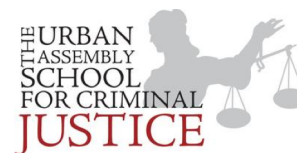


Name: _____ Date: _____

Chemistry ~ Ms. Hart

Class: Anions or Cations



6.8 Chemical Reactions - Lab #17

Background

- Synthesis reactions** Two or more reactants combine to make 1 new product. Examples: $C(s) + O_2(g) \rightarrow CO_2(g)$ $H_2O(l) + SO_3(g) \rightarrow H_2SO_4(aq)$
- Decomposition reactions** A single reactant breaks down to form 2 or more products. Examples: $H_2CO_3(aq) \rightarrow H_2O(l) + CO_2(g)$ $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$
- Single-replacement reactions** A single element replaces a similar element of an adjacent reactant compound. Examples: $Zn(s) + CuSO_4(aq) \rightarrow ZnSO_4(aq) + Cu(s)$
- Double-replacement reactions** Two ionic compounds exchange ions, producing 2 new ionic compounds. Examples: $NaCl(aq) + AgNO_3(aq) \rightarrow NaNO_3(aq) + AgCl(s)$ $HCl(aq) + NaOH(aq) \rightarrow NaCl(aq) + H_2O(l)$
- Combustion reactions** A single element or compound combines with oxygen gas releasing energy. This rapid oxidation is called burning. Examples: $C(s) + O_2(g) \rightarrow CO_2(g) + \text{energy}$ $2Mg(s) + O_2(g) \rightarrow 2MgO(s) + \text{energy}$ $2C_4H_{10}(g) + 13O_2 \rightarrow 8CO_2(g) + 10H_2O(g) + \text{energy}$

National Science Education Standards

This activity is appropriate for high school students and addresses the following National Science Education Standards for grades 9–12:

Science as Inquiry: Abilities Necessary to Do Scientific Inquiry; Understandings About Scientific Inquiry Physical Science: Structure and Properties of Matter Chemical Reactions; Interactions of Energy and Matter

Procedure

Decomposition activity

- Pour the yeast from the test tube into the flask containing the 20 mL of hydrogen peroxide (H_2O_2). The yeast contains the enzyme catalase that decomposes hydrogen peroxide. What gas or gases could be produced?

- Write a balanced equation for this decomposition reaction if O_2 and water are the products.

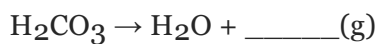
Double-replacement activity

- Pour the baking soda (sodium hydrogen carbonate, $NaHCO_3$) from the spoon into the 250-mL beaker containing the vinegar (acetic acid, $HC_2H_3O_2$).
- Describe what happens.

- Complete and balance the equation below for this reaction:



6. One of the products, carbonic acid (H_2CO_3), immediately decomposes into water and a gas. Complete and balance this equation, and identify the gas with a flaming or glowing splint:



Conclusion: describe the purpose of this lab and the reason why we have to balance chemical equations.

	Exceeding Standards	Met Standards	Approaching Standards	Initiating Standards
Data, Observation, Data Analysis	<input type="checkbox"/> Data is properly recorded <input type="checkbox"/> All balanced equations are correct	<input type="checkbox"/> Data is properly recorded <input type="checkbox"/> 2 out of 3 balanced equations are correct	<input type="checkbox"/> Data is properly recorded <input type="checkbox"/> 1 out of 3 balanced equations are correct	<input type="checkbox"/> Data is incomplete. <input type="checkbox"/> 0 balanced equations are correct
Conclusion	<input type="checkbox"/> Answers the purpose of the lab <input type="checkbox"/> Clearly explains the need to balance chemical equations.	<input type="checkbox"/> Answers the purpose of the lab <input type="checkbox"/> Explains the need to balance chemical equations.	<input type="checkbox"/> Answers the purpose of the lab <input type="checkbox"/> Attempts to explain the need to balance chemical equations.	<input type="checkbox"/> Doesn't answer the purpose of the lab <input type="checkbox"/> Attempts to explain the need to balance chemical equations.