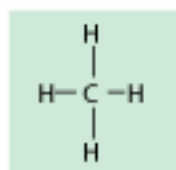


# CARBON COMPOUNDS:

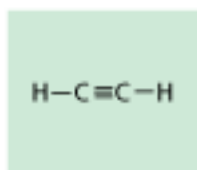
## SECTION 2.3:

### The Chemistry of Carbon:

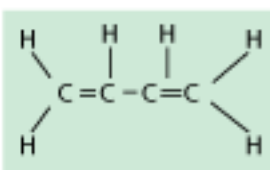
- ✓ Carbon as a “backbone”. All life on earth is referred to as carbon based life forms. The four macromolecules that compose living organisms all contain Carbon as their main element. Carbon has four valence electrons that allow it to react and bond in many ways to allow it to help serve various functions of living organisms.



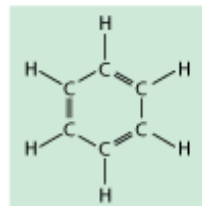
Methane



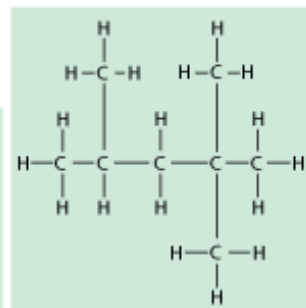
Acetylene



Butadiene



Benzene



Isooctane

### Macromolecules:

#### I. Carbohydrates.

##### Carbohydrates

Contain C, H, O  
In a 1:2:1 ratio

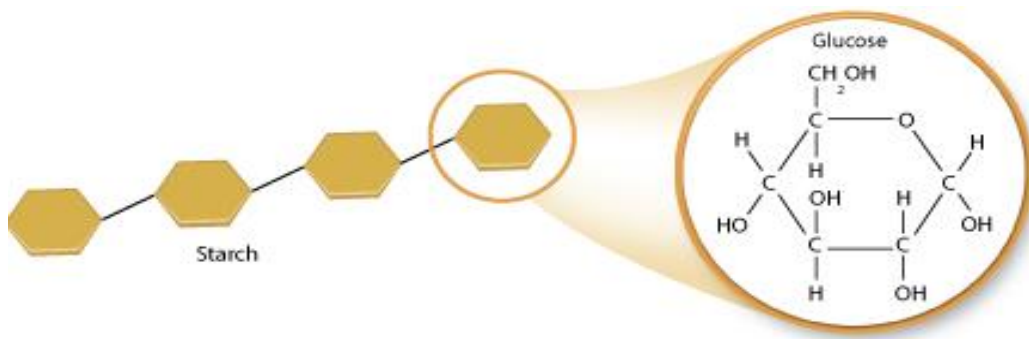
##### Complex Carbohydrates

When monosaccharides bond together they form polysaccharides resulting in a larger more “complex” molecule.  
Used to store energy and for cellular structure.

EX: Glycogen, Starch Cellulose

Simple Sugars: aka  
monosaccharides

Used for energy by cells.  
Ex: GLUCOSE, fructose

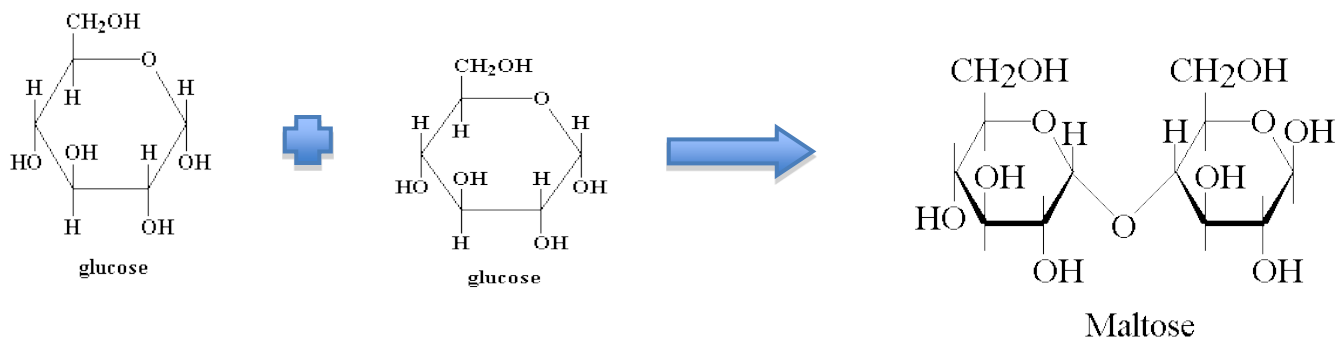


[Mr. D's Basics of Carbon](#)

[Mr. D. Explains Hydrocarbons](#)

[Nothing but Carbohydrates](#)





**MONOSACCHARIDES ---→ DISACCHARIDES ---→ POLYSACCHARIDES**

Check out some links:

[Mr. D knows this junk too!](#)

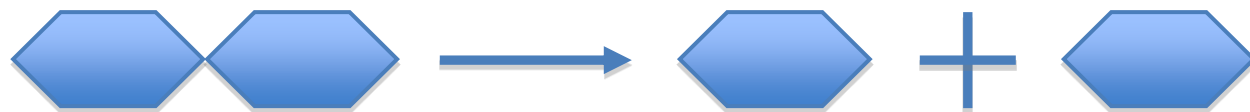
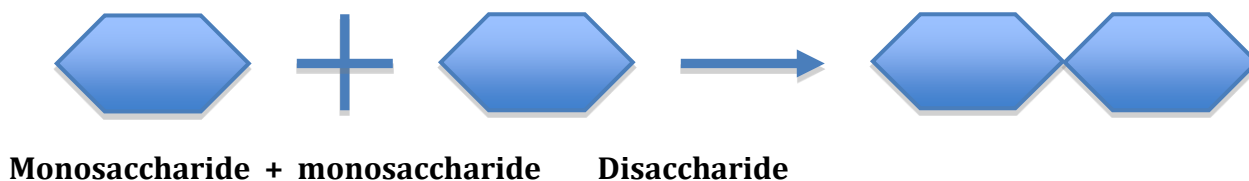
[Carbohydrate polymerization animation](#)

[Condensation and Hydrolysis Animation](#)



The Big Idea:

Dehydration Synthesis  
Hydrolysis



- ✓ Two monosaccharides bond together to form a disaccharide through a process called “dehydration synthesis” or condensation reaction.
- ✓ Predict: Why is this process called dehydration synthesis?
- ✓ Furthermore many simple sugars bond together in this manner to form polysaccharides.
- ✓ In a very similar fashion large polymers can be broken down by a process know as “hydrolysis”.

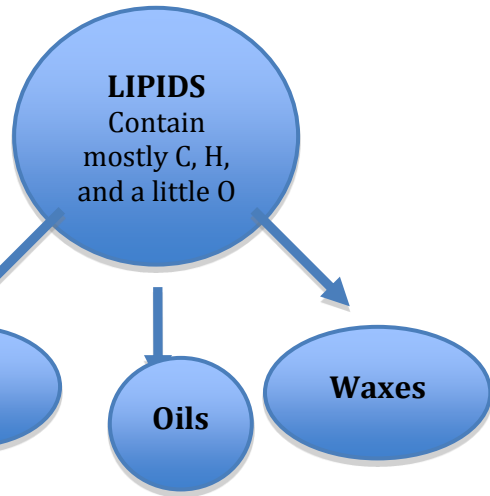
## Lipids:

### FUNCTIONS:

1. Store energy.
2. Used to help build cell membranes
3. Some are hormones that act like "chemical messengers"

### STRUCTURE:

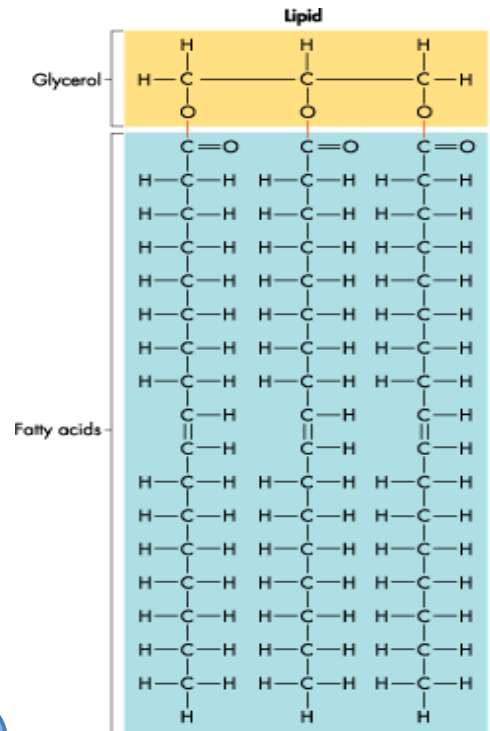
Most lipids are formed from glycerol and long fatty acid chains.



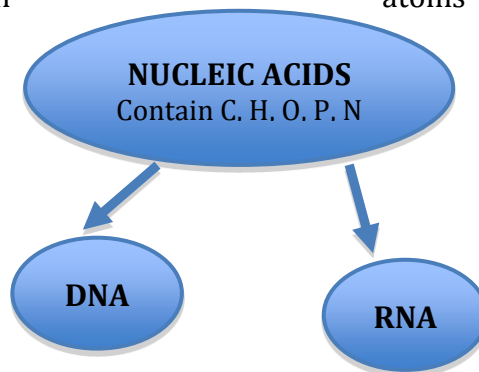
## Saturated -vs- Unsaturated

**A.** Saturated "with Hydrogen". If the fatty acid portion of a lipid has the greatest possible amount of Hydrogen atoms, it is said to be saturated. The easy way to determine this is to observe the bonds of the fatty acid tail, there should only be single bonds between each Carbon atom.

