Study Guide for first Biology Test

Study both the information that we went over in class and the information in the labs. Test questions will be a mix of: fill in the blanks, matching and some short answer. This test is worth 100 points.

What are some of the themes in biology? What is the main theme?
What is biology and why do we study it?
What is a cell (and what is not)?
What is alive? What are the characteristics that all living things have?
What does structure have to do with function?

What is the Scientific Method and what steps are involved?
Understand how to apply the steps of the scientific method as if you were describing the implementation of an actual experiment (such as our black/green box experiment).

What are primary articles, and why do scientists report their data? What is a secondary article?

How do you convert meters to cm or to mm? If you are reading a graduated cylinder how do you read the level of liquid in the container?

What is the purpose of a positive control? How about a negative control? If a test looks for peptide bonds can it detect a single amino acid?

Identify the four major elements

Know your electrons neutrons and protons. What charges do each have, and what do they do in an atom.

Distinguish between the following pairs of terms: atomic number and mass number, element and compound, polar and non-polar, ionic and covalent.

What are some of the characteristics of water that are important in the evolution and maintenance of life on Earth? What does polar mean? What happened to Willy’s family?

Distinguish between and discuss the biological importance of the following: nonpolar covalent bonds, polar covalent bonds, ionic bonds and Van der Walls reactions.

List and explain the FOUR properties of water that emerge as a result of its ability to form hydrogen bonds. How are these properties important in permitting life on the planet?

Distinguish between the following sets of terms: hydrophobic and hydrophilic substances; a solute, a solvent, and a solution.

Compare and contrast acids and bases, know enough about the pH scale to understand which numbers represent acidic, neutral and basic substances, what happens with acid rain?

Explain how an acid or a base solution is buffered, what is an example?

Why is carbon critical to life? (Think about the macromolecules.)

Explain the differences and similarities between prokaryotic and eukaryotic cells; Can you name prokaryotic vs. eukaryotic characteristics? What type of cells do you have?
What are the differences between plant and animal cells that we know now from class? What are some similarities? List all of the similarities and differences that you know so far.

What happens when we eat plants, how come a cow can eat plants? Why is the complex structure of cellulose a problem for our digestion?

Why does sugar taste sweet to your tongue but starch does not?

What are the 4 major macromolecules?

Describe the 4 levels of protein molecules folding and what the function is of having such complex structures. What does denature mean? What types of things can denature a protein?

Describe BOTH the hydrolysis and dehydration synthesis reactions. What do they do? When are they used?

Macromolecules are just that - large molecules. The four groups of macromolecules, shown in the table below, are essential to the structure and function of a cell. Below is a study chart, you should know the information in the chart and how these molecules are used in YOUR body. It would be good to have some examples for each.

<table>
<thead>
<tr>
<th>Group</th>
<th>Monomer</th>
<th>Polymer</th>
<th>Function</th>
<th>To Identify, Look for . .</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrate</td>
<td>Monosaccharide</td>
<td>Polysaccharide</td>
<td>Energy storage, glucose, receptors, structure of plant cell wall</td>
<td>Made of C,H, and O; – OH’s on all carbons except one “ends in -ose”</td>
</tr>
<tr>
<td>Protein</td>
<td>Amino acid</td>
<td>Polypeptide or protein</td>
<td>Enzymes, structure, receptors, transport, and many more</td>
<td>Contain N, have N-C-C backbone. R group determines specific function.</td>
</tr>
<tr>
<td>Nucleic acid</td>
<td>Nucleotide</td>
<td>Polynucleotide or nucleic acid</td>
<td>Information storage and transfer, genes DNA, RNA</td>
<td>Nucleotides are made of a sugar, a phosphate and nitrogenous base (T, C, U, A &amp; G)</td>
</tr>
<tr>
<td>Lipid *</td>
<td>Glycerol, fatty acids</td>
<td>N/A</td>
<td>Cell membrane structure (phospholipids) energy storage, insulation, steroids</td>
<td>Made of C,H, and O; lots of C-H bonds; may have some C=C double bonds if (unsaturated); includes steroids</td>
</tr>
</tbody>
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*note: Lipids are not polymers! (Do you know what that means)?