**BASIC BIOCHEMISTRY WEBQUEST**

***Respectfully modified from a Southern Columbia Area in Pennsylvania teacher site.***

**General Webquest Directions:** *Open a word document, put your name, date and period at the top, then cut/paste each topic heading followed by the question.  Find the answers by visiting the links found directly following the questions and reading ALL of the information based on these four macromolecules - carbohydrates, lipids, proteins, and nucleic acids. Type you response after each question.*

**BASIC CHEMISTRY**

***Link:***

<http://faculty.clintoncc.suny.edu/faculty/Michael.Gregory/files/Bio%20101/Bio%20101%20Lectures/Biochemistry/biochemi.htm>

1. Draw 2 separate carbon molecules both with four single bonds connected to hydrogen molecules. Next take away two hydrogens from each and connect the carbons together with a double bond.
2. What is the difference between being ionized and being polar?
3. What is a functional group?
4. List the functional groups mentioned and draw an example of each.
5. What is an isomer?
6. What is condensation? (not gas to a liquid!)
7. What is a hydrolysis reaction?
8. Compare macromolecules to Monomers; complete the chart below.

|  |  |
| --- | --- |
| **Example of a Macromolecule** | **Corresponding Monomer** |
| **polysaccharide** |  |
|  | **glycerol, fatty acid** |
| **protein** |  |
| **nucleic acid** |  |

♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦

**CARBOHYDRATES**

***Link:***

<http://www2.nl.edu/jste/carbohyd.htm#dehydration%20synthesis>

1. List the three main groups of carbohydrates.
2. Play the animation of dehydration synthesis. What two monosaccarides did you start with? What disaccharide was produced? What molecule was synthesized as a bi-product?
3. Four types of polysaccarides are mentioned on this page, name them. Which are found in animals?

♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦

**LIPIDS**

**Links:**

<http://www2.nl.edu/jste/lipids.htm>

***Neutral Fats:***

1. Play the animation of fatty acids being attached to the glycerol backbone by dehydration synthesis. What is the name of the functional group on the ends of fatty acids that lose their “–OH” in order to bond to the glycerol? When making one triglyceride, how many molecules of water are formed?
2. What is the difference between an saturated fatty acid and an unsaturated fatty acid?
3. What is a phospholipid?
4. Define and draw a simple picture of a micelle.
5. Define and draw a simple phospholipid bilayer

***Phospholipids and the Cell Membrane:***

***Links:***

<http://telstar.ote.cmu.edu/biology/downloads/membranes/>

1. What is the basic structure of a lipid?
2. What are some examples of lipids?
3. Name the four parts to a phospholipid molecule
4. Play the animation of phospholipids being immersed in water. Why do the tails float in the water pointing up? What happens when a second layer of phospholipids are added?
5. Which of the following are also found in the cell membrane: lipids, proteins, or carbohydrates? What is the role of steroids in a cell membrane?

***Steroids:***

***Links:***

<http://www.wiley.com/legacy/college/boyer/0470003790/animations/cholesterol/cholesterol.htm>

1. View the “overview” button on this link. Besides its role in the cause of heart disease, name four useful functions of cholesterol in the body.
2. View the “Heart Disease” button on this link. List two reasons why bad cholesterol can elevate in a person. Why can’t a person remove LDL from the blood when they are genetically predisposed? How does exercise help?

***Saturated and unsaturated fats***

***Links:***

<http://biology.clc.uc.edu/courses/bio104/lipids.htm>

1. Find the paragraph on saturated and unsaturated fats and explain why unsaturated fats are forced to take on a liquid form.
2. Read further and explain what a trans-fatty acid is and why they are a concern to your health.

♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦

**PROTEINS**

***Links:***

<http://faculty.clintoncc.suny.edu/faculty/michael.gregory/files/bio%20101/bio%20101%20lectures/biochemistry/biochemi.htm>

1. Scroll down to proteins. List the six functions of proteins listed. What are the units of a protein and how are they connected?
2. List the four types of structures in which they can fold. Since they are held in this folded place by hydrogen bonds, what is it called when you heat a protein and ruin its structure?
3. What does it say determines the final shape of a protein?

<http://www.sumanasinc.com/webcontent/anisamples/nonmajorsbiology/proteinstructure.html>

1. What food is featured in this animation that shows denatured proteins?

♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦

**NUCLEIC ACIDS**

1. What does DNA look like? Take the DNA tour http://learn.genetics.utah.edu/content/begin/tour/

***Go through the tutorial: What is DNA?***

1. Where is DNA located?
2. DNA coils into X shapes called what?
3. The DNA molecule has three main parts – list them.
4. How are bases in the double helix connected?
5. Explain the link between bases (letters), genes, and proteins made.
6.
7. Go to this link [http://www.pbs.org/wgbh/nova/genome/dna.html#](http://www.pbs.org/wgbh/nova/genome/dna.html) and click on the "Journey into DNA" [animation](http://www.pbs.org/wgbh/nova/genome/dna.html).  Zoom in and read each stage, then list the base pair combinations of the DNA molecule you see from top to bottom.
8. Go to this website: <http://www.visionlearning.com/library/module_viewer.php?mid=63> and scroll down to the “replication of DNA” concept simulation. Click and watch this animation and record the steps of DNA replication. First, the\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Next \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pair with the original DNA strand. The two new strands are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the original.