

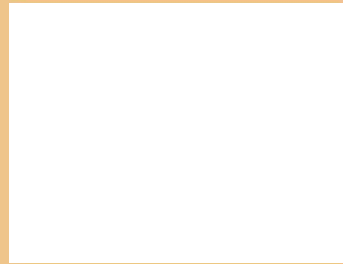
# Disclaimer

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, as well as partner talk. The differentiated activity sheets allow children to focus on deepening their 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 focus on deepening their 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 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.

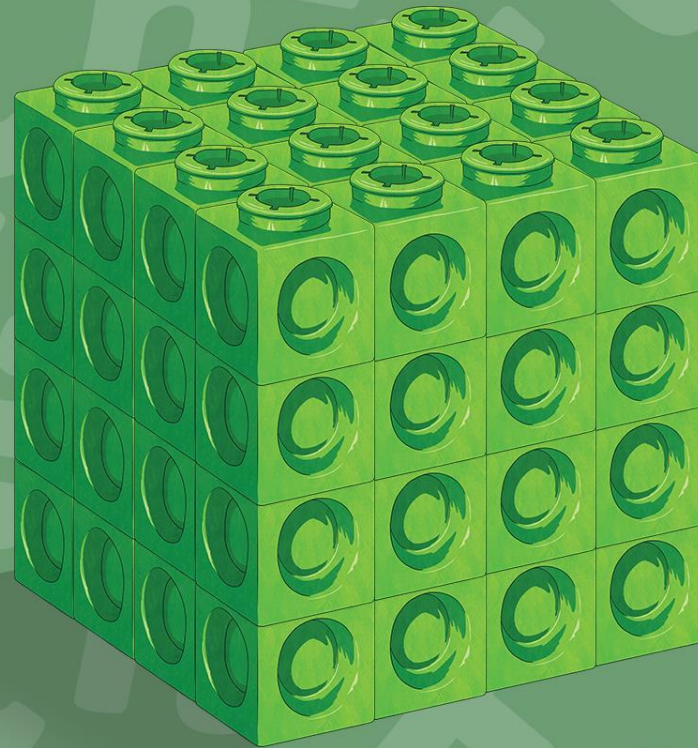
**Multiplication and Division**  
Maths / Year Group / Steps to Progression Overview

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		Consolidation					
Summer	Number: Decimals		Geometry: Properties of Shapes		Measurement: Converting Units		Measures: Volume		Consolidation			

# Cube Numbers



## Aim

- To find cube numbers.

## Success Criteria

- I can create cubes using interlocking cubes.
- I can write calculations to make cube numbers.
- I can use the  $^3$  notation correctly.

## Remember It

Answer the questions below using your knowledge of square numbers!

$$4^2 = 16$$

What is  
3 squared? 9

$$10^2 + 2 = 102$$

$$15^2 = 15 \times 15$$


$$8^2 = 64$$

What is  
7 squared? 49


$$3^2 + 2^2 = 13$$

$$20 \times 20 = 20^2$$

$$5^2 = 25$$



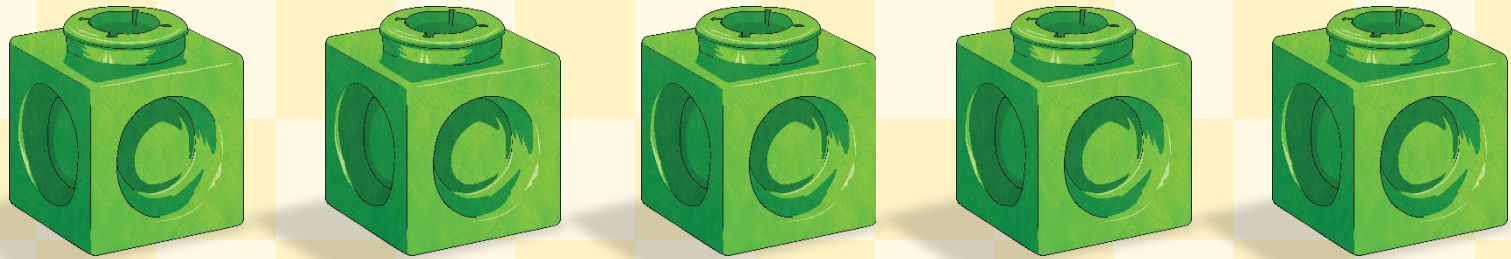
36 is the answer.  
What could the  
question be?



