

Mathematics- Grade 5

Dear Students, we have learnt about how we could find the area of perimeters. The topic 3.2.4 More about the area of rectangles is a repeating lesson. So, you have to do exercise 3.2.4 by your own.

#1

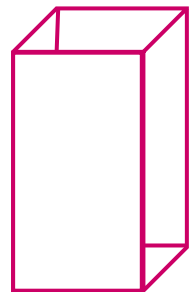
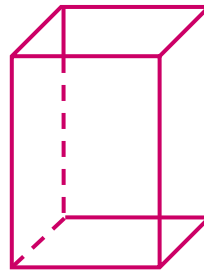
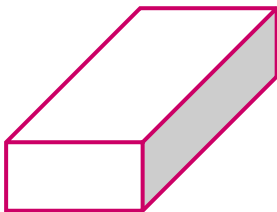
#2, a,c,d

3.3 Measurement of Prisms

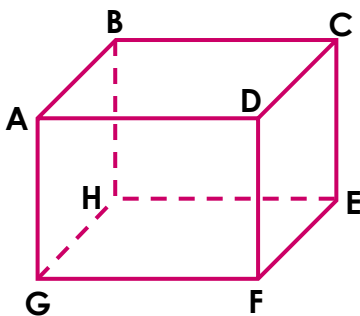
3.3.1 Surface Area of Rectangular Prisms

- ✓ A prism is a solid with three or more lateral surfaces which intersect in parallel lines.
- ✓ The name of the prism depends on the base of polygons.
- ✓ If the base of the prism is triangle, then it is called **triangular prism**.
- ✓ If the base of the prism is rectangle, then it is called **rectangular prism**.

Examples of rectangular prisms:



Let us consider the following rectangular prism, better known as a box.

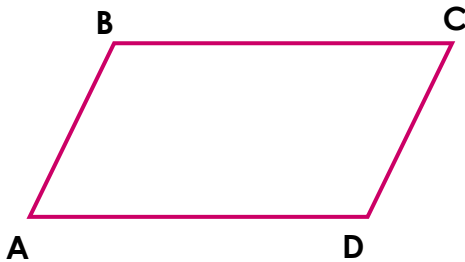


The points A, B, C, D, E, F, G, and H are called **vertices** (Vertex for single point).

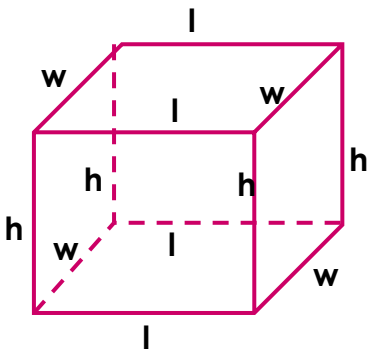
- Line segments AB, AD, AG, BC, BH, CD, CE, DF, EF, EH, FG, and GH are called **edges**.

Rectangles ABCD, ABHG, ADFG, BCEH, CDFE, and EFGH are called **faces**. A box has **three pairs of opposite faces**, which are **equal in area**:

♥ $ABCD = EFGH$; $ABHG = CDFE$; $ADFG = BCEH$.



- To find out the surface area of a box, three measurements are needed: **length (l)**, **width (w)**, and **height (h)**.
- All three dimensions are **at right angles to each other**.



The top and bottom faces have an area of $l \times w$;

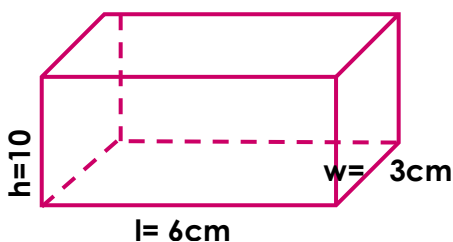
The front and back faces have an area of $l \times h$;

And the two side faces have an area of $w \times h$.

Total surface area of prism is given by

$$A = 2 \times (l \times w + l \times h + w \times h)$$

Example 1: - Find the surface area of the prism.



$$\begin{aligned} A &= 2 \times (l \times w + l \times h + w \times h) \\ &= 2 \times (6 \times 3 + 6 \times 10 + 3 \times 10) \\ &= 2 \times (18 + 60 + 30) \text{ cm}^2 \end{aligned}$$

$$= 2 \times 108 \text{ cm}^2$$

$$= 216 \text{ cm}^2$$

Example 2:- Calculate the surface area of a box with all edges of 10 cm.

$$A = 2 \times (l \times w + l \times h + w \times h)$$

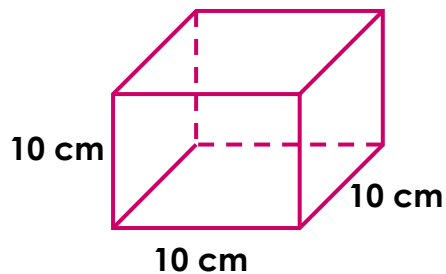
Where $l = w = h$.

$$A = 2 \times (l^2 + l^2 + l^2)$$

$$A = 2 \times 3 \times l^2 = 6 \times l^2$$

$$= 6 \times 10^2 = 6 \times 100 \text{ cm}$$

$$= 600 \text{ cm}^2$$



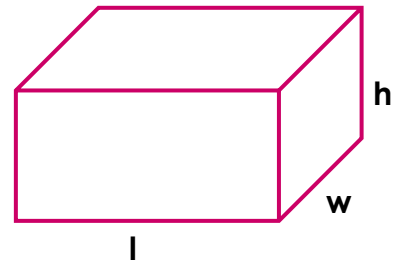
♥ This place is a **cube**, and its **total surface area** is $A = 6 \times l^2$

3.3.2. Volume of Rectangular Prisms

- **Volume** is the amount of space inside in a prism.
- To find the volume of a rectangular prism, we need to know its length, width, and height.

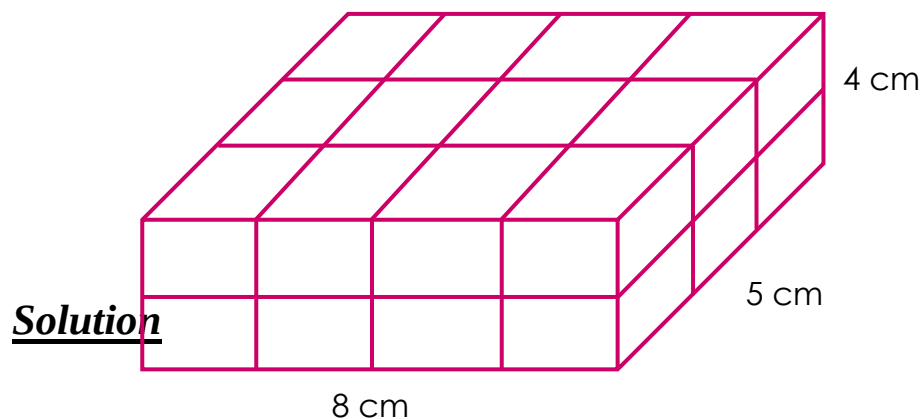
The Volume of prism is given by:

$$V = l \times w \times h$$



- The units of volume is given by in mm³ (mm x mm x mm), cm³ (cm x cm x cm), m³ (m x m x m).

Example 1 :- Find the volume of a box with length 8 cm, width 5 cm, and height 4 cm.



Solution

Each of these blocks is 1 cm by 1 cm. when we say “by”, it means we have to multiply.

$1 \times 1 \times 1 = 1$, and $\text{cm} \times \text{cm} \times \text{cm} = (\text{cm})^3$ which we write as cm^3 .

So, $1 \text{ cm} \times 1 \text{ cm} \times 1 \text{ cm} = 1 \text{ cm}^3$ (one cubic centimeter).

- The volume of the box is given by

$V = l \times w \times h = 8\text{cm} \times 5\text{cm} \times 4\text{cm} = 160 \text{ cm}^3$ (One hundred sixty cubic centimeters).

The Volume of a Cube with equal length, width and height is given by

$$V = l \times w \times h = l \times l \times l = l^3$$

Example 2:- Find the volume of a Box with a length of 7cm, width 6 cm and height 4cm.

Solution

$$l = 7\text{cm}, w = 6 \text{ cm}, h = 4 \text{ cm}$$

$$V = l \times w \times h$$

$$= 7 \text{ cm} \times 6 \text{ cm} \times 4 \text{ cm}$$

$$= 168\text{cm}^3$$

Dear Students there is also another worked examples in your text book. Please read example 22 & 23 on page 81 and example 24 & 25 on page 82 & 83 respectively.

And also workout Exercise 3.3.2 in your exercise book by your own.

#1, a,b,d

#3, a,b

#4, a,b,d