Chemistry of Life

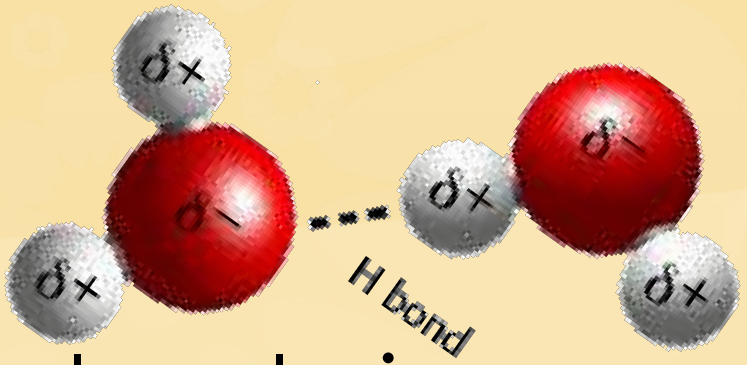
Water

- What makes water so essential to life on earth?
  - Single most abundant compound found in <u>living things</u>

Water

- Unlike most substances, water expands as it freezes, making ice less dense than liquid water, which is why ice floats on the surfaces of lakes/rivers
  - What would happen to aquatic plants and animals if ice sunk?

Water



- Properties of water
  - Polarity – A water molecule is polar because there is an uneven distribution of electrons between the oxygen and hydrogen atoms. This polarity causes hydrogen bonds, which are responsible for many of waters interesting properties

Water

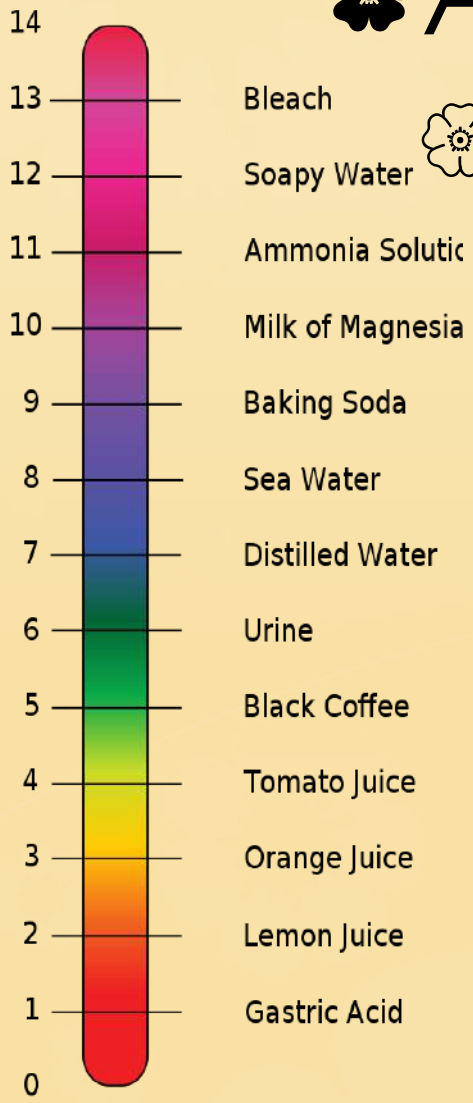
- Cohesion – an attraction between molecules of the same substance
  - Surface tension

Water

- Adhesion – an attraction between molecules of different substances
  - Capillary action

Water

- Acids, Bases and pH



- A water molecule can react to form ions (can break apart). Chemists devised a measurement system called the pH scale to show the concentration of H+ ions in a solution.

Water

- Neutral – pure water is neutral and has a pH of 7
- Acids – Acidic solution contain higher concentrations of H+ ions than pure water and have pH values below 7
  - Bases – Basic solutions contain lower concentration of H+ ions than pure water and have pH values above 7

