

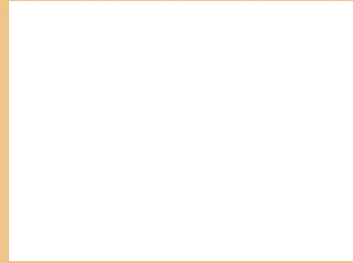
# Disclaimer

We hope you find the information on our website and resources useful.

## Animations

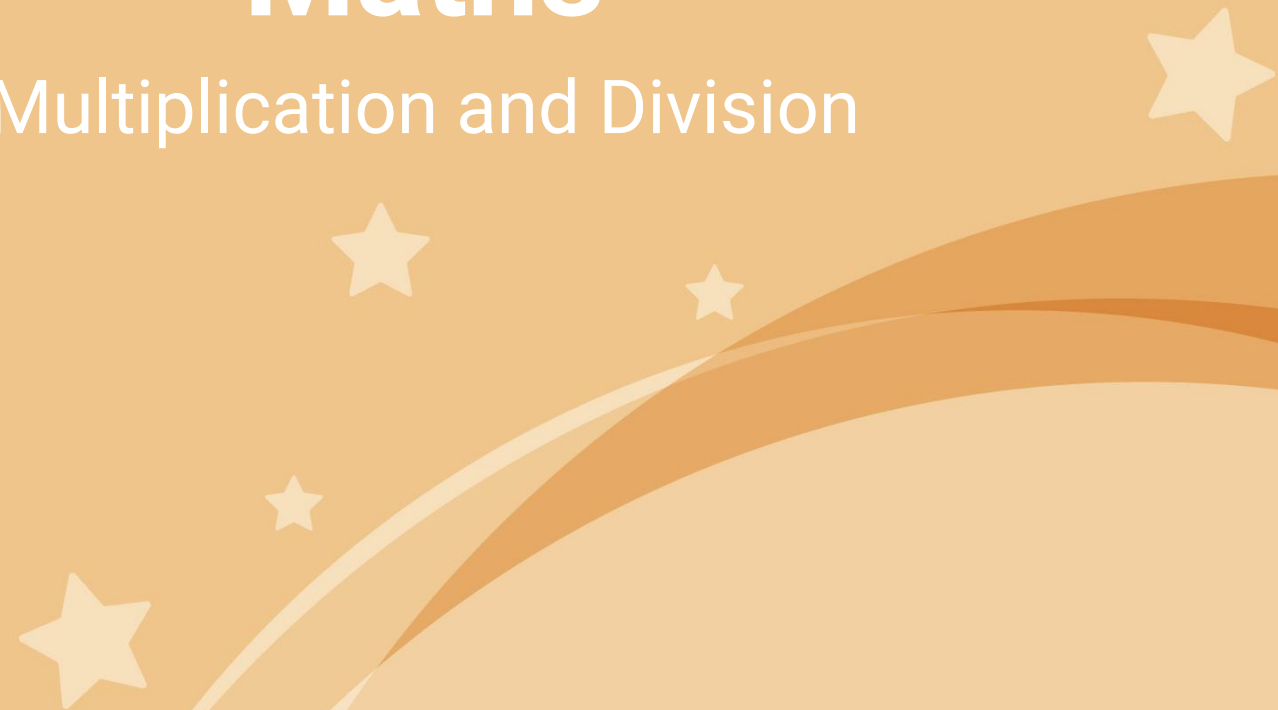
This resource has been designed with animations to make it as fun and engaging as possible. To view the content in the correct formatting, please view the PowerPoint in 'slide show mode'. This takes you from desktop to presentation mode. If you view the slides out of 'slide show mode', you may find that some of the text and images overlap each other and/or are difficult to read.

To enter slide show mode, go to the **slide show menu tab** and select either **from beginning** or **from current slide**.



