Name _____ Class _____ Date _____

Study Guide 2.3 : Carbon-Based Molecules

KEY CONCEPT

Carbon-based molecules are the foundation of life.

VOCABULARY

monomer	lipid	amino acid
polymer	fatty acid	nucleic acid
carbohydrate	protein	

MAIN IDEA: **Carbon atoms have unique bonding properties.**

1. Why is carbon often called the building block of life?

_____

_____

2. What ability allows carbon atoms to form a large number of molecules?

_____

_____

3. In the space below, sketch the three (3) basic structures of carbon-based molecules: straight chain, branched chain, and ring.

MAIN IDEA: **Four main types of carbon-based molecules are found in living things.**

Complete the table with functions and examples of each type of carbon-based molecule.

Molecule Type	Functions	Examples
Carbohydrate	4.	5.
Lipid	6.	7.
Protein	8.	9.
Nucleic acid	10.	11.

12. **What** determines a protein's structure and function?

_____

13. **What** are nucleic acids made of?

_____

Vocabulary Check

14. The prefix ***mono-*** means "one," and the prefix ***poly-*** means "many." How are these meanings related to the terms ***monomer*** and ***polymer***?

_____

_____

_____

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REINFORCEMENT **2.3: Carbon-Based Molecules**

KEY CONCEPT Carbon-based molecules are the foundation of life.

Carbon atoms are the basis of most molecules that make up living things. Many carbon-based molecules are large molecules called polymers that are made of many smaller, repeating molecules called monomers. There are four main types of carbon-based molecules in living things.

- **Carbohydrates** include sugars and starches, and are often broken down as a source of chemical energy for cells. Some carbohydrates are part of cell structure, such as cellulose, which makes up plant cell walls.
- **Lipids** include fats and oils and, like carbohydrates, are often broken down as a source of chemical energy for cells. One type of lipid, called a phospholipid, makes up most of all cell membranes.
- **Proteins** have a large number of structures and functions. Some proteins are needed for muscle movement; another protein, called hemoglobin, transports oxygen in blood. Another type of proteins, called enzymes, speed up chemical reactions in cells.
- **Nucleic acids** are molecules that store genetic information and build proteins. DNA stores genetic information in cells, and RNA helps to build the proteins for which DNA codes.

Use the paragraph above to answer the table below.

Type of Molecule	Functions	Example
Carbohydrate	**1.**	**2.**
Lipid	**3.**	**4.**
Protein	**5.**	**6.**
Nucleic acid	**7.**	**8.**

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Section Quiz 2.3: Carbon-Based Molecules

Choose the letter of the best answer.

_____ 1. Carbon is unique due to the carbon atom's
   a. bonding properties.
   b. six outer unpaired electrons.
   c. ionic compounds.
   d. hydrogen bonding strength.

_____ 2. Which category of carbon-based molecules includes sugars and starches?
   a. unsaturated fatty acids
   b. phospholipids
   c. proteins
   d. carbohydrates

_____ 3. Fats, oils, and cholesterol are all types of
   a. cell membranes.
   b. hormones.
   c. lipids.
   d. fatty acids.

_____ 4. Proteins are composed of which molecules?
   a. amino acids
   b. fatty acids
   c. monosaccharides
   d. nucleic acids

_____ 5. DNA and RNA are two types of
   a. proteins.
   b. nucleic acids.
   c. lipids.
   d. carbohydrates.