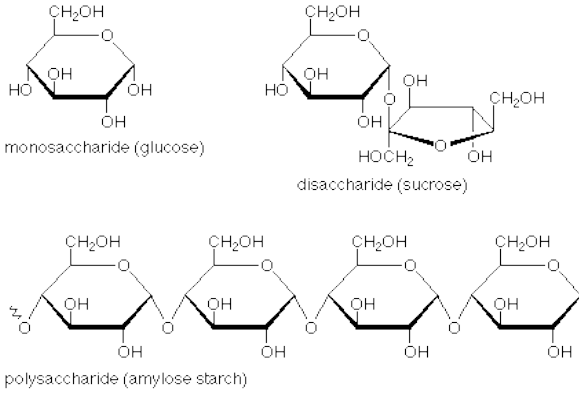
Unit 2 – Biochemistry – The Four Organic Macromolecules

- Macromolecules (_____) are made of _____ (aka subunits). Your body needs these molecules to perform functions. Your source of these is the food you eat. It is possible to use chemistry to perform _____ to see if these macromolecules are found in a sample.

A. Carbohydrates

Figure 2.1a http://2.bp.blogspot.com/_2Ae3LXb0OwE/TKpF1RkDICI/AAAAAAAAAAw/UOuuVgzr5q0/s1600/1feb23.gif



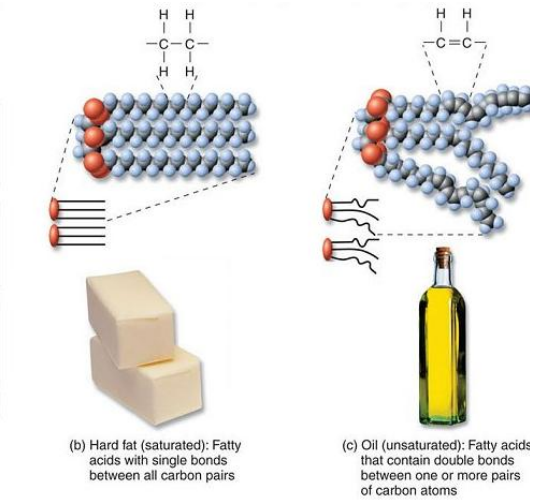
- Carbohydrates are made of atoms of_____ arranged into a polygon monomer called _____.
  - Examples of small carbs are _____ _____. These are sources of_____ for your cells.
  - Examples of large carbs are _____ _____.These are longer energy sources because they are bigger polymers.
  - Plants have a special carb called _____. This big carb provides _____.
  - _____is a chemical that indicates if _____ is present by turning from _____ when boiled.
  - _____indicates if _____ is present by turning from yellow/orange to blue/black.

Summary:

B. Lipids

- Lipids are made of atoms of _____ arranged into a monomer called a _____. Lipids have long tails called fatty acids. These can be saturated or unsaturated.

Figure 2.1b http://4.bp.blogspot.com/-5be_mvpJNrA/T385cRz6vZI/AAAAAA



  - _____ fatty acids form kinks and are _____at room temperature like plant oils.
  - _____ fatty acids form NO kinks and are _____at room temperature like animal fats.
- Lipids are important sources of _____. They are also stored by animals and be used as _____.
- The most important type of lipid is a _____. Phospholipids have a unique shape that _____ _____ around the outside of every cell !!!
- The indicator test for lipids is a_____ _____. The lipids get absorbed and leave a transparent spot.