# Maths

## Multiplication and Division



# Need a coherently planned sequence of lessons to complement this resource?

**Lesson Breakdown**

Below is our suggestion for the most coherent and progressive sequence to teach this area of PlanIt Maths steps on the White Rose Maths scheme of learning although we have not aimed to mirror the exact order in which the resources are presented.

**Multiples and Factors (1): Multiples**  
Use this comprehensive lesson pack to help teach children how to identify children's knowledge of the multiplication tables to deepen their knowledge will encourage children to work systematically, using rules to quickly identify two-digit numbers to three-digit numbers. Children's learning can also be focused on deepening the children's knowledge with a range of fluency, reasoning and problem-solving activities. By the end of the lesson, children should be confident in being able to identify the multiples of a number.

**NC Statement:** Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.

**Lesson Aim:** To identify multiples of numbers.

**Multiples and Factors (2): Factors**  
This comprehensive, teacher-made lesson pack is designed specifically to be used in a systematic way. This lesson will build on the children's prior knowledge of the order factors of numbers. The differentiated activity sheets allow children to work at their own pace. Children's learning can also be deepened by using the Dividing Fluency, reasoning and problem-solving activities. By the end of the lesson, children should be confident in being able to identify the factors of a number.

**NC Statement:** Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.

**Lesson Aim:** To identify all of the factors of a number.

**Assessment Statements**

By the end of this unit,

children working towards the expected level will be able to:

- recognise the multiples and factors of numbers and begin to find the common factors of two numbers;
- identify the prime numbers less than 20 and find the prime numbers up to 100 using their multiplication tables knowledge;
- multiply numbers up to 4 digits by one or two-digit numbers using short multiplication within their tables knowledge;
- multiply and divide numbers mentally using known facts e.g. doubling and halving;
- use the formal method of short division to divide numbers up to four digits by a one-digit number with increasing confidence;
- begin to interpret remainders as whole numbers, decimals and simple fractions where appropriate;
- multiply and divide whole numbers by 10, 100 and 1000;
- understand the notation for square and cubed numbers;
- recognise that the equals sign indicates equivalence;
- solve a range of multiplication and division problems including scaling and rates problems.

children working at the expected level will be able to:

- find factor pairs and identify the common factors of two or more numbers;
- recall the prime numbers up to 20 and be able to find the prime numbers up to 100 using their multiplication tables knowledge;
- multiply numbers up to four digits by one or two-digit numbers using short and long multiplication;
- multiply and divide numbers mentally using known facts e.g. doubling, halving, partitioning and recombining and beginning to use known facts to multiply and divide decimals;
- use the formal method of short division to divide numbers up to four digits by a one-digit number with increasing confidence;
- interpret remainders as whole numbers, decimals and simple fractions and begin to choose the way to express remainders, depending on the context of the problem;
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1000;
- identify and use square numbers, cube numbers and powers;
- recognise that the equals sign indicates equivalence and use it to solve simple equations and problems, including scaling, exchange rate and speed problems.

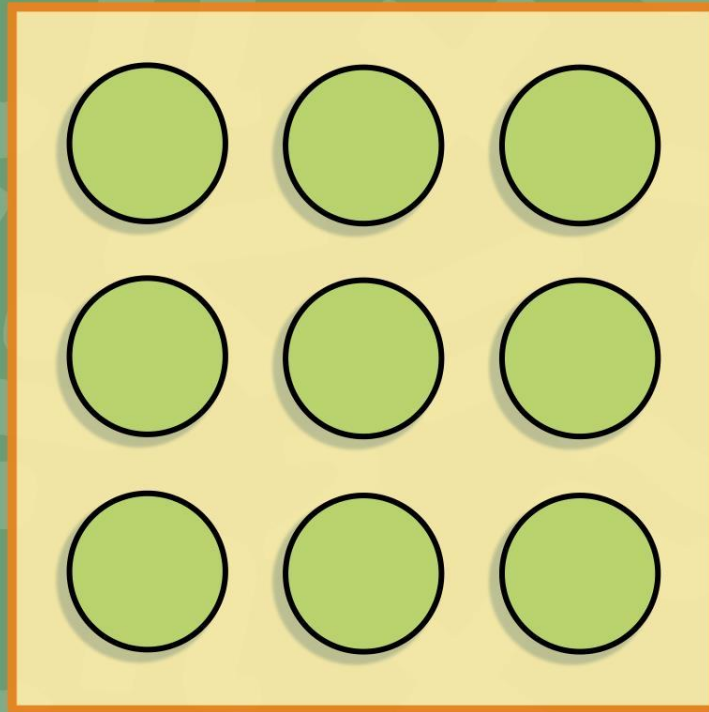
**Multiplication and Division**  
Maths / Year Group / Steps to Progression Overview

