

# Higher Order Thinking Skills

Primary 5

Lesson 6:  
Volume (I)

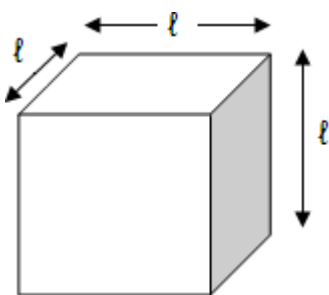
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**LESSON 6 Volume of Cubes and Cuboids****Formula:**

Volume of cuboid =  $l \times b \times h$



Volume of cube =  $l^3$



**GUIDED EXAMPLE 1**

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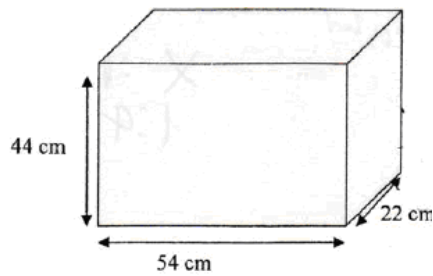
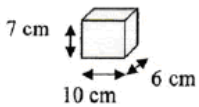
What is the maximum number of cubes of edge 4 cm that can be used to fill a tank 43 cm long, 51 cm wide and 39 cm high?

**GUIDED EXAMPLE 2**

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Identical boxes measuring 10 cm by 6 cm by 7 cm are put into a rectangular container measuring 54 cm by 22 cm by 44 cm. What is the maximum number of boxes that can be put into the container?

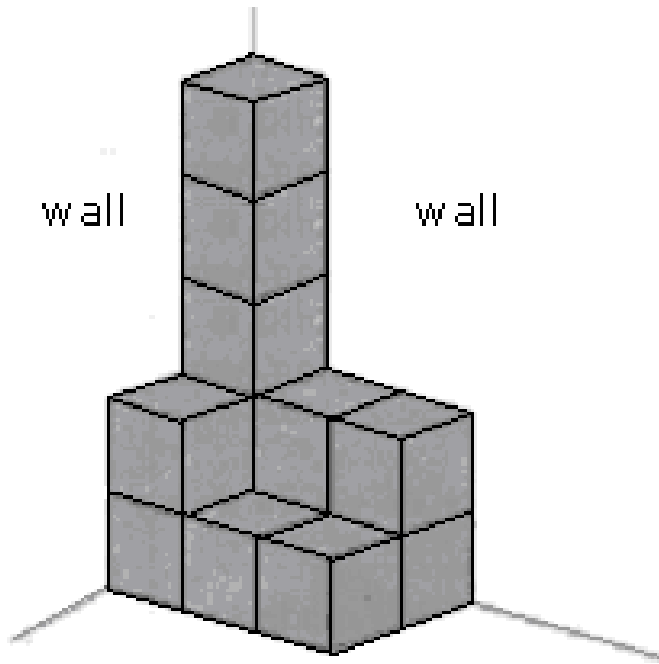
(Catholic High School/SA1/ Q29)



**GUIDED EXAMPLE 3**

Solid made of cubes

The figure shows a solid leaning against two walls.  
The solid is made up of identical cubes of side 2 cm.

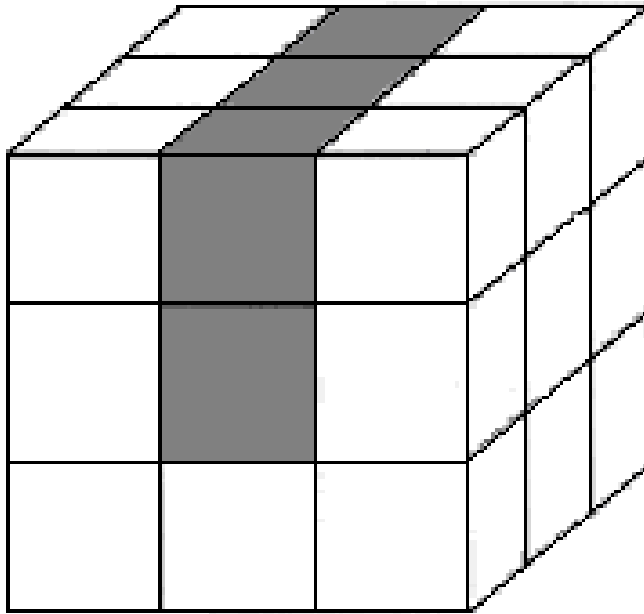


- (a) Find the volume of the solid.
  
  
  
  
  
  
  
  
  
  
- (b) A layer of paint is being applied on the entire solid.  
What is the total area that is being painted?

