NAME _____ DATE _____ CLASS _____

INQUIRY LAB – SHORT

Feedback and Climate Change

Earth's atmosphere is a mixture of several gases, including nitrogen, oxygen, carbon dioxide, and water vapor. Gases like carbon dioxide and water vapor trap some of the radiation emitted by Earth. This allows our planet to stay warm and sustain life. Recently the amount of carbon dioxide in our atmosphere has been increasing, enhancing the warming effect. What happens to temperature in a system if carbon dioxide levels increase? How will that affect glaciers and sea ice?

Focus on Science Practices

SEP 4 Analyzing and Interpreting Data
SEP 6 Constructing Explanations and Designing Solutions
SEP 8 Obtaining, Evaluating, and Communicating Information

Materials Per Group

- Antacid effervescent tablets, 4
- Clear plastic bottles, 1 L, 2
- Chunk of modeling clay, 2
- Graduated cylinder, 100 mL
- Crushed ice, 300 g
- Pencil
- Ruler
- Tap water, 50 mL
- Light/heat source, 100 W
- Balance
- Marker

Safety 

Carbon dioxide in the bottle may be under pressure. Wear safety goggles. Wear plastic gloves. Wash hands thoroughly with soap and water before leaving the laboratory.

NAME _____ DATE _____ CLASS _____

Procedure

1. Label one of the 1 liter bottles *control* and the other 1 liter bottle CO_2.
2. Mold the chunks of clay to fit over the opening of each bottle.
3. Remove the chunks of clay from the top of the bottles.
4. Use a balance to measure 150 g of crushed ice. Add the ice into the bottle marked *control*. Repeat this with the bottle marked CO_2.
5. Break the four antacid tablets so they will fit through the bottle's opening. Drop them into the CO_2 bottle.
6. Add 25 mL of water to each bottle. Swirl the contents of the CO_2 bottle if the antacid tablets are not reacting.
7. Immediately replace the chunk of clay over the openings of the bottles.
8. Position the light/heat source 6 cm away from the bottles. Ensure that both bottles will receive equal exposure to the light.
9. Turn on the light.
10. After 20 minutes use a graduated cylinder to measure the initial volume of liquid of each bottle.
11. Subtract the 25 mLs you added in step 6 from the initial volume of liquid to calculate the adjusted volume of liquid.

NAME _____ DATE _____ CLASS _____

Volume of Ice Melted		
Bottle	Volume of Liquid After 20 Minutes (mL)	Adjusted Volume of Liquid (mL)
Control Bottle		
Carbon Dioxide Bottle		

Analyze and Interpret Data

1. **SEP Evaluate and Communicate** Which bottle had the greatest volume of melted ice? What factor contributed to the difference?

2. **SEP Apply Scientific Reasoning** How would adding additional antacid tablets affect the feedback mechanism observed in this investigation?

NAME _____ DATE _____ CLASS _____