The aim of this overview is to support teachers using PlanIt Maths to show the most coherent and progressive sequence to teach each area of maths. We also want to fully support teachers who use the White Rose Maths scheme of learning to make full use of the resources available within PlanIt Maths. Wherever possible, lesson packs have been matched to each of the small steps on the White Rose Maths scheme of learning.

**Yearly Overview**

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value		Number: Addition and Subtraction		Statistics		Number: Multiplication and Division		Perimeter and Area			
Spring	Number: Multiplication and Division		Number: Fractions		Number: Decimals and Percentages		Measurement: Converting Units		Measures: Volume		Consolidation	
Summer	Number: Decimals		Geometry: Properties of Shapes		Consolidation: Position and Direction		Measurement: Converting Units		Measures: Volume		Consolidation	

# Square Numbers



## Aim

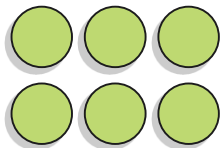
- To find square numbers.

## Success Criteria

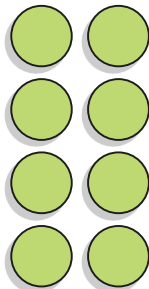
- I can create arrays to show square numbers.
- I can write calculations to make square numbers.
- I can use the  $^2$  notation correctly.

## Remember It

Write calculations to match the arrays.  
The first one has been done for you.



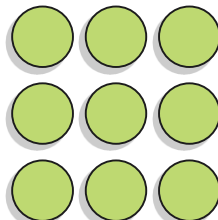
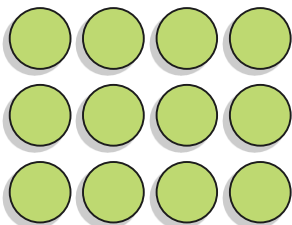
$$2 \times 3 = 6$$



$$4 \times 2 = 8$$



$$7 = 1 \times 7$$



Create arrays for the number 16. How many different formations can you make?





Let's look at the number 16.



16 counters can be organised in this way.

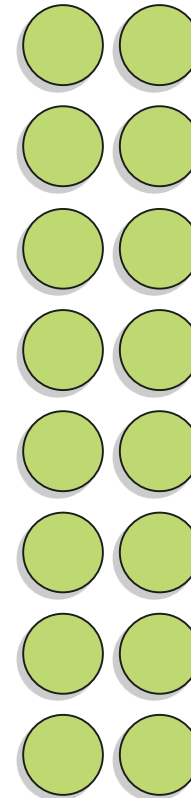
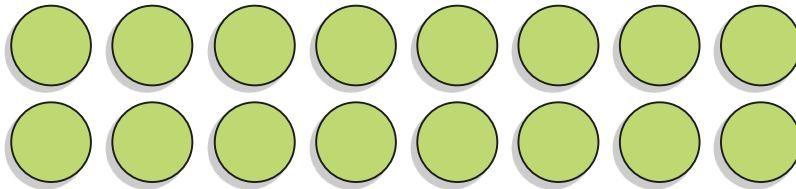
1 and 16 are factors of 16.

$$1 \times 16 = 16 \text{ and } 16 \times 1 = 16$$





Let's look at the number 16.



