Topic: Lipid Worksheet

Summary: Students learn the structure and properties of lipid molecules.

Goals & Objectives: Students will be able to identify properties and structures of triglycerides, phospholipids and cholesterol molecules.

Time Length: 20 minutes

Standards: CA Biology 1h. *Students know* most macromolecules (polysaccharides, nucleic acids, proteins, lipids) in cells and organisms are synthesized from a small collection of simple precursors.

Prerequisite Knowledge: Students have been introduced to carbon, hydrogen, oxygen atoms, hydrogen bonding, and single double covalent bonds.

Materials:
Worksheet
Textbook or notes on chemistry

Procedures:
1. If students are weak on the prerequisite knowledge, review chemistry terms.

2. Gives students the worksheet along with a textbook or chemistry notes.

Accommodations: Students with an IEP can answer questions 1, 3, 8, and 9. English language learners should have pictures and/or models of each lipid.

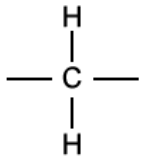
Evaluation:
Each question is worth 1 point each for a total of 12 points.

Name: _____ Row: _____

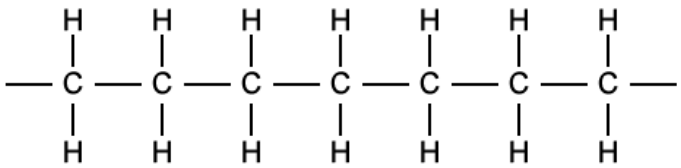
Date:_____ Period:_____

Lipid Worksheet

Lipids are fats including oils, waxes, steroids and cholesterol. Lipids are made from a hydrocarbon monomer that link together to form a hydrocarbon chain.



Hydrocarbon

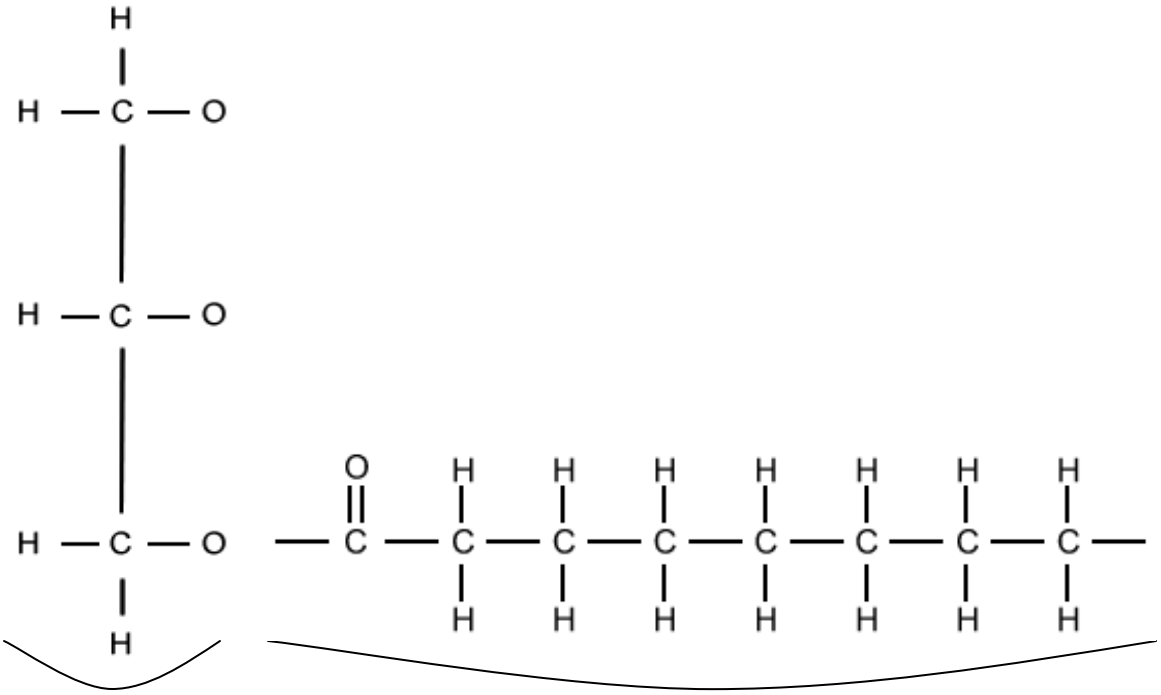


Hydrocarbon Chain

Hydrocarbon chains vary in length and are nonpolar. Nonpolar molecules are hydrophobic meaning they do not interact or mix with water. The three most common forms of lipids in the human body are triglycerides, phospholipids and cholesterol. Most of the fats you consume are triglycerides. Your body breaks them down and then the body stores fats as new triglycerides.

Triglycerides are three fatty acids bonded to a glycerol. Fatty acids are a hydrocarbon chain with a carboxyl group connecting it to the glycerol. Glycerol is a three carbon alcohol. There are two types of fatty acids, saturated and unsaturated. Saturated fatty acids are straight and are found mostly in animals. Unsaturated fatty acids are bent because of a double bond and are found mostly in plants.

1) Looking at the fatty acid below, copy it into the two remaining rows.



Glycerol

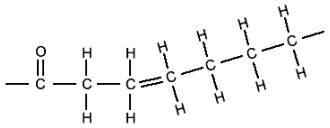
Fatty Acid

2) Fatty acids are composed of carboxyl group and _____.

