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Cube numbers

Multiply a number by itself, and then by itself again.

1 Learn



A cube 2 long, 2 wide and 2 tall needs 2 × 2 × 2 = 8 small cubes. We write this as 2^3 and say **"two cubed"**. So 8 is a **cube number**.



$1^3 = 1 \times 1 \times 1 = 1$



$2^3 = 2 \times 2 \times 2 = 8$



$3^3 = 3 \times 3 \times 3 = 27$

Example: work out 4^3

Think of a cube built in layers.
One layer: 4 × 4 = **16** small cubes.
4 layers: 16 × 4 = **64**. So $4^3 = 64$.

Squared or cubed?

$3^2 = 3 \times 3 = \mathbf{9}$ (a flat square)
$3^3 = 3 \times 3 \times 3 = \mathbf{27}$ (a solid cube)
A cube number needs **three** of the same number.

Flip's tip: the little ^{3} means three of the same number multiplied together. $4^3 = 4 \times 4 \times 4 = 64$. It is **not** $4 \times 3 = 12$, and **not** $4^2 = 16$.

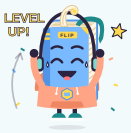
Warm up: work these out.

$1^3 =$ ☐	$2^3 =$ ☐	$3^3 =$ ☐	$5^3 =$ ☐	$10^3 =$ ☐

Grown-ups: encourage your child to work in two steps: square first, then multiply by the number once more (5^3: 5 × 5 = 25, then 25 × 5 = 125).

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2 Try it together a child and a grown-up, about 10 minutes



Cube builder

You need: up to 27 things that stack like small cubes (dice, sugar cubes or building bricks) and a table to work on.

1. Make a flat **2 by 2** square layer. How many cubes is that?
2. Put a second layer on top to make a **2 by 2 by 2** cube. How many cubes now?
3. Try a **3 by 3 by 3** cube: one layer of 3 by 3 first, then add layers. If you run out, count one layer and multiply by the number of layers.
4. Without building, predict the 4 by 4 by 4 and 5 by 5 by 5 cubes.

Side length	Cubes in one layer	Number of layers	Total cubes	Written as
2				2^3
3				
4				
5				

Grown-ups: ask "Why is each layer a square number?" Then: "How many layers does a 5 by 5 by 5 cube have?" Seeing a cube as stacked squares is what makes cube numbers make sense.

3 Practise

A. Draw a ring round every **cube number**.

8 9 12 16 27 30 36 64 81 100 125 1000

Cube numbers

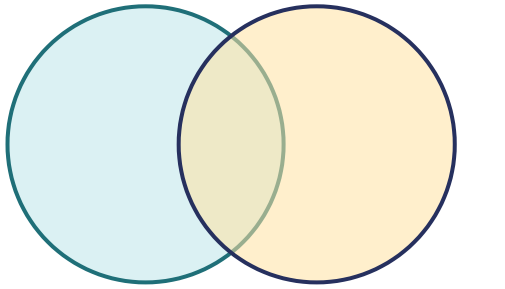
Scan to play this chapter in the game

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B. Finish the table of squares and cubes.

n	1	2	3	4	5	10
n^2	1		9			100
n^3	1		27			1000

C. Square, cube or both? Write each number in the right part of the diagram.



1 4 8 9 16
27 36 64 100 125

Two of them are in **both**. Can you find them?

D. Solve these.

A big cube is built from small cubes, **5** along each edge. How many small cubes?

_____

$2^3 + 3^2 =$

_____

$10^3 - 10^2 =$

_____

Challenge

Leo says, "$3^3 = 9$." Is he right? What has he done wrong?

_____

_____

I can... Tick when you can.

- ☐ say what the little 3 means
- ☐ work out cube numbers like $4^3 = 64$
- ☐ tell square numbers and cube numbers apart