

Name \_\_\_\_\_

Date \_\_\_\_\_

## Biochemistry Study Guide

### Organic Molecules

- Circle the three elements that are found in all organic molecules:

Carbon      Potassium      Hydrogen      Sodium      Chlorine      Oxygen      Neon

- Write the name of the monomer (subunit) for each of the four macromolecule groups:

- Carbohydrates: \_\_\_\_\_
- Lipids: \_\_\_\_\_
- Proteins: \_\_\_\_\_
- Nucleic Acids: \_\_\_\_\_

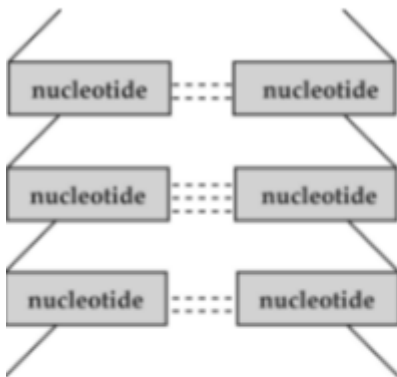
- Match the macromolecule group with its functions:

- Regulates chemical reactions and provides structure \_\_\_\_\_
- Quick energy and structure \_\_\_\_\_
- Insulation and stored energy \_\_\_\_\_
- Genetic information and production of proteins \_\_\_\_\_

- Match the molecular shape with its macromolecule group:



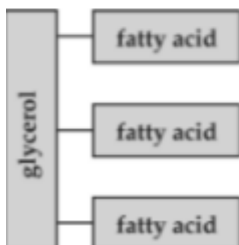
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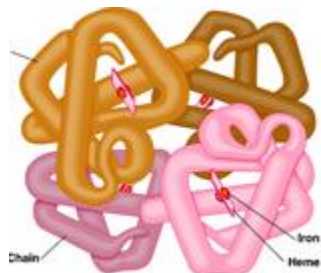
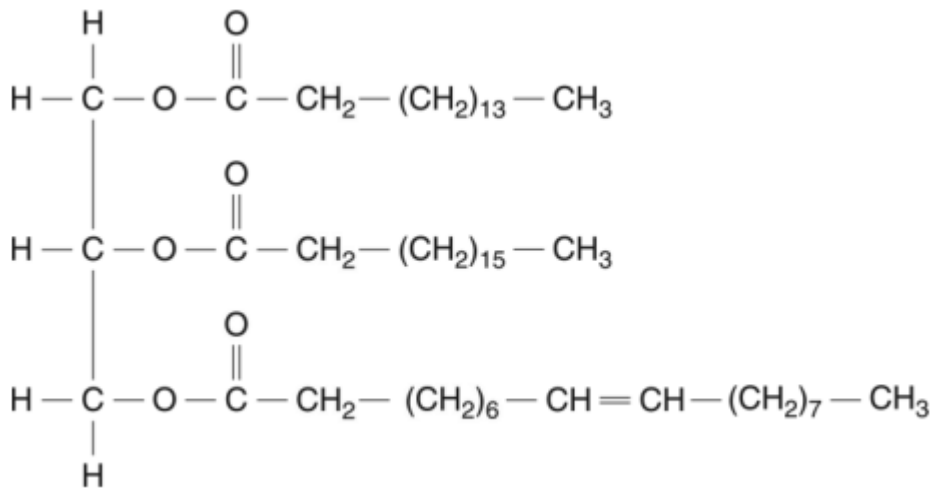
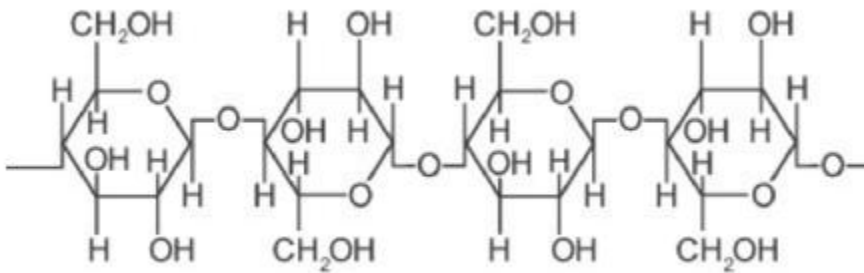


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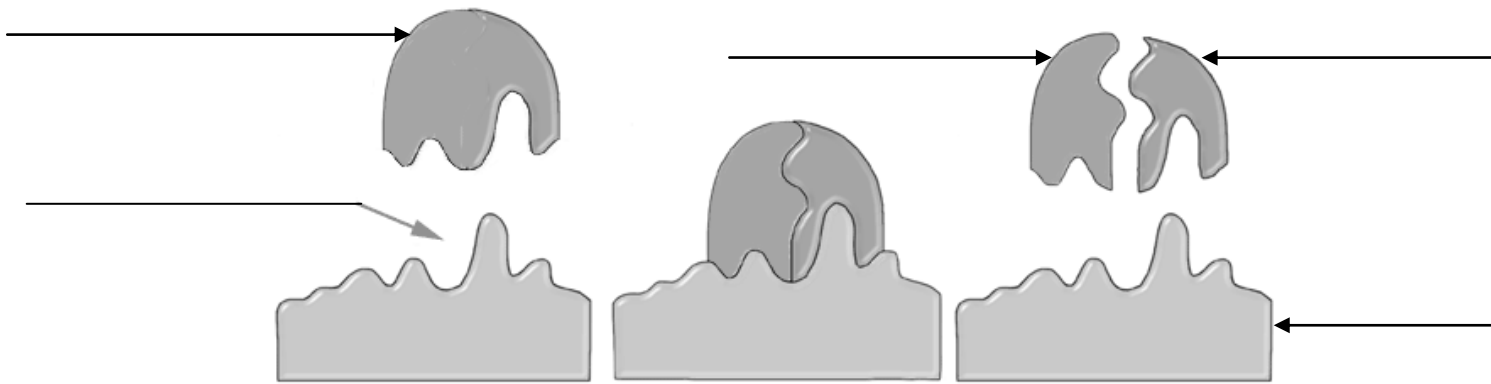
- Identify the following molecules as a carbohydrate, lipid, nucleic acid, or protein



- Match the following molecules with their associated macromolecule group:  
Glucose, DNA, Enzymes, Starch, Phospholipids, RNA, Hemoglobin, Insulin, Cellulose, Waxes, Hormones, ATP, Fat, Oils, Lactose, Fructose
  - Carbohydrates: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
  - Lipids: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
  - Proteins: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
  - Nucleic Acids: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
  
- From the list of molecules above, write the name of the molecule by its function: fat, oil, glucose, fructose, lactose, insulin, starch, hemoglobin, phospholipids, wax, enzymes, RNA, hormones, cellulose, DNA, ATP
  - \_\_\_\_\_ quick energy, formed during photosynthesis
  - \_\_\_\_\_ stored energy in plant cells (made up of 1,000s of glucose)
  - \_\_\_\_\_ provides structure to plant cell walls
  - \_\_\_\_\_ sugar found in fruits
  - \_\_\_\_\_ sugar found in milk
  - \_\_\_\_\_ makes up most of the cell membrane
  - \_\_\_\_\_ protects against water loss
  - \_\_\_\_\_ provides insulation to animals
  - \_\_\_\_\_ efficient, stored energy in plant seeds
  - \_\_\_\_\_ speeds up bio-chemical reactions
  - \_\_\_\_\_ carries oxygen around in red blood cells
  - \_\_\_\_\_ regulates the intake of glucose in cells
  - \_\_\_\_\_ regulates various reactions in the body
  - \_\_\_\_\_ stores genetic information
  - \_\_\_\_\_ uses the genetic code to produce proteins
  - \_\_\_\_\_ form of chemical energy that cells use
  
- Match the identification test with its associated substance:  
Starch, Lipids, Sugar, and Proteins
  - \_\_\_\_\_ turns purplish-black when iodine is added
  - \_\_\_\_\_ makes a translucent spot on brown paper
  - \_\_\_\_\_ does not mix with water
  - \_\_\_\_\_ turns reddish-orange when added to benedicts solution
  - \_\_\_\_\_ turns lavender when added to biuret solution

## Enzymes

- What type of macromolecule are enzymes? \_\_\_\_\_
- What do enzymes do? \_\_\_\_\_  
\_\_\_\_\_
- Lactase, catalase, amylase, sucrase, arginase, and RNA polymerase are all examples of some enzymes. What three letters are usually added to the end of an enzyme's name: \_\_\_\_\_
- Match the enzyme with the chemical reaction it is involved with:
  - \_\_\_\_\_ breaks down lactose sugar found in milk
  - \_\_\_\_\_ breaks down sucrose, better known as table sugar
  - \_\_\_\_\_ helps form RNA molecules
- Label the structures on the diagram of an enzyme reaction with the following terms: substrate, active site, enzyme, and product: (terms may be used more than once)



- What term is given to the reactants in an enzyme reaction? \_\_\_\_\_
- Most reactions that take place within a living organism require a certain amount of initial energy before the reaction can actually take place. This required initial energy is called activation energy. How do enzymes speed up the time it takes for a reaction to take place? \_\_\_\_\_  
\_\_\_\_\_
- In the lab, we added hydrogen peroxide to liver to observe how an enzyme reaction works. Catalase is an enzyme found in most cells, including liver cells, that helps break down hydrogen peroxide that is often produced as a byproduct during some chemical reactions in cells. We were able to observe catalase breaking down harmful hydrogen peroxide,  $H_2O_2$  into harmless liquid  $H_2O$  and  $O_2$  gas. How did we know that the catalase was successful? \_\_\_\_\_  
\_\_\_\_\_
- Explain why enzymes and their associated substrate are said to fit together like a lock and key?  
\_\_\_\_\_  
\_\_\_\_\_
- Catalyst is a term used to apply to chemicals that can speed up chemical reactions, while not being changed by the actual reaction. This way they can be used over and over again. In our experiment, was the catalase enzyme reusable? \_\_\_\_\_
- Certain changes in the environment can change the shape of the enzyme and make it no longer work. What term is used to refer to a change in the shape of an enzyme? \_\_\_\_\_
- What did we change in the catalase's environment to try to denature it? \_\_\_\_\_  
\_\_\_\_\_

- What effect did high temperatures have on the catalase enzyme? \_\_\_\_\_  
\_\_\_\_\_
- Why do we cook our food? \_\_\_\_\_  
\_\_\_\_\_
- What effect did low temperatures have on the catalase enzyme? \_\_\_\_\_  
\_\_\_\_\_
- Why do we put food in the freezer? \_\_\_\_\_  
\_\_\_\_\_
- We also changed the environment of a raw egg (made up proteins), by adding vinegar. What did we change in the egg's environment? \_\_\_\_\_
- Vinegar is an acid. What effect does adding an acid to an enzyme have on the enzyme? \_\_\_\_\_  
\_\_\_\_\_

## pH

- List the range of pH values that would be considered acidic: \_\_\_\_\_
- List the range of pH values that would be considered basic: \_\_\_\_\_
- What pH is considered neutral? \_\_\_\_\_
- If a solution's pH increases, is it becoming more acidic or more basic? \_\_\_\_\_
- If a solution's pH decreases, is it becoming more acidic or more basic? \_\_\_\_\_
- What happens when a base and an acid are mixed together? \_\_\_\_\_  
\_\_\_\_\_
- What do cells contain to help maintain homeostasis in relation to pH? \_\_\_\_\_

## Microscopes

- Who was the first person to use a microscope to look at cork and call the box-like structures he saw "cells" because they reminded him of the cells that monks live in at a monastery? \_\_\_\_\_  
\_\_\_\_\_
- Our classroom microscopes are compound light microscopes because they use two lenses. How do we calculate the total magnification of our microscopes? \_\_\_\_\_  
\_\_\_\_\_
- What magnification would a microscope have that has a 10X eye lens and a 4X objective lens? \_\_\_\_\_
- What magnification would a microscope have that has a 10X eye lens and a 10X objective lens? \_\_\_\_\_
- How does the magnified image vary from the real image? \_\_\_\_\_  
\_\_\_\_\_