**GUIDED EXAMPLE 4**

Solid made of cubes

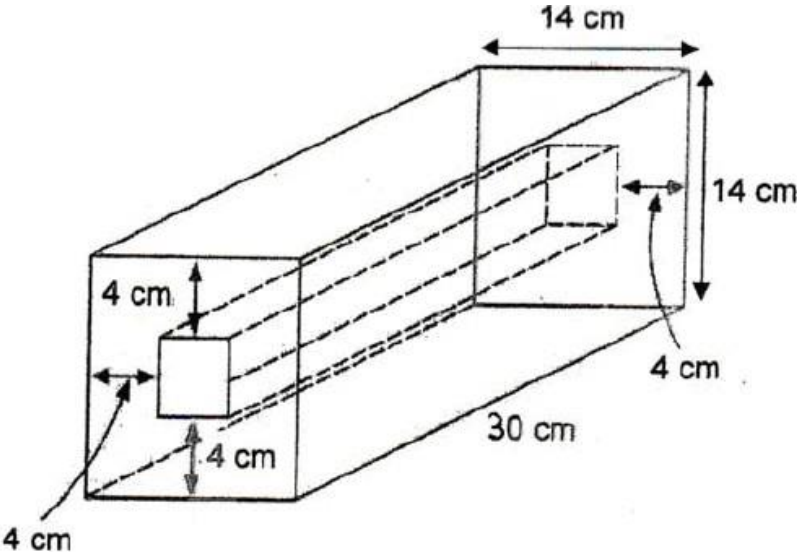
The figure shows a cuboid made up of some identical unit cubes. If the six shaded cubes are removed and the remaining solid is painted blue, what is the total area that is being painted?



**GUIDED EXAMPLE 5**

The solid below has a rectangular hole.  
Find the volume of the solid.

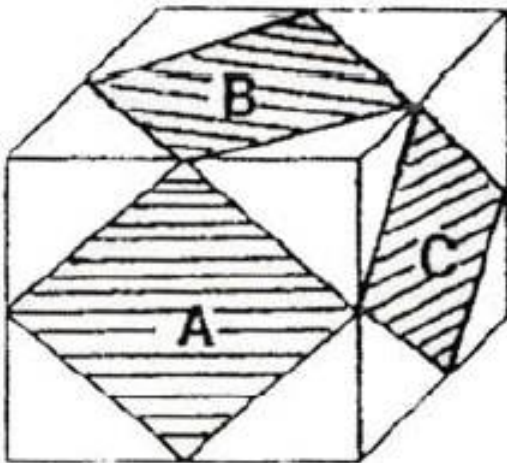
(Paya Lebar Methodist Girls' / Q40)



**GUIDED EXAMPLE 6**

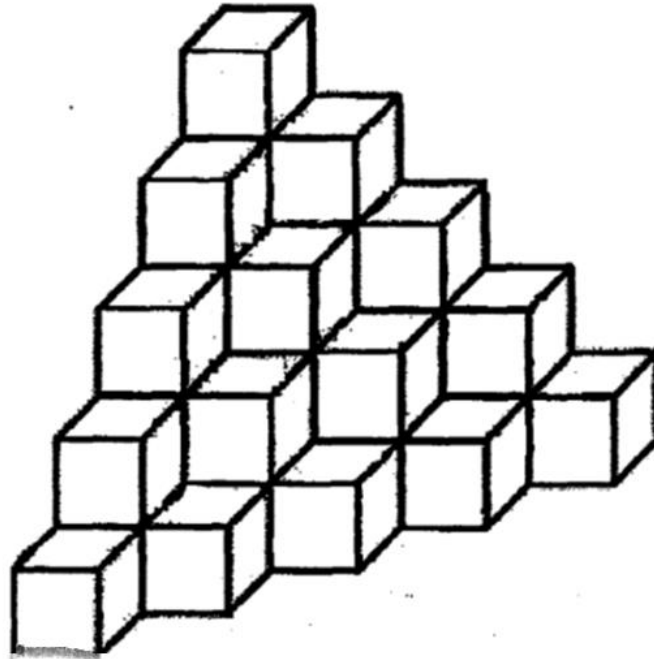
The figure shows a cube with 3 painted parts A, B and C.  
These painted parts are of the same area  
and they are touching the midpoints of the sides of the cube.  
The total area of the painted parts is  $54\text{cm}^2$ . Find the volume of the cube.

(Rosyth School/ Prelim/ Q45)



**BUILD YOUR UNDERSTANDING**

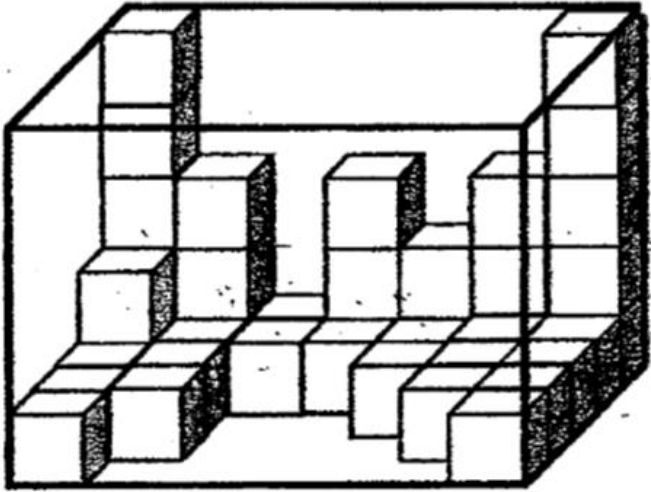
1. The figure below is made up of identical 3 cm cubes.



- (a) Find the volume of the solid.
- (b) A layer of paint is being applied on the entire solid. What is the total area that is being painted?

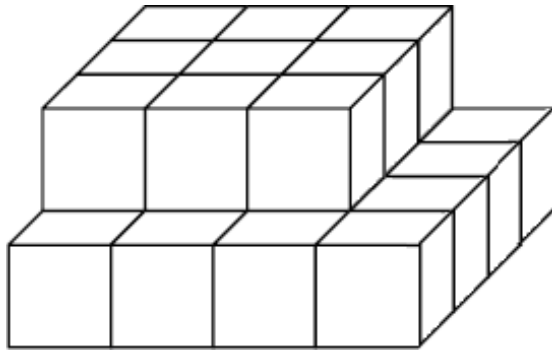


2. Derrick put some 2-cm cubes into a rectangular box as shown.



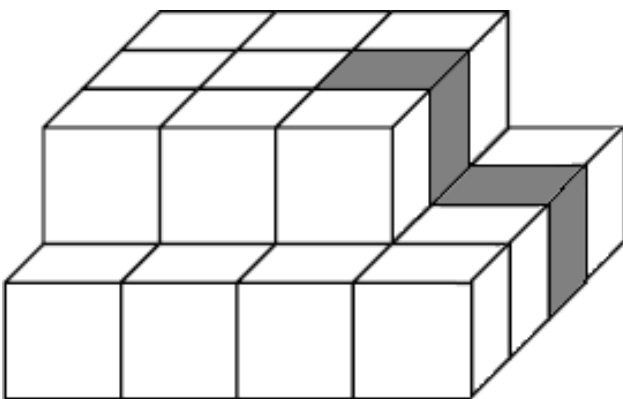
- a) What is the volume of the rectangular box?
- b) How many more of such cubes are needed to fill the box completely?

3. The figure below shows a solid made up of 2-cm cubes.



(Tao Nan School/SA1/ Q48)

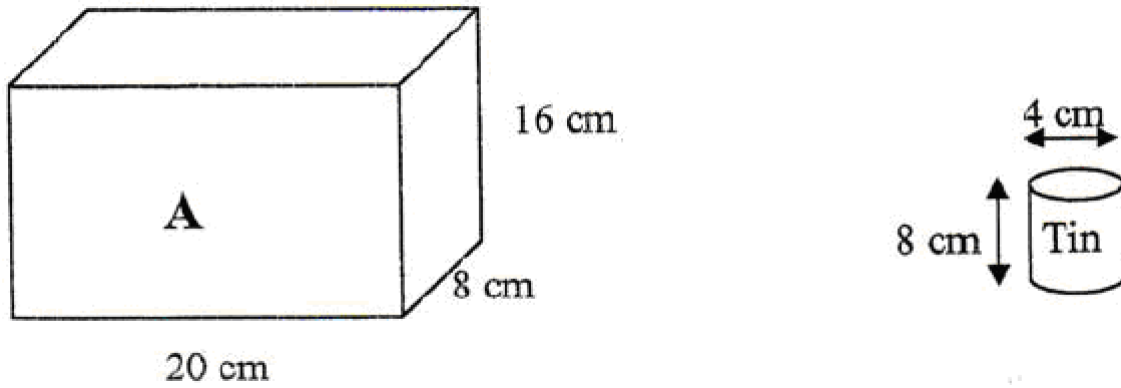
- (a) Find the volume of the solid
  
  
- (b) Find the total surface area of the solid.
  
  
- (c) If the two shaded cubes are removed and the remaining solid is painted red, what is the total area being painted?