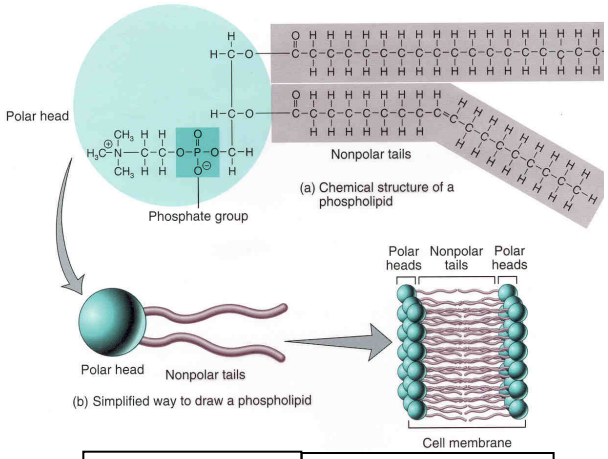


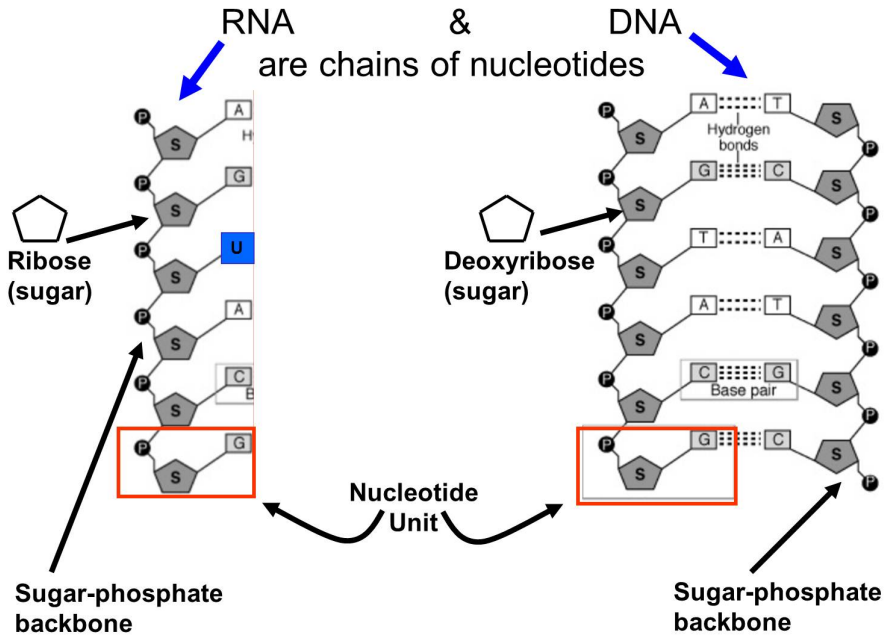
Figure 2.1c http://homepage.smc.edu/wissmann_paul/anatomy2textbook/phospholipid.

Summary:

C. Nucleic Acids

- Nucleic acids are made of atoms of _____ arranged into a 3- part monomer called a _____. Nucleotides come in five different types and information is stored based on their sequence/order.

Figure 2.1d http://sphweb.bumc.bu.edu/otlt/MPH-Modules/PH/PH709_BasicCellBiology/RNA_DN



- _____ (DNA) is a _____ of nucleotides that carries _____ for cells to make their needed molecules like proteins.
- Ribonucleic acid (_____) is a single strand of nucleotides that performs different jobs to help DNA _____.

Summary:

D. Proteins

- Proteins are made of atoms of_____ arranged into a monomer called an _____. Amino acids come in 20 different types and MUST go in the right order to form the right shaped protein. FORM fits FUNCTION.

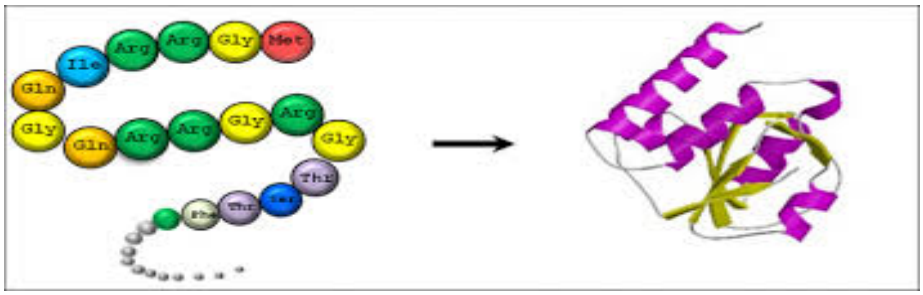


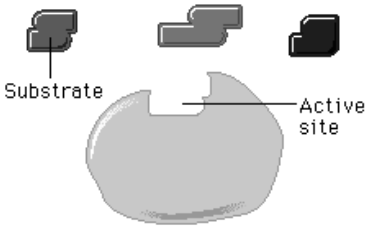
Figure 2.1e

https://www.ebi.ac.uk/training/online/sites/ebi.ac.uk.training.online/files/user/8

- **A protein's shape is important to the job it performs.** There are 6 important jobs.
  - _____ – builds parts like hair, nails, muscle
  - _____ – between cells and animals like the hormone insulin
  - _____ – prevent illness like antibodies
  - _____– absorbs light like melanin and chlorophyll
  - _____ – molecules like hemoglobin in your blood
  - _____ – speed up chemical reactions like catalase that breaks down hydrogen peroxide

Figure 2.1f

http://leavingbio.net/ENZYMES_files/image009.gif



- _____ is an indicator of proteins it turns from _____
- These four macromolecules are found in EVERY living thing on Earth. Cells make and break down these molecules as part of the cell's regulation and **homeostasis** needed for survival.

