
Thursday

L.O. Calculate, estimate and compare volume of cuboids.

What is volume?

Volume is a measure of how much space something takes up. We measure the volume of a three-dimensional object in **cubic centimetres** (cm^3) or **cubic metres** (m^3) or in **litres** (l), **millilitres** (ml), **pints** (pt) and **gallons** (gall).

How many different cuboids can you make with 24 cubes?

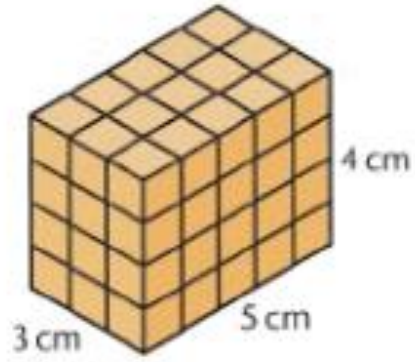
What does $1m^3$ look like?

The volume of a cuboid is the length times the breadth times the height.

$$V = lbh$$

Why this formula works is apparent when considering a cuboid built from 1 cm^3 blocks.

Example 1



Blocks in one layer $= 3 \times 5 = 15$

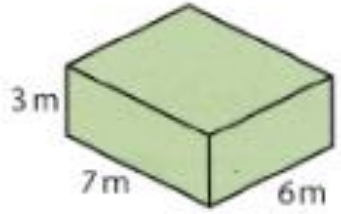
Blocks in four layers $= 4 \times 15 = 60$

Volume $= 60\,cm^3$

Volume is always measured in cubic units such as cubic centimetres (cm^3) or cubic metres (m^3).

Example 2

Find the volume of this room.



Volume $= lbh$

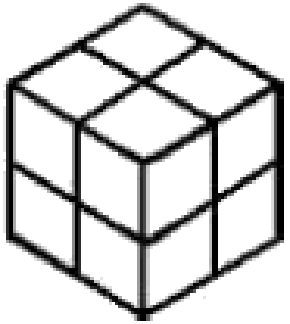
Volume $= (7 \times 6 \times 3)\,m^3$

$= (42 \times 3)\,m^3$

$= 126\,m^3$

Cubes

You need centimetre cubes and a piece of paper.



- Build a 2cm solid cube from the centimetre cubes.
- How many do you need?
- Now build a 3cm solid cube.
- How many do you need this time?

Copy and complete the table.

Edge of Solid Cube (cm)	1	2	3	4	5	6	7	8
Number of cm cubes	1							

Potential Additional Task

Draw a graph to show how the solid cubes grow.

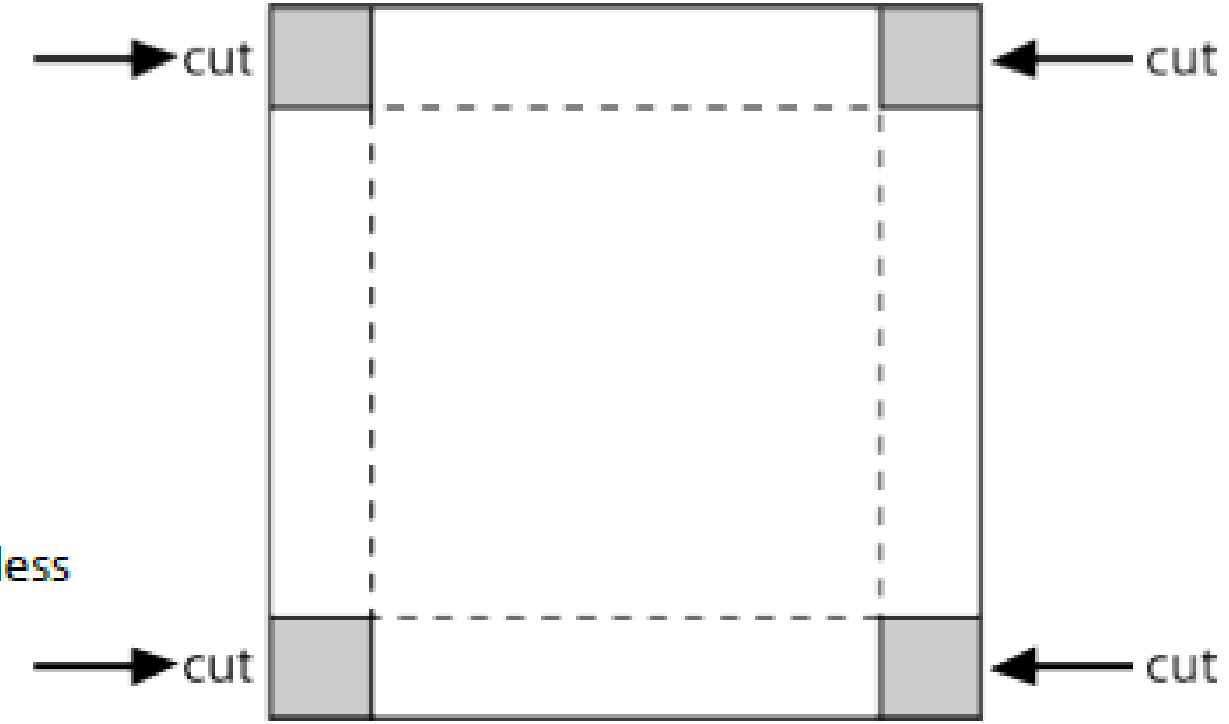
How many cubes would be needed for a 20cm cube?

