

Physics 121
Effect of Carbon Dioxide Lab

Purpose: To compare how the temperature increases in a carbon dioxide atmosphere to an air atmosphere.

Materials: Two PASCO thermistors or temperature probes, two empty 2 L bottles, two cans of carbonated soda, two corks, a beaker, lamp, stirrer, and a funnel.

Procedure:

1. Make a hypothesis about the temperature in how the two atmospheres will compare as a function of time when radiation is striking them.
2. Pour one can of soda into a 2 L bottle. Pour the other into the beaker.
3. Agitate the soda in the bottle to release CO₂ until you are confident most of the air in the bottle has been replaced by CO₂. You should agitate for at least two minutes. How can you test this? (Matches are available.) Once you have a CO₂ atmosphere, put the cork with the thermistor in it in the bottle. Make sure that the thermistor is not in the liquid, but instead in the upper half of the bottle. Mark this bottle "CO₂".
4. Remove the CO₂ from the soda in the beaker by stirring it vigorously, (This should be done for at least two minutes.) Pour the soda into a 2 L bottle and put a cork with a thermistor in the top.
5. Connect the two thermistors to the computer interface and start Data Studio. Make a graph with both temperatures displayed on it.
6. Put the lamp in a location where it shines equally on both bottles. Turn on the lamp; take 15 minutes of data or take data until both bottles have reached an equilibrium temperature.

Results: Make a data table showing the temperature in both bottles as a function of time.

1. Which bottle has the higher temperature with time? Is it the same bottle all the time or do they switch being higher?
2. What do you think is going on that causes one bottle to have a higher temperature?
3. Was your hypothesis correct? Why or why not?