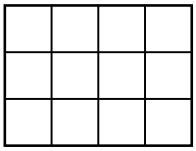
MENSURATION

While doing these activities the teacher should start making a table of formulae on one side. Students should also make it in their notebook.

1) Draw a rectangle of 4 x 3 on grid notebook. Count how many squares are there inside. This is area. Discuss length and breadth.
   Discuss formula : Area of rectangle = length x breadth



2) If we draw a rectangle whose length is 4 and breadth is 1? What is breadth is 2? You will get tables of 4. Discuss.

3) Draw a rectangle having length as 4 and breadth as half. 4 x ½ = 2 (recall multiplication of fractions) . Also discuss this as 4 x 0.5 = 2.0

4) Draw any square. Discuss area. It is a square number.
   Discuss formula : Area of square = side^2

5) Discuss unit of length, breadth and area (cm, cm, cm^2, m, m, m^2 etc)

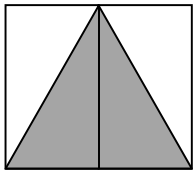
6) Draw a right angled triangle. Discuss that area is half of the rectangle covering it.

   Discuss formula : Area of right angled triangle = ½ base x height

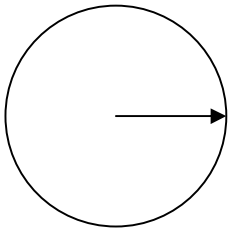
7) Draw a parallelogram. Discuss that the extra piece can be cut and moved to make a rectangle.

   Discuss formula : Area of parallelogram = base x height

8) Draw a triangle. Discuss how the area of each part is half of the rectangle covering it and therefore the area of whole triangle is half of the rectangle.



9) Discuss Area of circle -



Centre

Radius = r

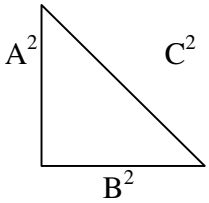
Diameter = **2r**

Circumference = $\boldsymbol{2\pi r}$

Area = $\boldsymbol{\pi r^2}$

10) Recall Pythagoras Theorem

$A^2+B^2=C^2$



11) Take 24 unit cubes. Make a cuboid. Discuss that the base layer has (lxb) cubes. And there are h such layers, so the volume is (lxbxh).
Volume is the number of unit cubes that will fit in this, in a box of this size. The unit is cm^3 .

12) Explain that for any shape of base, if the base is lifted up to make a 3d figure, where the top surface is the same as bottom surface,

volume = base area x height

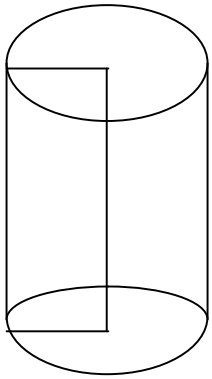
For any solid in which the top is a point, so the base is lifted into a point,

volume = 1/3 x base area x height

From the set of relationship solids, discuss what will be the volume of each shape, whether base area x height or 1/3 of it.

Right Circular Cylinder

Take a right circular cylinder from the set of relationship solids.



Explain - Base,

Lateral Area,

Axis of cylinder.

Height of cylinder

Generating line of cylinder

CALCULATION

1. Lateral surface area$= \mathbf{2\pi rh}$ unit

2. Total surface area= $\mathbf{(2 \times \pi r^2 + 2\pi rh)}$sq. units

3. Volume = $\boldsymbol{\pi r^2 h}$cubic units

Hollow Cylinder

Case I

If

External radius/ Outer radius =$\mathbf{r_o}$

Internal radius/ Inner radius = $\mathbf{r_i}$

Volume of the hollow cylinder= $\boldsymbol{\pi r_o^2 h - \pi r_i^2 h}$cubic units

Case II

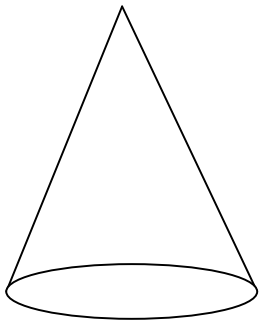
If thickness is given =$\mathbf{t}$

Volume=$\mathbf{2\pi rht}$cubic units

WORKSHEET ON CYLINDER

1. A solid sphere of brass having diameter 14cm is melted and right circular solid rod of 7cm.diameter is made from the material obtained. Find the length of the rod.
2. If the diameter and area of the lateral surface of a right circular cylinder are 14cmcm and 704 sq cm respectively, what is the height of the cylinder?
3. The outer and inner diameters of a hollow iron cylinder of length 20cm are 10cm and 8cm respectively. Find how many solid spheres each of diameter 6cm can be made by melting this iron cylinder.