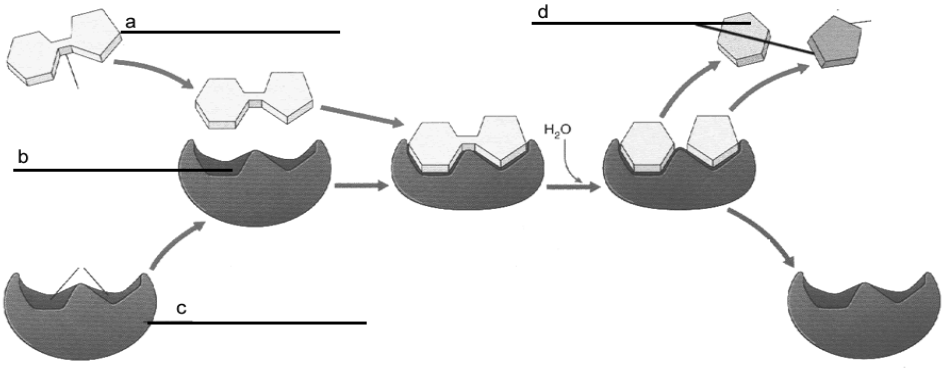
Summary:

E. Enzymes

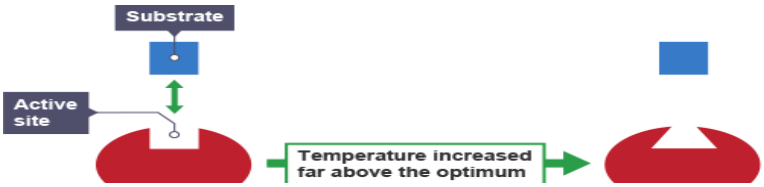
- Enzymes are a group of _____ that allow organisms to regulate internal conditions by speeding up chemical reactions.
- Enzymes _____ and have 4 unique properties:
    1. Enzymes _____(synthesis/digestions) by bringing substrates together in an optimum (BEST) orientation, thus _____ which is needed to start the reaction. Since enzymes are usually proteins, they are called _____.
    2. Enzymes have a _____that fits with only certain substrates.
    3. Enzymes are unchanged during the reaction, so they are_____.

Figure 2.1g

http://www.biologycorner.com/resources/enzyme_labelme.gif



4. Enzymes work at their optimum rate in only some conditions. Changes in ____ _____can _____the enzyme or change its shape.



_____.

Figure 2.1h

http://a.files.bbci.co.uk/bam/live/content/zn9r87h/large

on rate of enzymes is highest in the optimum conditions of each unique organism (thermal vent bacteria, penguins, cacti). _____

_____ can cause the enzymes to denature which _____.

Organisms and their cells have mechanisms to help minimize changes in temperature, pH and salinity (to maintain homeostasis).

- _____
- pH is a scale to measure if a solution is an acid or a base. The value of 7 is _____; below 7 are called _____; above 7 are called _____.
- Buffers can respond to changes in pH to help maintain homeostasis to prevent enzymes from becoming denatured.

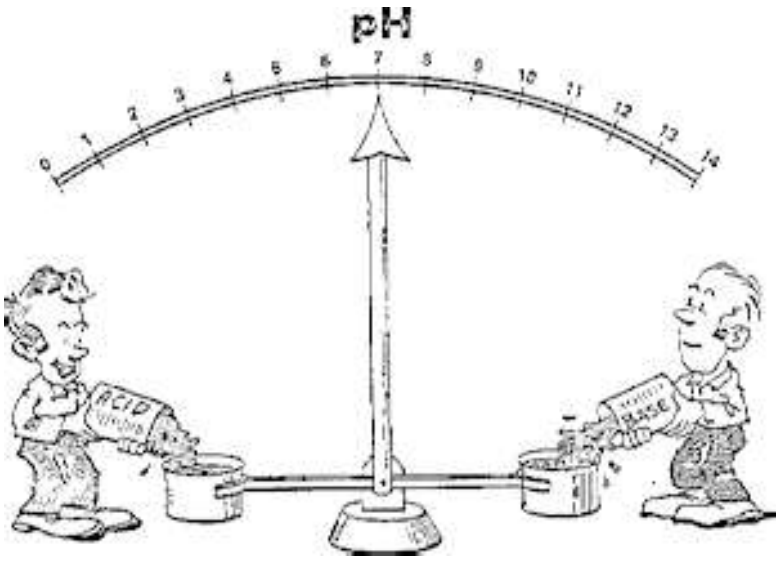


Figure 2.1j

http://scconline.stonechild.edu/course/view.php?id=27&week=10

Summary: