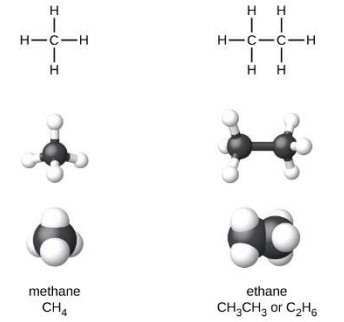
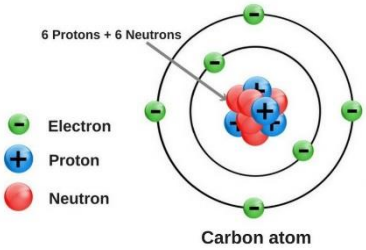
Chapter 3 – Biochemistry, Nutrition, and Water

Section 2: Carbon Compounds and Basic Biochemical Processes

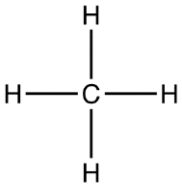


- Organic Compounds
  - Formed by living things and have a carbon backbone
    - Carbon is the backbone of life
  - 97% of the human body is made of the elements Carbon, Hydrogen, Oxygen, Nitrogen, Phosphorus, and Sulfur (CHONPS)
  - Molecules containing Carbon and Hydrogen are called Hydrocarbons

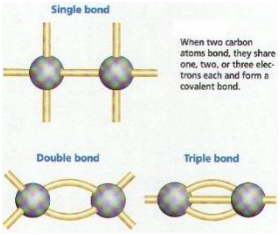
Carbon Compounds

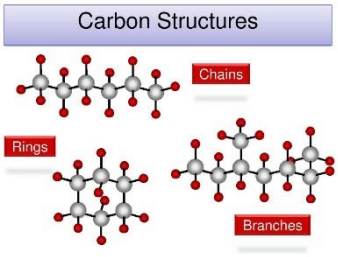


- ✓ The importance of the carbon atom (Carbon Bonding)
  - Carbon forms the backbone of all organic molecules
  - Carbon can form 4 bonds



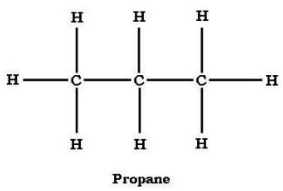
  - Carbon is self-bonding

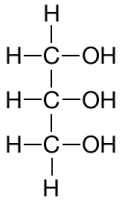




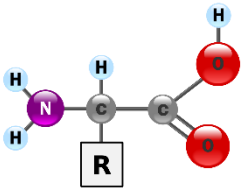
- ✓ Carbon Structures
  - The ability of carbon to bond to itself allows it to form **carbon chains, carbon branches, and carbon rings** which form the backbone of organic molecules

Link in Purple Packet – Three Carbon Backbone Activity



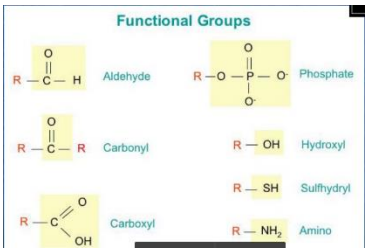


Glycerol



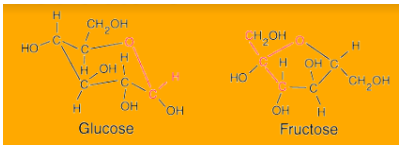
Amino Acid

Functional Groups

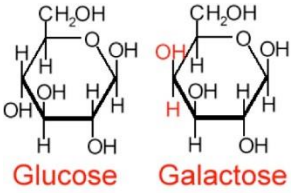


- Small clusters of atoms added to a carbon backbone which give organic molecules their properties.

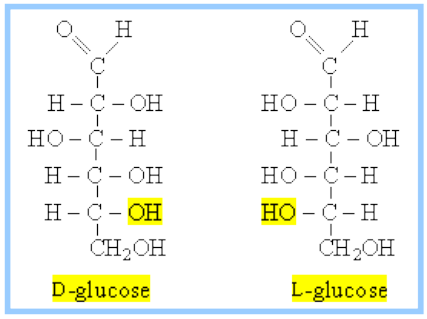
- **Isomers**
  - Same chemical formula with a different structure
    - **Structural**



    - **Geometrical**

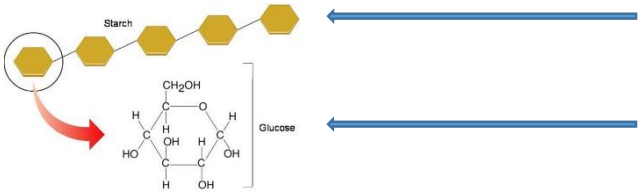


    - **Stereoisomers**



Making Polymers from Monomer Units

- ✓ **Polymer**
  - Large chains of repeating units
    - Starch is made up of many glucose molecules



Polymer (held together by covalent bonds)

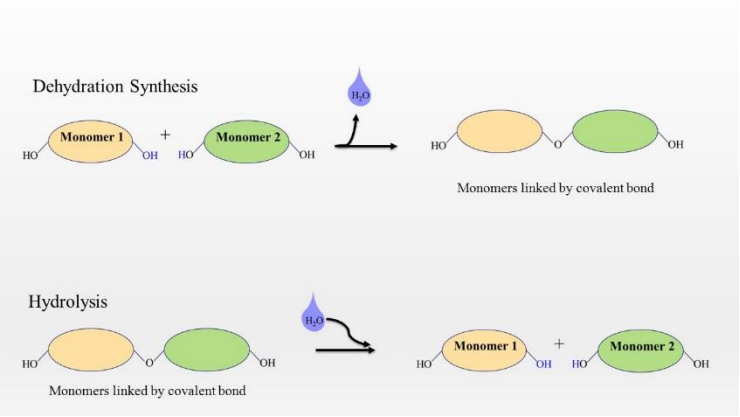
monomer

- ✓ **Monomer**
  - Individual units which make up polymers (they are the building blocks of polymers)
    - Glucose

Link in Purple Packet – Organic Plastic Lab and Polymer Demo → added each individual piece, heated it, which removes the water, and the pieces form together into one thing)

Condensation Reaction (Dehydration Synthesis)

- the making of polymers from monomers by **removing water**

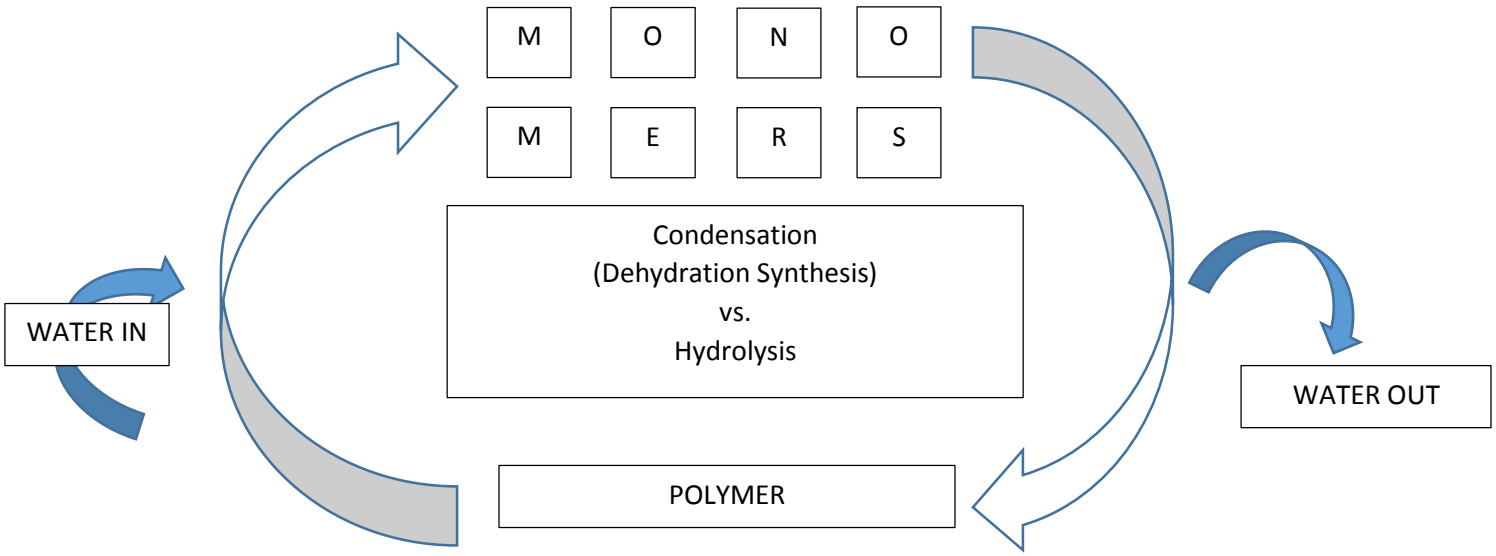


Hydrolysis Reaction

- the breaking down of polymers into monomers by **adding water**

❖ both processes use "When in doubt…"
- Enzymes…
  - Both condensation (dehydration synthesis) and hydrolysis are enzymatic reactions

Link in Purple Packet – Condensation / Hydrolysis Graphic Organizer



How are monomer units joined to form polymers in organic compounds?

Answer: Monomer units are joined together by a process called dehydration synthesis (condensation reaction) which is when water is removed in order to form the polymer. The biodegradable plastic lab was an example of this process.