How many different mathematical  
questions, involving the  $^2$  notation, can  
you come up with for this answer?



Here are 5 interlocking cubes.  
Is it possible to connect these together to build a complete cube?

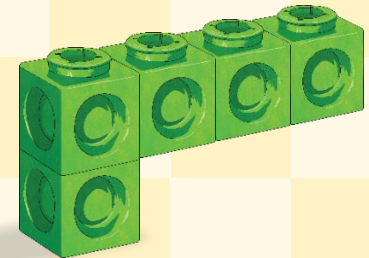
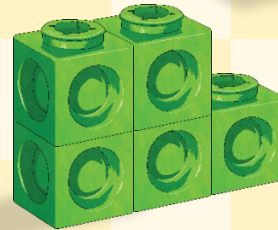
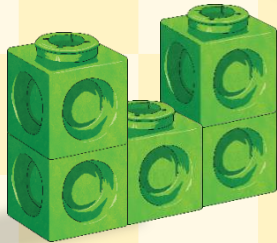
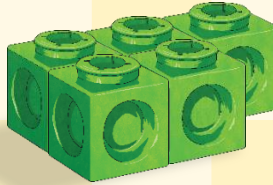
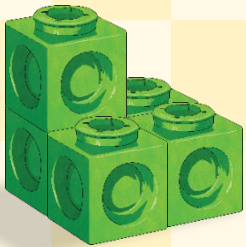


How will you know when you  
have created a complete cube?  
What will it look like?



It is not possible. Whichever way you build it, you cannot create a complete cube using 5 interlocking cubes.

Here are 6 examples. You might have found more!



We are close to having a complete cube with one of these models. How many more interlocking cubes do we need in order to build a complete cube?

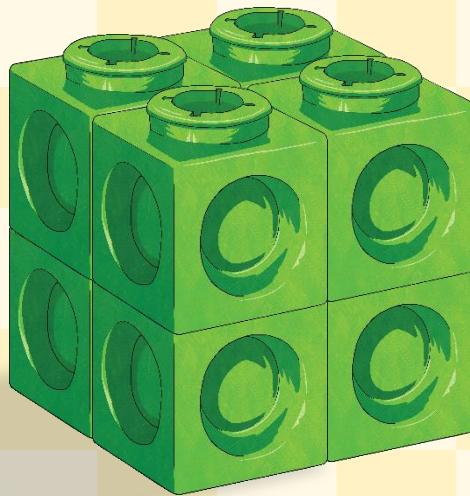




If we add 3 more cubes to our pile of 5 cubes, we can create a complete cube!

What do you notice about the **dimensions** of the cube?

The **dimensions** of a shape mean the length, width and height.



