Topic 2: Diffusion Date:

Remember:

- All substances are made of many millions of tiny molecules.
- These molecules are too small to be seen even with the most powerful microscope in the world.
- In some substances the molecules are more closely packed together than in others.
- The movement of substances can either be through a solution or through a gas.

Important word:

Diffusion the *net movement* of particles (ions/molecules) from a region of a *high concentration* to a region of *a lower concentration*, that is, *down* a *concentration gradient*.

Concentration The *amount of a particular substance* in a given amount of another substance

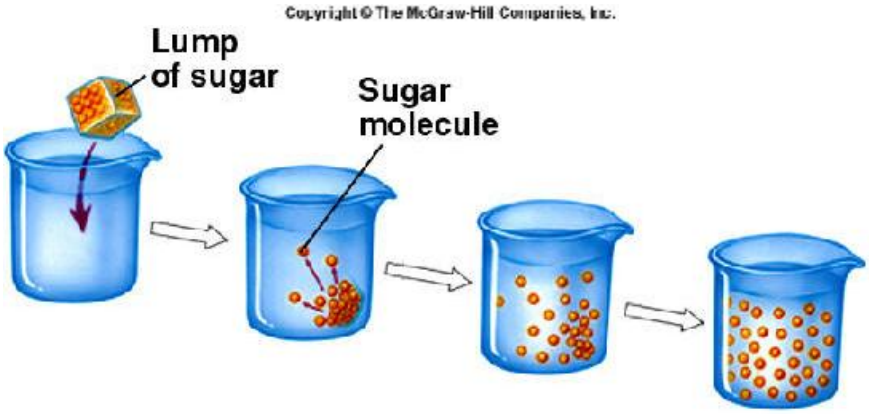
Net movement explains which *direction* particles have moved.

What is a concentration gradient and how is it related to diffusion?

- Diffusion occurs when particles spread.
- When the particles are **free** to move, then diffusion will happen.

In order for **diffusion** to occur, there has to be concentration gradient. **Concentration gradient** refers to the *differences of concentrations* between two regions, i.e. high and low.

- Example of diffusion would be [*drop a lump of sugar into a beaker of water*]:



Q: If you drop sugar into a beaker of water…

The explanation:

1. **Since sugar will sink onto the bottom of the beaker first, the bottom will be concentrated.**
2. **At the top of beaker, there is no sugar present.**
   - **There will be a concentration gradient between the water and the sugar.**
3. **After a few minutes, the sugar will dissolve.**
   - **Due to water particles hitting the sugar.**

4. **Molecules will <u>slowly spread</u> through the water, eventually <u>mix together evenly</u>. <u>Concentration gradient is now gone</u>.**
   - ❖ **All molecules bump into each other as they move about.**

Diffusion across a membrane:

- The cell surface is membrane is *<u>partially permeable</u>* [it allows some substances through but not others].
- Diffusion occurs *<u>across the membrane.</u>*
- Example of diffusion in plants – absorption of mineral salts by plant roots from soil and photosynthesis in plants.
- Other examples of diffusion that have occurred in our body:

Two examples of diffusion down concentration gradients

location	particles move	from	to
gut	digested food products	gut cavity	blood in capillary of villus
lungs	oxygen	alveolar air space	blood circulating around the lungs

Factors affecting the rate of diffusion:

- Some substances diffuse more quickly than others.

<u>Factors that can affect the rate of diffusion are:</u>