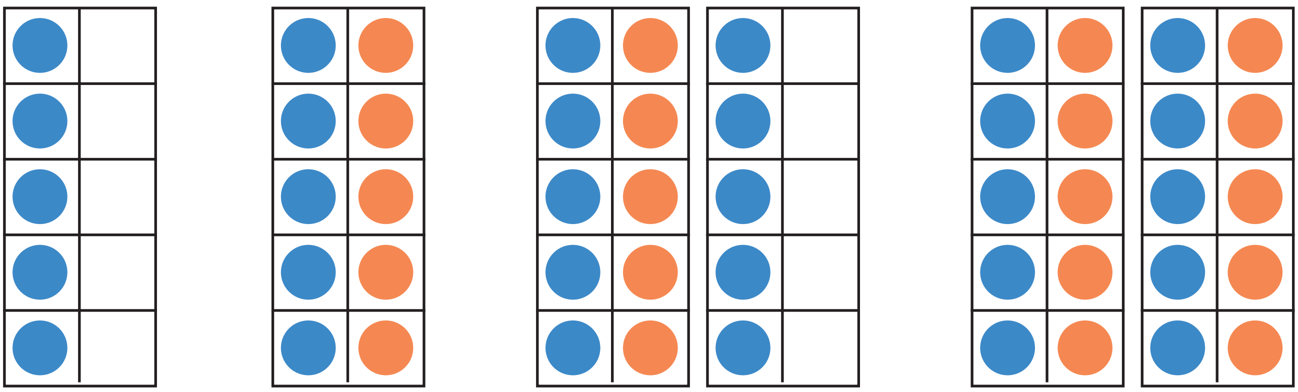

## The 2, 5 and 10 times tables

In Key Stage 1, children are introduced to the 2, 5 and 10 times tables, and should enter Lower Key Stage 2 being relatively secure with these foundation multiplication tables.

The 2, 5 and 10 times tables are used as ‘foundation’ multiplication tables which children use to work out a range of other multiplication facts – for example, the two times table can be used to work out the four times table (through doubling).

The 2, 5 and 10 times tables should be introduced using a range of manipulatives, including tens frames, arrays, repeated addition on the number line and number shapes.

You should encourage children to use their representations to help them draw out patterns in multiplication tables. For example, the patterns in the 5 times table can be effectively drawn out using tens frames. Multiplication tables can be drawn out by using tens frames.



5 10 15 20

## The inverse relationship between multiplication and division

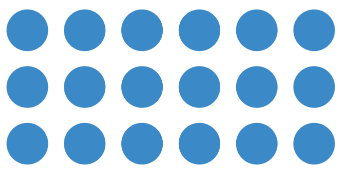
From Year 2, children should be conceptually introduced to the relationship between multiplication and division. It is important that starting in Year 2, children are encouraged to consider, investigate, use and practise the related division facts.

Multiplication and division are inverse operations. This means that multiplication is the opposite of division, and division is the opposite of multiplication. In other words, division 'undoes' multiplication, and multiplication 'undoes' division.

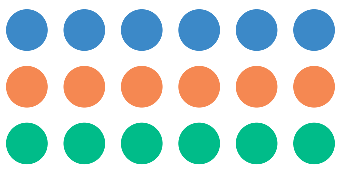
This can be represented using arrays.

So, if children know that 3 lots of 6, or 3 x 6, is 18, then they also know that **18 in groups of 6 is 3**.

3 lots of 6 or 3 x 6 = 18



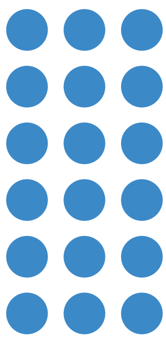
18 in groups of 6 = 3 groups or 18 ÷ 6 = 3



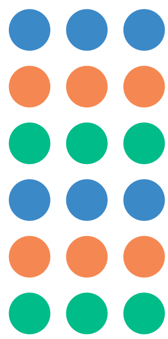
And because multiplication is commutative, 6 x 3 = 18 also means that 18 ÷ 3 = 6.