If you don't have cubes, could you use Minecraft or something similar?

Start with some sheets of squared paper measuring 15 × 15 and use them to make little boxes without lids.

You do this by cutting out squares at the corners and then folding up the sides.

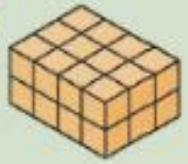
- Begin by cutting one square out of each corner.
- Fold up the sides.
- What is the size of the base?
- How high are the sides?
- What is its volume/how much could it hold?
- Now cut a 2 × 2 square out of each corner and fold up the sides.
- Does it look as if it holds more than the first box, less than the first box or just the same amount?
- What is the size of the base now?
- How high are the sides now?
- What is its volume/how much could it hold?
- Continue to cut squares out of each corner and explore the effects this has on the volume of the box.



Find the volume of each of the following cubes/cuboids. All the cubes are 1 cm^3.

1 

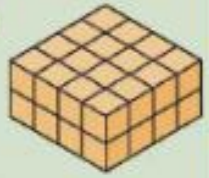
2 

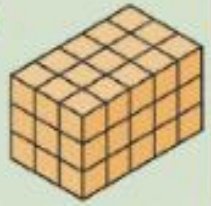
3 

4 

5 

6 

7 

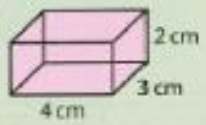
8 

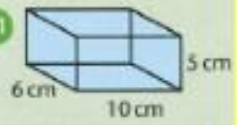
For each of the following boxes find:

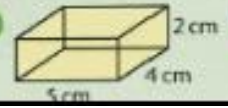
a) the number of 1 cm^3 needed to cover the base of the box

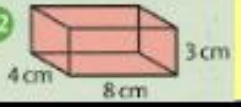
b) the number of layers of 1 cm^3 needed to fill the box

c) the volume of the box.

9 

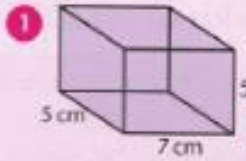
11 

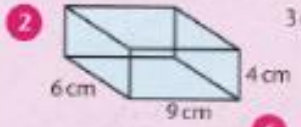
10 

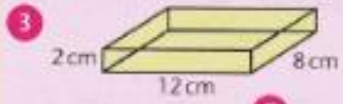
12 

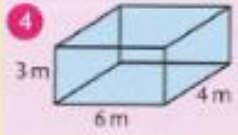
B

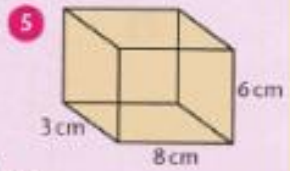
Find the volume of each cuboid.