RIGHT CIRCULAR CONE



Explain –

Base,

Lateral surface Area,

Height and vertex,

Slant height,

Generating lines of cone.

CALCULATION

1. Lateral surface area= $\mathbf{\pi rl}$ unit

2. Total surface area=$\boldsymbol{\pi rl+\pi r^2}$ sq. units

3. Volume$= \frac{1}{3}\boldsymbol{\pi r^2 h}$ cubic units

WORKSHEET ON CONE

1. The volume of the right circular cone is 66cubic cm. Height of that cone is 7 cm. Find the radius of the right circular cone.

2. The radius of the base of a cone cylinder is doubled. How many times the volume of the cone will be increased?

3. The height of a right circular cone is 9cm and the area of its base is 15sq. cm. Write the volume of the cone

4. The area of the curved surface of a right circular cone of height 24cm is 550cm^2. Find its volume.

5. If the diameter of the base of a right circular cone is 7cm. and its slant height is 11cm. Write the area of its lateral surface

6. The lateral surface area of a right cone is √5 times of its base area. What is the ratio of its height and radius?

SPHERE

Explain-

Axis of sphere,

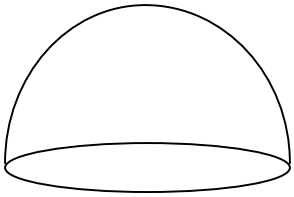
Generating curve of a sphere.

Areaof the total surface of the sphere.

Total Surface Area =$4\pi r^2$ sq. units

Volume of the sphere= $\frac{4}{3}\pi r^3$cubic units

Hemisphere



Total surface area = $(\frac{4\pi r2}{2} + \pi r^2) = 3\pi r^2$ sq. units.

Volume of the hemisphere =$\frac{1}{2} \times \frac{4}{3}\pi r^3 = \frac{2}{3}\pi r^3$ cubic units

WORKSHEET ON SPHERE

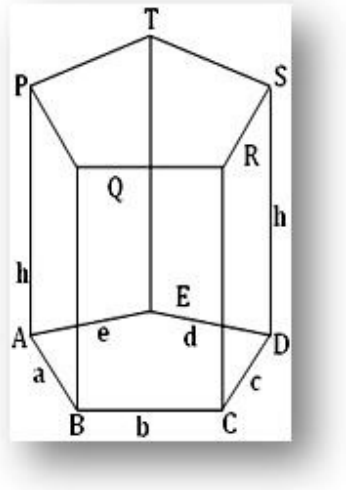
1. If the area of a curved surface of a sphere is numerically equal to twice of its volume, find its diameter.
2. Write by how many times the area of the curved surface off a sphere increases if its doubled.
3. The diameter of the hemisphere is 7cm. Write its total surface area.
4. The diameter of a hemisphere is 4.2 meters. Write its volume.
5. If the curved surface area of a sphere is 100π sq.cm, find its diameter.

WORKSHEET ON CYLINDER,CONE AND SPHERE

1. If the radii of the bases and the height of a right circular cone, a hemisphere and right circular cylinder are equal. Find out the ratio of their volumes.
2. The ratio of the volumes of a sphere and a right circular cone is 8:3, if the diameter of the sphere is 16cm and the radius of the bade of the cone is equal to that of the sphere, find the height of the cone.

3. A hollow sphere having internal radius 4cm and external radius 8cm, is melted and is recast into a solid right circular cone the diameter of whose base is 8cm. Find the height of the cone.
4. A solid sphere of brass having diameter 14cm is melted and right circular solid rod of 7cm.diameter is made from the material obtained. Find the length of the rod.
5. A right circular cylinder and a right circular cone have the same diameter and the same height. The ratio of their curved surface is 8:5. Find the ratio of the diameter and the height of the cylinder.
6. A metallic sphere of radius 21cm is dropped into a cylindrical vessel, which is partly filled with water. The diameter of the vessel is 1.68 meters. If the sphere is completely submerged, find by how much the surface of the water will rise.

