Chemistry 1 Name _____KEY_____
STUDY GUIDE *ALT 4 LT4a Test #1* Period ____ Date _____
Materials Needed: (1) Warrior Periodic Table; (2) Monoatomic and Polyatomic Ion List; (3) Lesson Handouts listed on the Packet Organizer #1.

ALT 4 (Unit 4 Toxins): How can I predict the products of a chemical reaction, and use chemical equations to solve a real world problem?
LT4.a:

How do chemists keep track of changes in matter? How are changes in matter classified?
How do chemical equations help predict what will be observed during a chemical reaction?
How do you balance atoms in a chemical equation according to the Law of Conservation of Mass?

Answer these review questions using your handouts, notes, and the text book.

1. For each element, anion, or polyatomic ion listed below, write the correct chemical symbol for it:
Examples: Carbonate CO_3^{2-} Sulfide S^{2-}

a. Sodium _____Na_____ d. Nitrate _____NO_3^-_____ g. Carbon ____C_____

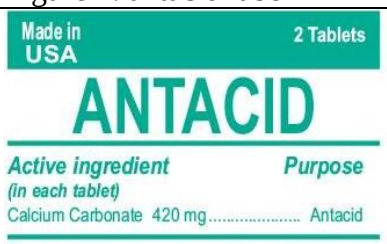
b. Calcium _____Ca_____ e. Chloride ____Cl^-___ h. Sulfate _____SO_4^{2-}_____

c. Copper _____Cu_____ f. Oxide _____$^{O2-}$_____ i. Magnesium ____Mg____

2. Use the product labels in Figure 1 below to answer parts (a) and (b).

a. The main active ingredient in the Epsom salts is _____magnesium sulfate_____ and the correct chemical formula for it is _____MgSO_4^{2-}_____.

b. The main active ingredient of the antacid tablets is ___calcium carbonate_____ and the chemical formula for it is _____Ca CO_3^{2-}_____.

Figure 1: bath salt label	Figure 1: antacid label
	

3. Relate each chemical symbol to the information it conveys:

Symbol	Interpretation	Symbol	Interpretation
(aq)	Aqueous solution	(g)	Gas
(s)	Solid	+	Reacts with
(l)	Liquid	→	To produce

4. Which of the following is the correct description of this reaction? Choose the best answer ___**B**___.

$Zn(s) + HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$

A. Hydrogen gas reacts with a solution of zinc chloride to produce solid zinc metal in a solution of hydrochloric acid. This is incorrect because it starts with hydrogen gas but H2 gas is a product.

B. Solid zinc reacts with a solution of hydrochloric acid to produce a solution of zinc chloride and hydrogen gas. This is correct.

C. Hydrogen gas reacts with solid zinc chloride to produce solid zinc metal in a solution of hydrochloric acid. This is incorrect because it starts with the products not the reactants.

D. A solution of zinc metal reacts with solid hydrochloric acid to produce a solution of zinc chloride and hydrogen gas. This is incorrect because zinc is a solid not a solution and hydrochloric acid is a solution not a solid.

5. Write a sentence to describe each chemical reaction:

a. $KOH(aq) + H_2SO_4(aq) \rightarrow H_2O(l) + K_2SO_4(aq)$

A solution of potassium hydroxide reacts with a solution of sulfuric acid to produce water and a solution of potassium sulfate.

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b. $Na(s) + H_2O(l) \rightarrow NaOH(aq) + H_2(g)$

Solid sodium metal reacts with liquid water to produce a solution of sodium chloride and hydrogen gas.

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c. $Cu(s) + CO_2(g) + H_2O(l) \rightarrow CuCO_3\ (s)$

Solid copper metal reacts with carbon dioxide gas and liquid water to produce solid copper (II) carbonate.

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6. Write a chemical equation including the correct phase symbols for this chemical reaction:
Solid sodium hydrogen carbonate (baking soda $NaHCO_3$) reacts with a solution of hydrochloric acid to produce aqueous sodium chloride, water, and carbon dioxide gas.

$$NaHCO_3\ (s) + HCl(aq) \rightarrow NaCl(aq) + H_2O\ (l) + CO_2(g)$$

7. Classify each equation as a physical or chemical change:

A. $2\ NaCl\ (l) \rightarrow 2Na(l) + Cl_2(g)$ _____chemical because new products are formed_____

B. $NaCl(s) \rightarrow NaCl(aq)$ _____physical change because the substance is the same on both sides and just the phase symbol changed from solid to a solution in water_____

C. $H_2O(s) \rightarrow H_2O(l)$ _____physical change as solid water melts to form liquid water___

8. Balance the following chemical equations. Show your atom inventory.

a. ____$N_2(g)$ + _**3**$H_2(g)$ → __**2** $NH_3(g)$

This was unbalanced to start.

Reactant Side	Product Side
__2_____ N	~~1~~ 2 N
___~~2~~_6___ H	~~3~~_6_ H

b. ___4 Fe(s) + ___**3**$O_2(g)$ → __**2** $Fe_2O_3(s)$

This was unbalanced to start.

Reactant Side	Product Side
~~1~~ 4 Fe	~~2~~ 4 Fe
~~2~~ 6 O	~~3~~ 6O

c. ____ Mg(s) + ____ $Br_2(l)$ → ____ $MgBr_2(s)$

All coefficients are 1. This is balanced.

Reactant Side	Product Side
1 Mg	1 Mg
2 Br	2 Br