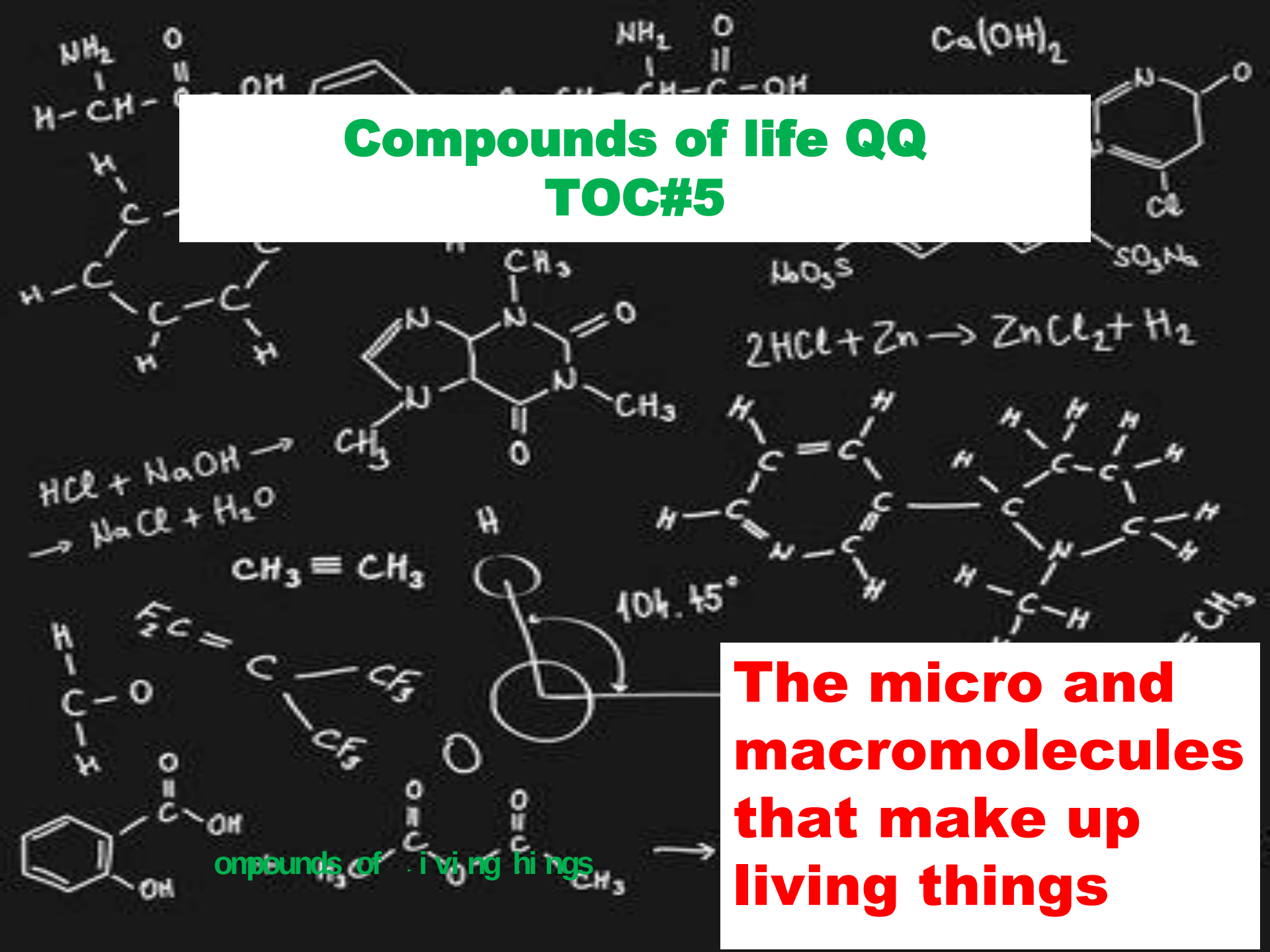

Compounds of life QQ
TOC#5
The micro and macromolecules that make up living things
2HCl + Zn → ZnCl2 + H2
HCl + NaOH → NaCl + H2O
CH3 ≡ CH3
104.45°
Ca(OH)2
SO3Na
NaO3S
ompounds of . i vi ng hi ngs

All compounds are classified as either:

A. Organic Compounds:
   - Contain Carbon
     - Ex: Human beings, DNA, Proteins

B. Inorganic Compounds:
   - do not contain carbon (except CO_2)
     - Ex: Water, salt, soil

The Four Compounds of Life

1. Carbohydrates
2. Lipids
3. Proteins
4. Nucleic Acids

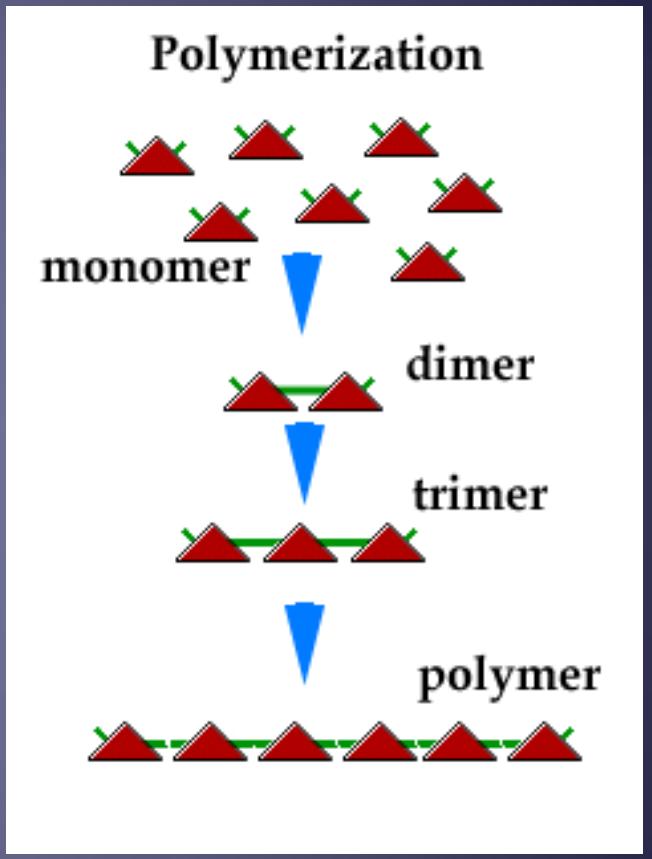
All contain two or more of 4 elements: Hydrogen, Oxygen, Carbon, and Nitrogen

