

1) What fundamental law of chemistry requires that equations be balanced?

2) What do the following symbols mean in a chemical equation?

a) (g)

b) (l)

c) (s)

d) (aq)

e)  $\xrightarrow{\Delta}$

f)  $\xrightarrow{KI}$

3) Fill in the table to remind you of how to recognize a type of reaction based on just the reactants.

When the Reactants Are:	It Means the Reaction is:	Example:
A hydrocarbon and oxygen	Combustion	$2 \text{C}_2\text{H}_6 + 7 \text{O}_2 \rightarrow 4 \text{CO}_2 + 6 \text{H}_2\text{O}$
	Synthesis	
	Decomposition	
	Single Displacement	
	Double Displacement	

4) Identify the seven diatomic elements.

5) Balance the following equations by adding coefficients. Identify the type of each reaction.

a)  $\text{Ca}(\text{OH})_2 + \text{HBr} \rightarrow \text{CaBr}_2 + \text{H}_2\text{O}$  Type: \_\_\_\_\_

b)  $\text{Mg} + \text{AlI}_3 \rightarrow \text{MgI}_2 + \text{Al}$  Type: \_\_\_\_\_

c)  $\text{C}_3\text{H}_8 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$  Type: \_\_\_\_\_

d)  $\text{AgOH} \rightarrow \text{Ag}_2\text{O} + \text{H}_2\text{O}$  Type: \_\_\_\_\_

e)  $\text{Cl}_2 + \text{Fe} \rightarrow \text{FeCl}_3$  Type: \_\_\_\_\_

f)  $\text{Ba}(\text{NO}_3)_2 + \text{Al}_2(\text{SO}_4)_3 \rightarrow \text{Al}(\text{NO}_3)_3 + \text{BaSO}_4$  Type: \_\_\_\_\_

6) - Write a balanced chemical equation.

- Include the states of matter (Use Solubility Rules, when needed!)

a) Copper metal will react with liquid bromine to make solid copper (I) bromide.

b) Cyclohexane,  $\text{C}_6\text{H}_{12(l)}$ , burns in the presence of oxygen to give carbon dioxide and water vapor.

c) Solid calcium carbonate decomposes upon heating to form solid calcium oxide and a gas.

- 7) - Write a balanced chemical equation.  
 - Include the states of matter (Use Solubility Rules, when needed!)  
 - Circle the spectator ions  
 - Write the net ionic equation.
- a) Aqueous sodium carbonate reacts with aqueous silver nitrate to make silver carbonate and sodium nitrate.
- b) Zinc will react with aqueous tin (IV) bromide to make tin and zinc bromide.
- c) Hydrochloric acid reacts with aqueous strontium hydroxide to make strontium chloride and water.

8) Given just the reactants, identify the type of reaction and write a balanced equation.

- a)  $\text{CaCl}_2 + \text{AgNO}_3 \rightarrow$  Type: \_\_\_\_\_
- b)  $\text{N}_2 + \text{Mg} \rightarrow$  Type: \_\_\_\_\_
- c)  $\text{Zn} + \text{CuNO}_3 \rightarrow$  Type: \_\_\_\_\_
- d)  $\text{C}_5\text{H}_{12} + \text{O}_2 \rightarrow$  Type: \_\_\_\_\_
- e)  $\text{Ba(OH)}_2 + \text{Na}_2\text{SO}_4 \rightarrow$  Type: \_\_\_\_\_
- f)  $\text{Cu(OH)}_2 \rightarrow$  Type: \_\_\_\_\_

9) Use your activity series to tell which of the following combinations of reactants will react.

Circle the pair that will react.

- |    |                            |                                       |
|----|----------------------------|---------------------------------------|
| a) | $\text{AgNO}_3$ and Cu     | $\text{Cu(NO}_3)_2$ and Ag            |
| b) | $\text{Mg(NO}_3)_2$ and Fe | $\text{Fe(NO}_3)_2$ and Mg            |
| c) | $\text{CaCl}_2$ and Pb     | $\text{PbCl}_2$ and Ca                |
| d) | HCl and Pt                 | $\text{PtCl}_6$ and $\text{H}_2$      |
| e) | K and $\text{H}_2\text{O}$ | $\text{H}_2$ and $\text{K}_2\text{O}$ |

10) Identify as either a physical (P) property or a chemical (C) property:

- a) \_\_\_\_\_ Hardness  
 b) \_\_\_\_\_ Density  
 c) \_\_\_\_\_ Aluminum reacts with hydrochloric acid to form hydrogen gas.  
 d) \_\_\_\_\_ Ethanol boils at  $78.4^\circ\text{C}$ .  
 e) \_\_\_\_\_ Vinegar is volatile.  
 f) \_\_\_\_\_ Table salt is composed of Na and Cl.  
 g) \_\_\_\_\_ Sugar dissolves in water.

11) Identify as examples of Physical Changes (P) or Chemical Changes (C):

- |          |                     |          |                                    |
|----------|---------------------|----------|------------------------------------|
| _____ 1. | glass breaking      | _____ 5. | fireworks exploding                |
| _____ 2. | spoiling food       | _____ 6. | frying an egg                      |
| _____ 3. | mixing lemonade     | _____ 7. | cream being whipped                |
| _____ 4. | bleaching your hair | _____ 8. | freezing chocolate covered bananas |