Biology GT—Unit One Review Guide

**Note: This will not be collected or graded. It is for your reference. Do as much or as little as you would like.**

**Vocab Practice**

Given the definition, write the word:

1. The amount of energy required to increase the temperature of a substance by one degree:
2. Special kind of lipid that makes up the cell membrane:
3. A solid that is dissolved in a liquid:
4. Molecules with atoms from two or more different elements:
5. A sub-atomic particle with a charge of 0; it is found in the nucleus:

Matching:

1. Molecule a. Bond that joins together two amino acids
2. Peptide bond b. A biological macromolecule made from

monosaccharides and used for energy

1. Carbohydrate c. In science, an explanation about the natural

world that accounts for all available evidence

and accurately predicts new observations

1. Non-polar d. Describes covalent bonds in which electrons

are shared equally

Describes molecules in which there is an equal

distribution of charge

1. Theory e. Atoms that have combined chemically

Choose the correct answer.

1. Composed of a sugar, a phosphate, and a nitrogen base; building block of nucleic acids  
   A) Electron  
   B) Neutron  
   C) Nucleic Acids  
   D) Nucleotides
2. Bond formed when two atoms share a pair of electrons  
   A) Electron  
   B) Ionic Bond  
   C) Covalent Bond  
   D) Hydrogen Bond
3. Monomer of a triglyceride  
   A) Nucleic Acid  
   B) Ionic bond  
   C) Fatty acid  
   D) Amino acid
4. Water molecules "sticking" to other water molecules  
   A) Theory  
   B) Cohesion  
   C) Protein  
   D) Adhesion
5. A process in which the formation of a new bond between two molecules results in the loss of a water molecule  
   A) Hydrogen bond  
   B) Hydrophobic  
   C) Dehydration synthesis  
   D) Hypothesis

True or False

\_\_\_\_\_\_\_\_ Capillary action is the tendency of water to “climb” tubes and it can be explained by cohesion and adhesion

\_\_\_\_\_\_\_\_ Monosaccharides are the building blocks of protein

\_\_\_\_\_\_\_\_ Lipids are biological macromolecules made up of fatty acids and triglycerides; they are used for long-term energy storage and make up cell membranes

\_\_\_\_\_\_\_ Amino acids are the building blocks of proteins

\_\_\_\_\_\_\_ Hydrogen bonds form between two atoms of opposite charge

**Scientific Method**

1. What does “theory” mean in the scientific community, and how is this different than how “theory” is used by the general public?

David is interested in finding out whether different growing mediums have an effect on bacteria. He mixes up some growth medium with sugar and some growth medium with protein, and he puts each medium into a separate Petri dish. To get bacteria, he swabs the door handle of the classroom. After swabbing the door handle, he touches the swab to each plate to transfer bacteria. The plates are kept in the same incubator at 37 degrees Celsius for 48 hours. He examines the plates and collects the following data:

|  |  |
| --- | --- |
| **Medium** | **Growth** |
| Sugar | Lots of bacteria  Colonies are different shapes and sizes |
| Protein | Fewer bacteria than sugar Some colonies are “fuzzy” |

Answer the following questions based on this experiment:

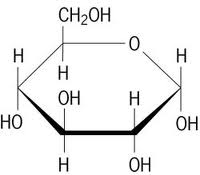
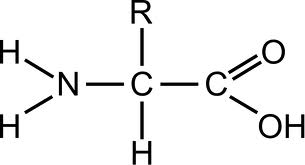
1. Point out one good feature of David’s experiment and explain why it was a good thing for him to do.
2. Point out at least two flaws in David’s experiment, explain why they were flaws, and explain how you would have avoided making those mistakes.
3. What claims, if any, can David make based on this experiment?

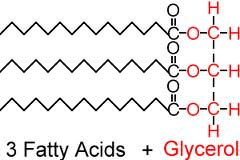
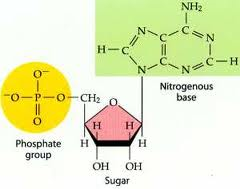
Christina did an experiment in which she isolated mold from bread and grew the mold on several different Petri dishes. She wanted to know how different temperatures affected the growth of the mold, so each plate was incubated at a different temperature for 48 hours. One plate was left out at room temperature (25 degrees C) for 48 hours. Here is her data:

|  |  |
| --- | --- |
| **Temperature** | **Growth** |
| 20 degrees C | No |
| 30 degrees C | Yes |
| 40 degrees C | No |
| Room temperature (25 degrees C) | Yes |

1. Make a claim based on this data. Support your claim with evidence and provide reasoning.

Identify each of the following structures:

1. Both carbohydrates and lipids have “energy” and “structure” as general functions. Explain the difference between how carbohydrates are used for energy and how lipids are used for energy. In addition, give a specific example of carbohydrates providing structure and lipids providing structure.
2. Every protein has a unique 3D shape. Why does this matter?
3. Give two differences between saturated and unsaturated fatty acids.
4. Glycogen, starch, and cellulose are all carbohydrates. What else do they have in common?
5. Why are nucleic acids important?
6. Give an example of a food that contains…  
   Carbohydrates:  
   Protein:  
   Lipids:
7. Why is a chain of amino acids called a “polypeptide?”
8. When a bond is formed between two glucose molecules, the process is called “dehydration synthesis.” Why?
9. Give an example of a polymer and an example of a monomer.
10. Define the four levels of protein structure:  
    Primary:  
      
    Secondary:  
      
    Tertiary:  
      
    Quaternary:
11. Explain how surface tension works.
12. Detergents—soap molecules—are often used to clean up oil that has spilled into bodies of water. Explain why this is a useful strategy.
13. Why does water form a very round drop on wax paper but not on microscope slides?
14. Someone gives you a flask containing a liquid. The flask is labeled cyclohexane. You pour some of this cyclohexane into a beaker of water, and the cyclohexane forms a layer on top of the water. What can you conclude about cyclohexane?  
    A) It’s a fancy name for oil  
    B) It’s hydrophilic  
    C) It’s polar  
    D) It’s nonpolar
15. If you have a solution of water and alcohol and you heat it up, the alcohol will evaporate much more quickly than water. Why?
16. Differentiate between a hydrogen bond and an ionic bond.
17. Look at the molecule below. Remember that each line between atoms represents a covalent bond. Are these covalent bonds polar or non-polar? Support your answer.  
    
18. Draw two water molecules and indicate the hydrogen bonding between them.
19. How does an atom become an ion?
20. Flourine has 9 protons and usually has 9 electrons. If you find a fluorine ion with a charge of -1, then how many electrons does this fluorine ion have?
21. Calcium has 20 protons. When calcium is ionized, it has a charge of +2. A calcium ion has:  
    A) 20 protons  
    B) 20 neutrons  
    C) 18 electrons  
    D) All of the above
22. How many carbon atoms are there in 12CO2?
23. How many oxygen atoms in 12CO2?
24. How many carbon dioxide molecules in 12CO2?
25. Diana can run 400 m in 55 s. How many kilometers can she run in 3 min?
26. Which is bigger, a microgram or a nanogram?
27. Why is the metric system more useful for scientists than the US system?