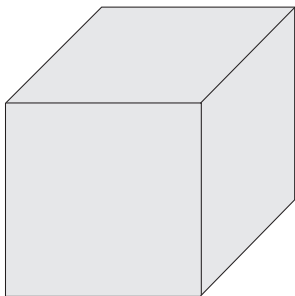


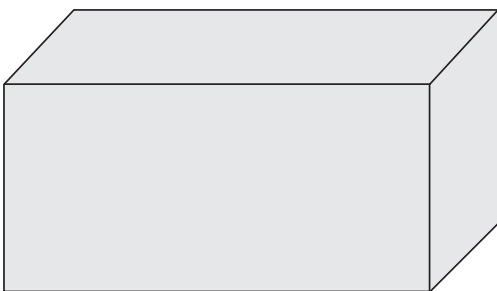
Unit 9 : Volume

Friendly Notes

Cubic Units



All the edges of a **cube** are of equal length.
The sides are all squares.



A **cuboid** has rectangular and/or square sides.

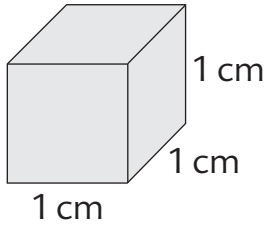
Cubes and cuboids are called
rectangular prisms.
Rectangular prisms are
solid figures.



Volume of Rectangular Prisms

The **volume** of a solid is the amount of space it occupies.
The volume of a unit cube is 1 cubic unit.

Each edge of the cube is 1 cm long.
The volume of the cube is 1 cubic centimeter (cm^3).



The cubic centimeter (cm^3) is a unit of volume.
The cubic inch (in.^3), cubic foot (ft^3), and cubic meter (m^3) are other units of volume.

Volume of rectangular prism = length \times width \times height

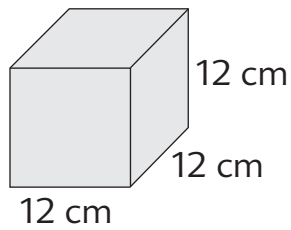
1. Find the volume of the rectangular prism which measures 18 cm by 20 cm by 10 cm.

$$\begin{aligned}\text{Volume of rectangular prism} &= 18 \times 20 \times 10 \\ &= 3,600 \text{ cm}^3\end{aligned}$$

2. Find the height of the rectangular prism which has a base area of 24 m^2 and a volume of 120 m^3 .

$$\begin{aligned}\text{Height of rectangular prism} &= \frac{\text{volume}}{\text{base area}} \\ &= \frac{120}{24} \\ &= 5 \text{ m}\end{aligned}$$

3. Find the volume of the cube.



$$\begin{aligned}\text{Volume of cube} &= 12 \times 12 \times 12 \\ &= 1,728 \text{ cm}^3\end{aligned}$$

4. A rectangular container which measures 24 cm by 18 cm by 10 cm is $\frac{3}{4}$ filled with water. Find the volume of water in the container.

$$\begin{aligned}\text{Volume of water in container} &= \frac{3}{4} \times (24 \times 18 \times 10) \\ &= 3,240 \text{ cm}^3\end{aligned}$$

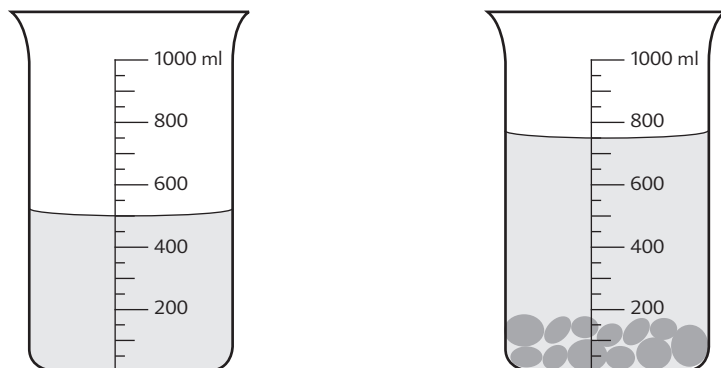
5. A rectangular tank 16 cm long and 15 cm wide is filled with water to a depth of 8 cm. If 240 cm^3 more water is needed to fill the tank, find the height of the tank.

$$\begin{aligned}\text{Volume of water in tank} &= 16 \times 15 \times 8 \\ &= 1,920 \text{ cm}^3\end{aligned}$$

$$\begin{aligned}\text{Volume of tank} &= 1,920 + 240 \\ &= 2,160 \text{ cm}^3\end{aligned}$$

$$\begin{aligned}\text{Height of tank} &= \frac{2,160}{16 \times 15} \\ &= 9 \text{ cm}\end{aligned}$$

Finding the Volume of a Solid



When a solid is placed into a container filled with water, the water level in the container will increase. We say that the volume of the water displaced by the solid is equal to the volume of the solid.

Volume of water in the beaker = 500 cm^3

Volume of water and the solid = 750 cm^3

Volume of the solid = $750 \text{ cm}^3 - 500 \text{ cm}^3$
 $= 250 \text{ cm}^3$