**B.** Unsaturated. Again looking at the fatty acid portion of the lipid, there should be one or more Carbon-to-Carbon double bonds. This reduces the overall number of Hydrogen atoms and therefore is unsaturated.

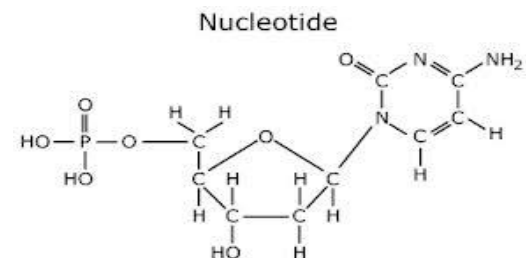
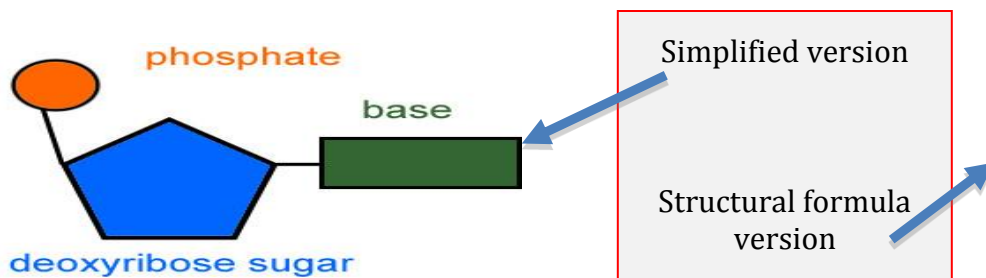


## Nucleic Acids:



**STRUCTURE:** Nucleic acids are polymers that are composed of many nucleotides.

Great now we need to know what a nucleotides is.....



Each nucleotide contains a 5 Carbon Sugar, a Phosphate group and one of the four Nitrogen bases.

## Proteins:

**PROTEINS**  
Contain C, H, O, N

### FUNCTION:

Control the rate of chemical reactions in living organisms (enzymes).

1. Help to regulate various cellular processes.
2. Help to form parts of cell membranes.
3. Assist in Immune defense.

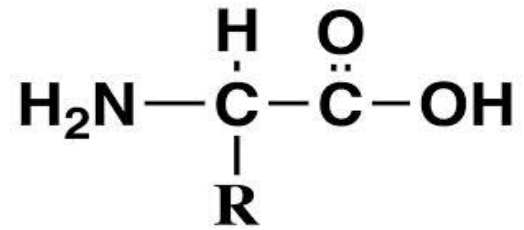
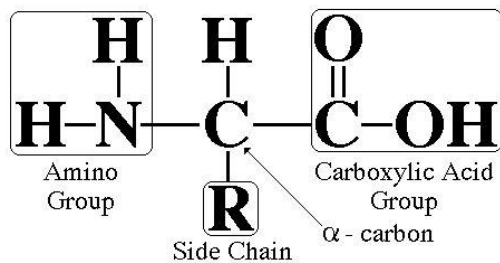
[Mr. D. Amino Acid Structure](#)



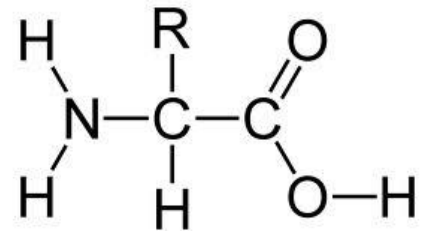
**STRUCTURE:** Proteins are polymers made from individual Amino Acids.

Awesome now we need to know what an Amino acid is...

### Amino Acid Structure



Don't be fooled.....



**LEARN:** Every Amino acid has the same amino group, and the same carboxyl group, it is the "R" group that each Amino acid different from one another.

There are only 20 Amino acids found in all living organisms.

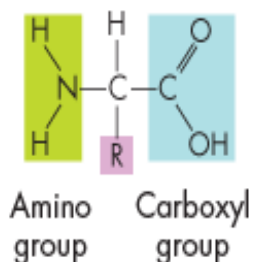
**Each Amino acid has 3 parts:**

1. NH<sub>2</sub> = amino group.
2. COOH = carboxyl group.
3. "R" group = this will vary

### REMEMBER.....

Amino acids will bond together in long chains to form proteins (polypeptides) using covalent bonds.

### General Structure of Amino Acids



### Formation of Peptide Bond

