Cell and Molecular Biology 1441
Supplemental Instruction
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Chapter 2 Study Questions

Elements and Compounds

1. What is matter?

2. What is the difference between an element and a compound?

3. What are some examples of the 92 naturally occurring elements?

4. How many of the 92 natural elements are essential to life?

5. What four elements make up 96% of living matter?

6. What are trace elements?

7. What medical condition does a deficiency in iodine lead to?

Atoms

1. What is an atom?

2. What are the three subatomic particles?

3. Fill in the chart below with the appropriate information:

Subatomic Particle	Mass	Charge
Protons		
Neutrons		
Electrons		

4. What force keeps the electrons near the nucleus?

5. What differentiates an atom of one element from the atom of another element?

6. What makes an atom electrically neutral as opposed to charged either positively or negatively?

7. What is the atomic number?

8. What is the mass number?

9. What is the difference between the mass number and the atomic mass of an atom?

10. Given the following symbol of a hypothetical element, what would each letter represent?

$$ {}^{A}_{Z}X $$

11. What is the atomic mass?

12. What are isotopes?

13. What is a radioactive isotope?

14. What are some examples of practical applications of radioactive isotopes?

<u>Electrons</u>

1. What are responsible for the chemical behavior of atoms?

2. What is energy? Potential energy?

3. Matter prefers the _____ (highest or lowest) state of potential energy.

4. What gives electrons their potential energy?

5. Which of the following electron shells would have the highest and lowest potential energy?
   a. 1^{st} electron shell
   b. 2^{nd} electron shell
   c. 3^{rd} electron shell

6. How can electrons move from one shell to another?

7. When an electron _____ (gains or loses) energy, it moves farther from the nucleus.

8. What happens to the energy that is lost when an electron moves closer to the nucleus?

9. What determines the chemical behavior of an atom?

10. What is the periodic table of elements?

11. What do the rows or periods correspond to?

12. How many maximum electrons can each electron shell hold?
    1^{st} shell =
    2^{nd} shell =
    3^{rd} shell =

13. Which electron shell's electrons determine the chemical behavior of an atom?

14. What are valence electrons?

15. What is the valence shell?

16. Given that carbon's atomic number is 6, how many valence electrons does it have?

17. What are inert elements?

18. What are orbitals?

<u>Chemical Bonding</u>

1. Why do chemical bonds form?

2. What are chemical bonds?

3. What are covalent bonds?

4. Define the following terms: molecule, single bond, double bond, structural formula, molecular formula.

5. What is electronegativity?

6. What is the difference between a nonpolar covalent bond and a polar covalent bond?

7. What happens to an atom in each of the following situations:
    a. gains an electron
    b. loses an electron

8. What is an ion? Cation? Anion?

9. What is an ionic bond?

10. Why is NaCl not a molecule?

Weak Chemical Bonds

1. What is a hydrogen bond?

2. What are van der Waals interactions?

Chemical Reactions

1. What are reactants and products?

2. What is meant by matter being conserved in a chemical reaction?

3. What is chemical equilibrium?

Bibliography: Campbell, Neil A.; Jane B. Reece. Biology. 7th Ed. Pearson Benjamin Cummings: 2005.