Guide to: Density

maths Links

Explanation:

Density, mass and volume are linked by **Density = $\frac{\text{Mass}}{\text{Volume}}$**, **Mass = Density × Volume**, and **Volume = $\frac{\text{Mass}}{\text{Density}}$**. Check the units carefully: if density is in **g/cm^3**, mass must be in **grams** (1 kg = 1000 g) and volume in **cm^3**.

When two metals or liquids are mixed together, never average the two densities—always work out the **Total Mass** and **Total Volume** separately, then use **Combined Density = $\frac{\text{Total Mass}}{\text{Total Volume}}$**.

Example 1: A solid metal block has volume **350 cm^3** and density **8.4 g/cm^3**. Find its mass in **kilograms**.

Solution:

Mass = Density × Volume
Mass = 8.4 × 350 = **2940 g**
Convert grams to kilograms (÷ 1000):
2940 ÷ 1000 = 2.94 kg
Answer: 2.94 kg

Example 2: Liquid A (**180 g**, density **0.9 g/cm^3**) is mixed with Liquid B (**420 g**, density **1.4 g/cm^3**). Find the density of the mixture.

Solution:

Vol A = 180 ÷ 0.9 = **200 cm^3**; Vol B = 420 ÷ 1.4 = **300 cm^3**
Total Mass = 180 + 420 = **600 g**
Total Volume = 200 + 300 = **500 cm^3**
Mixture Density = 600 ÷ 500 = 1.2 g/cm^3
Answer: 1.2 g/cm^3

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