Name: _____ Date: _____

Science _____ **Mixtures, Compounds & Elements PACKET**

Is It a Mixture?

Each of the following items describes two substances combining. Decide whether or not each of the resulting combinations could be a mixture. **Then explain why or why not**.

1. Substance A is added to substance B. The freezing point of B is lowered by 9^0 C.

_____

_____

2. When substance X and substance Y are mixed together, a magnet can remove particles of substance X.

_____

_____

3. Particles of substance B are suspended in substance T.

_____

_____

4. When substance X and substance Z are heated together in a test tube, drops of substance B form on the inside of the test tube.

_____

_____

5. When substance Q is added to substance R, substance R tastes salty.

_____

_____

6. When a solid substance Y is added to liquid substance R, there is a violent explosion. The resulting matter has less mass than the combined masses of Y and R.

_____

_____

Insert Symbol Here . .

The following sentences contain the names of many elements. Underline the names of the elements as you read. Then rewrite each sentence using the chemical symbols of the elements in place of the names.

1. First we wrapped some sandwiches in aluminum foil, then put some food in tin cans into our backpacks.

_____

_____

2. We looked at jewelry made of gold, copper, and silver.

_____

3. The balloons were filled with helium. _____

4. The mercury in the thermometer was up to the 30^0 mark. _____

_____

5. The neon sign over the movie theater advertised an adventure story about prospectors looking for uranium.

_____

6. Lithium is sometimes used as medicine.

_____

7. The vitamin supplements contain calcium, iron, and potassium.

_____

8. The town water supply was reacted with chlorine and fluorine.

_____

9. The solar cell contained a thin layer of silicon.

_____

10. When the glowing splint was placed in the bottle containing hydrogen, it created a "pop".

_____

Key Concepts

Pure substances that are made of more than one element are called compounds.

1. Which of the following represent elements and which represent compounds?

   a. HCl _____ c. Na _____

   b. CO _____ d. Ca _____

2. Can two or more elements be combined chemically to make a new element? Explain your answer.

   _____

   _____

   _____

3. Does the relative proportions of elements in a given compound vary from sample to sample (size to size)? Explain your answer.

   _____

   _____

Reviewing the Main Ideas

Complete the chart by filling in the correct answers to each question.

	ELEMENT	COMPOUND	MIXTURE
What kind of particles makes it up?			
How can it be broken down?			
Is it the same throughout?			

Fill in the blank . . .

Formula	Compound Name	Number of Elements	Names of the Elements	Number of Atoms of Each Element	Total Number of Atoms per Molecule
1. MgO	magnesium oxide	2	Magnesium Oxygen	Mg = 1 O = 1	2
2. SO_2	sulfur dioxide				
3. NH_3	ammonia				
4. H_2CO_3	carbonic oxide				
5. $C_{12}H_{22}O_{11}$	table sugar				
6. $MgSO_4$	Epsom salts				
7. $NaOH$	sodium hydroxide				
8. H_2O_2	hydrogen peroxide				
9. Fe_2O_3	iron oxide (rust)				
10. $NaHCO_3$	Sodium bicarbonate				

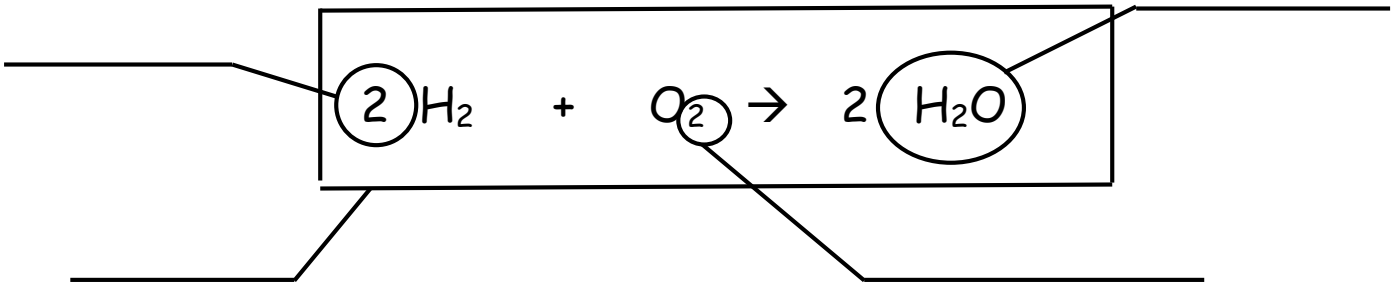
KEY CONCEPTS

- Pure substances that are made of more than one element are called **compounds**.

