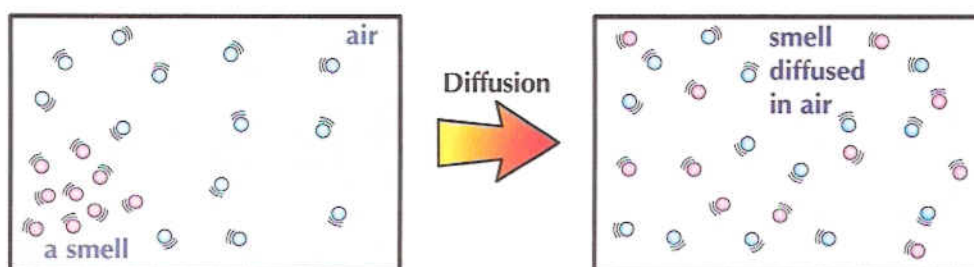


Transport Across the Cell Membrane

There are several methods of transport across a cell membrane. You need to learn how diffusion, osmosis, and active transport actually work.

Diffusion is the passive movement of particles

- 1) If there's a high concentration of particles (molecules or ions) in one area of a liquid or gas, then these particles will gradually move and spread out into areas of lower concentration. Eventually, the particles will be evenly distributed throughout the liquid or gas. This movement is called diffusion.
- 2) Diffusion is described as a passive process because no energy is needed for it to happen.
- 3) Diffusion can happen across cell membranes, as long as the particles can move freely through the membrane. For example, water, oxygen, and carbon dioxide molecules are small enough to pass easily through pores in the cell membrane.



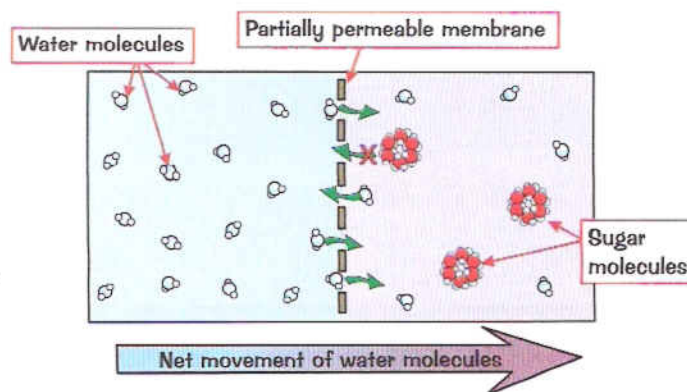
The speed of diffusion depends on several factors

- 1) The concentration gradient is the difference between an area of higher concentration and an area of lower concentration. Particles diffuse faster when there is a high concentration gradient (a big difference in concentration between the two areas).
- 2) The shorter the distance the particles have to travel, the faster the rate of diffusion.
- 3) Small molecules move faster than large molecules, so they diffuse faster.
- 4) At high temperatures particles have more kinetic (movement) energy, so they diffuse more quickly.
- 5) The larger the surface area of the cell membrane, the faster the rate of diffusion.

Osmosis is a special case of diffusion

Osmosis is the movement of water molecules across a partially permeable membrane from a region of high water concentration to a region of low water concentration.

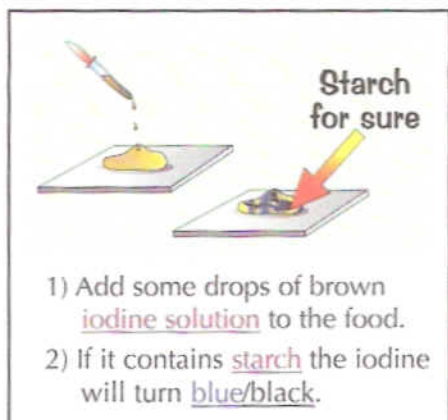
- 1) A partially permeable membrane is just one with really small holes in it. Water molecules can pass through them, but bigger molecules like glucose can't.
- 2) Dialysis tubing is a partially permeable membrane that you should learn the name of. It's called dialysis tubing because it's used in kidney dialysis machines.



Food Tests

There are three seriously boring food tests that you really need to know for your Regents exam...

1) The Iodine Test for STARCH — turns it blue/black

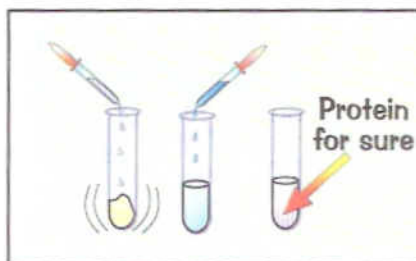


Example: Plant leaves make starch to use as food, in a process called photosynthesis (for more on this see p.47). You can find out if there is starch in a leaf by doing the iodine test.



1. Pick a leaf off a plant that has been in the Sun for a few hours. Boil the leaf in water for a few minutes.
2. Add iodine solution. The leaf will turn black if there is starch present.

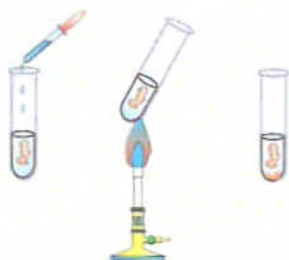
2) The Buret test for PROTEIN — turns Copper Sulfate Purple



- 1) First add **sodium hydroxide** (NaOH) solution to the food and shake with care.
- 2) Then add some weak **copper sulfate** (CuSO₄) solution.
- 3) If the **pale blue color** turns **purple**, there's **protein** present.

3) The Benedict's test for SIMPLE SUGARS — an orange precipitate

- 1) Add blue **Benedict's solution** to the food in a test tube. Bring to boiling point.
- 2) If you get an **orange precipitate** then the food contains **simple sugars**.



Example: Bread contains starch that is broken down into a simple sugar by your saliva when you chew.



If you chewed a piece of bread for a few minutes and then did the Benedict's test, an orange precipitate would be produced.

So what have you LEARNED?

Learn the three diagrams, with any labels. Then cover the page and try and picture the whole thing in your head. Then try and scribble it all down. It takes practice but you can do it.