

Unit 2: Biochemistry

Review Guide

LEARNING TARGETS

Place a checkmark next to the learning targets you feel confident on. Then go back and focus on the learning targets that are not checked .

Atoms & Molecules

- Describe the components of an atom. (NA)
- Differentiate between atoms, elements, and molecules. (NA)

Resources:

Textbook Section 2.1
Student Glossary
Atoms & Molecules Notes
Modeling Molecules Lab

Water

- Describe how the structure of water leads to its unique properties. (2.1.A)
- Explain the properties of water and its importance to life. (2.1.B)

Resources:

Textbook Section 2.2
Student Glossary
Water Notes
Water Summary

Organic Molecules

- Describe the function of carbohydrates, lipids, and proteins. (2.2.A)
- Compare and contrast the classes of organic compounds. (2.2.B)

Resources:

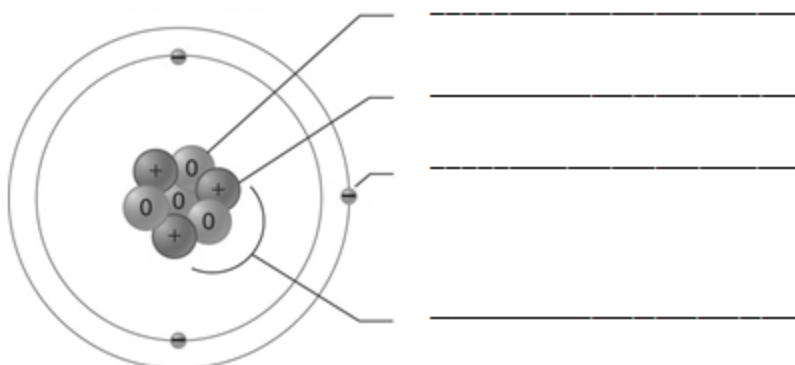
Textbook Section 2.3
Student Glossary
Biochemistry Notes
Carbohydrate Notes
Carbohydrate Review
Lipid Notes
Lipid Review
Protein Notes
Protein Review
Identification Labs



Test Friday
October 31st, 2014

LT: Describe the components of an atom.

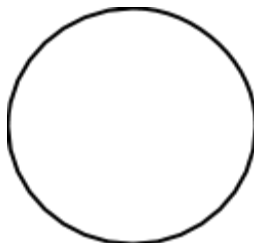
Label the following diagram:



Complete the following table:

	Mass	Charge	Location
Protons			
Neutrons			
Electrons			

Use a periodic table to find the atomic number and atomic mass of the element phosphorus. Using the circle below to represent the nucleus, create a simple diagram that shows the number of protons, neutrons and electrons in a single phosphorus atom.



Fill in the blank:

The protons and the neutrons are packed together in an inner core of the atom called the _____ . The outer part of the atom contains the _____ that orbit the nucleus. The overall charge of the nucleus is _____ due to the _____ but the overall charge of the electron cloud is _____ because of the _____. Therefore, the overall charge of the atom is _____. This implies that the electrons are held in orbit around the nucleus due to the _____ of opposite charges.

LT: Differentiate between atoms, elements and molecules.

What is the difference between an atom and a molecule?

Glucose has a molecular formula of $C_6H_{12}O_6$. This means that each molecule of glucose has must have:

_____ atom(s) of Carbon

_____ atom(s) of Hydrogen

_____ atom(s) of Oxygen

Does the symbol “H” indicates one molecule, atom, or compound of hydrogen? Explain why it could not be the other two in your response.

How many total atoms and molecules are represented by the following molecular formula: $2H_2O$?

Provide an example for each of the following terms:

Element _____

Atom _____

Molecule _____

LT 2.1.A: Describe how the structure of water leads to its unique properties.

Draw a picture of a molecule of water. Be sure to include information in your sketch that shows how a water molecule is considered polar.

Explain how water dissolves NaCl or another ionic compound. Draw a diagram representing this process. (Hint: Check the diagrams in the water article for help!)

What is the difference between a polar and nonpolar molecule.