<u>all are organic AND carbon-containing**</u>

Linking two+ Compounds Together

- **Polymerization!!**
  - Definition:

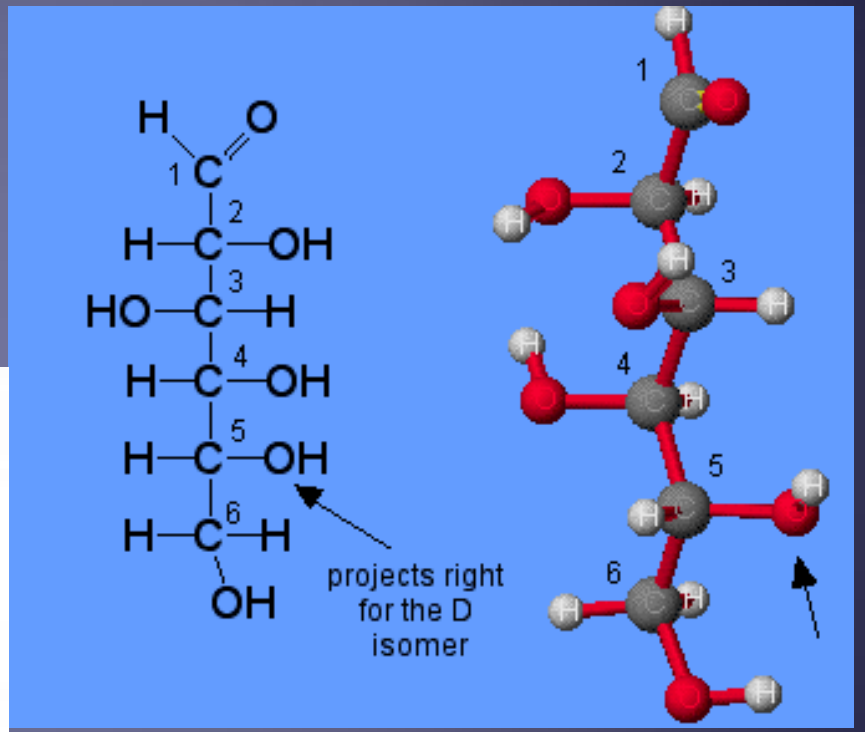
    Making polymers: taking smaller compounds and joining them together to make bigger compounds



-This creates a macromolecule!

1. Carbohydrates

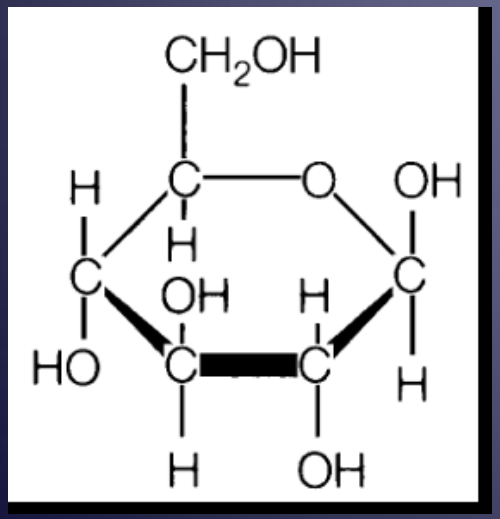
- Made up of Carbon, Hydrogen, Oxygen (1:2:1 ratio)
- Used as energy!!

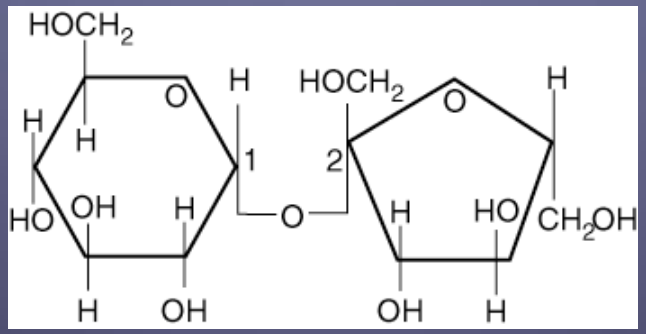


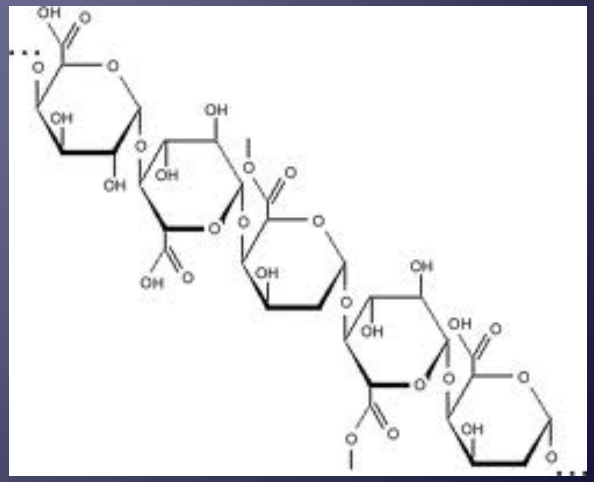
1. Carbohydrates (continued)