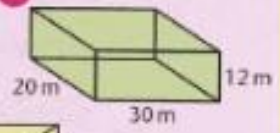
1 

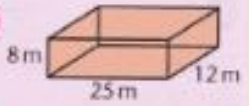
2 

3 

4 

5 

6 

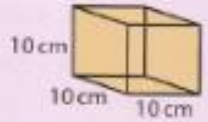
7 

8 

9 Copy and complete the table showing the volume of cuboids.

Length	Breadth	Height	Volume
15 cm	4 cm	8 cm	
7 cm	3 cm	5 cm	
20 cm	13 cm		520 cm^3
	6 cm	3 cm	108 cm^3
12 cm		6 cm	720 cm^3
22 cm	5 cm		990 cm^3
	6 cm	4 cm	192 cm^3
16 cm	8 cm		640 cm^3

10 How many 1 cm cubes would fit into this box?



11 What is the volume of a cube with:

a) 2 metre edges

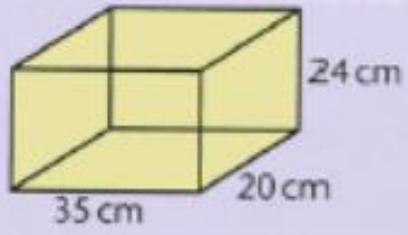
b) 5 cm edges?

L.O. Calculate, estimate and compare volume of cuboids.

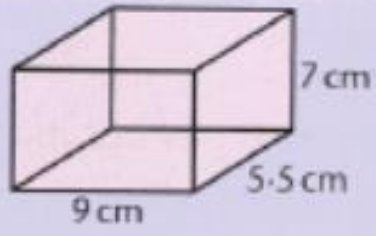
C

Find the volume of each cuboid.

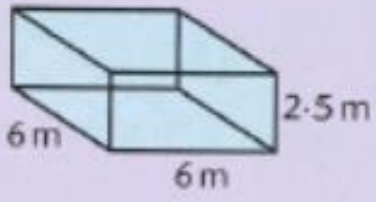
1



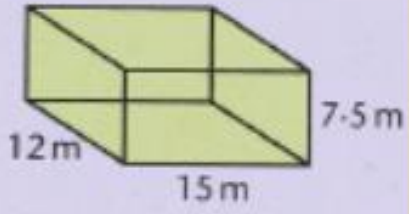
3



2



4

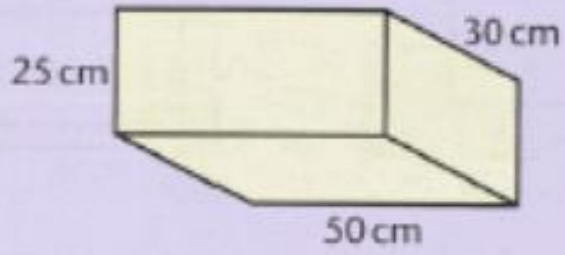


5 How many one centimetre cubes would fit into a one metre cube?

6 A cube has edges of 16 cm. What is its volume?

7 A cube has a volume of 343 cm^3. How long is each of its edges?

8 A game is packaged in a box with these dimensions.

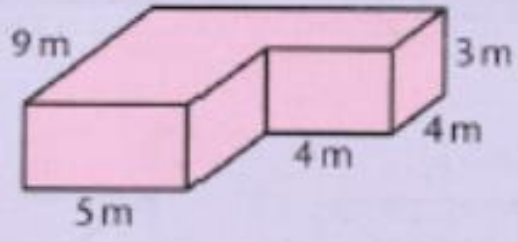


a) What is the volume of the box?