Enzymes

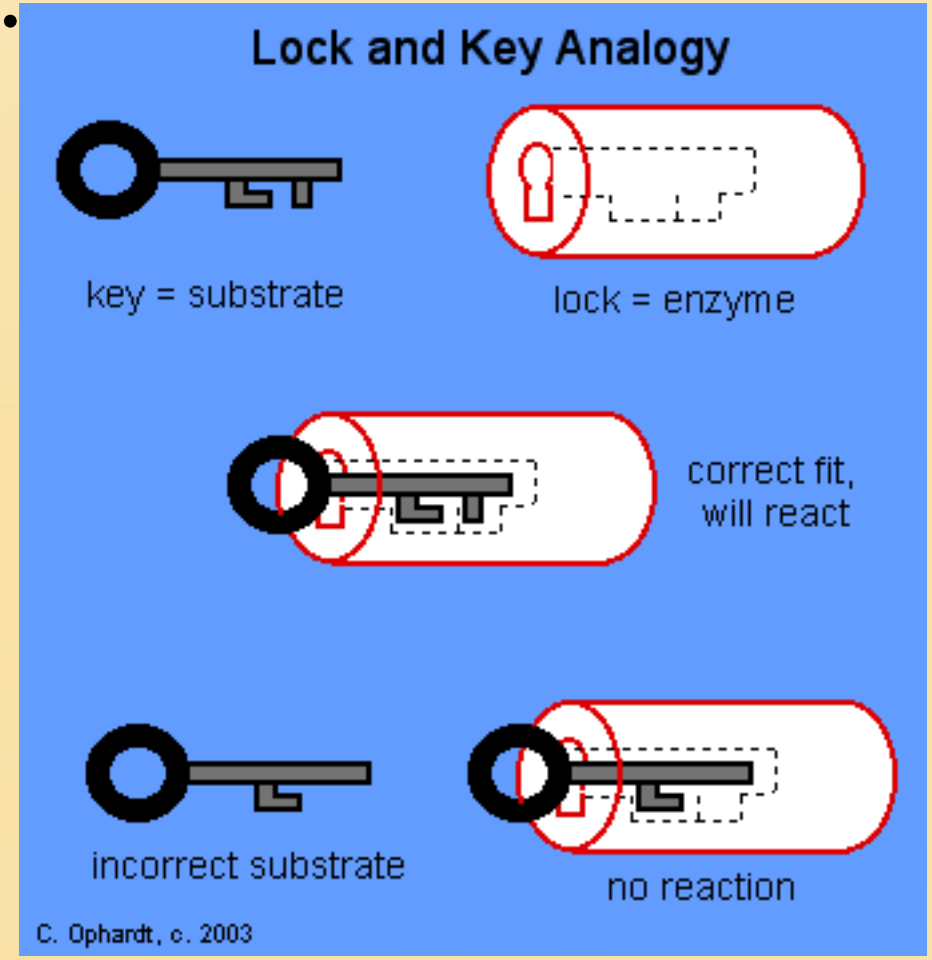
- Activation Energy – energy needed to start a chemical reaction
- Catalyst – substance that speeds up the rate of a chemical reaction by lowering the activation energy needed to start a reaction

Enzymes

- Enzymes
  - Are catalysts found in living organisms
  - Enzymes will only work on one chemical reaction. Each reaction has its own specific enzyme that speeds it up.

Enzymes

- They are compared to a lock and key.... each lock (chemical reaction) has only one key (enzyme) that will make it work.



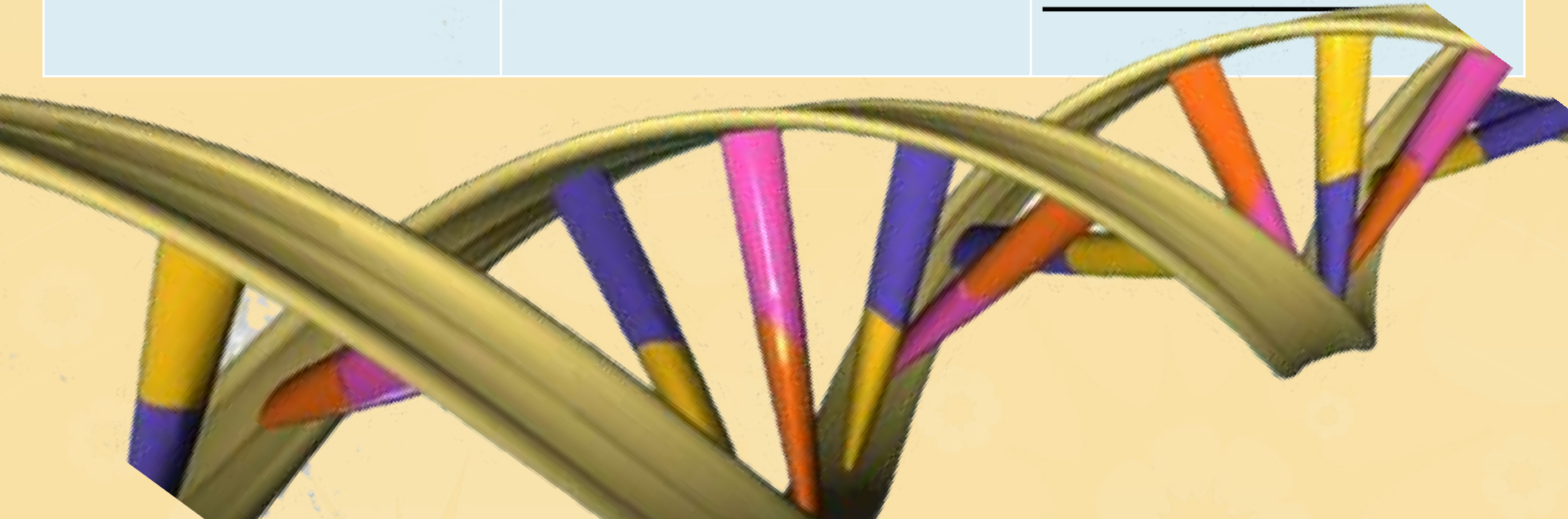
Why Study Carbon?

- Every living thing is made of carbon

Group Name	Examples	Function in Living Things
Carbohydrate	Starch Sugar	Main source of energy for living things

Group Name	Examples	Function in Living Things
Lipids	Fats Oils Waxes	Used to store energy. Also an important part of biological membranes and waterproof coverings.

Group Name	Examples	Function in Living Things
Nucleic Acids	Deoxyribonucelic acid (DNA)	Store and transmit hereditary or genetic information.



Group Name	Examples	Function in Living Things
Proteins	Chains of molecules called amino acids	Control the rate of reactions and regulate cell processes. Some are used to form bones and muscles. Others transport substances in and out of cells or help fight diseases.