LESSON 95

LAB

Not So Hot
Exothermic and Endothermic

Name _____

Date _____ Period _____

Purpose

To examine heat transfer for several chemical processes.

Procedure

Follow the instructions at each of the three stations. For each procedure, record the temperature change that you observe.

Station	Procedure	Beginning temperature	Ending temperature	Temperature difference
1	$NaHCO_3(aq) + HCl(aq) \longrightarrow NaCl(aq) + H_2CO_3(aq)$			
2	$CaCl_2(s)$ [water is added] $\longrightarrow Ca^{2+}(aq) + 2Cl^-(aq)$			
3	$NH_4Cl(s)$ [water is added] $\longrightarrow NH_4^+(aq) + Cl^-(aq)$			

Questions

1. When the temperature of the products is higher than that of the reactants, heat is transferred *to* the thermometer. A process that gives off heat to the surroundings is called **exothermic.** Based on your observations, which of the three procedures are exothermic?

2. When the temperature of the products is lower than that of the reactants, some of the heat energy is transferred *from* the thermometer. A process that absorbs heat from the surroundings is called **endothermic.** Which of the three procedures are endothermic?

3. What types of changes, chemical, physical, or both, do you think are taking place in the three beakers? Explain your reasoning.

4. If a process is endothermic, do the products feel hot or cold? Why?

5. **Making Sense** When you call something "hot," what do you mean? When you call something "cold," what do you mean?