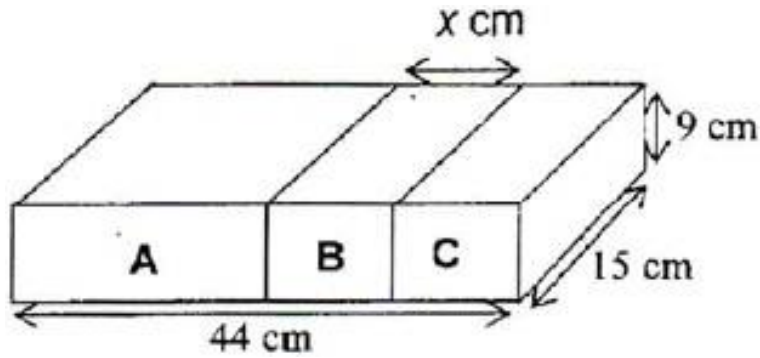


5. A is a box measuring 20cm by 8cm by 16cm.  
(Diagram not drawn to scale)  
Bala wants to put as many cylindrical tins as possible into Box A.  
What is the maximum number of cylindrical tins he can put into the box?

(Nan Hua Pri/SA1/ Q27)



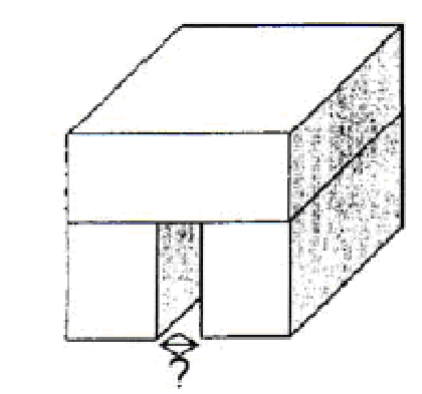
6. A block is 44cm long, 15cm wide and 9cm thick.  
 A carpenter cuts the length of the block into three parts A, B and C in the ratio of 5:3:3.



(Casuarina Pri/ SA1/ Q47)

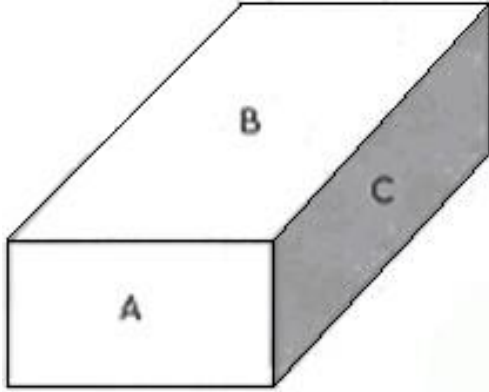
- (a) Find the volume of B

- (b) Find x



- (c) The carpenter made a stool out of the 3 parts.  
 What is the length of the gap between the 2 legs of the stool?

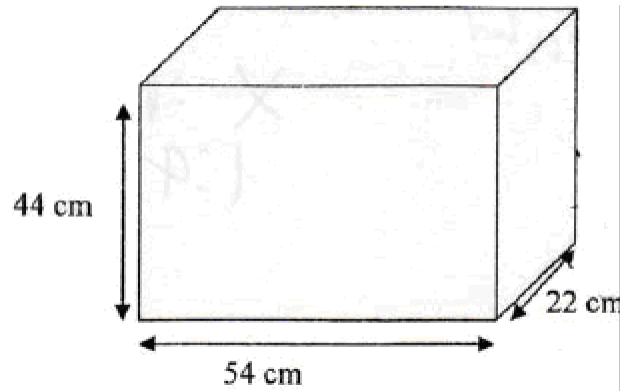
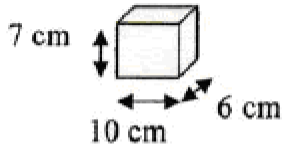
7. The area of face A, face B and face C of the cuboid shown below is  $24 \text{ cm}^2$ ,  $72 \text{ cm}^2$  and  $48 \text{ cm}^2$  respectively.  
Given that the sides of the cuboid are whole number, find the dimension of the cuboid.



**CHALLENGE YOURSELF**

1. Identical boxes measuring 10cm by 6cm by 7cm are put into a rectangular container measuring 54cm by 22cm by 44cm. What is the maximum number of boxes that can be put into the container?

(Catholic High School/ SA1/ Q29)



2. A brown cube is completely filled with identical red cubes.  
Each red cube has a volume of  $8\text{cm}^3$ .  
Each red cube is completely filled with identical yellow cubes.  
The ratio of the sides of the three cubes is 6:2:1 respectively.  
How many cubes are there altogether?

(Haig Girls' School/ Prelim 2/ Q46)