It is important to stress to children that, unlike multiplication, division is not commutative – as 18 ÷ 3 is not the same as 3 ÷ 18.

6 lots of 3 or 6 x 3 = 18



18 in groups of 3 = 6 groups or 18 ÷ 3 = 6



## Introducing the 4 times table

The four times table can be linked to the children's existing knowledge of the two times table. Answers to the four times table are double (or 2x) the corresponding answer for the two times table.

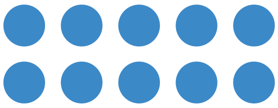
For example:

2 x 5 = 10

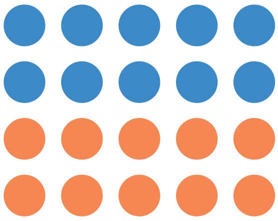
4 x 5 = 20 (2 x 10)

This relationship can be effectively shown using arrays made from two different colour counters, as shown below.

2 x 5 = 10



4 x 5 = 20 (or 2 lots of 10)



## Introducing the 8 times table

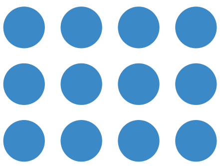
The eight times table should be the next times table that children are introduced to in lower Key Stage 2. This is because, just like the link between the 2 and 4 times tables, doubling can be used to help children calculate their 8 times table based on existing times table knowledge. Introducing the 8 times table after the 4 times table helps children to see the link between different multiplication tables.

Answers to the 8 times table are double (or 2x) the corresponding answer for the 4 times table.

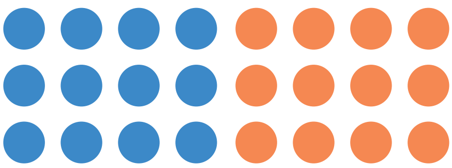
5 x **4** = 20 so 5 x **8** = 20 + 20 (or double 20) which means 5 x **8** = 40.

This relationship can be represented using an arrays.

3 x 4 = 12



therefore 3 x 8 = 24



12 + 12 = 24

Remind children they can use part-whole models, as shown in the 'doubling' section of this guide, to help them double larger numbers.

Children can also begin to investigate the relationship between the 2 times table and the 8 times table.

## Introducing the 3 times table

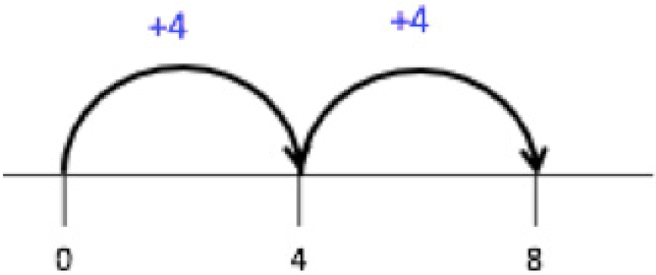
The three times table should be the next times table that children are introduced to in Lower Key Stage 2.

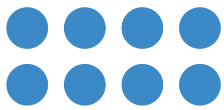
The three times table can also be linked to the two times table.

If 2 x 4 = 8 (2 lots of 4 is 8) 3 x 4 (3 lots of 4) is just one more 'lot' of 4.

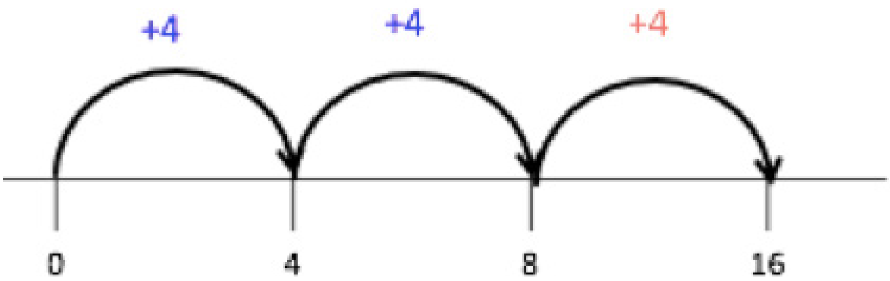
This can be represented using both repeated addition on a number line, and an array.

