# Volume

## You Can Count Cubes for All Sorts of Shapes

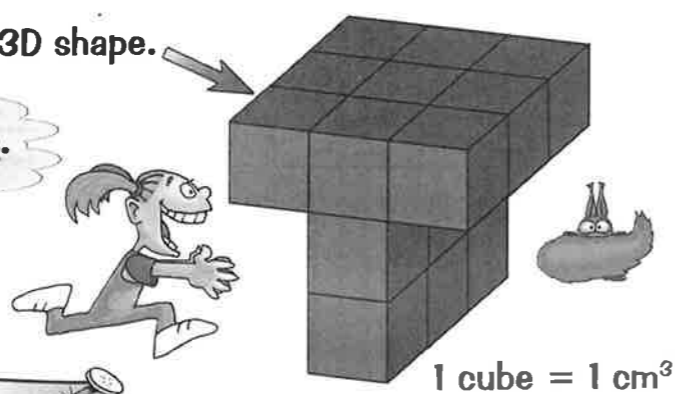The volume of a shape is the amount of space it takes up.

Say you've got a 3D shape made up of cubes with sides of 1 cm...

**EXAMPLE:** Find the volume of this 3D shape.

The T shape is made up of 5 cubes.

It's 3 cubes deep, so do 5 × 3 = 15 cubes.

Each cube has a volume of 1 cm³. So 15 cubes have a volume of 15 cm³.
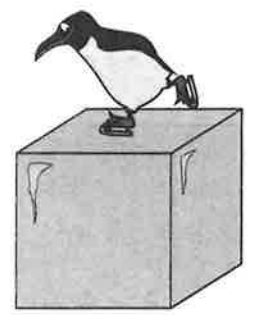
1 cube = 1 cm³

## There's a Formula for Calculating Volume

There's a quicker way of working out the volume of cubes and cuboids by measuring the lengths of the sides:

> **Volume of Cuboid = Length × Width × Height**
> **V = L × W × H**

It's the same formula for cubes too.

**EXAMPLE:**

Find the volume of an ice cube with sides of 4 cm.

Volume = Length × Width × Height

= 4 × 4 × 4 = 64 cm³

**EXAMPLE:** Find the volume of this cuboid.

Volume = Length × Width × Height

= 12 × 5 × 10 = 600 cm³

Height = 10 cm
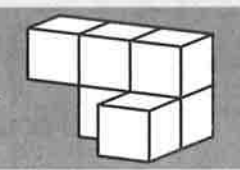
Width = 5 cm

Length = 12 cm
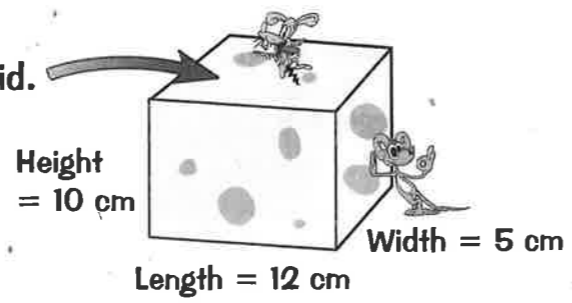
"I can calculate the volumes of cubes and cuboids."
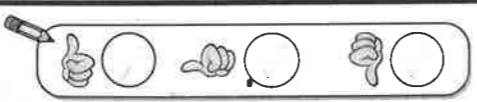
# Worked Examples

**1** Each cube has sides of 1 cm. Find the volume of this shape.

1) Each cube has a volume of 1 cm³. Count the number of cubes in the shape.

2) Multiply the number of cubes by the volume.

6 cubes

6 × 1 = 6       6 cm³

**2** Find the volume of a cuboid with length 6 cm, width 7 cm and height 3 cm.

1) Find the volume of a cuboid by using the formula volume = length × width × height.

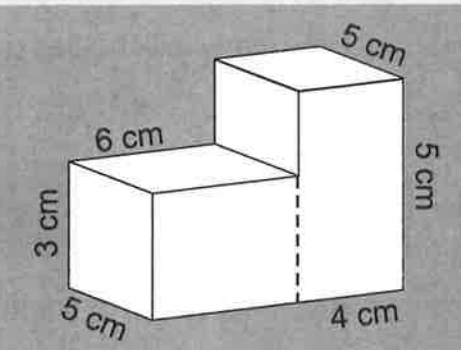2) Replace 'length' with 6, 'width' with 7 and 'height' with 3. Then multiply.

volume = length × width × height

= 6 × 7 × 3 = 126       126 cm³

**3** Imogen has some steps for her dolls' house. Work out the volume of the steps.

5 cm
6 cm
3 cm
5 cm
5 cm
4 cm

Volume of left-hand cuboid:
length × width × height
6 × 5 × 3 = 90 cm²

Volume of right-hand cuboid:
length × width × height
4 × 5 × 5 = 100 cm²

Total volume:
90 + 100 = 190 cm³

1) The block is made up of two steps.

2) Start by working out the volume of the left-hand cuboid. The length is 6 cm, the width is 5 cm and the height is 3 cm.

3) Now work out the volume of the right-hand cuboid. The length is 4 cm, the width is 5 cm and the height is 5 cm.
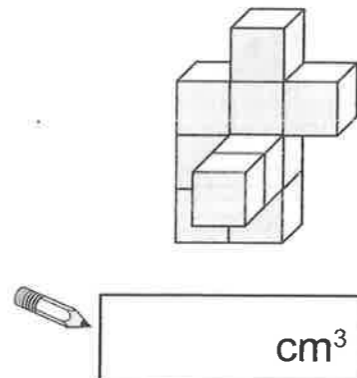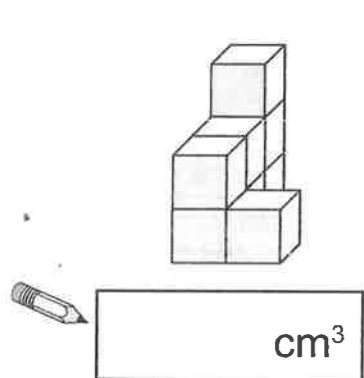
4) Add both the volumes together — don't forget the units.