## 8 Is a Cube Number

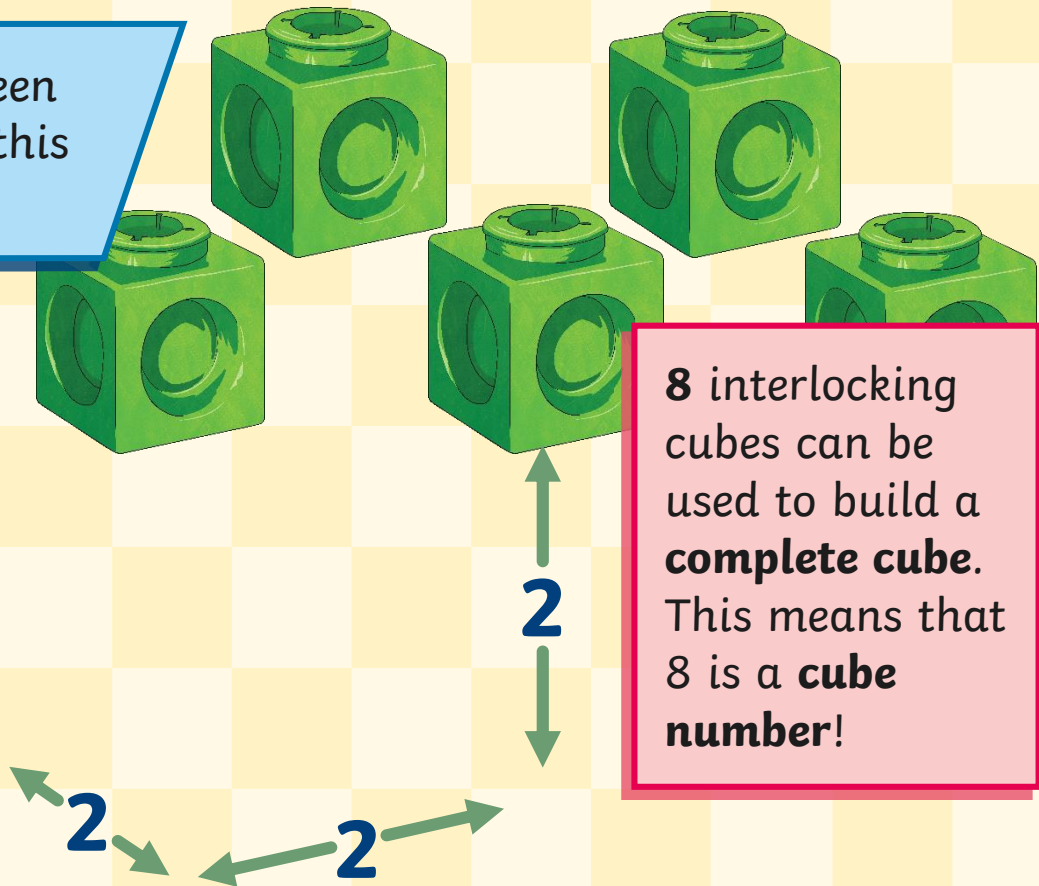
You will notice that the dimensions of the cube are the same if you look at the height, length and width of the image below.

How many cubes have been used altogether to build this complete cube?

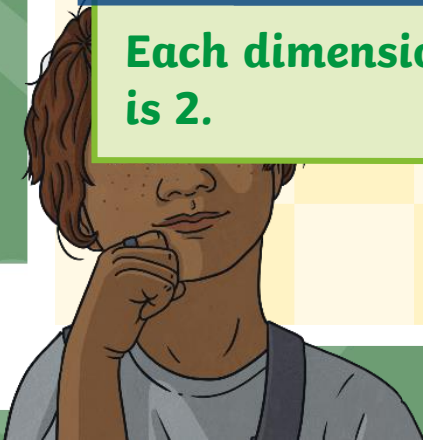
There are **8 cubes** used altogether.

What are the dimensions of the cube?

Each dimension is **2**.



**8** interlocking cubes can be used to build a **complete cube**. This means that **8** is a **cube number**!



Mathematicians often use tables to organise their findings. We could use a table to show our working for the cube we have built.

Number of cubes in each dimension	Number of cubes used altogether (the cube number)
2	8

What if the dimensions were 3, 4 or 5? What cube numbers would they make?