LT 2.1.B: Explain the properties of water and its importance to life.

List the properties of water discussed in class.

Define cohesion and list one application or example of water's cohesive property.

Define adhesion and list one application or example of water's adhesive property.

Explain how cohesion and adhesion work together to allow water to move against gravity up a tree. (Hint: It is similar to how a meniscus forms!)

What does it mean to be a universal solvent?

How would you describe a hydrogen bond to someone else?

Draw a diagram representing how 5 molecules of water would form hydrogen bonds.

What happens to water molecules when they freeze? Why is it important that water is less dense when frozen?

LT 2.2.A: Describe the function of carbohydrates, lipids and proteins.

Fill in the blanks:

Glucose is a carbohydrate with a molecular formula of _____. It is one of the simple sugars or _____. The three simple sugars are: _____, _____, and _____. Carbon, _____ and _____ are the three elements found in carbohydrates. A double sugar or _____ is formed when two monosaccharides come together in a process is called _____. Carbohydrates in which three or more sugars are linked are called _____. Carbohydrates serve as the primary _____ source in all living things.

Lipids are a second major group of organic compounds that are made of the elements _____, _____, and _____. Examples of lipids are fats, _____, and _____. Lipids contain more energy than carbohydrates and are made by combining one _____ molecule and three _____ through a process called _____. Lipids differ because they have three different _____. Fatty acid tails may be _____ or _____ depending on whether or not they have double bonds.

Amino acids are bonded together by a _____ bond. When three amino acids are linked together, _____ water molecules are removed in dehydration synthesis. When five amino acids are linked, _____ water molecules are removed. Most proteins are usually hundreds to _____ of amino acids long and called _____. There are a millions of different proteins, but each one has one of two functions. Some proteins are for the structure of the various cell parts while others are called _____ because they control all the biochemical reactions in living things.

Complete the following table summarizing the functions of organic molecules:

Organic Molecule	Functions
Carbohydrates	
Lipids	
Proteins	

LT 2.2.B: Compare and contrast the classes of organic compounds.

What is the relationship between monomers and polymers?

Determine if each of the following terms describes a monomer (M) or polymer (P).

- | | |
|---------------------------------|-------------------------------|
| _____ 1. Cellulose | _____ 7. Enzyme |
| _____ 2. Unsaturated fatty acid | _____ 8. Saturated fatty acid |
| _____ 3. Starch | _____ 9. Glucose |
| _____ 4. Glycerol | _____ 10. Polypeptide |
| _____ 5. Fructose | _____ 11. Amino acid |
| _____ 6. Lipid | _____ 12. Glycogen |

What is the difference between glycogen and glycerol?

Complete the following table comparing the monomers of organic molecules:

Organic Molecule	Monomer(s)
Carbohydrates	
Lipids	
Proteins	

Label the following as a monosaccharide (M), disaccharide (D) or polysaccharide (P).

- | | |
|--------------------|-------------------|
| _____ 1. Cellulose | _____ 6. Glycogen |
| _____ 2. Fructose | _____ 7. Lactose |
| _____ 3. Galactose | _____ 8. Maltose |
| _____ 4. Glucose | _____ 9. Chitin |
| _____ 5. Starch | _____ 10. Sucrose |

Determine whether each of the following statements describes a carbohydrate (C), lipid (L), or protein (P):

- _____ Consist of three fatty acids bonded to glycerol molecule.
- _____ Contain peptide bonds.
- _____ Commonly called fats and oils.
- _____ Made of amino acids.
- _____ Used for long-term energy storage, insulation, and protective coating.
- _____ Contain hydrogen, carbon, oxygen, and nitrogen.
- _____ Contains C, H, and O and is insoluble in water.
- _____ Tested for with Benedict's solution and/or iodine.
- _____ Includes enzymes which speed up reactions.
- _____ Built with glycerol and fatty acids.
- _____ Primary source of energy for your body.
- _____ Made up of long chains of amino acids.

Complete a Venn Diagram for carbohydrates, lipids and proteins:

