# Noteset 1J - In Class Notes

## Density

The mass of an object compared to its volume

$$D = \frac{m}{V} \quad \frac{(\text{mass, g})}{(\text{volume, mL, cm}^3)} \qquad \underset{\text{(liquid)}}{1\,\text{mL}} = \underset{\text{(solid)}}{1\,\text{cm}^3}$$

Density is a <u>ratio</u> of mass to volume

$D_{water} = 1.00\,\text{g/mL}$ (1 g : 1 mL)

100 g water : 100 mL water
500 g water : 500 mL water
] same ratio

Density is an <u>intensive property</u>, a property that only depends on what a substance is (identity) over the amount (g, mL, etc).

Density is also a <u>direct relationship</u>, As a "ratio" of mass to volume the variables are "directly" linked to each other.

$D_{water} = 1.00\,\text{g/mL} \quad 1.00\,\text{g/mL} = \frac{100\,\text{g}}{100\,\text{mL}} = \frac{200\,\text{g}}{200\,\text{mL}} = \frac{500\,\text{g}}{500\,\text{mL}}$

M ↑, V ↑ or M ↓ V ↓ (both same direction)

# Solving Density Problems

1. Determine mass and volume
2. Plug into eqn (include units)
3. Divide quantities and include units
4. Round to 2 (or less) places after decimal

$$D = \frac{m}{V} \quad \frac{(g)}{(mL)}$$

Ex: $m = 35.9\,g$ $V = 61.6\,mL$

$$D = \frac{m}{V}^{*} \qquad D = \frac{35.9\,g}{61.6\,mL}^{*} \qquad D = 0.58279$$

$$D = 0.58\,g/mL^{*}$$

units: $\frac{\text{\_\_\_ g}}{\text{\_\_\_ mL}} = \text{\_\_\_ g/mL}$

* required for all problems