# Writing Calculations for Cube Numbers

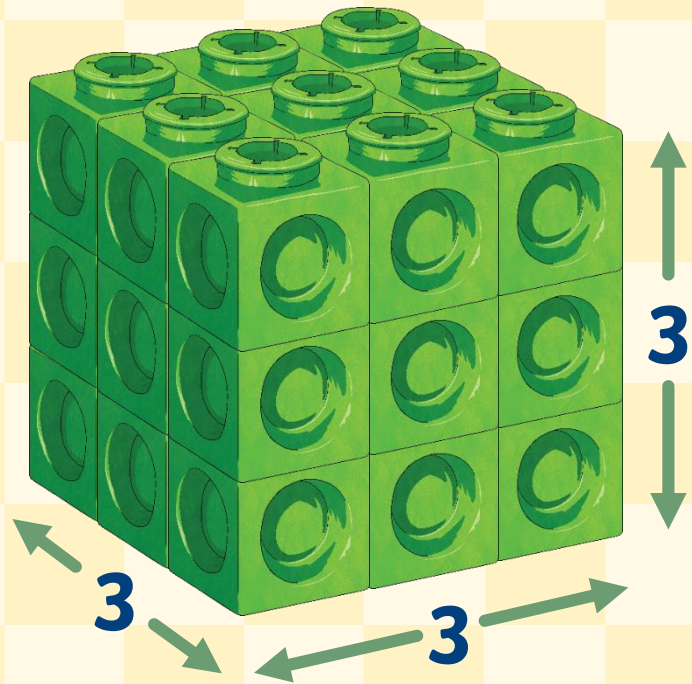
Let's look at some cubes that you may have built!

Number of cubes in each dimension	Number of cubes used altogether (the cube number)
<b>3</b>	<b>27</b>

How do we write a calculation when we cube a number?

$$\begin{array}{c} \boxed{3} \times \boxed{3} \times \boxed{3} = \boxed{27} \\ \text{length} \quad \text{width} \quad \text{height} \end{array}$$

$$\boxed{9} \times \boxed{3} = \boxed{27}$$



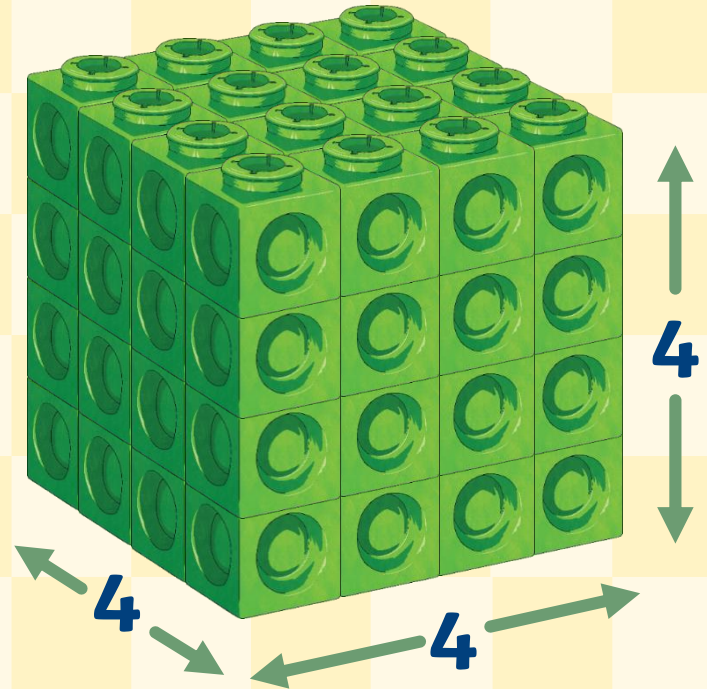
**27 is a cube number!**

# Writing Calculations for Cube Numbers

Number of cubes in each dimension	Number of cubes used altogether (the cube number)
4	64

How do we write a calculation when we cube a number?

$$\begin{array}{c} \boxed{4} \\ \text{length} \end{array} \times \begin{array}{c} \boxed{4} \\ \text{width} \end{array} \times \begin{array}{c} \boxed{4} \\ \text{height} \end{array} = \boxed{64}$$



64 is a cube number!

