

1a. Combustion (or “burning”) is an exothermic reaction with \_\_\_\_\_.

b. Exothermic reactions \_\_\_\_\_ energy, and endothermic reactions \_\_\_\_\_ energy.

2. Write a balanced chemical equation (with phase subscripts) for each reaction:

a. Magnesium burns: \_\_\_\_\_

b.  $\text{Na}_{(s)} + \text{O}_{2(g)} \text{----->}$  \_\_\_\_\_

c. Methane burns in a bunsen burner. \_\_\_\_\_  
(Methane (aka “natural gas”) has the formula  $\text{CH}_4$ )

d. Liquid hexane ( $\text{C}_6\text{H}_{14}$ ), one of the compounds found in gasoline, undergoes combustion:

\_\_\_\_\_

e.  $\text{C}_3\text{H}_7\text{OH}_{(l)} + \text{O}_{2(g)} \text{----->}$  \_\_\_\_\_

3. Write a balanced equation for each combustion reaction: Include phase subscripts on reactions a-d.

a.  $\text{Al}_{(s)} + \text{O}_{2(g)} \text{----->}$  \_\_\_\_\_

b. Potassium is burned: \_\_\_\_\_

c. Gasoline burns in your car engine (use  $\text{C}_9\text{H}_{20}$  as an “average” formula for gasoline)

\_\_\_\_\_

d. Acetylene gas ( $\text{C}_2\text{H}_2$ ) burns in a welding torch: \_\_\_\_\_

e. Coal (Carbon) is combusted. \_\_\_\_\_

f. Hydrogen gas is combusted. \_\_\_\_\_

g. Ethanol ( $\text{C}_2\text{H}_5\text{OH}$ ) burns. \_\_\_\_\_

h. Glucose ( $\text{C}_6\text{H}_{12}\text{O}_6$ ) is combusted. \_\_\_\_\_  
(This reaction also occurs during cellular respiration in your body when you “burn sugar.”)

i.  $\text{C}_{54}\text{H}_{104}\text{O}_6 + \text{O}_2 \text{----->}$  \_\_\_\_\_  
(olive oil!)

**Part II. Solubility chart and phases.**

1. Intro and demo: Look up each compound on your solubility chart, and classify each one as “soluble” or “insoluble” into water.

$\text{CuSO}_4$  \_\_\_\_\_  $\text{CuCO}_3$  \_\_\_\_\_  $\text{CoCl}_2$  \_\_\_\_\_

2a. Write the formula, including the phase subscript, for solid copper II sulfate. \_\_\_\_\_

b. Write the formula, including the phase subscript, for copper II sulfate dissolved in water. \_\_\_\_\_

3. Use your solubility chart to classify each compound as “soluble” or “insoluble” in water.

$\text{MgSO}_4$     soluble    insoluble                       $\text{Ba}(\text{C}_2\text{H}_3\text{O}_2)_2$     soluble    insoluble

$\text{PbSO}_4$     soluble    insoluble                       $\text{CuI}$                       soluble    insoluble

$\text{CuCl}_2$     soluble    insoluble                       $\text{CuI}_2$                       soluble    insoluble

$\text{CuCl}$      soluble    insoluble                       $\text{Li}_2\text{CO}_3$                 soluble    insoluble

$\text{K}_2\text{S}$       soluble    insoluble                       $\text{PbBr}_2$                 soluble    insoluble

$\text{AuNO}_3$     soluble    insoluble                       $\text{Mg}(\text{NO}_3)_2$           soluble    insoluble

$(\text{NH}_4)_2\text{S}$     soluble    insoluble                       $\text{FeSO}_3$                 soluble    insoluble

$\text{CuS}$         soluble    insoluble                       $\text{FeSO}_4$                 soluble    insoluble

$\text{NaOH}$       soluble    insoluble                       $\text{K}_2\text{SO}_3$                 soluble    insoluble

$\text{MgCO}_3$     soluble    insoluble                       $\text{K}_2\text{SO}_4$                 soluble    insoluble

**Part III: Balance each equation, using the lowest possible integer coefficients.**