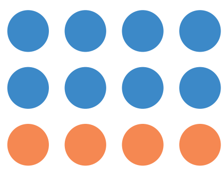
2 x 4 = 8



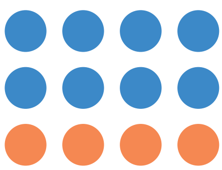



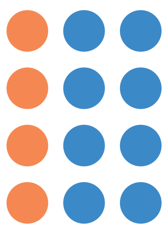
Therefore 3 x 4 or 3 lots of 4 would just be one more 'lot' of 4.



And because of the commutative nature, we can show that 3 x 4 is the same as 4 x 3.





So children can work out the answer to the three times table by finding out the corresponding answer to the 2 times table (using their inverse relationships if needed) and adding another ‘lot’ of the number they are multiplying.

For example, to work out 6 x 3, children can work out 6 x 2 and add 6.

## Introducing the 6 times table

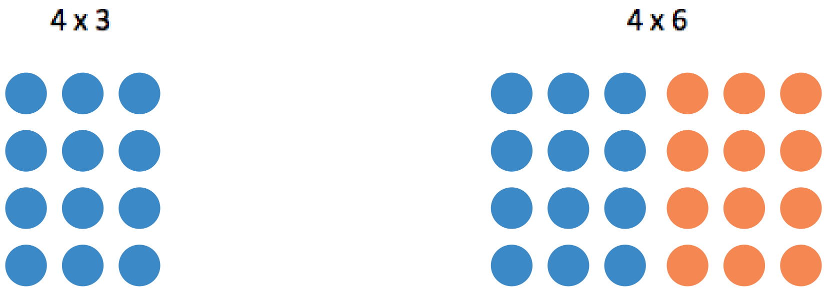
Just like the relationship between the two and four times table, the six times table can be linked to the three times table by doubling.

4 x 3 = 12

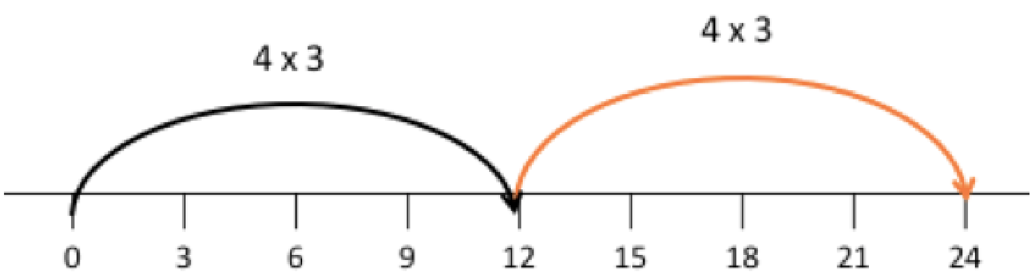
4 x 6 = double 12

Draw attention to the fact that 6 is **double** 3. Because of this, they know that 4 lots of 6 is **double** 4 lots of 3.

This can be represented using arrays.




The number line can also be used to represent the relationship between the 3 and 6 times tables.



## Introducing the 7 times table

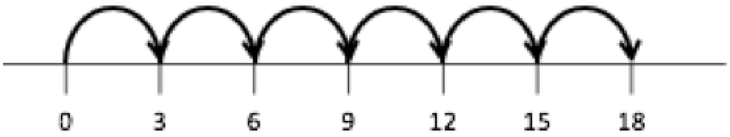
Just as with the 2 and 3 times table, children can use addition to link the 6 and 7 times table.

6 x 3 = 18 (6 lots of 3 is 18) therefore 7 x 3 is just one more ‘lot’ of 3.