- Sugars and starches
  - Simple sugars: monosaccharides
    - Ex: glucose
  - Two simple sugars: disaccharides
  - Complex sugars: polysaccharides

} polymers



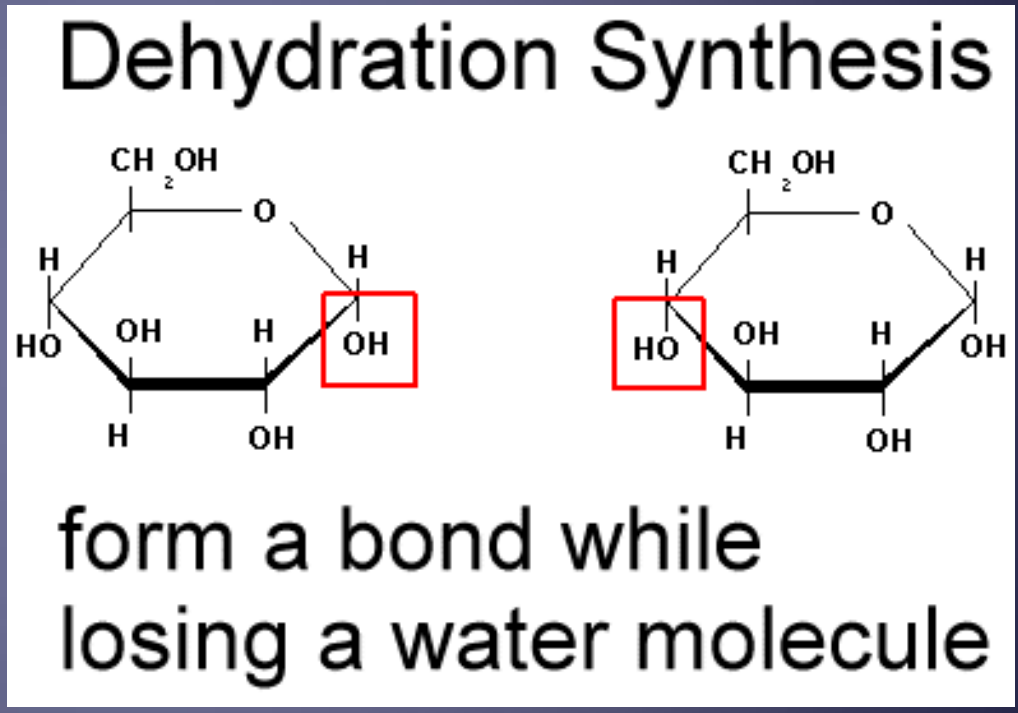




Linking two or more simple sugars

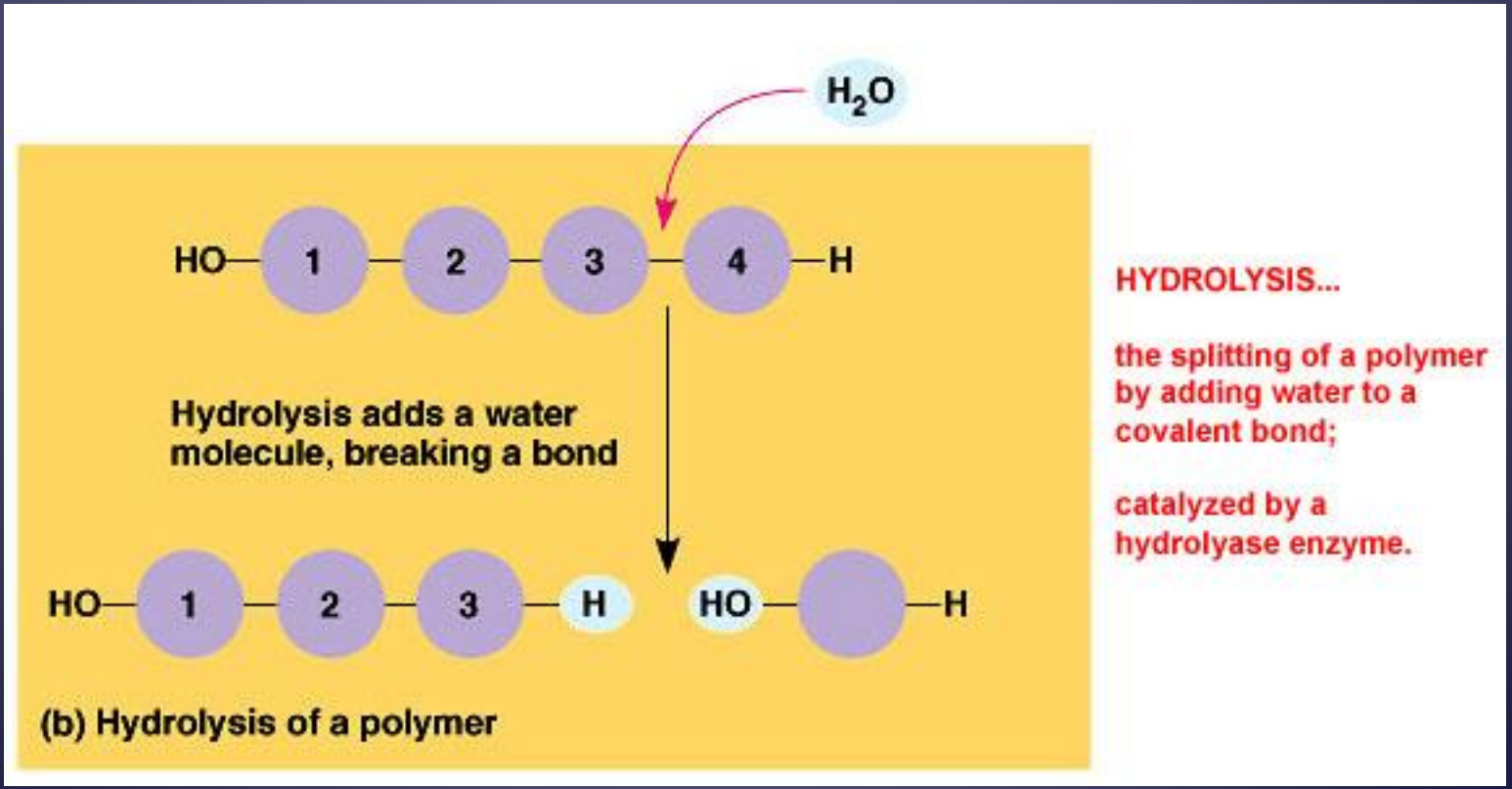
- Known as **Dehydration Synthesis**

