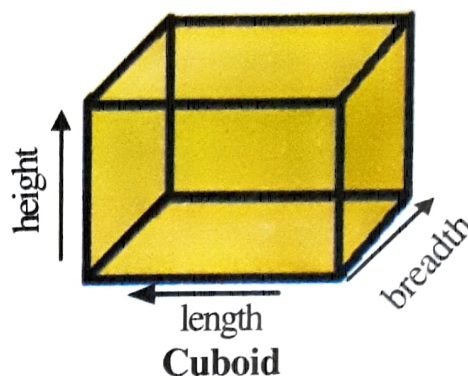
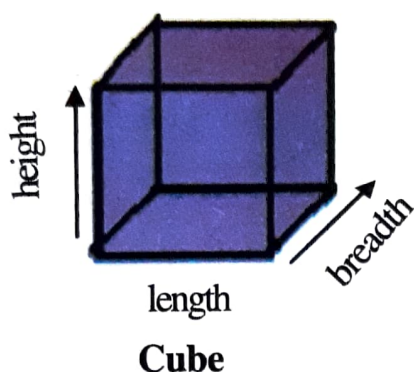




We know that the area of the figures which have length and breadth, is the region that is occupied by them.

Let's see such objects which have length, breadth along with height,

Like—



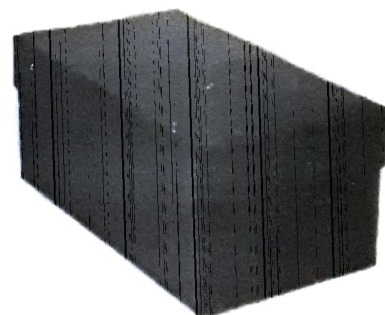
Such objects also having height along with length and breadth. The space occupied by such objects is called the **volume**.

Teacher — Let's see this shoe box. Jaya, tell what is the shape of this shoe box ?

Jaya — The shape of the shoe box is cuboidal.

Teacher — Rohit measure the length, the breadth and the height of this shoe box.

Rohit — Madam, Length of the shoes box is = 20 cm
breadth = 10 cm
height = 8 cm



Teacher — Salma, can you tell, how much space does this shoe box occupy?

Salma — Yes madam, this box occupies 20 cm, 10 cm and 8 cm space in length, breadth and height respectively.

Teacher — Very Good! Salma told us that this box occupies space in length, breadth and height in all the three directions. The measurement of the occupied space is found by multiplying length, breadth and height with one another. The space that is occupied by the box is called the **volume** of the box.

Volume of the box = length $\times$ breadth $\times$ height

Volume is measured in **unit cube**. Like— cubic centimetre(cm^3) cubic metre(m^3) etc.

Teacher — Rani, please tell what will be the volume of the shoe box ?

Rani — $20 \text{ cm} \times 10 \text{ cm} \times 8 \text{ cm} = 1600 \text{ cubic centimetre (cm}^3\text{)}$

Teacher — Well done!

We have seen that—

Volume of cuboid = length $\times$ breadth $\times$ height

Let's see this too—

Teacher — This is a Ludo's dice. Roli, please tell what shape is this?

Roli — This is a cubical dice.

Teacher — Roli, now you measure the length, the breadth and the height of this dice.

Rubi — The length, the breadth and the height of the dice is 2 cm each respectively.



Teacher — Well done! Rahul, tell how much space does this dice occupy?

Rahul — This cube occupies space 2 cm in length, 2 cm in breadth and 2 cm in height.

Teacher — Very Good! We observed that a cube occupies same space in all the three directions- length, breadth and height. To measure the space that is occupied by the dice, we multiply length, breadth and height with one another.

Rozi, now tell how much space has the dice occupied ?

Rozi — Madam, the length, breadth and height of the dice are equal.
Therefore $2 \text{ cm} \times 2 \text{ cm} \times 2 \text{ cm} = 8 \text{ cubic cm (cm}^3\text{)}$

Teacher — Well done! The cubic dice occupies 8 cubic cm space. The total space occupied by the dice is called its volume.

