Green house gases Lab Activity

Background Information:

Research what you know about greenhouse gasses. What are they? What do they do? Why are they called greenhouse gasses?

Prediction: Write a prediction on how the greenhouse gases in this experiment will affect temperature.

Materials:

- 2 liter size soda bottles
- 2 digital thermometers
- Heat lamp set up on a ring stand.
- 2 corks with hole through them for the thermometer
- Canned 'air'-(the type to clean keyboards, which contain Difluoroethane (HFC-152a), trifluoroethane (HFC-143a), and completely non-flammable tetrafluoroethane (HFC-134a) are potent greenhouse gases.)
- Cellophane tape

Procedure:

1. View and then draw a picture of the model set-up.
    a. Teacher notes:
        i. The two-liter bottles should be side by side. One of the bottles has a small hole poked into the side, just large enough to fit the nozzle from the bottle air. This bottle should be labeled Greenhouse gasses (GG) Both have digital thermometers placed through the cork fittings replacing the screw tops.
        ii. The heat lamp is either free standing or placed on a clamp set up, and should be placed about 12 inches from the bottles so that it shines equally on both bottles. This is very important to have equal distance and equal angles.
2. Obtain equipment and set up according to the model
3. Read directions and create data tables that match experiment.
4. Set thermometer to °C. In the bottles, allow both thermometers to equilibrate to the same temperature. Record temperature of both bottles.
5. Get a piece of tape about 5 cm long and have it easily handy for quick use.
6. Obtain the canned 'air'. Place the thin straw tube onto the nozzle if it is not already there.
7. Place the thin straw tube into the hole found on the side of the bottle that is labeled GG.
8. With quick short bursts, squirt air into the bottle 10 times. (Watch the temperature and make note of what happened. This is due to the compressed gas changing states, it is not part of the experiment, however, it must be adjusted)
9. Remove the straw and quickly seal the hole.
10. Allow the temperature to re-equilibrate to close to the original temperature.
    a. Both bottles should have the same temperature within 0.2 degrees.
11. Make sure both bottles are equidistant and equal angles from the heat lamp and right next to each other, as the equipment diagram indicates.
12. Record temperature in both bottles as time zero (0).
13. Turn lamp on. Record temperature of both bottles every 30 seconds for 10-15 minutes.
14. Turn lamp off.
15. Remove equipment; return it to the proper location, clean up.

Data:

- Create a data table based on above experiment. Record data.

Analyze Data:

1. Create a single graph with 2 data sets from both bottles.
2. Discuss the graph. What is it "telling" you? Remember a small consistent difference is significant

Conclusion:

- What do you conclude about the evidence of greenhouse gases effect on temperature.

Extend:

- Discuss the real world implications

You are responsible to write up a formal lab report for this lab according to normal lab report protocol.