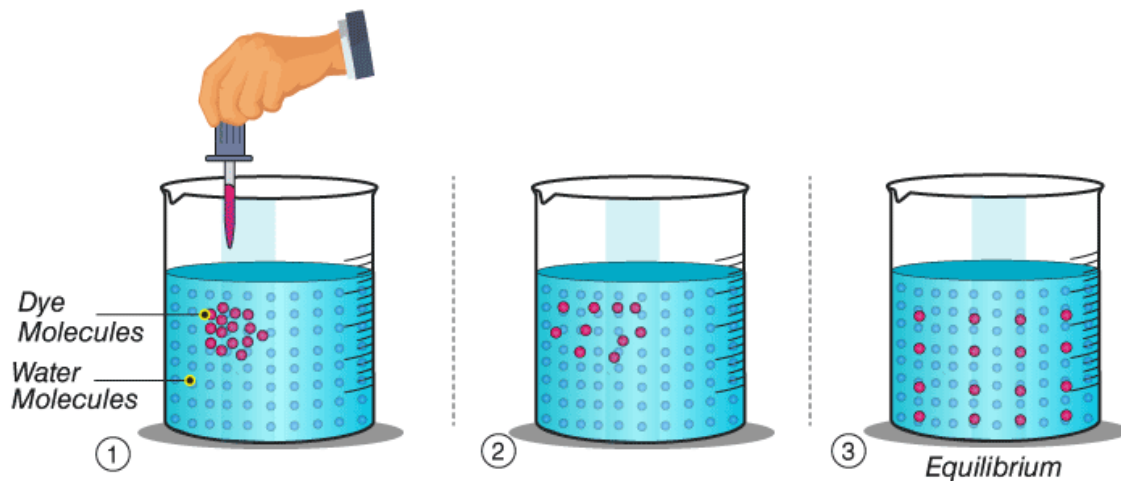


## **Diffusion**

“Diffusion is the movement of molecules from a region of higher concentration to a region of lower concentration down the concentration gradient.”

Diffusion is the process of movement of molecules under a concentration gradient. It is an important process occurring in all living beings. Diffusion helps in the movement of substances in and out of the cells. The molecules move from a region of higher concentration to a region of lower concentration until the concentration becomes equal throughout.

Liquid and gases undergo diffusion as the molecules are able to move randomly.



Example:

Take water in a beaker. Add a few copper sulfate crystals in one place and leave it as it is for some time without disturbing it. After some time we can see that the beaker contains a uniformly coloured solution. Here, both water and copper sulfate diffuse independently. With this experiment, we can infer that solutes move from a higher concentration to a lower concentration in a solution.

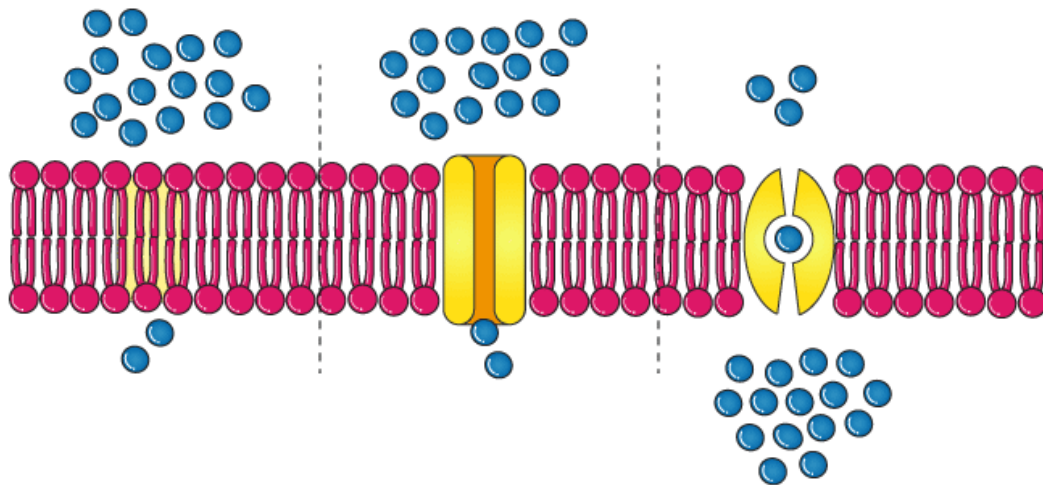
### **Types of Diffusion**

Diffusion is widely used in various fields such as biology, physics, chemistry, etc. Diffusion can be classified into two main types: Simple diffusion and facilitated diffusion.

## Simple diffusion

A process in which the substance moves through a semipermeable membrane or in a solution without any help from transport proteins. For example, bacteria deliver small nutrients, water and oxygen into the cytoplasm through simple diffusion.

## Facilitated diffusion



Facilitated diffusion is a passive movement of molecules across the cell membrane from the region of higher concentration to the region of lower concentration by means of a carrier molecule.

**Dialysis:** It is the diffusion of solutes across a selectively permeable membrane. A selectively permeable membrane is one that allows only specific ions and molecules to pass through, while it obstructs the movement of others.

## Factors affecting Diffusion

There are a few factors that affect the process of diffusion, which individually and collectively alters the rate and extent of diffusion. These factors include:

- Temperature.
- Area of Interaction.
- Size of the Particle.
- The steepness of the concentration gradient.

## Examples of Diffusion

- A tea bag immersed in a cup of hot water will diffuse into the water and change its colour.

- A spray of perfume or room freshener will get diffused into the air by which we can sense the odour.
- Sugar gets dissolved evenly and sweetens the water without having to stir it.
- As we light the incense stick, its smoke gets diffused into the air and spreads throughout the room.
- By adding boiling water to the dried noodles, the water diffuses causing rehydration and making dried noodles plumper and saturated.

### **Causes of Diffusion**

Diffusion is a natural and physical process, which happens on its own, without stirring or shaking the solutions. Liquid and gases undergo diffusion as the molecules are able to move randomly. The molecules collide with each other and change their direction.

### **Significance of Diffusion**

Diffusion is an important process, which is involved in the different life processes. As mentioned above, it is the net movement of particles, ions, molecules, solution, etc. In all living species, diffusion plays an important role in the movement of the molecules during the metabolic process in the cells.

Diffusion is important for the following reasons:

- During the process of respiration, this process helps in diffusing the carbon dioxide gas out through the cell membrane into the blood.
- Diffusion also occurs in plant cells. In all green plants, water present in the soil diffuses into plants through their root hair cells.
- The movement of ions across the neurons that generates electrical charge is due to diffusion.