

Practical Model of Matter

Content:

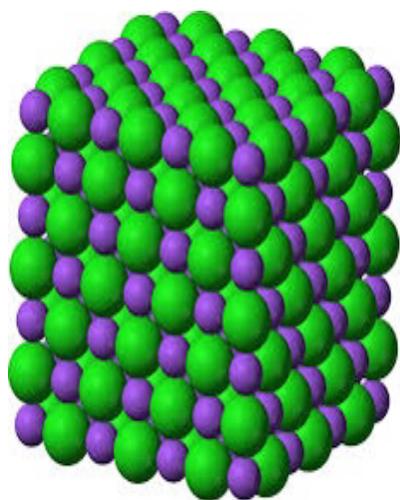
1. Practical model
2. Density
3. Internal Energy and changes of state
4. Specific latent Heat
5. Practical motion in Gases

Practical Model

- All matter is made up of very small particles, or **atoms**
- The particle model is a model that describes the **arrangement** and **movement** of particles in a substance
- The particle model can be used to explain
 - The different states of matter e.g. **solids, liquids** and **gases**
 - Physical properties e.g. differences in **density**
- Matter can exist in one of three different states: **solid, liquid**, or **gas**

1- Solids:

- Solid Particles (Internal Structure) :
 - The particles are **closely packed**
 - The particles **vibrate** about fixed positions
- Solids Structure (External Structure):
 - A definite **shape** (they are **rigid**)
 - A definite **volume**



Examples of Solid in Daily Life



Furniture



Kitchen Utensils



Electronics



Books



Clothing



Food



Vehicles



Footwear

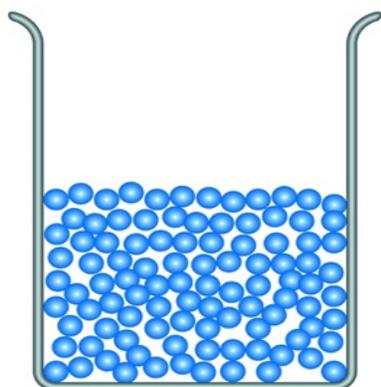
2- Liquids

► liquid Particles (Internal Structure) :

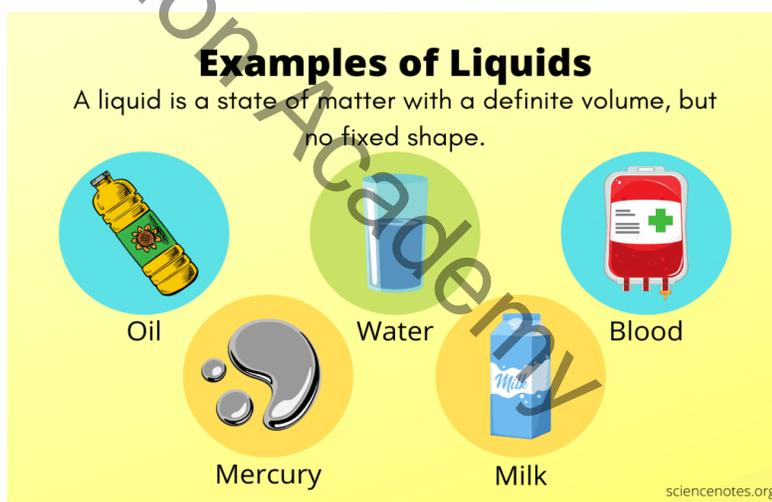
- The particles are **closely packed**
- The particles can **flow** over one another

► Liquids Structure (External Structure) :

- No definite shape – they are able to **flow** and will take the shape of a container
- A definite **volume**



Liquid



3- Gases

► Gas Particles (Internal Structure):

- The particles are **far apart**
- The particles move **randomly**
- Gases are highly **compressible**, this is because:

P5: Practical Model of matter

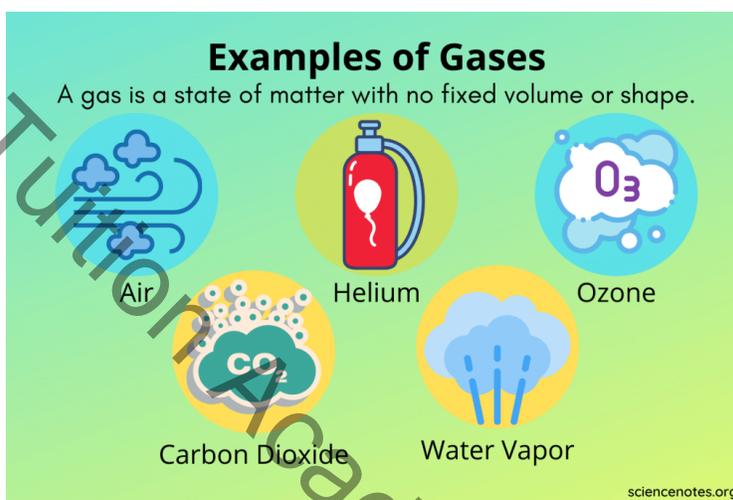
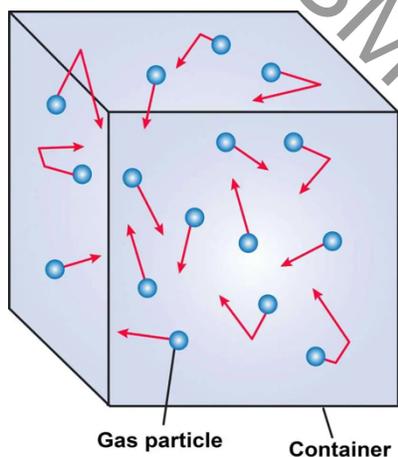
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a) There are large **gaps** between the particles

b) It is easier to **push** the particles closer together than in solids or liquids

► Gases Structure (Internal Structure):

- No definite shape – they will take the shape of their container
- No fixed volume – if placed in an evacuated container they will expand to fill the container



Difference between Solid, Liquid and gas

Solid	Liquid	Gas
		
<ul style="list-style-type: none">▪ Rigid▪ Fixed Shape▪ Fixed Volume▪ High Density▪ Closely tight and organized particles▪ Slightly Compressible	<ul style="list-style-type: none">▪ Not Rigid▪ No Fixed Shape▪ Fixed Volume▪ Average to High Density▪ Closely tight but not disorganized particles▪ Slightly Compressible	<ul style="list-style-type: none">▪ Not Rigid▪ No Fixed Shape▪ No Fixed Volume▪ Low Density▪ Far apart and disorganized particles▪ Highly Compressible

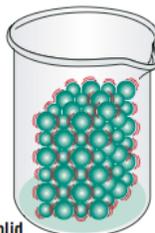
Overview of 3 states of matter

P5: Practical Model of matter

The particle model

Properties of solids:

- have a definite shape
- do not flow
- virtually impossible to compress
- expand if heated, but usually less than liquids and gases.



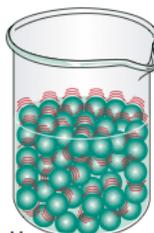
solid

Particles in solids:

- strongly bonded to each other
- vibrate a little, but not much compared to liquids and gases
- vibrate faster when heated.

Properties of liquids:

- no definite shape
- can flow to take the shape of the bottom of a container
- very difficult to compress (virtually incompressible).



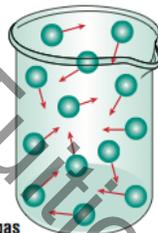
liquid

Particles in liquids:

- weakly bonded to each other
- break their bonds easily
- vibrate and move more than those in a solid
- move faster when heated.

Properties of gases:

- no fixed shape
- gases spread (or diffuse) to completely fill a container
- gases are easily compressed.



gas

Gas particles:

- are 'free', having no bonds between them
- have much more energy than those of a solid or liquid
- fly around, bouncing off each other and the walls of their container.

