

PART 4: DENSITY, MASS, VOLUME



DENSITY

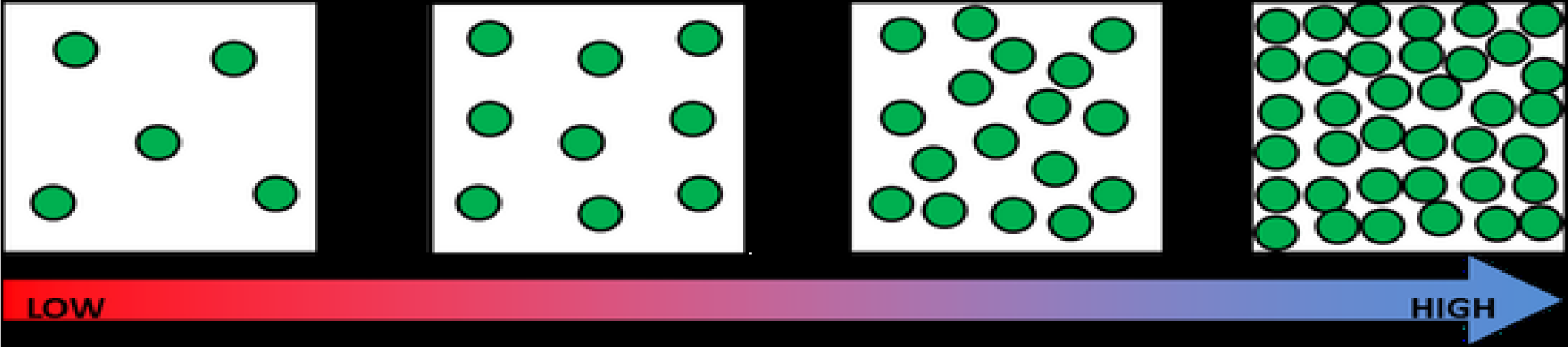


Density depends on the **number of atoms** or molecules that are in a certain **volume**.

- The more particles there are in that space, the more dense is that substance.

*Take 5 ml of solid gold. It is solid because there is **less energy** in its particles. So the particles are close to each other, and are densely packed. You can fit **lots** of particles into a 5 ml space.*

- *Now melt that gold into liquid, and take out only 5 ml of it – some of the liquid remains behind! There is **more energy** in the liquid particles, so they make more space around themselves and are further apart. So there are **fewer** of them (less dense) in that new 5 ml space.*
- *In the same way, 5 ml of gold as gas is even **less** dense.*

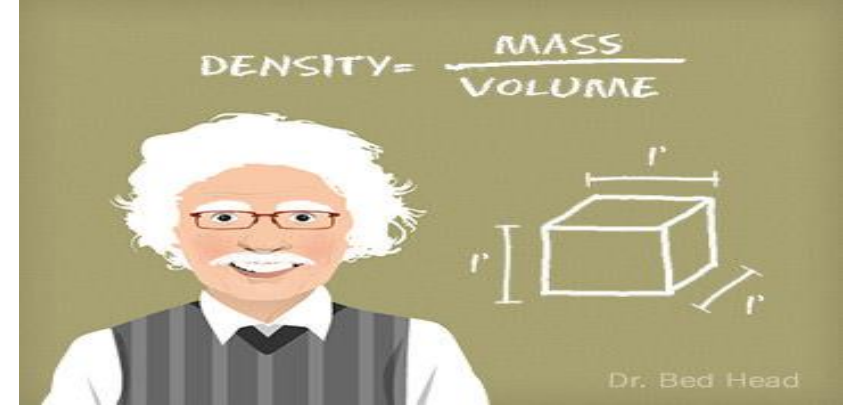


What is density?

- Density is a comparison of how much matter there is in a certain amount of space.

FACTS and FORMULAS

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$



- Scientists say that **density** is the **mass** of matter per unit **volume**. So the formula used to calculate it is:

$$D = \frac{M}{V} \quad \text{or} \quad \text{Density (g/cm}^3\text{)} = \frac{\text{Mass (g)}}{\text{Volume (cm}^3\text{)}}$$

Could Mass be in kg? Could Volume be in ml? Could Density be in kg/ml?

- Less dense things will **float** on more dense things.
- That explains why **solids sink** in their liquids, and why **gases rise** above their liquids.
Exception: *Ice is the only solid that floats on its liquid. Why has Nature done this?*
- **Immiscible** (*UnMixable*) liquids cannot mix together.
(The **Less** dense liquid will then **float** on the denser liquid. *Just like oil floats on water.*)