



SSLC-FIRST BELL 2.0-CHEMISTRY-CLASS-11

Chapter-2

**GAS LAWS AND MOLE CONCEPT**

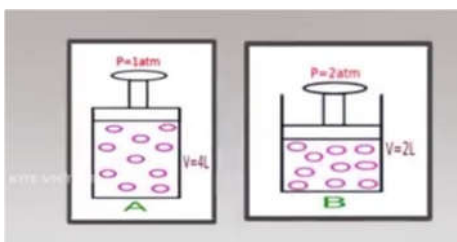
**Temperature of a gas**

1. Which is the energy gained due to the movement of the molecules?
    - Kinetic energy
  2. When a gas is heated, temperature is increased. What happens to the movement of molecules if the temperature of the gas is increased?
    - When the freedom of movement of gas molecules increases the energy of the molecules also increases
- ✓ **TEMPERATURE is the average kinetic energy of molecules in a substance**
- Pull the piston of a syringe backwards. Press the piston after closing the nozzle of the syringe. What will happen to the volume of the balloon?



Observation: Volume of the balloon decreases.

**Relationship between Volume and Pressure of a Gas**



- Definite mass of a gas is kept in a closed cylinder A. Suppose the gas is transferred to the other cylinder B without changing the Temperature. Is there any change in the number of molecules? What happens to the pressure when the volume is decreased?
- Observation: No change in number of molecules.
- When the pressure is increased the volume of gas decreases.

### BOYLE'S LAW

- Robert Boyle, the British physicist and chemist, who established the relationship between volume and pressure of a gas through experiments.
- At a constant temperature, volume of a definite mass of gas is inversely proportional to its pressure. If p is pressure and v is volume then  $p \times v$  is a constant.

Written as

*Pressure  $\propto$  1/Volume*

$PV = \text{Constant}(k)$

#### Activity 1

Pressure in atm	Volume in L	PV
1	1000	1000
2	500	1000
4	.....	.....

Ans:

$$PV = 1000$$

$$4 \times V = 1000$$

$$V = \frac{1000}{4} = 250$$

#### Activity 2

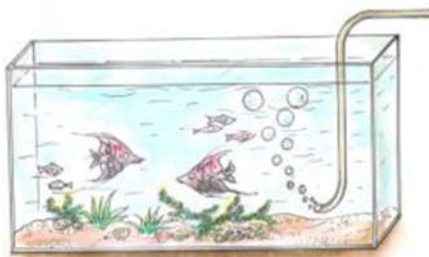
Analyse the data given below. Temperature and number of molecules are the same.

Pressure(P)	Volume (V)
1 atm	100 L
4 atm	25 L
5 atm	20 L
10 atm	10 L

1. Find  $P \times V$
2. Which gas is related to this?
3. What will be the volume of the gas if the pressure is changed to 2 atm under the same conditions?

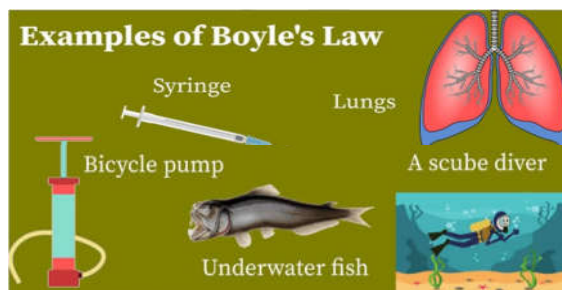
### Activity 3

- The size of the air bubbles rising from the bottom of an aquarium increases. Can you explain the reason?



- The pressure is very high in depth of water. This high pressure reduces the volume of the air bubbles. The size of the air bubbles increases as the pressure decreases when the bubbles move upwards.

### Real life examples of BOYLE'S LAW



- Syringe
- Human lungs
- Bicycles pump
- Air bubbles on the surface of water

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