- LEARNING OBJECTIVES I -

1. Be able to list and define the various characteristics of life.

2. Be able to describe the hierarchy of biological organization from the atom to the biosphere.

3. Know the chart that organizes the domains and kingdoms, and be able to list in the correct descending order each level of organization from kingdom to species. Know the correct nomenclature used in naming of an organism; i.e., Genus species.

4. Be able to give a brief overview of evolution with respect to unity, diversity, and natural and artificial selection. Know the proper steps in the “Scientific Method”. Be able to define what constitutes a “good” experimental design, such as control group, variables, sampling error, etc.

5. Be able to discuss electrons, protons, neutrons, atomic number, atomic weight, what makes an isotope, the shell model with respect to the energy levels and orbitals of an atom, valence number, and the differences between an atom, molecule, compound and mixture.

6. Understand what constitutes an ionic bond, covalent bond (polar and non-polar), hydrogen bond, and van der Waals interactions.

7. Know the different properties of water and how they relate to biology: cohesion, surface tension, high specific heat, heat of vaporization, and its unique properties as a solvent. Be able to describe what constitutes an acid, a base, pH, and buffers.

8. Know what makes carbon unique as the building block for organic compounds, define enantiomers and isomers, be able to recognize each of the functional groups, their general properties, and on what organic compounds one would expect to find them.

9. Be able to define a monomer, polymer, and the differences between condensation and hydrolysis reactions. Know and be able to recognize the various carbohydrates (from monosaccharide to polysaccharide) to include starch, cellulose, chitin and glycogen and where one would find each of these.

10. Know and be able to recognize lipids and their structure, the difference between a saturated and polyunsaturated fats, phospholipids, and steroids. Know what constitutes the structure of amino acids, how peptide bonds lead to polypeptides, and ultimately to proteins.

11. Know and be able to define primary, secondary, tertiary and quaternary structure of proteins, and what alterations in its environment can cause denaturation.

12. Know the five components of nucleic acids, and what constitutes a polynucleotide.