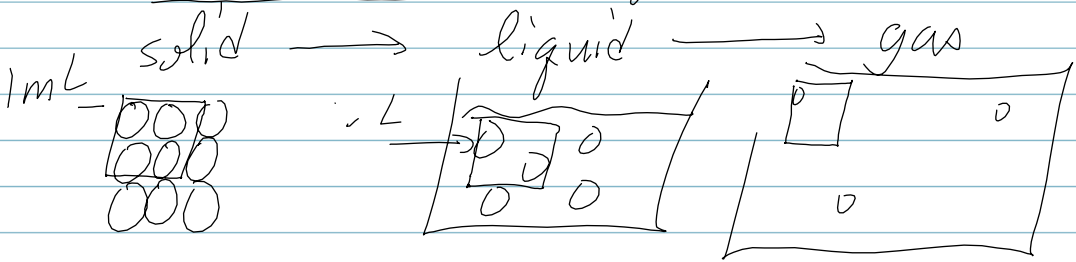


Density
= how "dense" a material is

$$\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{g}{mL} \text{ or } \frac{g}{L}$$

→ density varies with temperature
increase temp. →



density decreases (usually)

Al density at ~25°C
2.7 g/mL

iron = Fe 7.9 g/mL

lead = Pb 11.3 g/mL

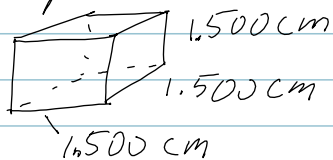
water (at 4°C) 1.00 g/mL

The mass of a sample is 287g
and the volume is 25.4 mL.

What is the density of this sample?
(AT = 25°C)

$$\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{287\text{g}}{25.4\text{mL}} = 11.3 \frac{\text{g}}{\text{mL}}$$

A cube of osmium metal is
1.500 cm on a side and has a
mass of 76.31 g at 25°C. What is
its density ρ in g/cm^3 at this
temperature?



$$\text{mass} = 76.31\text{g}$$

$$\text{Volume} = l \times w \times h = (1.500\text{cm})^3 \\ = 3.375\text{cm}^3$$

$$\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{76.31\text{g}}{3.375\text{cm}^3} = 22.61 \frac{\text{g}}{\text{cm}^3}$$

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

$$\underline{\text{mass} = \text{volume} \times \text{density}}$$

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

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

The density of titanium metal is 4.51 g/mL at 25°C. What is the mass of titanium that has a volume of 65.8 mL at 25°C?

$$\text{mass} = \text{volume} \times \text{density} = 65.8 \text{ mL} \left(\frac{4.51 \text{ g}}{\text{mL}} \right)$$
$$\boxed{= 297 \text{ g}}$$

What is the volume of 75.0g
of benzene at 15°C?
The density of benzene at 15°C
is 0.8787 g/mL.

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

$$= 75.0\text{g} \left(\frac{\text{mL}}{0.8787\text{g}} \right) = \underline{85.4\text{mL}}$$

PDF