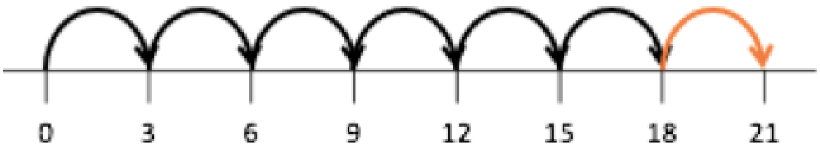
7 x 3 = 18 + 3 = 21

This can effectively be represented using a number line.

6 x 3 = 18



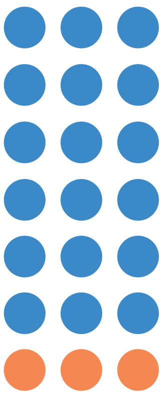

Therefore 7 x 3 = 6 x 3 + 3



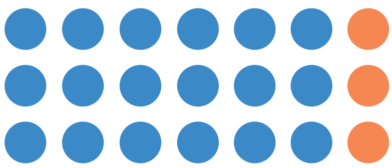

This can be linked to arrays, and therefore the commutative relationship can be seen.

You can easily show that 7 lots of 3 or **7** x 3 = 21 is the same as 3 lots of 7, or 3 x **7** = 21

7 x 3 = 21



3 x 7 = 21



## Introducing the 9 times table

By the time children are formally introduced to the nine times table, they can actually already calculate most of the nine times table by using their existing times table knowledge and the fact that multiplication is commutative.

For example, they should be encouraged to use their three times table to work out 3 x 9 = 27, as 3 x 9 = 9 x 3.

Children should explore the link between the ten times table and the nine times table. They should notice every answer to a number multiplied by 9, is just 'one lot' less than the answer to the same number multiplied by 10.

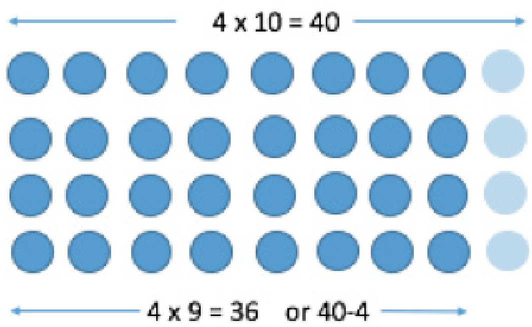
For example:

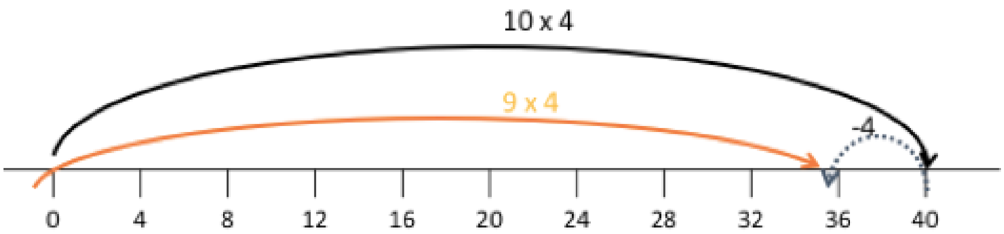
6 x 10 = 60

60 – 6 = 54

so 6 x 9 = 54

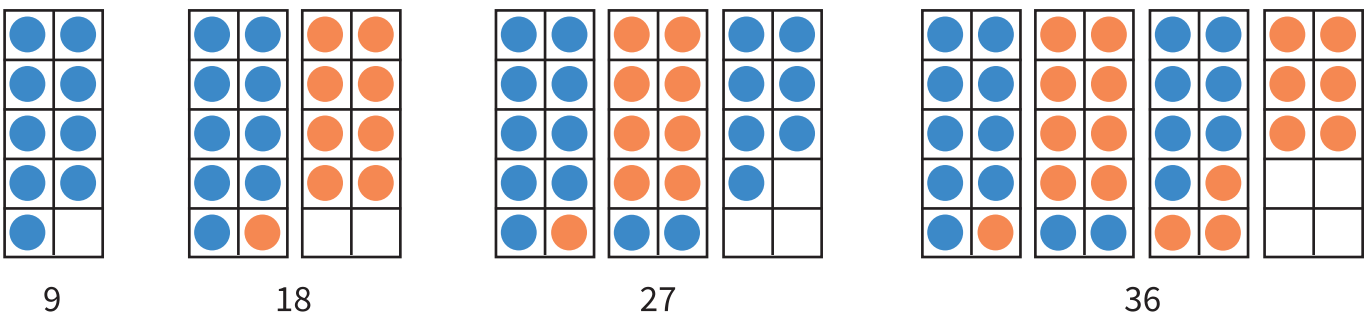
Arrays and the number line can be used to help represent this relationship:




Children may also notice patterns in the 9 times table. For example, that the digit root (the addition of the digits in the number, regardless of their place value, until it reaches a single digit answer) always equals 9 (e.g. The digit root of 99 is 9 as 9 + 9 = 18, 1 + 8 = 9) or that, for 1 – 10 x 9, the tens digit increased by 1, from 0, and the ones digit decreased by 1 from 9.

However, **it is important that the reason these relationships exist (i.e. due to the link between the 10 and 9 times table) is explored**, rather than them simply being learnt as 'tricks' without meaning. Tens frames can help children unpick this relationship.



## Introducing the 11 times table

Just like the nine times table, it is important that when introducing the eleven times table, you draw attention to the fact that children can use their existing times table knowledge and the commutative nature of multiplication to work out the majority of their eleven times table.

Children should also be encouraged to explore the link between the 10 and 11 times tables.

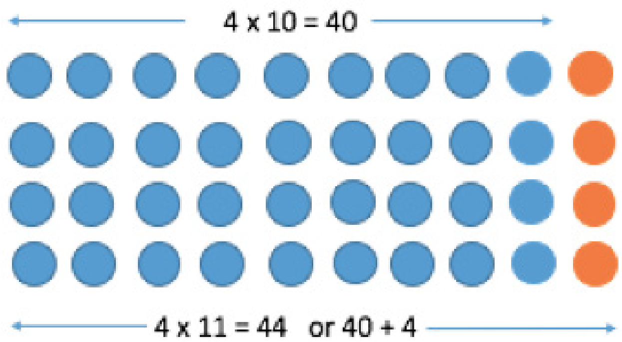
For example, using their commutative facts, they may notice that:

8 x 11 = 88 is just one lot of 8 more than 8 x 10 = 80

3 x 11 = 33 is just one lot of 3 more than 3 x 10 = 30

Therefore they can always use their 10 times table to help them work out their 11 times table.

This relationship is best represented using an array.




Children may also notice patterns in their eleven times table. For example, it is common for children to state that 'you put the digit you are multiplying by twice', by which they mean that **3** x 11 is **3 3**. However, it is important for children to explore why this pattern exists. (Since 10 times a number is always a multiple of 10, the answer to 11 x the same number will always be the multiple of 10 plus the number you are multiplying by, which creates the 'double digit' effect).

Children should also investigate at what point any patterns they notice break down (for example, 11 x 11 is not 1111, which is a common answer if children have not developed the conceptual understanding behind the pattern they have noticed).

