BOTANY–Ch 1 Notes Macromolecules Name _____

1. All cells are composed of 4 main molecules
2. These molecules are called _____.
3. They are composed mainly of atoms of Carbon (C)**,** Hydrogen (H) and Oxygen (O).
4. These _____are joined to form molecules which are then joined to form macromolecules.
5. These macromolecules are _____ bonded.
   - They _____ electrons
6. All living organisms are composed of 4 major classes of macromolecules: _____ _____

7. The primary component of all macromolecules is _____
   - Carbon has 4 electrons in its outer energy level, and carbon seeks to fill its energy level by sharing its electrons with other atoms. Carbon atoms form _____ that are the backbone of many different kinds of molecules.
   - These long carbon chains are _____

8. Carbohydrates are _____
   - A carbohydrate is composed of _____
   - Some carbohydrates like table sugar are simple, small molecules called monomers.
   - Other carbohydrates (starches like_____) exist as chains of many subunits (monomers) that form complex polymers
9. The simplest carbohydrate molecules are small sugars or _____ (monomers) that taste sweet. The formula for glucose is $C_6H_{12}O_6$
   - Carbohydrates are made by linking individual sugars together to form long chains called _____ (polymers).
   - Polysaccharides are insoluble in water. They can be deposited in specific storage areas in a cell. The cells ability to store energy in the form of polysaccharides lets organisms build energy reserves called glycogen.

10. _____ is a polysaccharide composed of glucose subunits (monomers)
    - Amylose is the simplest kind of starch – it is a long unbranched chain. Baking or boiling breaks the long chain into shorter lengths
    - Humans consume a lot of starchy carbohydrates such as the seeds of _____ _____. It makes up about two-thirds of all calories used by people.
    - _____store glucose in long branched chains called glycogen.

11. Many organisms use _____ as structural molecules such as plants.
    - Plants make _____ which forms the cell walls of plants. Most animals cannot break the cellulose down so it is undigested. – we call it dietary fiber.
    - Cows and horses have special _____ that do break the cellulose down.

12. _____ store energy. They are composed of _____
    - A lipid is not soluble in water, but it is soluble in oil
    - The most important kind of lipid is fat, an energy _____ molecule.
    - Fats have more carbon-hydrogen bonds than carbs and can store more energy! But the body cannot _____ as easily as carbs. So the body can metabolize _____than fats in a given time and therefore receive more energy from the carbs!
    - The backbone of the structure is a _____ molecule and the branches are _____
    - Saturated fats are usually _____ – butter, Crisco
    - _____ fats are usually liquid – cooking oil
    - Steroids – hormones in your _____
    - _____– earwax or candle wax

13. A _____ is composed of long chains of subunits called amino acids.

- There are 20 different kinds of _____ used by humans. There is an endless variety of possible proteins the body can produce!
- A typical protein has approximately _____ amino acids linked together in its chain.

14. The chemical properties of a protein depend on its _____
    - The _____of amino acids in the protein is called its primary structure.
    - Amino acids interact with neighboring amino acids which causes parts of the chain to_____ _____. The coiling and bending determines the protein's secondary structure.
    - In most proteins, the entire chain folds into a _____ called its tertiary structure.
    - When 2 or more proteins combine for form clusters, the mix of proteins forms quaternary structures.
    - Proteins often play _____ roles in organisms.
        - Cartilage and tendons are made of a _____ called collagen.
    - Proteins second major role in living organisms is forming _____. Enzymes _____ the rate at which chemical reactions occur during metabolism.
    - Most _____ necessary for growth, movement and other body activities would not take place without enzymes.

15. The fourth major class of macromolecules is called _____. Nucleic Acids contain_____.
    - The 2 types of nucleic acids are: _____ or Deoxyribonucleic acid and _____ or Ribonucleic acid
    - The subunits of DNA and RNA are called _____
    - These nucleotides are grouped into units called genes. Genes encode information concerning how given organisms will _____
    - _____ is involved in making working copies of genetic information. These RNA copies are used in assembling amino acids to produce certain proteins which produce specific cells.

    - A DNA _____ consists of two interlocking coil-shaped strands that resemble a spiral staircase called a _____
    - DNA is stored in a compact form called_____. It encodes the sequence of all the cells proteins
    - RNA have a variety of shapes depending on their function. RNA assembles or _____ the proteins from the instructions given by the DNA.

REVIEW QUESTIONS

1. What is a macromolecule

2. What is a carbohydrate, what is it made of, examples

3. What is a lipid, what is it made of, examples

4. What is a protein, what is it made of, examples

5. What is a nucleic acid, what is it made of, examples

6. **STUDY YOUR CHART!!!!**