16 counters can be organised in this way.

2 and 8 are factors of 16.

$$2 \times 8 = 16 \text{ and } 8 \times 2 = 16$$

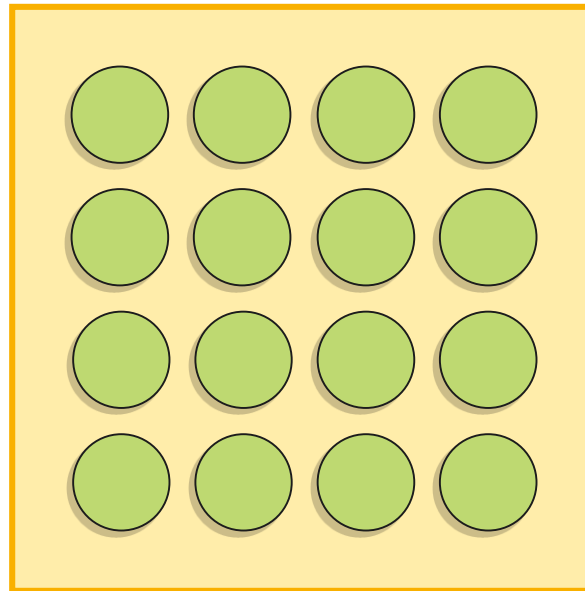


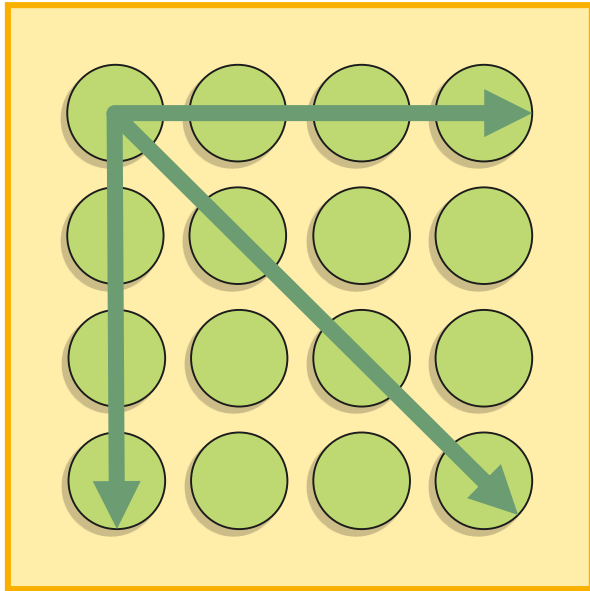


Let's look at the number 16.

There is something special about the number 16. What do you notice about this formation?

16 counters can be organised in this way.





- 16 is a special number because it is a square number.
- A square shape has the same dimensions all around and this is the same with square numbers.
- 16 has 4 counters going across, down and even diagonally.

**Using counters is a good way to investigate if a number is a square number or not.**

How could we write a calculation to match this array?  
What are the factors that make the product of 16?

**To square a number,  
you multiply it by itself!**

$$4 \times 4 = 16$$

## Finding Square Numbers



Is 16 the only square number?

Using counters, investigate which of the numbers below are square numbers. Can you write the calculation to match?

10

12

21

9

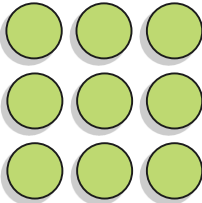
25

17

4

36

# Finding Square Numbers

Square Number	Not a Square Number
<p>9</p>  <p><math>3 \times 3 = 9</math></p>	

Click on the square numbers to see the arrays.

~~7~~

4

12

21

36

9

# Square Number Notation

This is the correct notation used by mathematicians when squaring numbers.

$$7^2$$

Consider:

How could we calculate 7 squared?

To square 7, you would multiply 7 by itself.

What would the calculation look like?

