

Physical Quantities and Measurement

Measurement of volume:

Volume is the space occupied by an object.

SI unit of area is cube metre (m^3).

Density:

- It is mass per unit volume of a substance.
- **Unit: Relative density** g/cm^3 or kg/m^3
- **Relative density** = Density of the substance / Density of the water

Variation in density of gases and liquids with temperature:

- When temperature increases in case of a solid the volume does not change much so the density is not altered much.
- When temperature increases in case of a gases and liquids the volume does not change much so the density is not altered much.

The amount of flat surface or region occupied by a closed figure is known as the area of the closed figure.

Steps to measure area of closed figure using graph paper

- **Step 1:** Firstly, we place the closed figure on a squared paper or a graph paper where every square measures $1 \text{ cm} \times 1 \text{ cm}$.
- **Step 2:** Then we make an outline of the figure.

- **Step 3:** Now we look at the squares enclosed by the figure. Some of them are completely enclosed, some half, some less than half and some more than half. Note down the number of squares of each category.
- **Step 4:** Calculate the area of the closed figure by considering the following points.
 - (a) Take the area of 1 full square as 1 square unit.
 - (b) Ignore portions of the area that are less than half a square.
 - (c) If some portion enclosed by the figure is more than half a square, then count its area as one square unit.
 - (d) If exactly half of the square is counted, take its area as $\frac{1}{2}$ square unit.

Formulae for measuring area of regular bodies

- Area of square = $(\text{side})^2$
- Area of rectangle = length $\times$ breadth
- Area of circle = $\pi \times (\text{radius})^2$
- Surface area of cylinder = $2\pi \times (\text{radius}) \times \text{length}$
- Surface area of sphere = $4\pi \times (\text{radius})^2$
- Area of triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

1.

Speed = $\frac{\text{space covered}}{\text{time taken}}$

2. If speed is the same throughout a journey, then the motion is uniform.

3. If speed varies, then the motion is non-uniform.

4. Speed is measured by a speedometer.

5. Distance moved by a vehicle is measured by an odometer.

6. Distance covered = Speed $\times$ Time

7. For equal distance, less travel time means higher speed.

8. For equal time interval, greater distance covered means higher speed.