We observed—

Volume of cuboid = length $\times$ breadth $\times$ height

Volume of cube = side $\times$ side $\times$ side





Activity

Take some blocks of plastic or wood having equal length, breadth and height. Make cuboids of different length, breadth and height with these blocks. The adjacent figure of the block has equal length, breadth and height of 1 cm. Some cuboids are made with the help of it. Look—

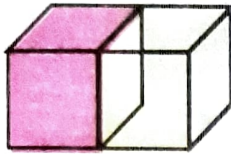
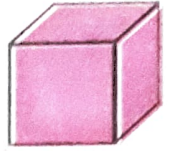


figure – 1

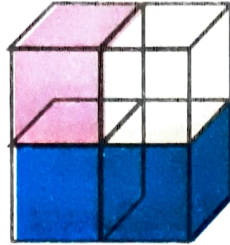


figure – 2

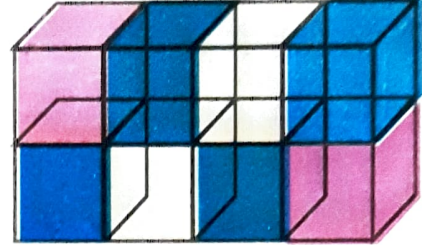


figure – 3

There are 2 blocks in figure one, 4 in figure two and 8 in figure three. The length, breadth and height of each block is 1 cm. So the volume of each block is 1 cubic cm.

Hence, the volume of these figures are 2 cubic cm, 4 cubic cm and 8 cubic cm.

Example—1 The length, breadth and height of a pencil box is 20 cm, 6 cm and 3 cm respectively. Find the volume of the pencil box.

Solution : The pencil box is cuboidal in shape.

$$\begin{aligned}\text{Volume of cuboid} &= \text{length} \times \text{breadth} \times \text{height} \\ &= 20 \text{ cm} \times 6 \text{ cm} \times 3 \text{ cm} \\ &= 360 \text{ cubic cm}\end{aligned}$$

Hence, the volume of the pencil box is 360 cubic cm.

Example 2 : Length, breadth and height of a chalk box is 8 cm each. Find the volume of the chalk box.

Solution : Length, breadth and height of the chalk box are equal. Hence, the box is cubical in shape.

$$\begin{aligned}\text{Volume of cube} &= \text{side} \times \text{side} \times \text{side} \\ &= 8 \text{ cm} \times 8 \text{ cm} \times 8 \text{ cm} \\ &= 512 \text{ cubic cm}\end{aligned}$$

Hence, the volume of the chalk box is 512 cubic cm.



Capacity

The capacity of a container is the quantity of fluid that it contains. If a bucket contains four jugs of water, 4 jugs will be its capacity.

If a jug contains 6 glasses of water. 6 glasses will be its capacity.

Likewise, spoon, cup, glass, jug

and bucket have different capacities. To know the capacity of containers fill water in cup by spoon, in glass by cup, in jug by glass and in bucket by jug. Find out what is the capacity of each container ?

- (a) How many spoons of water does cup contain ?
- (b) How many cups of water does glass contain ?
- (c) How many glasses of water is equal to the capacity of jug ?.....
- (d) How many jugs of water is equal to the capacity of bucket ?

Fluids have a tendency to flow. Therefore fluids like water, petrol, milk, kerosene oil etc. are kept in containers. Containers have length, breadth and depth or height. Therefore fluids are also measured as volume, which is called **capacity**. Litre is the unit of capacity. In short litre is written as L and millilitre is written as mL.

1 Litre	=	1000 Millilitre
1 Millilitre	=	1 cubic cm or cu cm

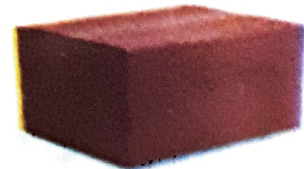
We have learnt

- Meaning of volume and capacity.
- Difference between the units of volume and area.

Project work – Make the students familiar with different measuring containers of different capacities and help them to draw their pictures.



Exercise



1. To fill a container of 1 litre with water —
 - (a) How many times 50 mL container will be used ?
 - (b) After filling the container three times by 250 mL container. In how many times it will be completely filled by a container of 50 mL.
 - (c) If we pour water 12 times by a container of 50 mL. In how many times the remaining part of the container will be filled by a container of 200 mL.

2. Fill in the blanks—

	cubic m	cubic cm	litre
a	2		2000
b			500
c		11000	

3. Fill in the blanks in the following question —

- (a) length $\times$ $\times$ height = volume
- (b) length $\times$ breadth $\times$ = volume
- (c) 2 m $\times$ $\times$ 3 m = 12 cu m
- (d) 4 m $\times$ 4 m $\times$ = 64 cu m

4. A water tank from inside is 1.5 metres long, 50 cm broad and 75 cm high. Find the capacity of the water tank.

5. Length, breadth and height of a carton are 10 cm each. Find the volume of the carton.

6. The capacity of a container is 1.5 L, its length is 10 cm and breadth is 15 cm respectively. Find its height.