Unit 1 - Possible Free Response Questions

You will see one or more of these FRQ/Essay questions on your first AP Biology exam which will take place the second week of school. On the day of the exam, Mr. Collea will come in and pick a number(s) out of the Boston Red Sox helmet - the number(s) chosen will be the free response question(s) written for that exam so plan accordingly.

"If you fail to plan…plan to fail."

1. The unique properties of water make life on Earth possible. Select four properties of water and for each property:

a) **identify** and **define** the property and **explain** it in terms of the chemical/physical nature of water. **[16]**

b) **describe** how water affects the functioning of living organisms by **explaining** each of the following:

- **(i)** the ability of water to moderate temperature within living organisms and in organisms' environments**. [3]**
- **(ii)** the movement of water from the roots up and out the leaves of plants. **[3]**
- **(iii)** the role of water as a medium for the metabolic processes of cells. **[3]**

2. All life on Earth is carbon based. Our carbon basis allows for the formation of complex molecules.

a) Atomically speaking, what allows the element carbon to be the backbone of many large, complex macromolecules such as carbohydrates, fats/lipids, proteins and nucleic acids. **[5]**

b) For each of the four groups of complex carbon based molecules (*macromolecules*) mentioned above:

- **(i)** **discuss** the structural components of the macromolecule. **[12]**
- **(ii)** **state** one example of a molecule that belongs to each of the groups you chose and briefly **describe** its function. **[4]**

c) All of these groups of macromolecules are created from *monomers* joining to form *polymers*. **Name** and **describe** the chemical reaction that join and split these molecules. **[4]**

3. Proteins – large complex molecules – are major building blocks of all living organisms. **Discuss** each of the following in relation to proteins:

a) their chemical composition. **[5]**

b) levels of protein structure with a specific example of each. **[15]**

c) the roles of DNA, mRNA and tRNA in protein synthesis. **[5]**

4. Statistical Calculations:

Mean - Median - Mode - Standard Deviation - Standard Error / Standard Error Bars - Chi Square

*** We will begin our study of Basic Statistics on the first day of school. ***