

Model of Matter – The Particulate Nature of Matter

What you are expected to know as core knowledge?

To know the basis of this model

To explain the 3 States of Matter using the arrangement & movement of particles

Use the model to explain

- physical properties (e.g. shape, volume, density, compressibility) of the 3 states
- expansion & contraction
- change of states / phases transition (e.g. melting, boiling, condensation, freezing)

Basic Concept:

1. Matter has mass and occupy space
2. The state of a matter determines its physical properties
3. Add/remove heat -> Change of state / Phase transition
4. Heat is an energy
 - Heat flows when there is a difference in temperature between 2 regions
 - When the 2 regions are in thermal equilibrium (i.e. same temperature), there is no **NET** heat flow



HOT

Heat Flow

COLD



Evidence for the Particulate Nature of Matter

1. Diffusion

Diffusion is the spontaneous random movement of particles from a region of higher concentration to a region of lower concentration. **At equilibrium**, a **uniform** mixture is obtained. **No energy** needed.

Example: Potassium permanganate crystal + water, Bromine gas + air.