## Introducing the 12 times table

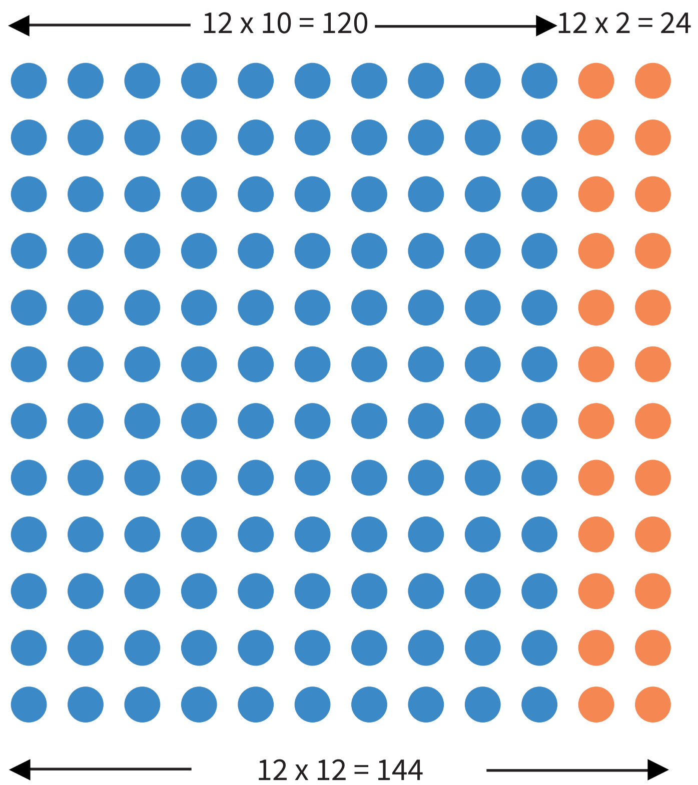
The twelve times table is often the last times table introduced in Lower Key Stage 2. Again, children should be encouraged to realise that, due to the commutative nature of multiplication, they can work out all but one of their twelve times table by using the times table facts they already know. For example, 9 x 12 can be solved using the 12 x 9 multiplication fact.

Therefore, children should identify that 12 x 12 is the only 'new' multiplication fact in the twelve times table.

They should be encouraged to use their existing multiplication facts to work this out.

For example, they could notice that using the distributive law, they can write 12 x 12 as 12 x 10 and 12 x 2 (or 12 x 10 + 12 x 2). Therefore, 12 x 12 = 120 + 24 = 144.

The distributive law and its usefulness for calculating 12 x 12 using existing facts can easily be represented using an array.




## Continuing times table learning in Upper Key Stage 2

It is important that children's fluency in their 1-12 times table is maintained throughout Upper Key Stage 2. They will use their times table facts to help them in a wide range of maths topics, as well as when using formal methods of multiplication and division.

Children should also be introduced to a wider range of related facts for their 1-12 times tables. In Year 5, children should explore the relationship between the 1-12 times tables and multiplication questions that involve multiples of 10 (e.g. how is 20 x 3 linked to 2 x 3).

It is important that these links are explored conceptually. Children should realise that if a number in the multiplication is ten times larger than a related fact, then the answer to the multiplication will also be ten times larger.

e.g. 40 x 6 = 240 as 40 is ten times larger than 4, and therefore the answer to 40 x 6 is ten times larger than the answer to 4 x 6 = 24.

This can then be extended to multiples of 10 and 100. For example, 40 x 60 = 2,400, as 40 is ten times larger than 4, and 60 is ten times larger than 6, and therefore the answer to 40 x 60 is 4 x 6 x 10 x 10.

**The distributive and associative law** should also be used to explain this relationship.

The associative law means that 40 x 60 is the same as 4 x 10 x 6 x 10, which can be written as 4 x 6 x 10 x 10, which could also be written as 4 x 6 x 100.

In Year 6, this knowledge and understanding should be extended to decimal numbers.

## Where to find all your resources

**The Ultimate Times Tables Resource Pack** is one of Third Space Learning's premium Maths Hub resources and can be found by visiting mathshub.thirdspacelearning.com.

Like all our resources, they have been created by primary maths expert authors and practising teachers to support schools on their journey towards mastery in maths.

When you have identified those target pupils who need more intensive and personalised support than classroom teaching can provide, our 1-to-1 interventions will enable any child to make rapid progress and develop conceptual as well as procedural understanding.

Get in touch if you want to find out more: thirdspacelearning.com.