Definition: Linking two simple sugars together by removing a water molecule

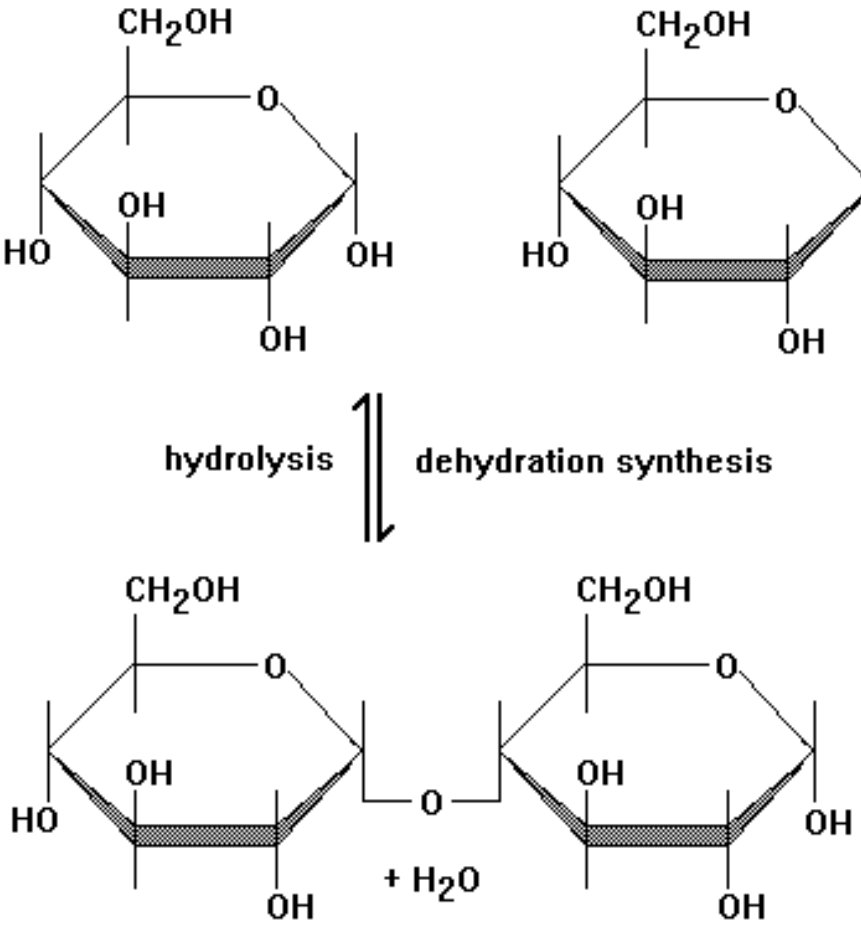


Breaking two or more simple sugars

- Known as **HYDROLYSIS**
  - **Definiton:** Breaking two simple sugars apart by adding in a water molecule



The Two Work Together….



http://www.youtube.com/watch?v=b7TdWLNhMtM

QQ#1

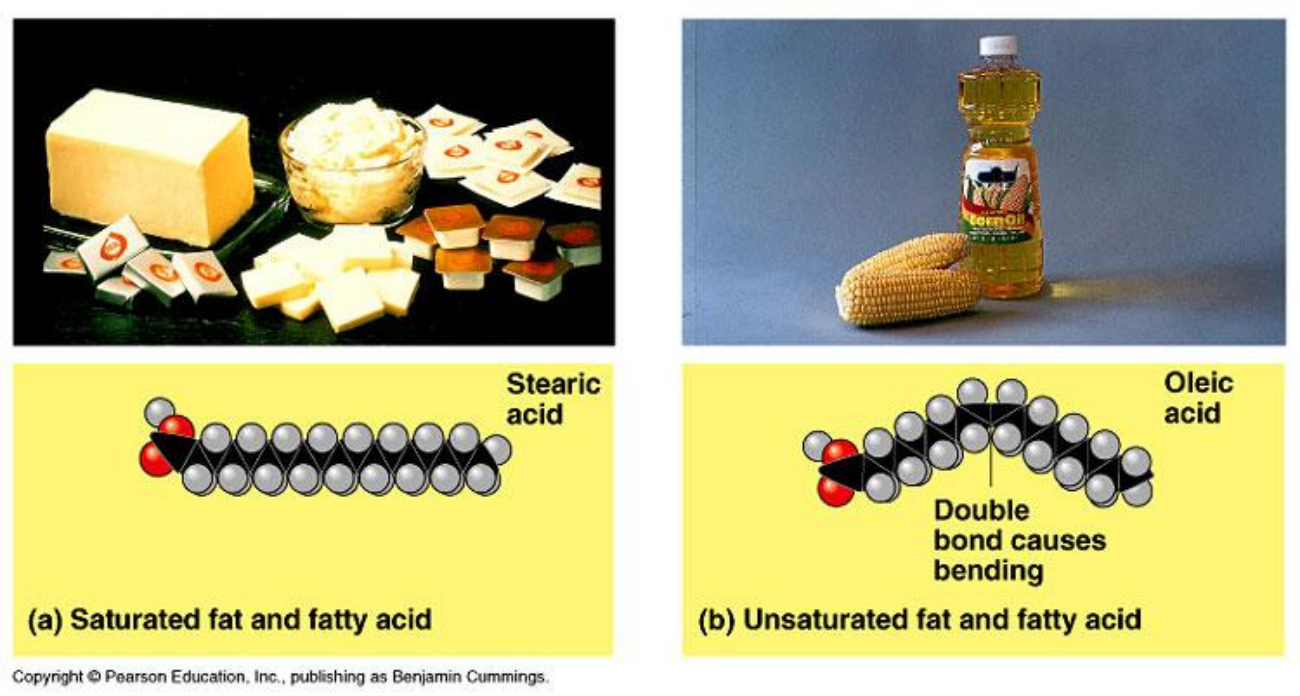
- What process links carbohydrates? What process breaks down carbohydrates?

QQ#2

- What do you think the relationship between carbs as a source of energy and hydrolysis is?

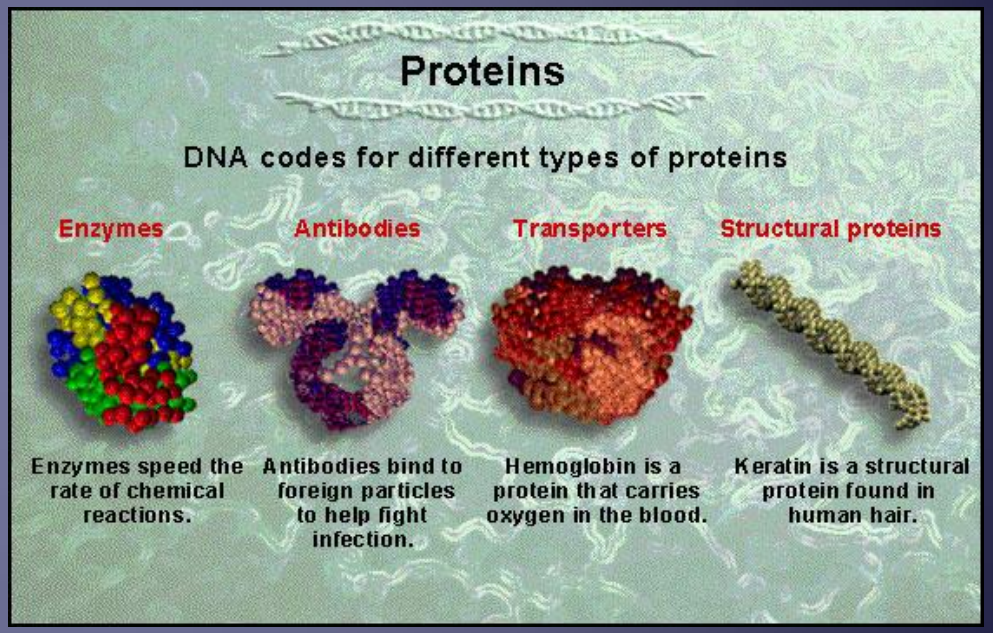
2. Lipids

- Organic compounds that are waxy and oily
- Are used to store energy, form biological membranes, and as chemical messengers
- Often formed by a glycerol molecule combining with fatty acids



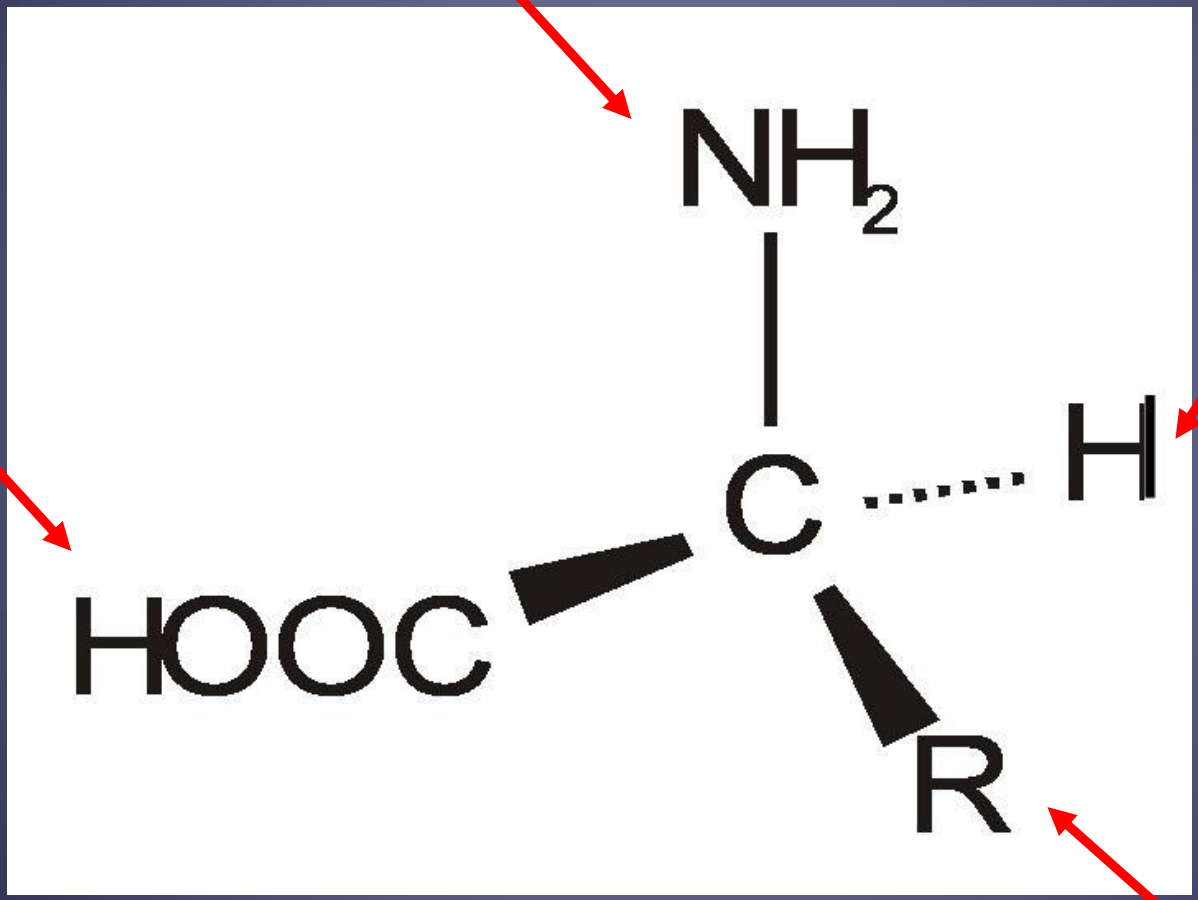
3. Proteins

- Organic compounds that contain nitrogen in addition to carbon, hydrogen, and oxygen
- Made up of building blocks called amino acids
- Amino acids are linked together (via dehydration synthesis) by a covalent bond known as a “peptide bond”



Amino Acids

Amino Group



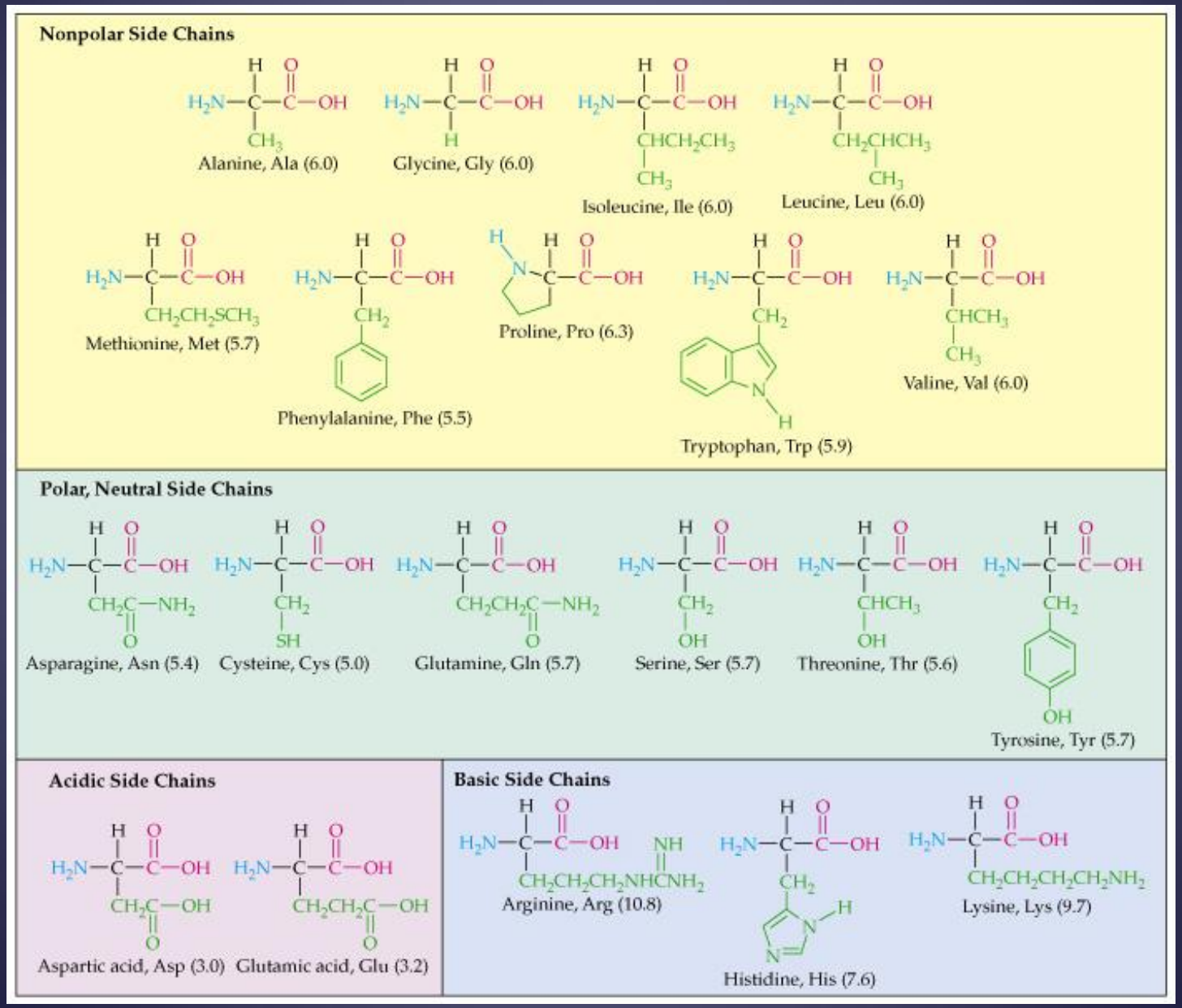
Hydrogen

Carboxyl Group

"R" Group – different for every amino acid-20 in total

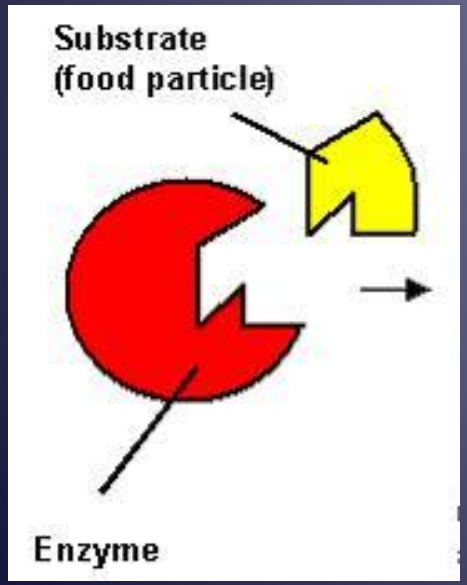
You need to draw this and know the part!

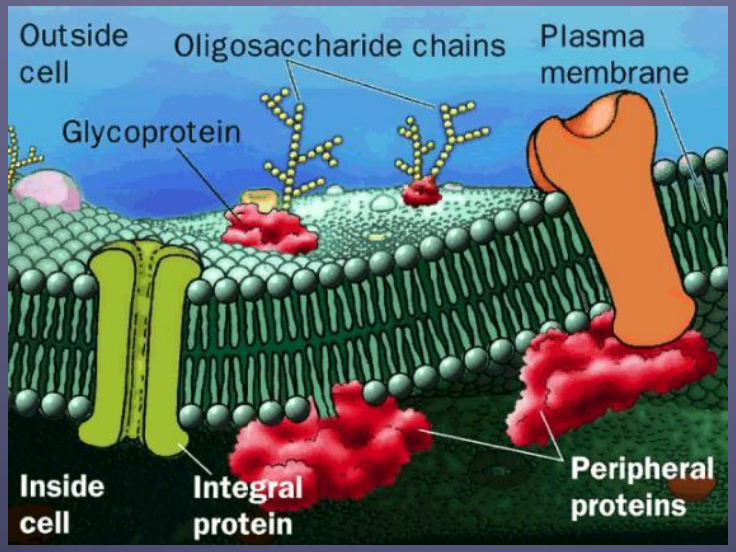
20 Amino Acids

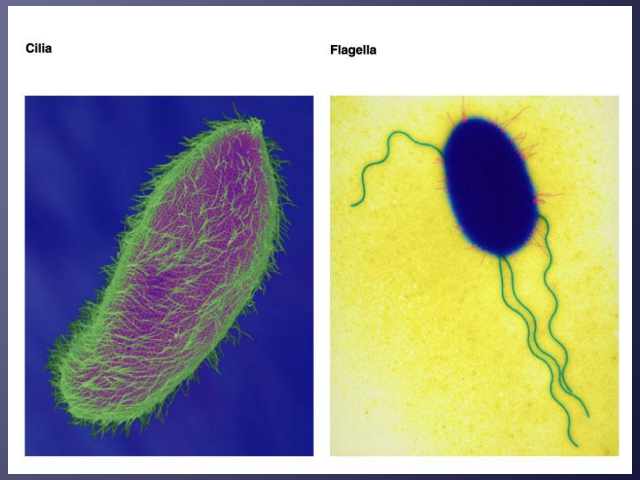


Proteins are multi-functional…

- Carry out chemical reactions (enzymes)
- Pump small molecules in and out of cells (membrane proteins)
- Cell Movement (cilia and flagella)

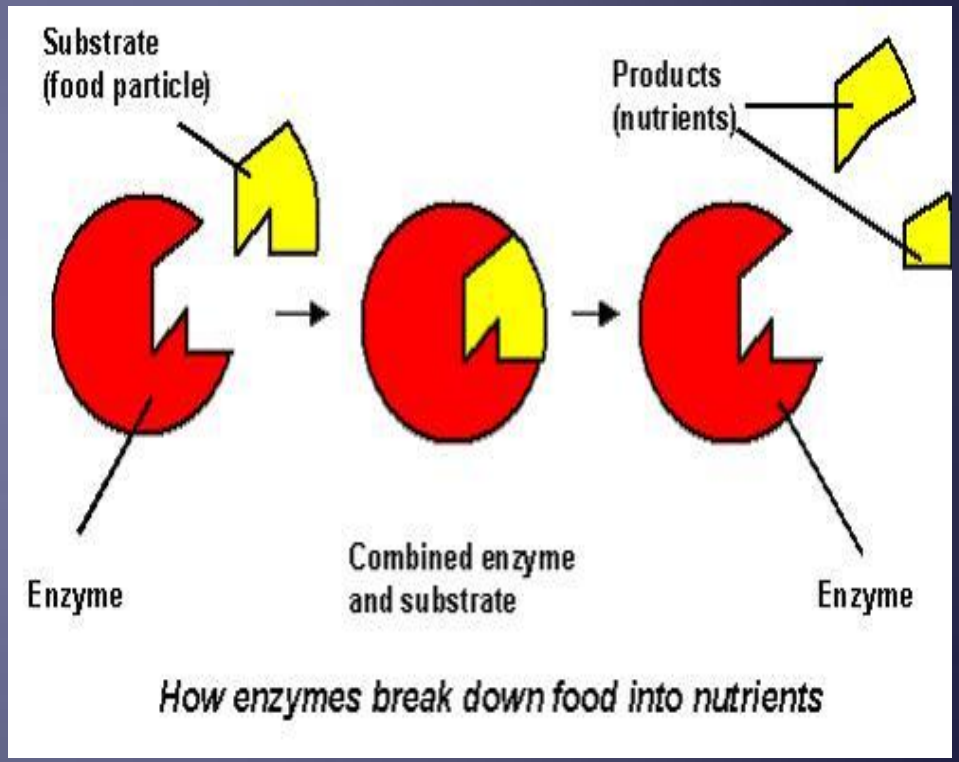






Enzymes

- The most major class of proteins
- Catalysts: speed up the rate of a chemical reaction
  - Not changed by the reaction
  - Lower the “start-up” energy required for reactions
  - Substrates bind to active sites that are extremely specific!

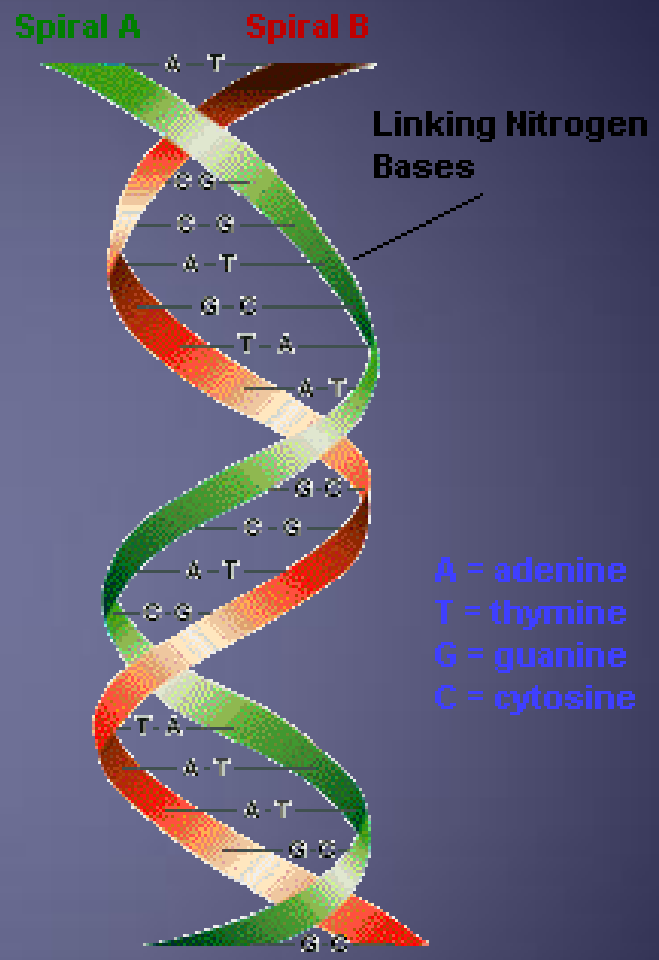


How enzymes break down food into nutrients

4. Nucleic Acids

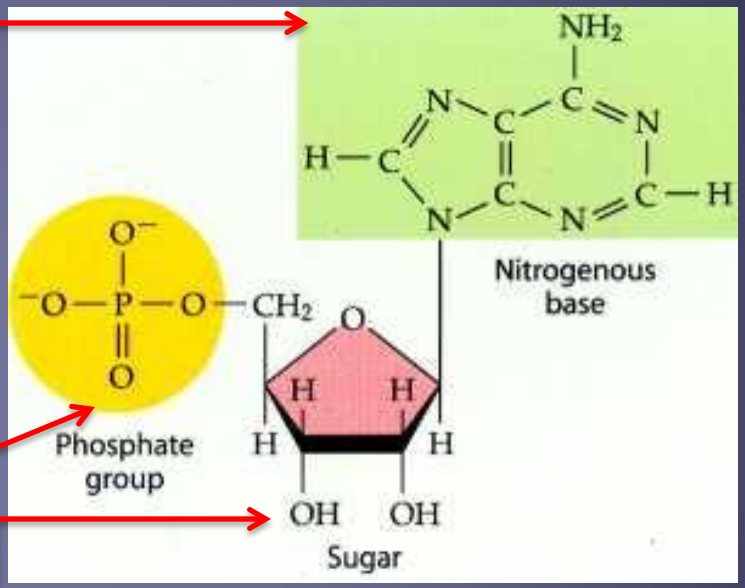
- Large, complex organic molecules composed of carbon, oxygen, hydrogen, nitrogen, and phosphorous atoms

- Two kinds: RNA and DNA
  - Both store and transmit genetic information



4. Nucleic Acids (continued)

- Building blocks of these polymers are called nucleotides
- nucleotides contain three parts:
  - Nitrogen base
  - A phosphate group
  - 5-carbon sugar
- Nucleotides are linked together by covalent bonds to form Nucleic Acids



QQ#3

- What are the monomers of each of the following:
  - Proteins
  - lipids
  - Carbohydrates
  - Nucleic acids