The calculation would be  $7 \times 7 =$

What would the answer be?

$$7 \times 7 = 49$$

Have a go at solving these:

$$8 \times 8$$

$$8^2$$

$$10 \times 10$$

$$10^2$$

$$11 \times 11$$

$$11^2$$






## Square Numbers

To find square numbers.

Cut out the cards below and find and match up the arrays, calculations and square number notations. Write in the answers after each equals sign to find the square numbers.

For example:

	$2 \times 2 = 4$	$2^2 = 4$
-----------------------------------------------------------------------------------	------------------	-----------

Array	Calculation	Square Number Notation
	$5 \times 5 =$	$4^2 =$
	$6 \times 6 =$	$3^2 =$
	$3 \times 3 =$	$7^2 =$
	$4 \times 4 =$	$6^2 =$
	$7 \times 7 =$	$5^2 =$

## Square Numbers

To find square numbers.

numbers on the multiplication grid.

4	5	6	7	8	9	10	11	12
4	5	6	7	8	9	10	11	12
8	10	12	14	16	18	20	22	24
12	15	18	21	24	27	30	33	36
16	20	24	28	32	36	40	44	48
20	25	30	35	40	45	50	55	60
24	30	36	42	48	54	60	66	72
28	35	42	49	56	63	70	77	84
32	40	48	56	64	72	80	88	96
36	45	54	63	72	81	90	99	108
40	50	60	70	80	90	100	110	120
44	55	66	77	88	99	110	121	132
48	60	72	84	96	108	120	132	144

## Square Numbers

To find square numbers.

Think about a strategy that you could use when multiplying two 2-digit numbers. You could use the partitioning method. For example,  $14 \times 14$  can be broken down into  $14 \times 10 + 14 \times 4$ .



Multiplication Expression	Answer
	196
$15 \times 15$	
	256
$18 \times 18$	

Complete the statements.

420

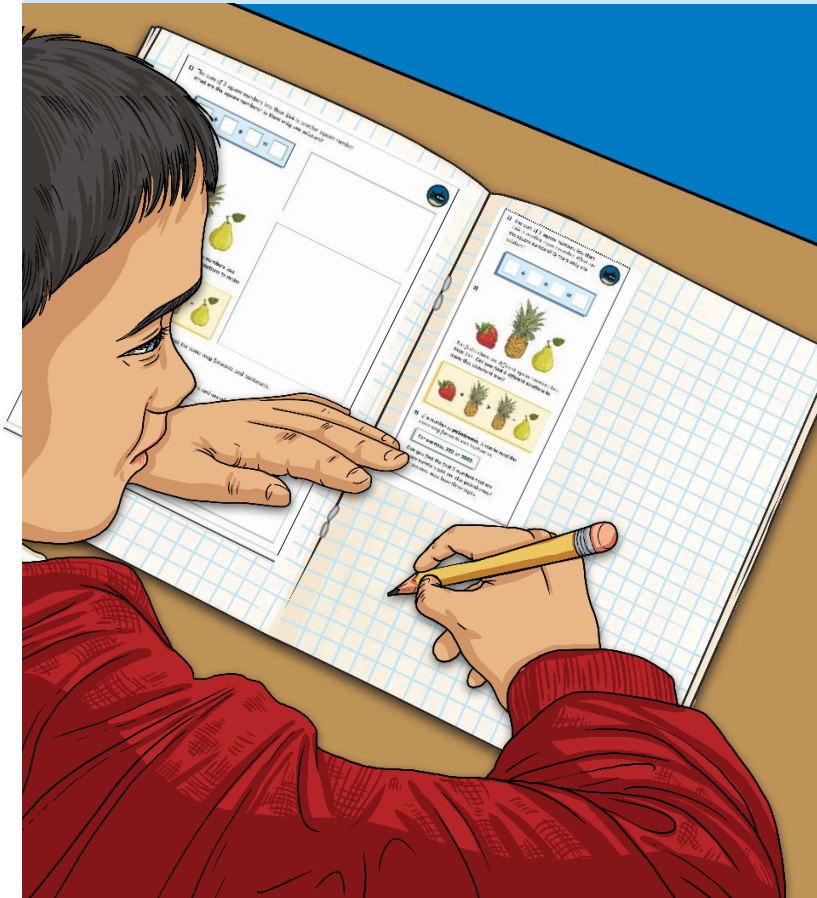
900

50 squared

1000

## Diving into Mastery

Dive in by completing your own activity!