3) What are the four parts of a triglyceride? _____ & 3 _____

4) The human body stores fats as _____.

5) Label the following fatty acids as saturated or unsaturated.



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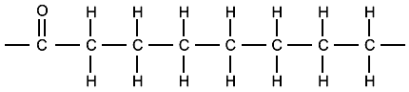
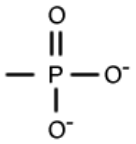


_____

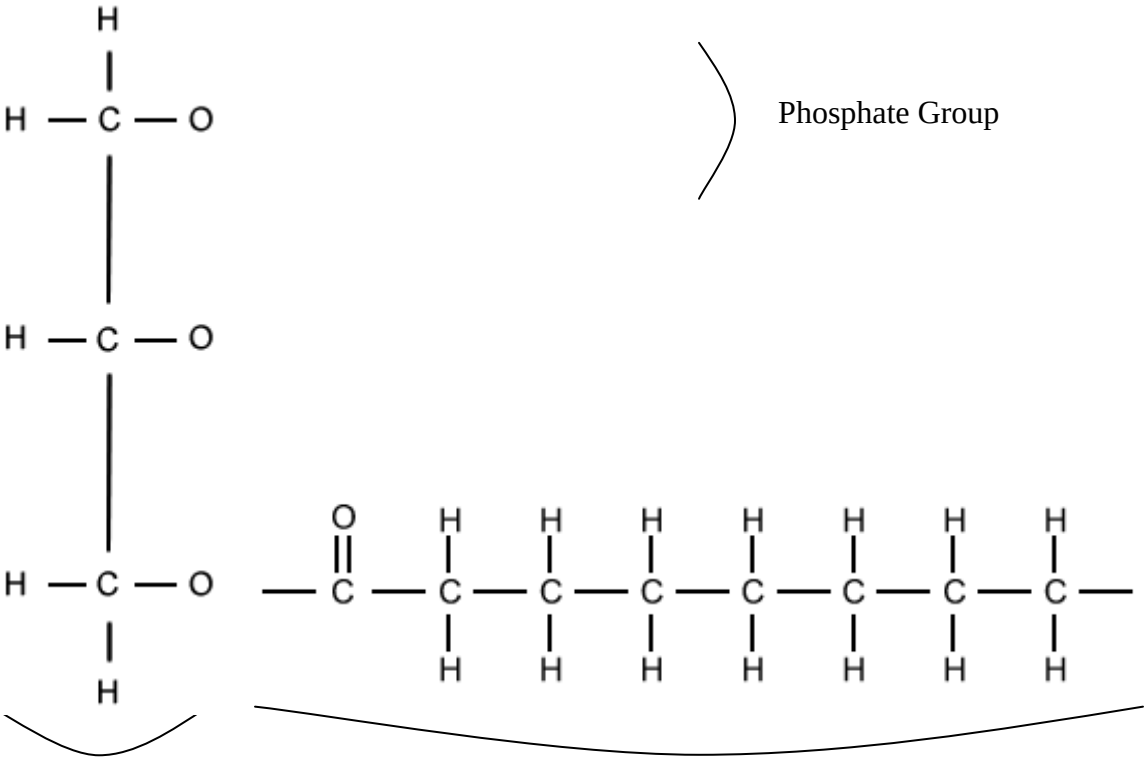
6) When a hydrocarbon chain is bent, it is called _____.

Phospholipids are similar to triglycerides except a phosphate group replaces one of the fatty acids. The phosphate group is a polar molecule. Polar molecules are hydrophilic and interact with water.

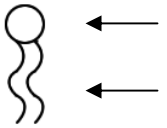


Phosphate Group

7) Fill in one phosphate group and the remaining fatty acid. Label all the parts.

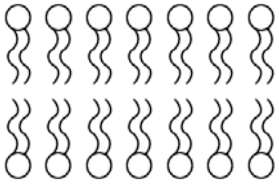


The common form of a phospholipid looks like a circle with two tails. Phospholipids are polar on the phosphate group side and nonpolar on the fatty acid side. When one phospholipid is next to another phospholipid, they line up with the heads are on one side and the tails are on the other side. Two rows of phospholipids are called a lipid bilayer and they make up the membranes of all cells.



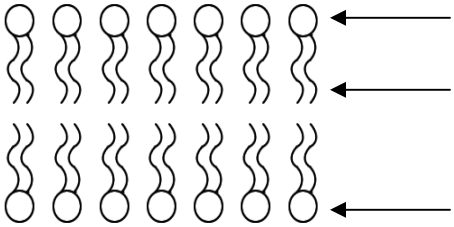
Phosphate Group Head

Fatty Acid Tails



Lipid Bilayer

8) Below, label which parts are polar and nonpolar.



9) Where would you find the lipid bilayer in a cell? _____

Cholesterol has a different shape in that it forms rings instead of hydrocarbon chains. Cholesterol is found only in animals in: body tissues, blood and cell membranes. All steroid hormones (testosterone, estrogen, and progesterone) are derived from cholesterol.

10) What lipid do animal cells have inside their cell membranes? _____

11) What does hydrophobic mean? _____

12) What are steroid hormones made from? _____