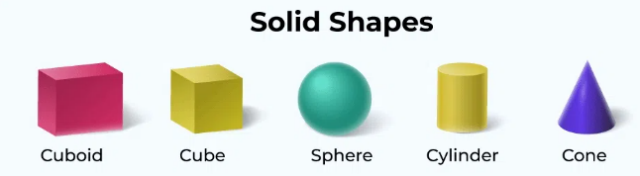
CBSE Notes for Class 10 Maths Chapter 12 – Surface Areas and Volume

Introduction to Surface Area and Volume

This chapter relates to the measurement of the surface area and volume of various geometrical solids, such as cubes, cuboids, cylinders, cones, spheres, and hemispheres. It gives an understanding of how to calculate the surface areas and volumes directly and applied problems for those shapes.



CBSE Class 10 Maths Chapter 12 Surface Areas and Volume - Revision Notes

Surface Area of Solids

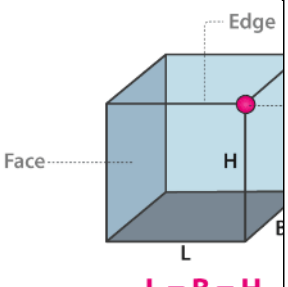
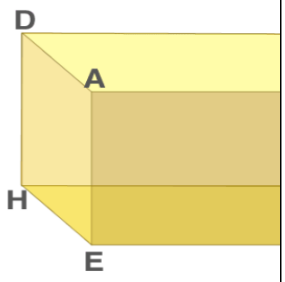
Surface area measures the total area of all the outer surfaces of any 3D object. It is used to describe the surface external to the object, and a measurement is done in square units, that is cm² or m². Surface areas of solids are of two types:

1. **CSA (Curved Surface Area):** It is the area of a 3D figure's lateral or curved surface, excluding the base or top. For example, in a cylinder, CSA means the curved surface area excluding the circular bases.
2. **TSA (Total Surface Area):** It is the sum of all the outer surface areas of the 3D figure, both the curved/lateral surface and the bases. For example, in a cylinder, TSA comprises both the curved side and the area of the two circular bases.

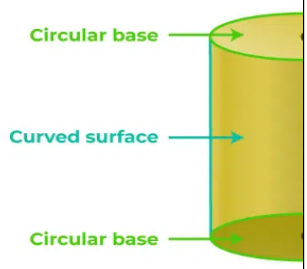
Volume of Solids

Volume is a measure of the amount of space occupied by a 3D object. Volume is measured in cubic units-for example, cm³ or m³, which therefore represent how much capacity or content an object has.

Formulas Related to the Surface Area and Volume of Solids:

Shape	Formulas related to the solids
	**Cube:** A Cube has six identical square faces. **Total Surface Area of cube** = $6a^2$ **Curved Surface area of cube** = $4a^2$ **Volume of Cube** = a^3
	**Rectangle:** A Rectangle has six rectangular faces. **Total Surface Area of Rectangle** = $2(lb + bh + hl)$ **Curved surface area of Rectangle** = $2(l + b)h$

Volume of Rectan
$l \times b \times h$

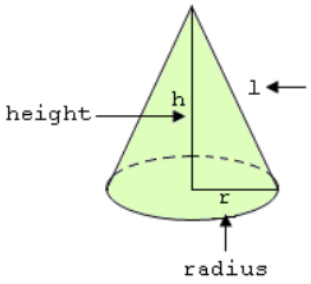


Cylinder: A C
consists of two circul
joints with a curved su

The Total Surface A
the Cylinder = $\pi r(r +$

Curved Surface area
cylinder = πrh

The volume of the cy
= $\pi r^2 h$

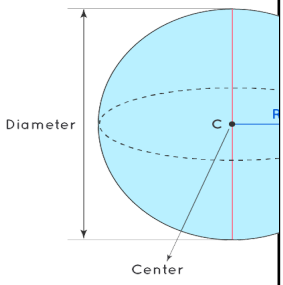


Cone: In maths, a con
circular base and
surface.

The Total Surface A
Cone = $\pi r(l + r)$

Curved Surface ar
cone = πrl
The volume of con
$\pi r^2 h$

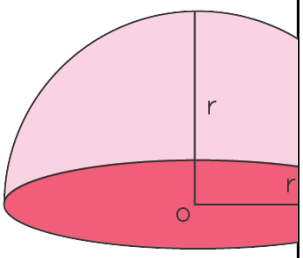
Slant height (l) = $\sqrt{h^2}$



Sphere: Sphere has o
curved surface in the sl
a ball.

The Total Surface A
the Sphere = $4\pi r^2$

The volume of the Sp
$\frac{4}{3}\pi r^3$



Hemisphere: A hemisphere is half of a sphere and consists of one curved surface and one base.
The total Surface Area of the Hemisphere = $3\pi r^2$
Curved Surface area of the Hemisphere = $2\pi r^2$

The volume of the Hemisphere = $\frac{2}{3}\pi r^3$

Solved Problems:

Question 1: A canal is 300 cm wide and 120 cm deep. The water in the canal is flowing at a speed of 20km/h. How much area will it irrigate in 20 minutes if 8 cm of standing water is desired?

Answer: Volume of water flows in the canal in one hour = width of the canal $\times$ *depth of the canal* $\times$ *speed of the canal water*

In 20 minutes the volume of water = $\frac{72000\times20}{60} m^3 = 24000 m^3$

Area irrigates in 20 minutes = $\frac{24000}{0.08} = 300000 m^2 = 30 hectares.$

Question 2: A cone of radius 4 cm is divided into two parts by drawing a plane through the midpoint of its axis and parallel to its base. Compare the volumes of the smaller cone and the bigger cone.

Answer: Let the height of the cone = h

Therefore,

$$\frac{Volume\ of\ the\ smaller\ cone}{Volume\ of\ the\ cone} = \frac{⅓\ \pi r^2 h/2}{⅓\ \pi r^2 h} = \frac{1}{2}$$

Key Features of CBSE Maths Notes for Class 10 Chapter 12

- The notes are aligned with the latest pattern of the CBSE curriculum.
- Visual aids are provided with every concept to get a better understanding of surface area and volumes of solid.
- The notes are easy to understand, making it ideal for self-learning.
