**General Biology 1 – BSC 2010**

**Unit 1: Chapters 1-3. Due on day of Exam 1.**

**No late assignments collected.**

Complete this worksheet to help you study. Also use it to make flash cards. Fill this out by looking for definitions, descriptions in the PowerPoint slides, and then go to the book for material that you need more information on.

**Exam 1: Chapters 1-3**

**Videos: Related YouTube videos to help complete the worksheets**

**Chemistry (Chapter 2):** [**https://youtu.be/IMN4p619nRw**](https://youtu.be/IMN4p619nRw)

**Macromolecules, Introduction (Chapter 3):** [**https://youtu.be/xt6rFnKxSNY**](https://youtu.be/xt6rFnKxSNY)

**Macromolecules Part 2, Proteins (Chapter 3):** [**https://youtu.be/DMdBZTZQvbg**](https://youtu.be/DMdBZTZQvbg)

**Macromolecules Part 3, Carbohydrates (Chapter 3):** [**https://youtu.be/K88hiwaQqAo**](https://youtu.be/K88hiwaQqAo)

**Macromolecules Part 4, Lipids (Chapter 3):** [**https://youtu.be/DFK6X9V60vY**](https://youtu.be/DFK6X9V60vY)

**Chapter 1: The Science of Biology**

* **Define**:
  + Biology
  + Science
* **Define** and compare **Inductive** and **Deductive** **Reasoning**:
* **Define** Hypothesis
* List the steps of the Scientific Method (steps)
* Why must a hypothesis be testable and falsifiable?
* **Define** the following: experiment, control and experimental groups, models
* Explain what a Scientific Theory is, and how it compares to the traditional use of the work theory
* Explain the concepts of **basic** and **applied** **science**.
* What does “Peer Reviewed” mean in terms of scientific reports?
* Define **plagiarism**
* What does the term **primary resources** mean? When would you want to use **primary resources**? Provide an example of a primary resource.
* What does the term **secondary resources** mean? When would you want to use **secondary resources**? Provide an example of a secondary resource.
* **List** the 7 properties of life (of living organisms)
* Explain Biological organization and list the levels from atoms to biosphere.
* What are the 3 Domains of life?
* What are the basic definitions of **prokaryote** and **eukaryote**? Provide an example of how they are similar and how they are different. Provide an example of each.
* What is meant by the saying “Structure and Function”? Does this apply to all levels of biological organization (atoms, molecules, all the way to organisms and beyond?)

**Chapter 2: Small Molecules and the Chemistry of Life**

* **Define the following terms**: atom, atomic mass, atomic number, mass number, neutron, electron, proton, element, neutral atom, isotopes, atomic weight (how it is determined, see isotope section), molecule, compound
* **Which elements** make up 96.3% of living things? (**C, H, N, O, P, S** make up 98% of living things)
* **Define the following terms related to electrons**: orbitals, energy levels (shells), valence shell, inert, octet rule,
* **Complete this sentence**: Electron arrangement determines…
* Define: Chemical Reactions, reactants, products.
* What is an **equilibrium**?
* **CHEMICAL BONDS: Know Definition, Strength and Example**
* Which is stronger, Hydrogen bond or covalent bond? **EXPLAIN why!**
* **Ionic** **bonds**:
* How is the gain or loss of electrons related to ionic bonds?
* Define **Ions**, **Cation**, and **Anion**. Use NaCl as example (which is the cation, anion, and how does salt form).
* How does salt dissolves in water
* **Covalent**:
  + **Define:** Covalent bond
  + **Define**: Molecular and structural formulas (draw an example using water)
  + How many covalent bonds can carbon form? **Explain why.**
  + Define **electronegativity**, what is an example of an electronegative element on the periodic table?
  + Define: polar, nonpolar
  + Explain why water is a polar molecule.
  + What is meant be the saying “Like dissolves Like”?
* Define: Hydrogen Bonds. How are the easily broken?
* True or False: Hydrogen bonds are important in DNA and Protein structures? Explain your answer.
* Describe the following concepts regarding **Water**: polar, freezing (why does ice float), cohesiveness, adhesiveness,
  + **Define the Properties of water:** specific heat, heat of vaporization, plus 4 more…
* Define hydrophobic and hydrophilic:
* **Solutions (define the terms)**: solvent, solute, mole, molar solution
* **Define:** pH, Acid, base:
* **What is the chance in hydrogen ions if you go from a pH of 4 to pH of 5 (remember it is in log scale)**?
* Explain the pH scale, which numbers are on the scale, and which are acidic, basic or neutral.
* What are buffers and why are they important in living organisms?
* How many covalent bonds can carbon form, and why is this important in making biological molecules?
* What is a **hydrocarbon**?
* List the name, chemical formula, and specific example of function for each of the functional groups, (examples = Phosphates are important in DNA, Sulfhydral in protein, etc)
  + **Functional groups**: hydroxyl, amino, carboxyl, phosphate, sulfhydral, others…( **Isomers**: structural and stereoisomers (enantiomers)

**Chapter 3: The Chemical Building Blocks of Life (Macromolecules)**

* **Define: Macromolecules**, polymers, monomers: define
* **Define Dehydration** **Reaction and Hydrolysis** **Reactions**
* **MACROMOLECULES**: know the building blocks, the bonds that hold them together and examples
* Complete the following table on macromolecules

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name of Macromolecule** | **Definition** | **Name of Monomer** | **Name of Polymer** | **Name of bond linking the monomers** | **Examples** |
| **Carbohydrate** |  |  |  |  |  |
| **Nucleic Acids** |  |  |  |  |  |
| **Proteins** |  |  |  |  |  |

* ***Answer this too!*** Why are lipids not listed in this table? They are macromolecules. Are they polymers? Are they polar or nonpolar?
* **Carbohydrates**:
  + What are the major functions of carbohydrates?
  + Define and provide examples of each of the following:
    - **Monosaccharides**:
    - **Disaccharides:**
    - **Polysaccharide**:
* **Proteins**:
  + Define **Amino Acid**
  + How many amino acids are there?
  + Why is STRUCTURE and FUNCTION specifically important for proteins?
  + What are the important functions of proteins
  + Define **R-groups:**
  + Understand that some amino acids are nonpolar, polar/uncharged, charged. Why is this important in the sequence of amino acids in a protein and the structure and function of a protein?
  + **Define Peptide Bond**:
  + **Levels of Structure:** Complete the following table:

|  |  |  |
| --- | --- | --- |
| **Level** | **Definition** | **Types of Bonds** |
| **Primary** |  |  |
| **Secondary** |  |  |
| **Tertiary** |  |  |
| **Quaternary** |  |  |

* + **Define: Domains**, chaperones, **denature**, disassociate
* **Nucleic Acids**:
  + **Define: Nucleotides**
  + Which bases of DNA pair with each other, and how many hydrogen bonds are involved for each pairing?
  + Define and provide an example of a **purine** and a **pyrimidine**.
  + Define: **Gene**
  + Compare DNA to RNA. How are they similar? List 3 ways they are different.
  + **What is mRNA?**
  + **What is** **ATP**
* **Lipids**:
  + **True or False: Lipids are Hydrophobic/nonpolar**
  + ***List*** all types/examples:
  + **List the Functions of Lipids**:
  + **Define and draw a triglyceride**:
  + Define and provide an example of **Saturated Fats**
  + Define and provide an example of **Unsaturated Fats**:
  + **Define and draw a Phospholipids and a phospholipid bilayer**
  + **Define Steroids and** **Cholesterol**