Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Unit 2 Topic 3

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**Unit 2: Topic 3 Identifying the Macromolecules Worksheet**

**Tips for Identifying Pictures of Macromolecules:**

***Carbohydrates***

* Pictures of carbohydrate monomers (monosaccharides) have one ring of carbon atoms (looks like a pentagon or hexagon) with oxygen atoms and hydrogen atoms branching off the ring.



* Pictures of carbohydrate polymers (polysaccharides) have several rings of carbon atoms joined together by bonds.



***Lipids***

* Pictures of lipid polymers (fats) have a glycerol molecule (three carbon atoms joined in a chain with oxygen and hydrogen atoms branching off) linked to one or more fatty acid molecules (long chains of carbon and hydrogen atoms)



***Nucleic Acids***

* Pictures of nucleic acid monomers (nucleotides) have a phosphate group (with a phosphorus atom surrounded by four oxygen atoms, PO42-), a 5-carbon sugar (looks like a pentagon), and a nitrogenous base (looks like one or two rings containing nitrogen atoms
* Pictures of the nucleic acid polymer DNA have a double helix structure (a winding staircase) that is composed of two chains of nucleotides. Pictures of the nucleic acid polymer RNA show a single chain of nucleotides.When “untwisted” the DNA molecule looks like a ladder. The phosphate groups and 5-carbon sugars of each nucleotide are located in the sides of the ladder, and the nitrogen bases form the middle “rungs” of the ladder.



***Proteins***

* Pictures of protein monomers (amino acids) have a central carbon atom bonded to four things: a single hydrogen atom, an amino group (contains nitrogen and hydrogen atoms), a carboxyl group (contains a carbon atom that is double-bonded to an oxygen atom), and an R group (changes for each of the 20 different amino acids)



* Pictures of protein polymers (polypeptide) show a chain of amino acids, with the amino group of one amino acid bonded to the carboxyl group of the next amino acid in the chain.







* Pictures of a “full protein” may show multiple polypeptide chains folded around one another.

***Directions:*** *Place a check mark in the column of each kind of macromolecule that has each characteristic. Some may need more than one check*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Characteristics** | **Carbohydrate** | **Lipid** | **Protein** | **Nucleic Acid** |
|  |  |  |  |  |
|  |  |  |  |  |
| http://ww1.prweb.com/prfiles/2011/12/01/9006172/adenine-nucleotide.jpg |  |  |  |  |
| http://www.chemeddl.org/resources/models360/files/107526/d-glucose-beta%20Haworth.png |  |  |  |  |
| Enzymes (molecules that speed up chemical reactions) are an example of this type of macromolecule  |  |  |  |  |
| Includes fats and oils |  |  |  |  |
| Polymers formed from amino acids |  |  |  |  |
| http://www.geneticliteracyproject.org/wp/wp-content/uploads/2012/09/blue-DNA.jpg |  |  |  |  |
| Always contains carbon and hydrogen |  |  |  |  |
| http://web.visionlearning.com/custom/chemistry/custom/images/starch_yellow2.gif |  |  |  |  |
| DNA and RNA are examples of this type of macromolecule |  |  |  | ` |
| Table sugar (sucrose) is an example of this type of macromolecule |  |  |  |  |
| **Characteristics** | **Carbohydrate** | **Lipid** | **Protein** | **Nucleic Acid** |
| http://www.worldofmolecules.com/foods/Sucrose.png |  |  |  |  |
| Stores genetic information  |  |  |  |  |
| Is a polymer |  |  |  |  |
| Controls cellular activities |  |  |  |  |
|  |  |  |  |  |
| The polymer of this macromolecule is called a polypeptide  |  |  |  |  |
| Is made of nucleotides |  |  |  |  |
| Is an organic compound |  |  |  |  |
| Includes starches |  |  |  |  |
| Made up of monomers |  |  |  |  |
| Is an organic compound |  |  |  |  |
| http://education-portal.com/cimages/multimages/16/example-of-a-dipeptide.jpg |  |  |  |  |
| Formed by dehydration synthesis |  |  |  |  |
| Its monomers usually end in “ose”  |  |  |  |  |
|  |  |  |  |  |
| Breaks apart by hydrolysis |  |  |  |  |
| Important for defense, structure, storage, and transport |  |  |  |  |