STUDENT PAGE

NAME Josiah Dudley

I. DATA/ OBSERVATIONS

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	REACTION	PREDICTION: *Will the reaction be endothermic or exothermic?*	OBSERVATIONS	RESULTS
X	Hydrogen Peroxide + Potato	Exothermic	Bubbles/fizzing. Hydrogen Peroxide is cloudy.	Endo
✓	Hydrogen Peroxide + Liver	Exothermic	Bubbles/fizzing. Liver is discolored. Hydrogen is cloudy. Warm.	Exo
X	Hydrogen Peroxide + Yeast	Endothermic	Bubble/audible fizzing. Gas is blowing up the bag. Warm.	Exo
✓	Sodium bicarbonate + Water	Endothermic	cold water, Cloud of up	Endo
X	Sodium bicarbonate + Vinegar	Exothermic	cold, bubbleing, and gas filled it up.	Endo
X	Sodium Carbonate + Water	Endothermic	Cloudy water, dissouled well. No bubbles. Slightly warm	Exo
X	Ice Cream Salt + Water	Exothermic	Cold water, cloudy	Endo
✓	Epsom Salts + Water	Endothermic	Cloudy water, Cold water	Endo

II. ANALYSIS

1. Describe the energy change in exothermic and endothermic reactions. Use the data to support what you say.

Heat, a form of energy, was either absorbed or given off. In Endothermic reactions the energy was absorbed, So the baggie felt cooler. In Exothermic reactions, the baggie became warmer because energy was given off.

2. How do the energy graphs (see handouts) tell you that the reactions are changing temperature?

In the Endothermic reactions involve the reactants taking in or absorbing potential energy from the surroundings. This absorption shows a decrease in the surrounding temperature (solvent & baggie). It is the opposite in the Exothermic reaction because the reactants release energy to the environment.

3. How are endothermic and exothermic reactions different from each other? Use chemical equations to help you explain your answer.

In Endothermic reactions the reactants take in energy for the reaction to occur. Therefore, energy is on the reactants side of the chemical equation: Energy + A + B → AB

In Exothermic reactions, the reactants release the energy, so the energy is on the product side of the chemical equation: A + B → AB + Energy.

III. Application

Using the following information, plus what you've learned in the previous experiment, design a hot pack and a cold pack. Verify the temperature of your hot and cold packs using the thermometer provided. (You decide on time intervals.)

- **Most commercial hot packs reach a temperature between 60°C (140°F).**
- **Optimal cold temperature is 10°C (50°F); freezing temperatures can damage skin.**

Record your process below:

1) For the endo reaction, we chose, Ice cream salt and water to combine In to a styrofoam cup. The cup was insulated on the top using a piece of square foam with a hole in the center, So the thermometer could be inserted into the hole and down into the solution. The solutions temperature was taken on a 2 minute interval from 0-14 mins.

2) for the exothermic reaction we chose hydrogen peroxide and yeast to combine in the second styrofoam cup. The same setup was used, but the temperature was recorded at .5 minute intervals: from 0-6 minutes.

Create a way to display your temperature data here.

Time: 0 min – 25°C
2 min – 23°C
4 min – 22°C
6 min – 22°C
8 min – 21°C
10 min – 20°C
12 min – 20°C
14 min – 19°C

Time: 0 min – 24°C
.5 min – 24°C
1 min – 25°C
1.5 min – 26°C
2 min – 28°C
2.5 min – 30°C
3 min – 34°C
3.5 min – 35°C
4 min – 40°C
4.5 min – 42°C
5 min – 44°C
5.5 min – 45°C
6 min – 45°C