1) Circle the square numbers in the table below.

one hundred	11	twenty-five
43	forty-six	121
twenty	196	99
144	twelve	eighty-one

2) Calculate:

$$10^2 + 10 = \square$$

$$7^2 - 13 = \square$$

$$6^2 + 4 - 5 = \square$$

$$5^2 - 20 + 3 = \square$$

$$9^2 \div 3 = \square$$

$$8^2 \div 4 = \square$$

3) Find the missing number in each calculation.

$$\square^2 = 144$$

$$\square^2 = 121$$

$$\square^2 - 2 = 98$$

$$\square^2 + 10 = 91$$



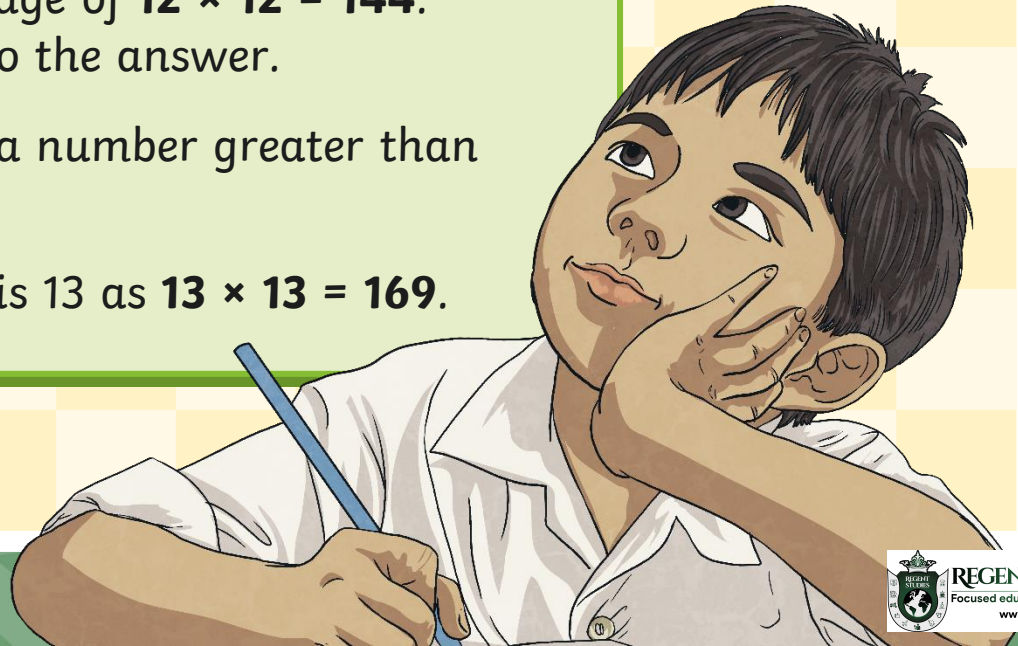
$$13^2 = 169$$

You would need to find a number that you can multiply by itself to create the product of 169.

We could use knowledge of  $12 \times 12 = 144$ .  
This brings us close to the answer.

We need to multiply a number greater than 12 to reach 169.

The missing number is 13 as  $13 \times 13 = 169$ .



## Aim



- To find square numbers.

## Success Criteria

- I can create arrays to show square numbers.
- I can write calculations to make square numbers.
- I can use the  $^2$  notation correctly.

