

# Activity 29

## OBJECTIVE

To find the relationship among the volumes of a right circular cone, a hemisphere and a right circular cylinder of equal radii and equal heights.

## MATERIAL REQUIRED

Cardboard, acrylic sheet, cutter, a hollow ball, adhesive, marker, sand or salt.

## METHOD OF CONSTRUCTION

1. Take a hollow ball of radius, say,  $a$  units and cut this ball into two halves [see Fig. 1].
2. Make a cone of radius  $a$  and height  $a$  by cutting a sector of a circle of suitable radius using acrylic sheet and place it on the cardboard [see Fig. 2].
3. Make a cylinder of radius  $a$  and height  $a$ , by cutting a rectangular sheet of a suitable size. Stick it on the cardboard [see Fig. 3].

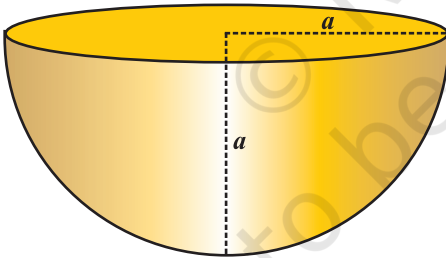


Fig. 1

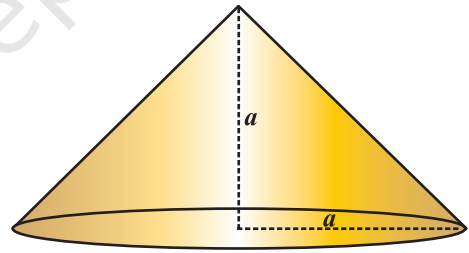


Fig. 2

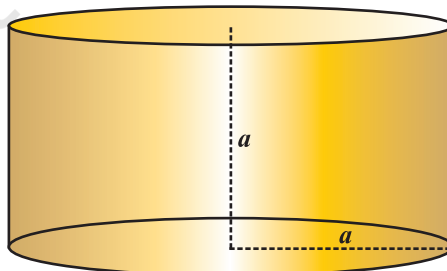


Fig. 3

## DEMONSTRATION

1. Fill the cone with sand (or salt) and pour it twice into the hemisphere. The hemisphere is completely filled with sand.

Therefore, volume of cone =  $\frac{1}{2}$  volume of hemisphere.

2. Fill the cone with sand (or salt) and pour it thrice into the cylinder. The cylinder is completely filled with sand.

Therefore, volume of cone =  $\frac{1}{3}$  volume of cylinder.

3. Volume of cone : Volume of hemisphere : Volume of cylinder = 1:2:3

## OBSERVATION

Radius of cone = Height of the cone = -----.

Volume of cone =  $\frac{1}{2}$  Volume of -----.

Volume of cone =  $\frac{1}{3}$  Volume of -----.

Volume of cone : Volume of a hemisphere = ----- : -----

Volume of cone : Volume of a cylinder = ----- : -----

Volume of cone : Volume of hemisphere : Volume of cylinder = ----- :  
----- : -----

## APPLICATION

1. This relationship is useful in obtaining the formula for the volume of a cone and that of a hemisphere/sphere from the formula of volume of a cylinder.
2. This relationship among the volumes can be used in making packages of the same material in containers of different shapes such as cone, hemisphere, cylinder.