## Density

### Passage

Density is a property that tells us how much mass is packed into a certain volume. Two objects can be the same size but have very different masses because their particles are packed differently. An object with tightly packed particles has a high density, while one with loosely packed particles has a low density.

The formula for density is:
Density = Mass / Volume
Mass is measured in kilograms (kg) or grams (g), and volume is measured in cubic metres (m³) or cubic centimetres (cm³). Density is usually measured in kg/m³ or g/cm³.

Density helps us understand why some objects float while others sink. An object will float in a liquid if its density is lower than the liquid's density. For example, wood floats on water because it is less dense. A metal spoon sinks because its density is higher than that of water.

Different materials have different densities. For instance, oil is less dense than water, which is why it forms a layer on top. Understanding density is important in many areas of science, such as designing ships, studying rocks, and even cooking.

### Questions

#### Part A — Multiple Choice

1. Which statement best describes density?
A. The amount of space an object takes up
B. The amount of mass in a certain volume
C. The force acting on an object
D. The weight of an object in water

2. Which object is most likely to float in water?
A. An object with density 8 g/cm³
B. An object with density 1 g/cm³
C. An object with density 0.5 g/cm³
D. An object with density 5 g/cm³

3. Which pair of units is correct for density?
A. N and $m^3$
B. kg and N
C. $g/cm^3$
D. $m/s^2$

## Part B — Short Questions

4. Why does a metal spoon sink in water while a piece of wood floats?

5. Explain what happens when oil is poured into water.

## Part C — Data Interpretation

A small block has a mass of 120 g and a volume of 60 $cm^3$.

6. Calculate its density.

A second block has a density of 2 $g/cm^3$ and a volume of 50 $cm^3$.

7. Calculate its mass.

## Part D — Challenge Question

8. A rock sinks in water, but a large wooden boat floats. Explain why size alone does not determine whether something floats.

## Answer Key

### Part A

1. B

2. C

3. C

### Part B

4. The spoon sinks because its density is higher than water's density, while wood floats because its density is lower.

5. Oil floats on water because it has a lower density, so it forms a layer on top of the water.

### Part C

6. Density = mass ÷ volume = 120 ÷ 60 = 2 g/cm³

7. Mass = density × volume = 2 × 50 = 100 g

### Part D

8. Floating depends on density, not size. A wooden boat has an overall density lower than water because it contains air, so it floats even though it is large. A rock has a higher density and sinks.