CHAPTER 4- PRISM



Explain –

Prism

Side edge of prism

Base of prism

Height of prism

Right prism

CALCULATION

1. Lateral surface area of the prism= **Sum of the areas of the rectangular sides**

= ah+bh+ch+dh+eh

= (a+b+c+d+e)h

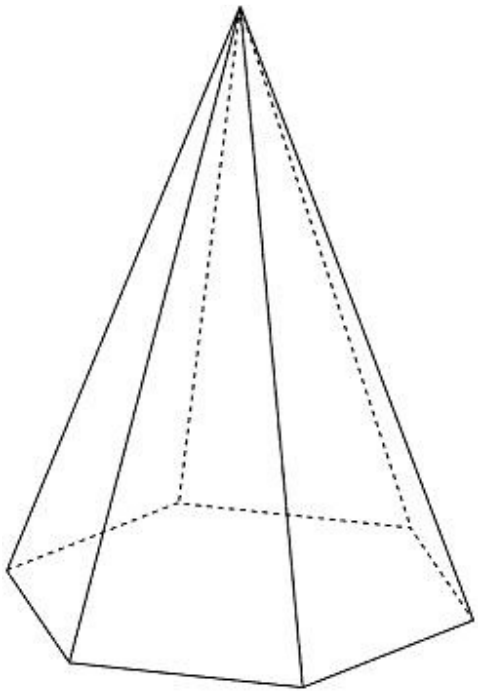
= perimeter of the base × height

2. Total surface area of the prism= **(Lateral surface area+2 × area of the base)**
3. Volume of the prism = **area of the base × height**

WORKSHEET ON PRISM

1. The base of the right pyramid is a square of side 12cm and its height is also 12cm. Find out the whole surface area and its volume.
2. The base of the right prism is a triangle whose sides aae21cm, 20cm and 13cm. if the height of the prism is 40cm. Find the area of whole lateral surface and volume.
3. The total surface area of a right prism standing on an equilateral triangle is $50\sqrt{3}$ square meter. If the area of it lateral surface is equal to six times its base area, find the height of the prism.
4. The base of a right prism is a regular hexagon of side 15cm. If the lateral surfaces measure 1800sq.cm, find the height and volume of the prism.
5. If the area of the base and volume of a right prism are respectively $9\sqrt{3}$ cm^2 and $30\sqrt{3}$ cm^3, find the measure of its height.
6. The base of the right prism of height 6ft. is an equilateral triangle. If the total surface area is $96\sqrt{3}$ sq.ft, find the volume of the prism.
7. A right prism whose height is 12cm has its base a triangle having sides 21cm, 20cm and 13cm. find the total surface area and the volume of the prism.
8. The base of a right prism is a square whose diagonal is $24\sqrt{2}$ cm long and lateral surface area is 960 sq.cm. find its height and volume.

CHAPTER5- PYRAMID



Explain-

Pyramid

Lateral faces or slant faces

Vertex

Base

Slant edges

Height

Triangular pyramid, Quadrilateral pyramid

RIGHT PYRAMID

Height of the right pyramid,

Slant height of the rightpyramid,

CALCULATION

1. Area of the slant surfaces of the pyramid

$$= \frac{1}{2}al+\frac{1}{2}al+\frac{1}{2}al+\frac{1}{2}al+\ldots\ldots$$

$$= \frac{1}{2}x\ (a+a+a+\ldots..)\ xl$$

$$= \frac{1}{2}\ x\textbf{perimeter of the base x slant height}$$

2. Total area of the pyramid = **area of the base + area of the slant surfaces**

3. Volume of the pyramid = $\frac{1}{3}$**xarea of the basexheight**

WORKSHEETONPYRAMID

1.The base of the right pyramid is a square of side 12cm and its height is also 12cm. Find out the whole surface area and its volume.

2.The base of a right pyramid is an equilateral triangle each side of which measures 6meters. If its height is 12metrs, find the volume of the pyramid.

3. The base of the right pyramid is a rectangle of side 12cm and 9cm, and each slant edge measures 8.5 cm, find the area of the lateral surface and volume of the pyramid.

4. The base of a right pyramid whose height is 5meters is an equilateral triangle. If the volume of the pyramid is $\frac{3\sqrt{3}}{5}$ cubic meter. Find the perimeter of the base.

5. A right pyramid stands on a rectangular base of length 24cm and breadth 18cm. If each edge of the pyramid measures 17cm, find the volume of the pyramid.

6. The base of the right pyramid is a square of side 10cm and its height is also 12cm. find out the whole surface area and its volume.

7. The base of a right pyramid is a square having area 576sq.meters. If the area of the lateral surface is 960 sq. meters, find its volume.

8. The base of a right pyramid is a rectangle whose length and base are 18meter and 10meter respectively. If its height is 12meter, find its volume and of slant surfaces.