Greenhouse in a Beaker

❓ QUESTION

What affect does adding carbon dioxide to the air have on the air's temperature during the day and during the night?

✸ HYPOTHESIS

In your science notebook, record your hypothesis in an "If....then....because...." format.

📑 MATERIALS

- 2 600 mL Beakers
- 1 250 mL Flask
- 1 Rubber stopper with hole
- 1 Vinyl tubing, 3/16" diameter, 60 cm long
- 1 Clip light with 1 75 watt bulb
- 1 Ruler
- 2 Probe thermometers
- Small piece masking tape
- 4 Alka-Seltzer tablets
- Science notebooks
- Safety glasses
- 240 mL Water (room temperature)

☑ PROCEDURE

Part 1, Day

1. Set up the light source 15 cm in front of the two beakers. The beakers should be receiving equal light.

2. Insert the tubing through the hole in the 250 mL flask. Place the other end of the hose near the bottom of one of the beakers. Secure the tubing inside the beaker with a small piece of masking tape.

3. Add 120 mL of water to the flask.

4. Turn on the clip light. Wait for the temperature in each beaker to stabilize. The temperatures in the beakers should be similar, but they do not have to be exactly the same.

5. Record the stable temperature of each beaker in the data table.

6. Break two Alka-Seltzer tablets in half and drop the pieces into the flask. Secure the rubber stopper.

7. Record the temperature of each beaker every 30 seconds for three minutes.

Part 2, Night

1. After you have data to model temperatures during the day, empty out your beakers and flask. Refill the flask with 120 mL water. Resecure the tubing inside one of the beakers.

2. Turn on the clip light. Wait for the temperature to stabilize. The temperatures in the beakers should be similar, but they do not have to be exactly the same.

3. Record the stable temperature of each beaker in the data table.

4. Break two more Alka-Seltzer tablets in half and drop the pieces into the flask. Secure the rubber stopper.

5. Turn off the light.

6. Record the temperature of each beaker every 30 seconds for three minutes.

⊞ DATA

Make these tables in your science notebook:

Simulated Day Data

	BEAKER 1 (WITHOUT CO_2)	BEAKER 2 (WITH CO_2)
Beginning Temperature		
30 seconds		
1 minute		
1 minute, 30 seconds		
2 minutes		
2 minutes, 30 seconds		
3 minutes		

Simulated Night Data

	BEAKER 1 (WITHOUT CO_2)	BEAKER 2 (WITH CO_2)
Beginning Temperature		
30 seconds		
1 minute		
1 minute, 30 seconds		
2 minutes		
2 minutes, 30 seconds		
3 minutes		

Create a graph in your science notebook displaying both the day and night temperatures for both beakers.

⁂ CONCLUSION

Do you accept or reject your hypothesis? What were the results of your investigation? Use data to explain what happened.

Why do you think this happened?

How does this demonstration relate to climate change?