## Crank up the volume — this stuff is getting good...

You're on the last few pages of this section now — just in time to learn about finding the volume of shapes. Exciting stuff. Make sure you don't forget the units though...
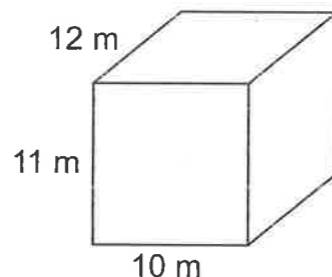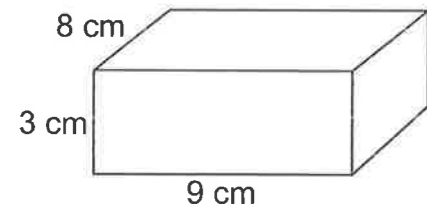
# Volume

**1** Each cube has sides of 1 cm. Find the volume of each shape.

✏️ [ _____ cm³ ]    ✏️ [ _____ cm³ ]

**2** Find the volumes of these cuboids.

8 cm, 3 cm, 9 cm

12 m, 11 m, 10 m

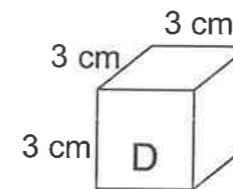✏️ [ _____ cm³ ]    ✏️ [ _____ m³ ]

**3** Complete the table below by calculating the volume of each cuboid.

| Length (cm) | Width (cm) | Height (cm) | Volume (cm³) |
|---|---|---|---|
| 7 | 4 | 2 | |
| 5 | 5 | 5 | |
| 6 | 2 | 9 | |

2 marks

2 marks

2 marks

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# Volume

**4** Circle the three cuboids which have the same volume.

A: 3 cm, 2 cm, 6 cm
B: 2 cm, 2 cm, 8 cm
C: 18 cm, 1 cm, 2 cm
D: 3 cm, 3 cm, 3 cm
E: 3 cm, 9 cm, 2 cm, 2 cm
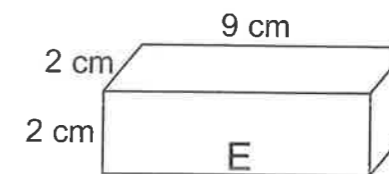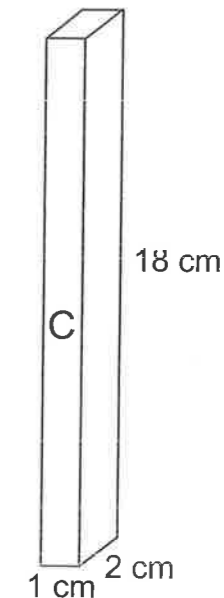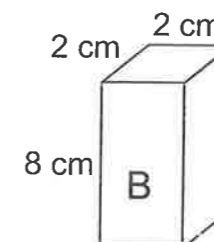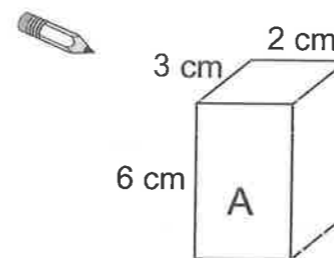
2 marks

**5** The volume of this cuboid is 120 cm³. Find its height.

4 cm, 3 cm

✏️ [ _____ cm ]
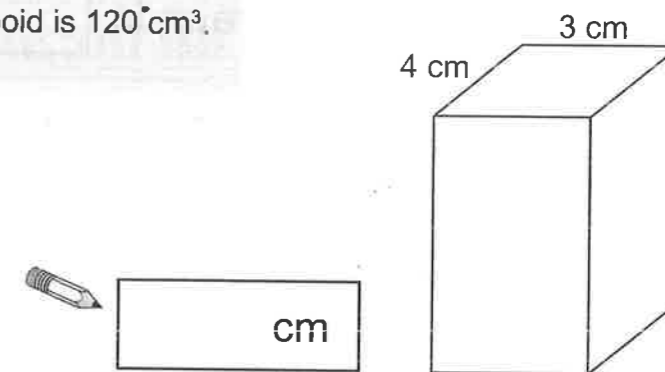
1 mark

**6** The shape below is made up of two cuboids. Work out the volume of the shape.

4 cm, 4 cm, 2 cm, 10 cm, 3 cm

✏️ [ _____ cm³ ]
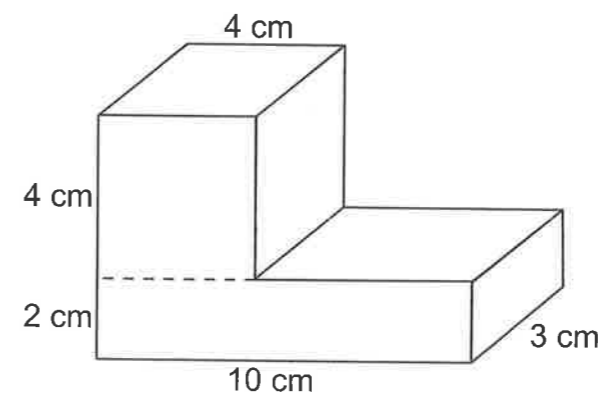
2 marks

"I can calculate the volumes of cubes and cuboids."

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