

**MOLECULES, CHEMICAL BONDS, AND CHEMICAL REACTIONS**

7. Match the terms in Column B to the chemical equations listed in Column A. Enter the correct letter or term in the answer blanks.

Column A	Column B
1. $A + B \rightarrow AB$	A. Decomposition
2. $AB + CD \rightarrow AD + CB$	B. Exchange
3. $XY \rightarrow X + Y$	C. Synthesis

8. Figure 2-1 is a diagram of an atom. Select two different colors and use them to color the coding circles and corresponding structures on the figure. Complete this exercise by responding to the questions that follow, referring to the atom in this figure. Insert your answers in the answer blanks provided.

- Nucleus
- Electrons

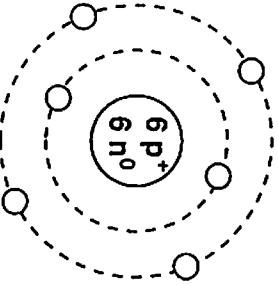


Figure 2-1

1. What is the atomic number of this atom? \_\_\_\_\_
2. What is its atomic mass? \_\_\_\_\_
3. What atom is this? \_\_\_\_\_
4. If this atom had one additional neutron but the other subatomic particles remained the same as shown, this slightly different atom (of the same element) would be called a(n) \_\_\_\_\_
5. Is this atom chemically active or inert? \_\_\_\_\_
6. How many electrons would be needed to fill its outer (valence) shell? \_\_\_\_\_

11. Figure 2-3 illustrates five water molecules held together by hydrogen bonds. First, correctly identify the oxygen and hydrogen atoms both by color card by inserting their atomic symbols on the appropriate circles (atoms). Then label the following structures in the figure:

- Oxygen
- Hydrogen
- Positive pole (end)
- Negative pole (end)
- Hydrogen bonds

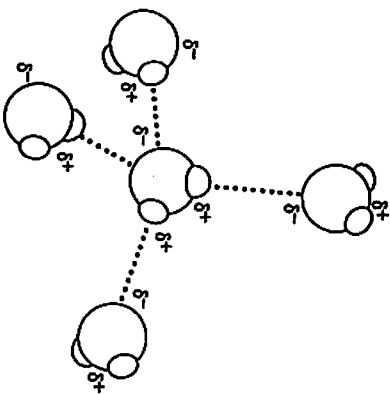
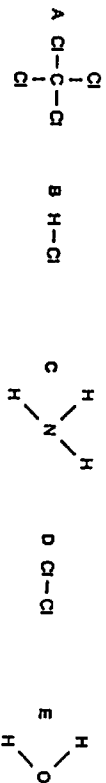


Figure 2-3

12. Circle each structural formula that is likely to be a polar covalent compound.



13. Respond to the instructions following the equation:



1. In the space provided, list the chemical formula(s) of compounds. \_\_\_\_\_
2. In the space provided, list the chemical formula(s) of ions. \_\_\_\_\_
3. Circle the product(s) of the reaction.
4. Modify the equation by adding a colored arrow in the proper place to indicate that the reaction is reversible.

2. Use choices from the key to identify the energy form in use in each of the following examples.

*Key Choices*

A. Chemical      B. Electrical      C. Mechanical      D. Radiant

- \_\_\_\_\_ 1. Chewing food  
 \_\_\_\_\_ 2. Vision (two types, please—think)  
 \_\_\_\_\_ 3. Bending your fingers to make a fist  
 \_\_\_\_\_ 4. Breaking the bonds of ATP molecules to energize your muscle cells to make that fist  
 \_\_\_\_\_ 5. Lying under a sunlamp

## COMPOSITION OF MATTER

3. Complete the following table by inserting the missing words.

Particle	Location	Electrical charge	Mass
		+ 1	
Neutron			
	Orbitals		

4. Insert the *chemical symbol* (the chemist's shorthand) in the answer blank for each of the following elements.

- \_\_\_\_\_ 1. Oxygen      \_\_\_\_\_ 4. Iodine      \_\_\_\_\_ 7. Calcium      \_\_\_\_\_ 10. Magnesium  
 \_\_\_\_\_ 2. Carbon      \_\_\_\_\_ 5. Hydrogen      \_\_\_\_\_ 8. Sodium      \_\_\_\_\_ 11. Chloride  
 \_\_\_\_\_ 3. Potassium      \_\_\_\_\_ 6. Nitrogen      \_\_\_\_\_ 9. Phosphorus      \_\_\_\_\_ 12. Iron

5. Using the key choices, select the correct responses to the following descriptive statements. Insert the appropriate answers in the answer blanks.

*Key Choices*

A. Atom      C. Element      E. Ion      G. Molecule      I. Protons  
 B. Electrons      D. Energy      F. Matter      H. Neutrons      J. Valence

- \_\_\_\_\_ 1. An electrically charged atom or group of atoms  
 \_\_\_\_\_ 2. Anything that takes up space and has mass (weight)

- \_\_\_\_\_ 3. A unique substance composed of atoms having the same atomic number  
 \_\_\_\_\_ 4. Negatively charged particles, forming part of an atom  
 \_\_\_\_\_ 5. Subatomic particles that determine an atom's chemical behavior, or bonding ability  
 \_\_\_\_\_ 6. The ability to do work  
 \_\_\_\_\_ 7. The smallest particle of an element that retains the properties of the element  
 \_\_\_\_\_ 8. The smallest particle of a compound, formed when atoms combine chemically  
 \_\_\_\_\_ 9. Positively charged particles forming part of an atom  
 \_\_\_\_\_ 10. Name given to the electron shell that contains the most reactive electrons  
 \_\_\_\_\_ 11. \_\_\_\_\_ 12. Subatomic particles responsible for most of an atom's mass

6. For each of the following statements that is true, insert T in the answer blank. If any of the statements are false, correct the underlined term by inserting your correction in the answer blank.

- \_\_\_\_\_ 1. Na<sup>+</sup> and K<sup>+</sup> are needed for nerve cells to conduct electrical impulses.  
 \_\_\_\_\_ 2. The atomic number of oxygen is 8. Therefore, oxygen atoms always contain 8 neutrons.  
 \_\_\_\_\_ 3. The greater the distance of an electron from the nucleus, the less energy it has.  
 \_\_\_\_\_ 4. Electrons are located in more or less designated areas of space around the nucleus called orbitals.  
 \_\_\_\_\_ 5. An unstable atom that decomposes and emits energy is called retroactive.  
 \_\_\_\_\_ 6. Iron is necessary for oxygen transport in red blood cells.  
 \_\_\_\_\_ 7. The most abundant negative ion in extracellular fluid is calcium.  
 \_\_\_\_\_ 8. The element essential for the production of thyroid hormones is magnesium.  
 \_\_\_\_\_ 9. Calcium is found as a salt in bones and teeth.