Chapter 6 Balancing and Stoichiometry Worksheet and Key

Topics:
- Balancing Equations
- Writing a chemical equation
- Stoichiometry

Practice:

1. **In the reaction: 4Li (s) + O$_2$ (g) → 2Li$_2$O (s)**

    a. what is the product?

    b. what are the reactants?

    c. what does the "(s)" after the formula of lithium oxide signify?

    d. what is the coefficient of the lithium metal?

    e. in what phase is the lithium oxide?

2. Define "chemical reaction".

3. List the observations that are evidence of a chemical reaction:

4. Write and balance the chemical equation that relates to each of the following word equations:
Remember that some elements exist as diatomic molecules (oxygen, nitrogen, hydrogen, halogens).
a. solid zinc metal + oxygen gas → solid zinc oxide

b. HCl (*aq*) + magnesium hydroxide (*aq*) → magnesium chloride (*aq*) + water
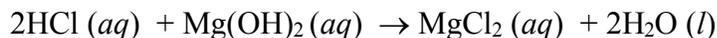
c. HNO$_3$ (*aq*) + calcium hydroxide (s) → calcium nitrate (*aq*) + water

5. *Balancing and Stoichiometry:*

a. $H_2 + Cl_2 \rightarrow HCl$ (needs balanced)

How many grams of HCl can be produced if 7.25 g of Cl_2 is reacted with an unlimited supply of H_2?

b. $Al + Fe_2O_3 \rightarrow Al_2O_3 + Fe$ (needs balanced)

How many grams of Fe can be produced when 10.0g of Al is reacted with an excess (unlimited) supply of Fe_2O_3?

c. $Pb(CH_3COO)_2 + H_2S \rightarrow PbS + CH_3COOH$ (needs balanced)

How many grams of PbS is produced when 5.00g of H_2S is reacted with an excess (unlimited) supply of $Pb(CH_3COO)_2$?

SEE NEXT PAGE FOR KEY

Chapter 6 Balancing and Stoichiometry Worksheet

Topics:

- Balancing Equations
- Writing a chemical equation

- Stoichiometry

Practice:

1. **In the reaction: 4Li (s) + O$_2$ (g) → 2 Li$_2$O(s)**

    a. what is the product?

        Li$_2$O (*s*)

    b. what are the reactants?

        Li (*s*) O$_2$ (*g*)

    c. what does the "(*s*)" after the formula of lithium oxide signify?

        phase = solid

    d. what is the coefficient of the lithium metal?

        4

    e. in what phase is the lithium oxide?

```` ````   **solid**

2. Define "chemical reaction".

    Ionic or covalent bonds are made and/or broken, and a new substance is made.

3. List the observations that are evidence of a chemical reaction:

    A color change, the formation of a new phase, a new odor, a temperature change, the emission light, or the appearance of a flame.

4. Write and balance the chemical equation that relates to each of the following word equations:
Remember that some elements exist as diatomic molecules (oxygen, nitrogen, hydrogen, halogens).
a. solid zinc metal + oxygen gas → solid zinc oxide

    2Zn (*s*) + O$_2$ (*g*) → 2 ZnO (*s*)

b. HCl (*aq*) + magnesium hydroxide (*aq*) → magnesium chloride (*aq*) + water

    2HCl (*aq*) + Mg(OH)$_2$ (*aq*) → MgCl$_2$ (*aq*) + 2H$_2$O (*l*)

c. HNO$_3$ (*aq*) + calcium hydroxide (s) → calcium nitrate (*aq*) + water

    2HNO$_3$ (*aq*) + Ca(OH)$_2$ (*s*) →   Ca(NO$_3$)$_2$ (*aq*) + 2 H$_2$O (*l*)

5. Balancing and Stoichiometry:

a. H_2 + Cl_2 → **2** HCl (needs balanced)

How many grams of HCl can be produced if 7.25 g of Cl_2 is reacted with an unlimited supply of H_2?

7.25 g Cl_2	1 mol Cl_2	2 mol HCl	36.46 g HCl	= 7.46 g HCl
	70.90 g Cl_2	1 mol Cl_2	1 mol HCl	

b. **2**Al + Fe_2O_3 → Al_2O_3 + **2**Fe (needs balanced)

How many grams of Fe can be produced when 10.0g of Al is reacted with an excess (unlimited) supply of Fe_2O_3?

10.0 g Al	1 mol Al	2 mol Fe	55.85g Fe	= 20.7 g Fe
	26.98 g Al	2 mol Al	1 mol Fe	

c. $Pb(CH_3COO)_2$ + H_2S → PbS + **2**CH_3COOH (needs balanced)

How many grams of PbS is produced when 5.00 g of H_2S is reacted with an excess (unlimited) supply of $Pb(CH_3COO)_2$?

5.00 g	1 mol H_2S	1 mol PbS	239.27 g	= 35.1 g PbS
	34.09 g H_2S	1 mol H_2S	1 mol PbS	