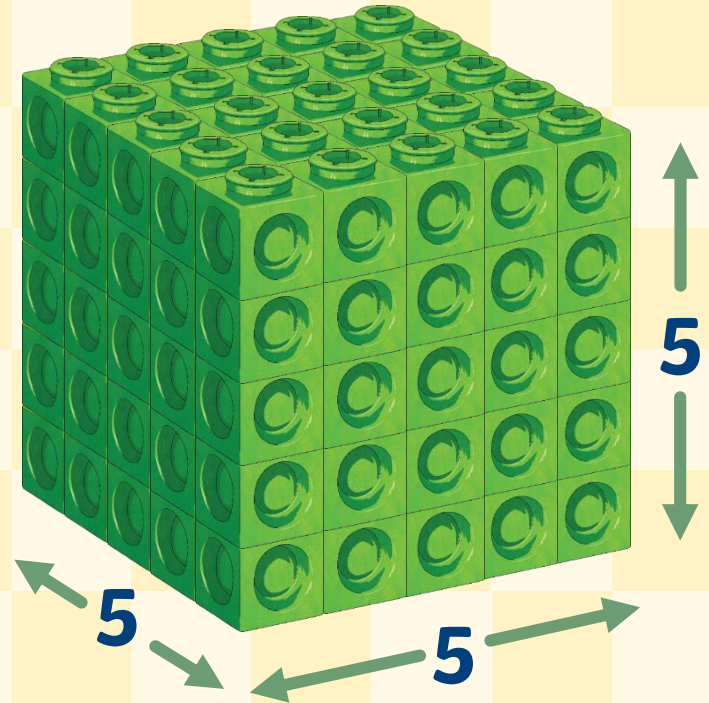


# Writing Calculations for Cube Numbers

Number of cubes in each dimension	Number of cubes used altogether (the cube number)
<b>5</b>	<b>125</b>

How do we write a calculation when we cube a number?

$$\begin{array}{c} \boxed{5} \\ \text{length} \end{array} \times \begin{array}{c} \boxed{5} \\ \text{width} \end{array} \times \begin{array}{c} \boxed{5} \\ \text{height} \end{array} = \boxed{125}$$



**125 is a cube number!**



If a mathematician wanted to square a number, they would use this notation.

$$10^2$$

The calculation would look like this:

$$10 \times 10 = 100$$



The 2 tells us to multiply 10 by itself!

# Cubing a Number

But, if a mathematician wanted to cube a number, they would use this notation:

$$10^3$$

The calculation would look like this:

$$10 \times 10 \times 10 = 1000$$

The 3 tells us to multiply 10 by itself 3 times!

What would the calculation look like for the following...?

$$6^3$$

$$6 \times 6 \times 6 =$$

$$8^3$$

$$8 \times 8 \times 8 =$$

$$9^3$$

$$9 \times 9 \times 9 =$$

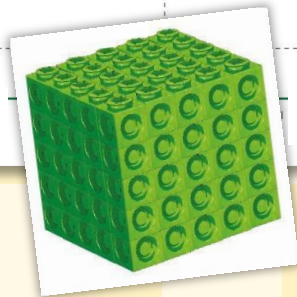
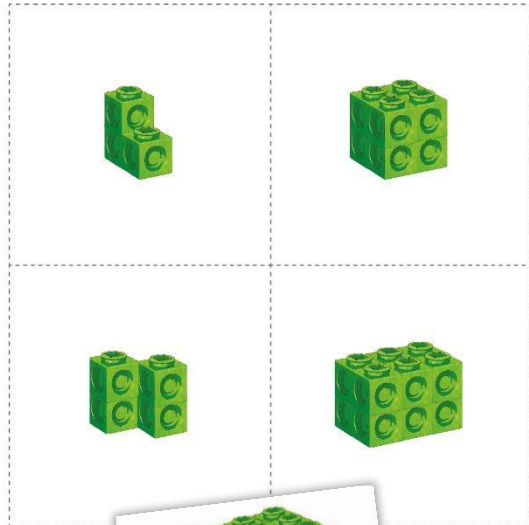


## Cube Numbers

To find cube numbers.

### Adult Guided Task

Use the activity cards and question prompts to have a discussion about cube numbers. Consider whether each image is showing a cube number or not and sort them into two piles. You could use sorting hoops to help you sort.



## Cube Numbers

To find cube numbers.

Calculation	Cube Number
$1 \times 1 \times 1$	
$3 \times 3 \times 3$	27
$5 \times 5 \times 5$	64
	216

Statements using  $<$ ,  $>$  or  $=$ .  
Put the correct symbol in the boxes on the right.

<input type="checkbox"/> $10 - 2$	<input type="text"/>
<input type="checkbox"/> $5 \times 5 \times 5$	<input type="text"/>
<input type="checkbox"/> 100	<input type="text"/>
<input type="checkbox"/> 3 cubed	<input type="text"/>

## Cube Numbers

To find cube numbers.

I used this method to solve the first one:

$$6 \times 6 \times 6 =$$

$$6 \times 6 = 36$$

$$36 \times 6 = 216$$



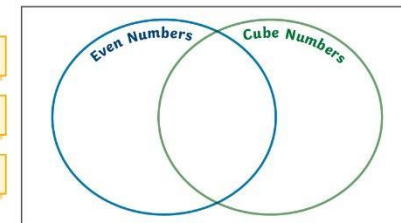
Calculation	Cube Number
$6 \times 6 \times 6$	216

Using the Venn diagram below.

125

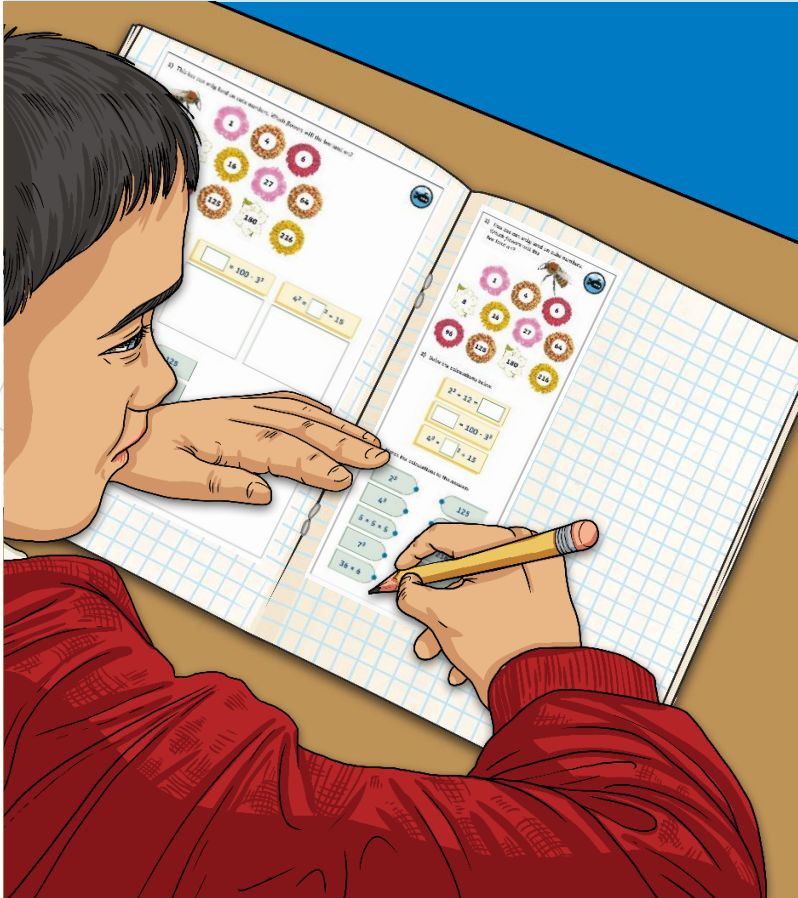
216

180



## Diving into Mastery

Dive in by completing your own activity!



1) This bee can only land on cube numbers. Which flowers will the bee land on?

2) Solve the calculations below.

$2^3 + 12 =$ <input type="text"/>	<input type="text"/> $= 100 - 3^3$	$4^3 =$ <input type="text"/> $+ 15$
<input type="text"/>	<input type="text"/>	<input type="text"/>

3) Match the calculations to the answers.

$2^3$	125
$4^3$	343
$5 \times 5 \times 5$	216
$7^3$	8
$36 \times 6$	64

## Aim



- To find cube numbers.

## Success Criteria

- I can create cubes using interlocking cubes.
- I can write calculations to make cube numbers.
- I can use the  $^3$  notation correctly.

