Read pages 464 – 471.

1. How is a chemical formula different than an empirical formula?

2. Which element is usually written first in a chemical formula?

3. Identify the oxidation numbers for each atom in the following compounds:

   a. CaF_2

   b. PO_2

   c. MgH_2

   d. Li_2S

   e. $FeBr_2$

   f. Na_3N

4. For the following elements and ions, use the oxidation numbers to write the formula for the molecule made by combining them:
   a. aluminum and chlorine
   b. carbon and fluorine
   c. oxygen and potassium
   d. the phosphate ion and sodium

5. What is a polyatomic ion?

6. What is a binary compound?

7. Write the names for the following ionic compounds:

   a. NaBr

   b. Li_2O

   c. FeS

   d. $Cu(NO_3)_2$

   e. $Mg(OH)_2$

   f. $CaCO_3$

8. Write the names for the following covalent compounds:

   a. NF_3

   b. CCl_4

   c. S_3Cl_2

   d. N_2O_3

Chapter 19B **Physical Science**

Read pages 472 – 476.

1. List five signs that indicate a chemical change may have taken place.

2. For the equation, $NaOH + Cl \rightarrow NaCl + H_2O$:
   a. Which chemicals are the reactants?
   b. Which chemicals are the products?

3. Why do chemical equations have to be balanced?

4. What is the solid product that settles out of a solution called?

5. The chemical formula for copper nitrate is $Cu(NO_3)_2$.
   a. How many copper atoms does the molecule have?
   b. How many nitrogen atoms does it have?
   c. How many oxygen atoms does it have?

6. Balance the following chemical equations:

   a. $Pb + O_2 \rightarrow PbO$

   b. $FeBr_3 + Cl_2 \rightarrow FeCl_3 + Br_2$

   c. $H_2O_2 \rightarrow H_2O + O_2$

   d. $Na_2CO_3 + Ca(OH)_2 \rightarrow NaOH + CaCO_3$

Bonus: + 5 points

Write the balanced chemical equation for this reaction:

Calcium hydroxide combines with hydrogen chloride to make calcium chloride and water.

Read pages 477 – 481.

1. Write the product for each composition reaction:
   a. $C + O_2 \rightarrow$ _____
   b. $CaO + H_2O \rightarrow$ _____

2. Write the products for this decomposition reaction: $HgS \rightarrow$ _____ + _____

3. Determine the number of molecules of each of the product formed for this decomposition reaction:

   $C_6H_{12}O_6 \rightarrow$ ___ C + ___ H_2 + ___ O_2

4. What must usually be added to make a compound decompose?

5. What area of chemistry involved the study of energy changes in a reaction?

6. A reaction that gives off heat is called _____.

7. A reaction that absorbs heat is called _____.

8. Classify each of the following reactions as composition, decomposition, single replacement, or double replacement:

   a. $2Na + 2H_2O \rightarrow 2NaOH + H_2$

   b. $2Hg + O_2 \rightarrow 2\ HgO$

   c. $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$

   d. $Fe_2O_3 + 2Al \rightarrow 2Fe + Al_2O_3$

   e. $2KClO_3 \rightarrow KCl + 3O_2$

   f. $Mg + 2\ HCl \rightarrow MgCl_2 + H_2$

BONUS:

What is MTBE?

What is its chemical formula?

What is it used for?

What is one problem associated with MTBE?