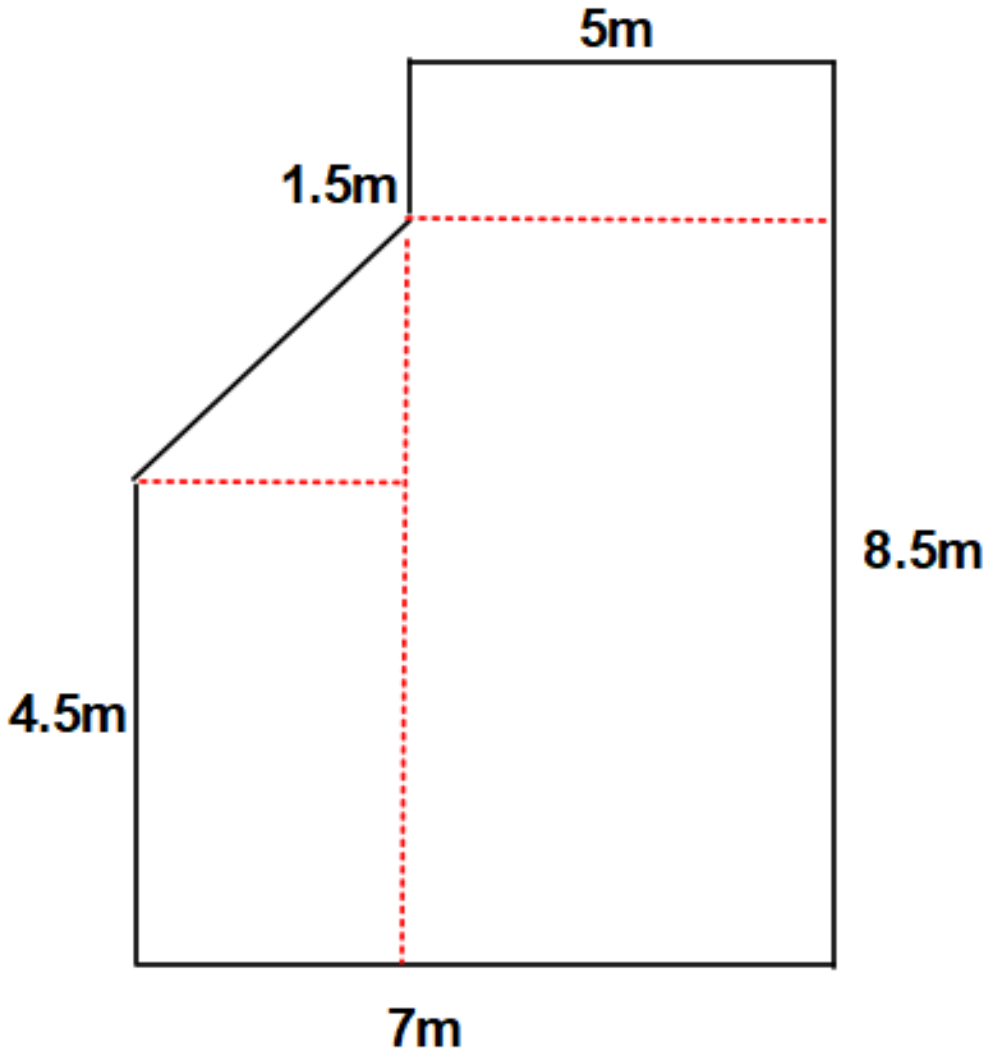
b) How many boxes would fit into a cubic container with edges of 1·5 m?

c) How many boxes would fit into a cuboid box 3 m long, 2 m wide and 2 m high?

9 Find the volume of the air space in this L-shaped room.



How much air is in 6PW?



Plan of 6PW

Not to scale - Height of room 2.5m

ANSWERS

Page 102

A

1 8 cm³
2 18 cm³
3 24 cm³
4 30 cm³
5 12 cm³
6 27 cm³
7 32 cm³
8 45 cm³
9 a) 12
b) 2
c) 24
10 a) 20
b) 2
c) 40
11 a) 60
b) 5
c) 300
12 a) 32
b) 3
c) 96

Page 103

B

1 175 cm³
2 216 cm³
3 192 cm³
4 72 cm³
5 144 cm³
6 7200 cm³
7 2400 cm³
8 900 cm³

9

Length	Width	Height	Volume
15 cm	4 cm	8 cm	480 cm³
7 cm	3 cm	5 cm	105 cm³
20 cm	13 cm	2 cm	520 cm³
6 cm	6 cm	3 cm	108 cm³
12 cm	10 cm	6 cm	720 cm³
22 cm	5 cm	9 cm	990 cm³
8 cm	6 cm	4 cm	192 cm³
16 cm	8 cm	5 cm	640 cm³

10 1000
11 a) 8 m³
b) 125 cm³

C

1 16 800 cm³
2 90 m³
3 346·5 cm³
4 1350 m³
5 1 000 000
6 4096 cm³
7 7 cm
8 a) 37 500 cm³
b) 90
c) 320
9 183 m³