Honors Biology Study Guide- Chapter 2

Section 2.1: The Nature of Matter

1. What is Matter?
2. What is the smallest unit of matter that cannot be broken down by chemical means?
3. Draw and label an atom with the 3 subatomic particles. Use Carbon for this example
4. What is an electron cloud?
5. Fill in the Table below for the 3 subatomic particles

|  |  |  |
| --- | --- | --- |
|  | Charge | Mass |
| protons |  |  |
| neutron |  |  |
| electrons |  |  |

1. Which subatomic particle has a mass so small it is disregarded?
2. How many electrons can be in the
   1. 1st energy level = \_\_\_\_\_\_\_\_electrons
   2. 2nd energy level = \_\_\_\_\_\_\_ electrons
   3. 3rd energy level = \_\_\_\_\_\_\_ or 18 electrons
3. What is the atomic number
4. What is the mass number
5. How do you determine the number of neutrons in an atom?
6. If uranium has a mass # of 234 and an atomic number of 92, how many neutrons does it have
7. What is an isotope
8. Why do average atomic masses contain so many digits
9. How do you determine the most common isotope of an element?
10. Identify what the numbers represent in both of the formats describing an element below.
    1. 12C C-12 🡨

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1. What are the horizontal rows called on the periodic table?
2. What are the vertical columns called on the periodic table?
3. Which contains elements with similar properties?
4. Which of the following elements does not share properties with the others?
   1. Helium
   2. Krypton
   3. Neon
   4. Magnesium
5. What are ions
6. What are valence electrons
7. How many valence electrons are in atoms belonging to each group
8. What are the charges of ions in each of the groups
9. Why don’t 4A and 8A elements form ions
10. How do ions form ionic bonds?
11. Explain what happens to the electrons in a salt compound (NaCl)
12. How do atoms form covalent bonds
13. When atoms share electrons, what is the new substance called
14. Explain what happens when a hydrogen molecule is formed (H2)
15. Why is water a polar covalent molecule
16. What are hydrogen bonds?
17. Draw out a few hydrogen bonds between water molecules

Section 2.2: Water & Solutions

1. Why is water so important to living things?
2. Why does water store energy well?
3. What effect does water have on coastal lands
4. When your body releases water when you are hot, what is your body trying to maintain?
5. What is cohesion?
6. Cohesion allows small objects to float on water. What is this condition called?
7. What is adhesion?
8. Adhesion allows liquid water to move up thin tubes
9. What does water do when it freezes
10. What do most substances do when they turn into solids?
11. What is meant by the statement “like dissolves like”
12. Define the following
    1. Solution:
    2. Solute:
    3. Solvent:
13. How is a mixture different from a compound
14. What’s an acid
15. What pH does an acid have
16. What is a base
17. What pH level do bases have?

Section 2.3: Chemistry of Cells

1. What 3 elements do all organic compounds contain
2. What is a polymer
3. How is a polymer formed? How is it broken down?
4. What is the chemical formula for glucose?
5. Glucose & fructose are isomers. What does this mean
6. What is the main structural difference between glucose and fructose
7. Glucose & fructose are both single/ simple sugars. What are these called?
8. When you put glucose and fructose together, what disaccharide is formed
9. What are 2 other disaccharides discussed in your text
10. What type of carbohydrate is formed when 3 or more monosaccharides are put together
11. Which glucose polymer is a source of food for plants
12. Which glucose polymer is synthesized in your liver
13. Which glucose polymer makes up the cell wall in plants?
14. What are 4 common types of lipids
15. Are lipids polar or nonpolar
16. What is a fatty acid
17. What components make up a triglyceride
18. What are some differences between saturated and unsaturated fats

|  |  |
| --- | --- |
| Saturated fatty acids | Unsaturated fatty acids |
|  |  |

1. What is the difference between hydrophobic & Hydrophilic molecules
2. What subunit makes up proteins
3. Why are proteins important
4. What elements are found in proteins
5. What is the basic structure of an amino acid
6. How many different amino acids are there?
7. What makes one amino acid different from another
8. What is a polypeptide
9. Describe what occurs during the formation of each structure
10. What type of bond holds amino acids together
11. List and describe the 4 levels of protein structure
12. What subunit makes up nucleic acids
13. Draw and label the basic shape of this subunit
14. What are 3 main differences between DNA & RNA

|  |  |
| --- | --- |
| DNA | RNA |
|  |  |

1. What does ATP stand for
2. Where does an ATP molecule store its energy
3. When it releases energy, what happens to the ATP molecule

Section 2.4

1. What is energy
2. The body uses energy to carry out chemical reactions. What is the sum of all the chemical reactions in the human body called?
3. What is the energy needed to start a chemical reaction called?
4. How do enzymes speed up chemical reactions?
5. What class of organic molecules do enzymes belong to
6. What is another name for an enzyme
7. Are enzymes used up in chemical reactions/
8. Label the reactants, products, and enzyme in the following chemical reaction

CO2 + H2O + Carbonic Anhydrase H2CO3 + Carbonic Anhydrase

1. Where else could the enzyme be placed