

Determination of the density of liquids and solids (regular and irregular)

Introduction

The density of a substance measures the mass it contains in a given volume. Density is calculated using the equation:

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

Apparatus

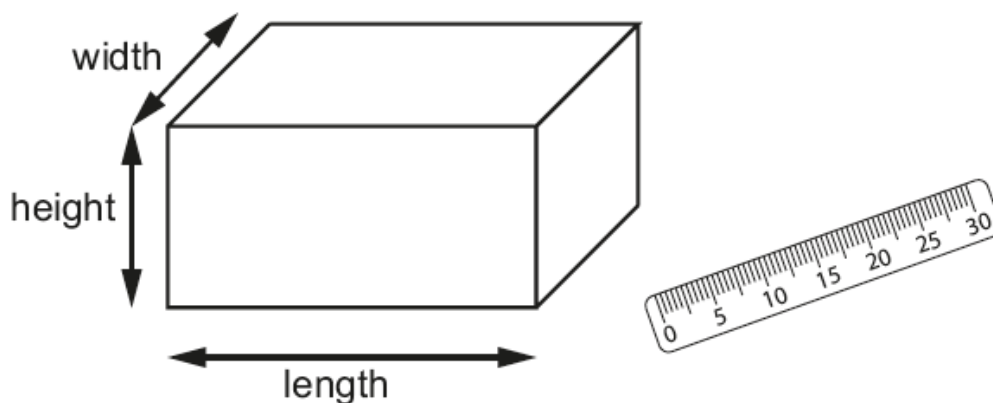
2 × regular shaped solids
2 × irregular shaped solids
30cm ruler
50 cm³ measuring cylinder
water

Access to:

electronic balance ± 0.1 g

Measuring the density of a regular shaped solid

Diagram of Apparatus



Method

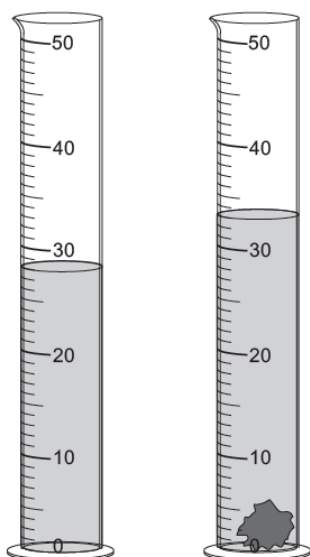
1. Record the mass of the solid.
2. Record the length, width and thickness of the solid using a ruler.
3. Repeat for cubes of different material.

Analysis

1. Calculate the volume of the cube from: $\text{volume} = \text{length} \times \text{height} \times \text{width}$.
2. Calculate the density in g/cm^3 .

Measuring the density of an irregular shaped solid

Diagram of Apparatus



Method

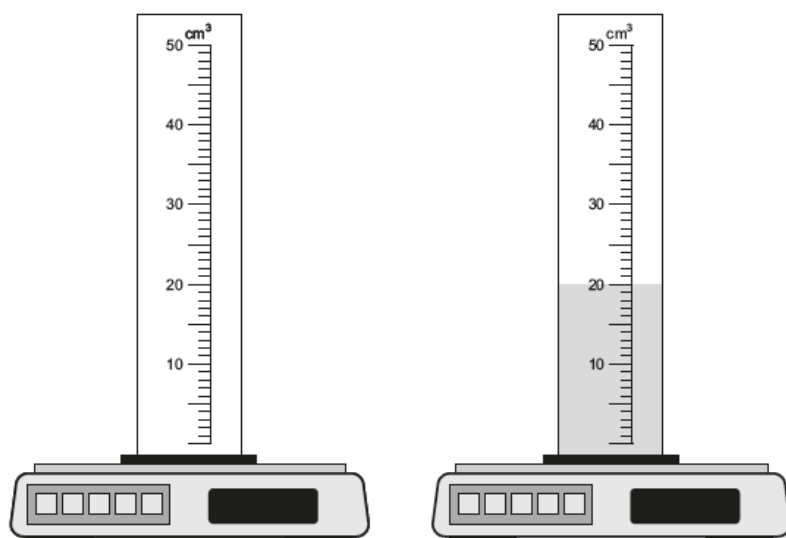
1. Record the mass of the solid.
2. Fill the measuring cylinder with water up to 20 cm^3 and record the volume.
3. Gently place the solid into the measuring cylinder and record the new volume.

Analysis

1. Calculate the volume of the solid by subtracting the original volume from the new volume.
2. Calculate the density in g/cm^3 .

Measuring the density of a liquid

Diagram of Apparatus



Method

1. Record the mass of the empty measuring cylinder.
2. Add 20 cm^3 of water to the measuring cylinder.
3. Record the mass of the measuring cylinder with the water.

Analysis

1. Calculate the mass of the water by subtracting the mass of the measuring cylinder (without water) from the mass of the measuring cylinder with the water.
2. Calculate the density in g/cm^3 .