Vocabulary Skills: Applying Definitions

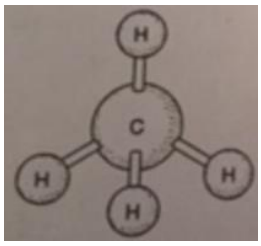
On the diagram below, label correctly each of the following.

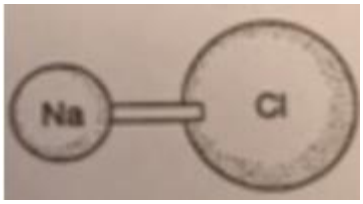
chemical formula coefficient chemical equation subscript

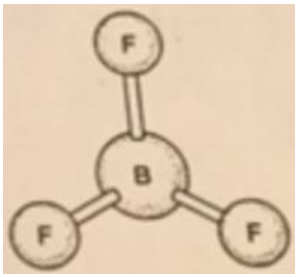


Writing Formulas: Applying the Main Idea

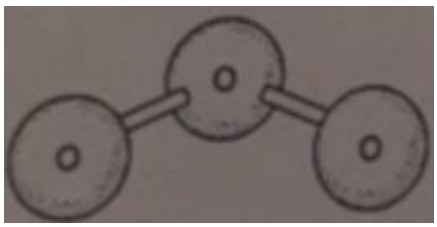
The drawings below show molecules of various compounds. Under each drawing, write the correct formula for the compound.

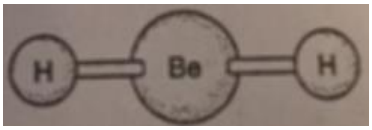


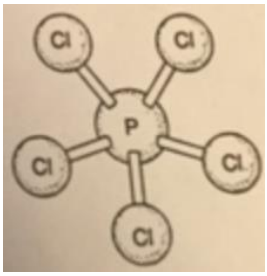




1 . _____ 2. _____ 3. _____







4. _____ 5. _____ 6. _____

Interpreting Formulas and Equations

Problem: What can you learn from formulas and equations?

Materials: Pencil and paper

Procedure:

1. A chemical formula shows the elements in a compound and the numbers of atoms of each element. The formula for carbon dioxide is CO_2. The small number 2 is a subscript. Subscripts show how many atoms of each element have combined to form the compound. The carbon symbol does not have a written subscript. This means there is only one atom of carbon in the molecule.

2. Use the data tables shown below. In Table 1, write the number of atoms of each element for each of the compounds shown.

3. A chemical equation describes what happens in a chemical change. The equation $2H_2 + O_2 \rightarrow 2H_2O$ states that two molecules of hydrogen combine with a molecule of oxygen to make two molecules of water. The substances to the **left** of the arrow are called **reactants**. The substances to the **right** of the arrow are called **products**. The **arrow** means **yields** or produces. Notice the 2 in front of the H_2, and H_2O. Numbers used in **front** of symbols and formulas are called **coefficients**. They are used to show the amounts of each substance in a reaction. A balanced chemical equation shows the same number of each kind of atom on both sides of the arrow. Coefficients are written in front of symbols and formulas in order to make the equation balanced. **Chemical equations must be balanced because atoms are never lost or gained in chemical change.**

4. In Table 2, write coefficients in the blanks to balance the equations. If the coefficient is 1, do not write it.

Data and Observations

Table 1

Formula	Number of hydrogen atoms	Number of carbon atoms	Number of oxygen atoms	Number of other atoms
H_2O_2				
$CaCO_3$				
$NaC_2H_3O_2$				
C_3H_7OH				
$C_{12}H_{22}O_{11}$				

Table 2

1. ____H_2 + ____N_2 → _____ NH_3
2. ____Mg + ____HCl → _____ $MgCl_2$ + _____H_2
3. ____ H_2O_2 → ____ H_2O + ____ O2
4. ____ $C_6H_{12}O_6$ + _____ O_2 → ____CO_2 + H_2O
5. ____ AgNO3 + _____NaCl → ____ AgCl + $NaNO_3$

Analysis

1. What information is in a formula? _____

_____

2. What does a subscript tell? _____

_____

3. What information can be obtained from a chemical equation? _____

_____

4. What does a coefficient tell? _____

5. What are the reactants in equation 1? _____

_____

6. What are the products in equation 4? _____

_____

Conclusions and Applications

7. Why are word equations not used for chemical reactions? _____

_____

_____

8. Why is it important to use coefficients in chemical equations? _____

_____

_____