Name_____ Date_____

Molecules of Life

The food you eat, the silk a spider uses to make a web, the muscles in your body – all of these structures are made of **macromolecules**. Macromolecule is the term that biologists use for large molecules. There are four types of macromolecules that are important in biology: **carbohydrates**, **lipids**, **proteins**, and **nucleic acids**.

Carbohydrates are a source of **energy** in our diet. When we eat foods that contain carbohydrates, the energy in them is changed in our cells to a form that our bodies can use. Carbohydrates also form building materials like the **chitin** that covers the surface of insects and **cellulose** that makes up plant cell walls. Carbohydrates are the group that includes simple sugars and more complex molecules made up of lots of sugars bonded together. A carbohydrate made of two sugars is called a **disaccharide**. An example of this is **sucrose**, which is table sugar like you may put on your cereal or use to make cookies. **Starch** is an example of a complex carbohydrate made of many linked sugars. Plants often store carbohydrates in the form of starch. Eating potatoes or grains is the main source of starch for humans.

Lipids are macromolecules that include **fats**, which store large amounts of **energy**. Fats can be **saturated,** which means that they are a solid at room temperature like lard, or **unsaturated,** which are liquids at room temperature like vegetable oil. All lipids are **hydrophobic**. This means that they do not mix with water. If you make salad dressing using oil and water, you can shake it to mix it but the oil and water will quickly separate again. This is because the oil (a lipid) is hydrophobic and does not mix with water.

Proteins are a group of macromolecules that have many different structures and functions. Proteins can be structural like the proteins that make up your **hair** and **fingernails**, but they can also do many other jobs. One important group of proteins is **enzymes**, which make chemical reactions occur faster. For example, enzymes in your stomach help you to digest your food. All proteins are made of building blocks called **amino acids**, and then fold into complicated three-dimensional shapes that allow them to do their job.

Nucleic acids are the last category of macromolecules. The most familiar type of nucleic acid is **DNA** or **deoxyribonucleic acid**. DNA is the molecule that carries all the instructions to make an organism. DNA is inherited meaning it is passed from parent to offspring. DNA is made of building blocks called **nucleotides**. DNA is found in the **nucleus** of cells. All living things from bacteria to elephants have DNA made of nucleotides in their cells.

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Molecules of Life Questions

1. True or False. Macromolecules are small molecules.

2. Carbohydrates are a source of _____ in the human diet.

3. Which carbohydrate below makes up the structure of plant cell walls?
   a. starch
   b. chitin
   c. cellulose
   d. sucrose

4. What is a characteristic of all lipids?

5. Fats that come from animals are typically solids at room temperature. This means they are _____ fats.

6. True or False. Lipids are a huge source of energy.

7. _____ are a group of proteins that make chemical reactions occur faster.

8. List one structure in your body that contains proteins.

9. The building blocks of proteins are _____, and the building blocks of nucleic acids are _____.

10. DNA is found in the _____ of your cells.