TOPIC

- CUBOID - Introduction
- Sums based on Cuboid
- CUBE – Introduction
- Sum based on Cube and Cuboid

SURFACE AREAS AND VOLUMES

- **CUBOID - Introduction**

CUBOID

Examples :

Brick

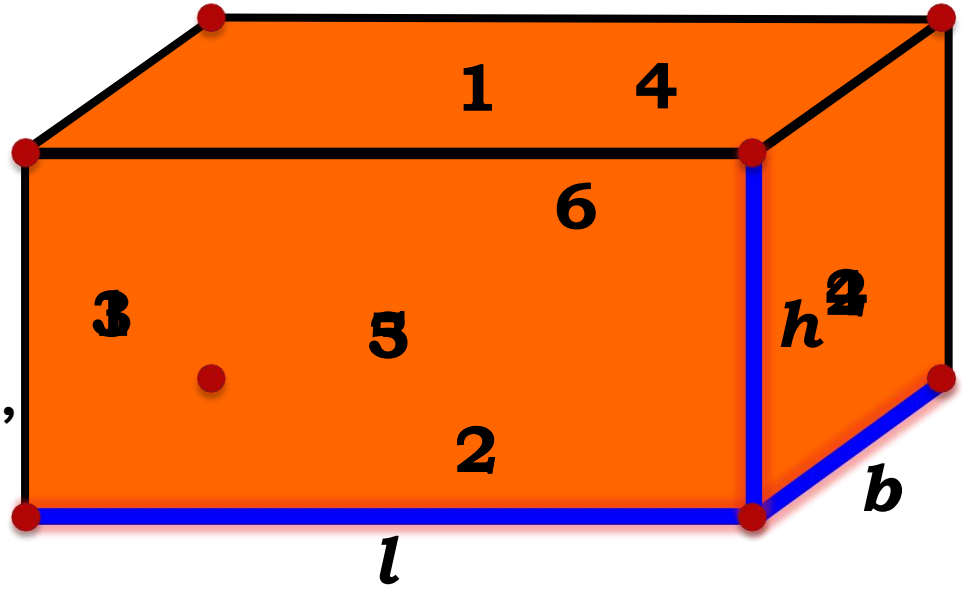
Let us see few examples of cuboid

Boxes

Fish Aquarium

CUBOID

- A cuboid has six faces.
  - ❖ Two horizontal faces.
  - ❖ Four vertical faces.
- A cuboid has eight corners.
- A cuboid has three dimensions, which are length (l), breadth (b) and height (h)



Let us see geometrical figure of cuboid

Formulae

Vertical Surface Area $= 2\,(l + b)\,h$

Total Surface Ar

Let t
the
surf

Area of the shaded face
$= b \times h$

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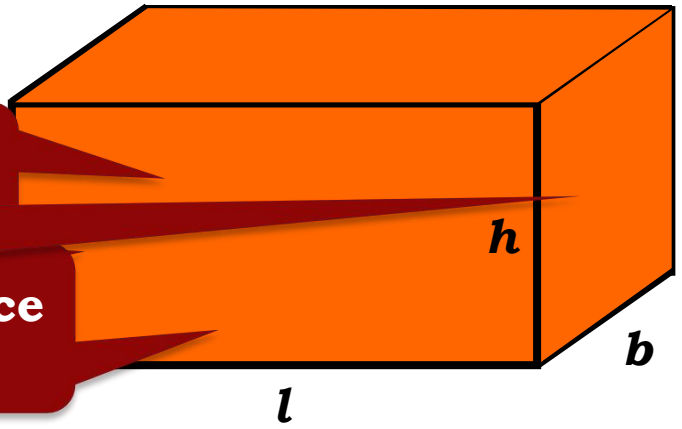


Area of rectangle = Product of adjacent sides

Total surface area = **Vertical surface** + **Area of 2 base faces**

$= 2\,(l + b)\,h + 2\,(lb)$

$= 2lh + 2bh + 2lb$

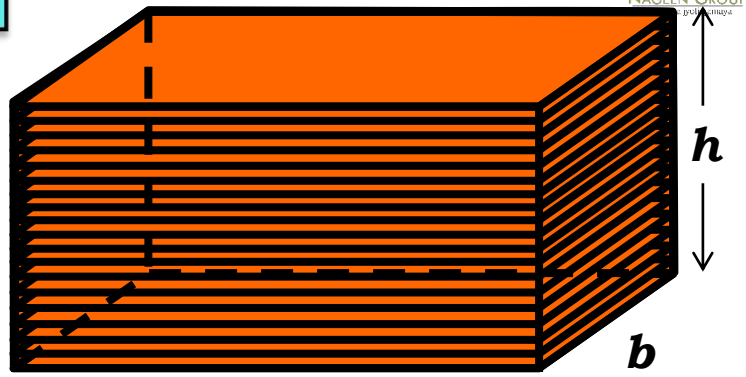
$= 2(lb + bh + lh)$

$= 2\,(l + b)h$

Formulae

Continuing the process
if w ... gles
... What is the figure so formed ?
... What is the space occupied ?

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



$l \times b$

$2 \times l \times b$

$3 \times l \times b$

$\vdots$

$h \times l \times b$

SURFACE AREAS AND VOLUMES

- **Sums based on Cuboid**

Q. The dimensions of a cuboid in cm are 16 × 14 × 20. Find its total surface area.

Sol.

For given cuboid,

length (l) = 16 cm

breadth (b) = 14 cm

height (h) = 20 cm

What is formula for finding total surface area of cuboid ?

$2(lb+bh+lh)$

Total surface area of cuboid $= 2(lb + bh + lh)$

$= 2\ (16 \times 14 + 14 \times 20 + 16 \times 20)$

$= 2\ (224 + 280 + 320)$

$= 2\ (824)$

$= 1648\ \text{cm}^2$

∴ Total surface area of the cuboid is 1648 cm².

Volume

Q. The cuboid water tank has length 2 m, breadth 1.6 m and height 1.8 m. Find the capacity of the tank in litres.

Sol.

length (l) = 2 m

breadth (b) = 1.6 m

height (h) = 1.8 m

We know that,
1 m^3 = 1000 litres

What is formula for finding volume of cuboid ?
$l \times b \times h$

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

$= 2 \times 1.6 \times 1.8$

$= 5.76\ m^3$

$= 5.76 \times 1000$ litres

$[1m^3 = 1000 \text{ litres}]$

$= 5760$ litres

∴ Volume of cuboid water tank is 5760 litres.

SURFACE AREAS AND VOLUMES

- **Sum based on Cuboid**

Q. A fish tank is in the form of a cuboid whose external measures are 80 cm × 40 cm × 30 cm. The base, side faces and back face are to be covered with a coloured paper. Find the area of the paper needed.

Area of the paper needed = Area of base + Area of two side faces + Area of back face

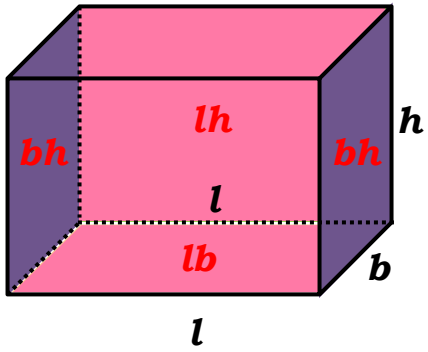
Sol.

For cuboid fish tank,

length (l) = 80 cm

breadth (b) = 40 cm

height (h) = 30 cm



Area of base = $l \times b$

= 80 × 40

What is the formula to find area of base ?

Ar $2 \times b \times h$

= 2 × 40 × 30

= 2400 cm²

What is the formula to find area of back face ?

nd

m²

Q. A fish tank is in the form of a cuboid whose external measures are 80 cm × 40 cm × 30 cm. The base, side faces and back face are to be covered with a coloured paper. Find the area of the paper needed.

Area of the paper needed = Area of base + Area of two side faces + Area of back face

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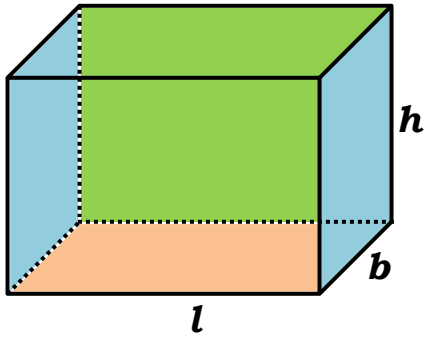


Area of the paper needed

= **Area of base**

+ **Area of two side faces**

+ **Area of back face**

= 3200 + 2400 + 2400

= 8000 cm²

∴ **Area of the pa**

Area of base= 3200 cm²

Area of two side faces= 2400 cm²

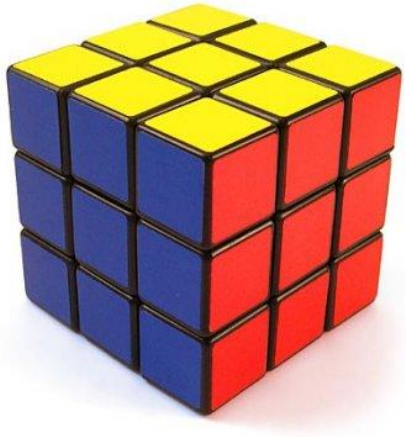
Area of back face= 2400 cm²

SURFACE AREAS AND VOLUMES

- **CUBE – Introduction**

CUBE

- **Cube is a special type of cuboid in which all surfaces are square in shape**



Rubix cube

Let us see few examples of cube

Dice

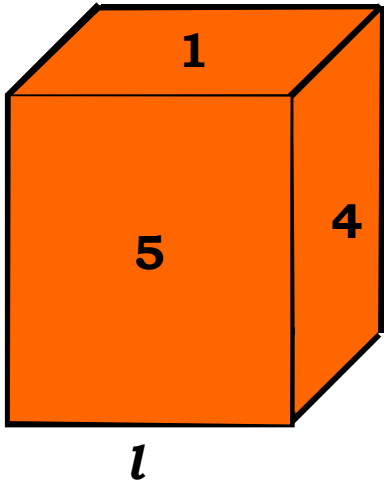
CUBE

- **A cube has six faces.**

Let us see geometrical figure of cube

All the sides of a cube are equal

Let 'l' be the length of each side



Formulae

1. Vertical surface area $= 4l^2$
2. Total surface area = $6l^2$
3. Volume of

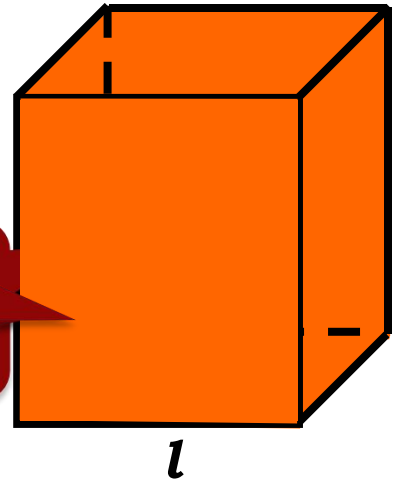
Let

Are

Area of shaded face
$= l^2$

Area of squar

Volun
capacity of the cube



Volume of a cube = $l \times b \times h$
$= l \times l \times l$
$= l^3$

square face

SURFACE AREAS AND VOLUMES

- **Sums based on Cube**

Q. The side of a cube is 60 cm. Find the total surface area of the cube.

Sol.

length (l) = 60 cm

Total surface area of the cube = $6l^2$

$= 6 \times (60)^2$

$= 6 \times 3600$

$= 21600 \text{ cm}^2$

What is formula for finding Total surface area of cube?

$6l^2$

$\therefore$ Total surface area of the cube is 21600 cm^2.

Q. Perimeter of one face of cube is 24 cm.
Find (i) the total area of the 6 faces (ii) the volume of the cube.

Sol.

Perimeter of one face of cube = Perimeter of square

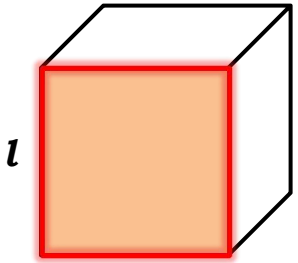
$\therefore$ $24 = 4l$

What is formula for finding Perimeter of square ?

$4l$

$l = \frac{24}{4}$

$\therefore$ $l = 6$ cm



Total surface area of cube $= 6l^2$

$= 6 \times (6)^2$

$= 6 \times 36$

$= 216$ cm^2

Volume of cube $= l^3$

$= (6)^3$

$= 216$ cm^3

$\therefore$ Total surface area of the cube is 216 cm^2 and Volume of the cube is 216 cm^3

Q. The volume of a cube is 1000 cm³. Find its total surface area.

Sol.

Volume of a cube = l^3

$\therefore$ **$1000 = l^3$**

$\therefore$ **$l = 10$ cm** **[Taking cube roots]**

What is formula for finding Total surface area of cube?

$6l^2$

Total surface area of a cube = $6l^2$

$= 6 \times (10)^2$

$= 6 \times 100$

$= 600 \text{ cm}^2$

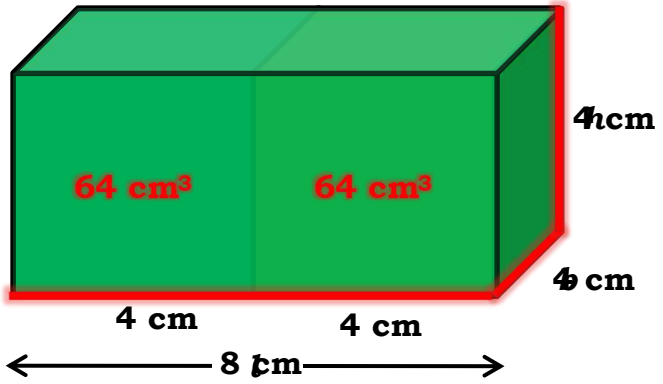
$\therefore$ **Total surface area of the cube is 600 cm².**

SURFACE AREAS AND VOLUMES

- **Sum based on Cube and Cuboid**

Q. 2 cubes each of volume 64 cm³ are joined end to end. Find the surface area of the resulting cuboid.

Hint: find : l , b and h of cuboid



Sol. Volume of one cube = 64 cm³

$\therefore \quad a^3 = 64$

$\therefore \quad a = 4$ cm

After joining the cubes,

$l = 8$ cm, $b = 4$cm, $h = 4$cm

Surface area = $2(lb + bh + lh)$

What is the formula to find volume of cube ? a^3

$= 2(8\times4 + 4\times4 + 8\times4)$

$= 2(32 + 16 + 32)$

$= 2 \times 80$

$= 160\text{cm}^2$

$\therefore$ **Surface area of the cuboid is 160 cm²**

Thank You