Cloud in a Bottle Lab

I. Title

I. Title: Cloud in a Bottle

II. Purpose

II. Purpose: The purpose of this lab is to understand how clouds form.

Background: How is condensation related to cloud formation?"

Clouds

Clouds II

What do these images have in common?

Which statement best describes the processes involved in cloud formation?

- Smoke causes clouds
- Clouds have something to do with evaporation and floating dust
- Water vapor from my tea kettle is the same as a cloud
- Clouds are made of air, water, and popcorn

II. Purpose - Background

- Using your text, write a paragraph applying the concepts of air compression and expansion. What happens to the temperature of the air when it is compressed and allowed to expand? Quote the book following this format
- EXAMPLE

  "These mechanisms operate to transfer energy between Earth's surface(both land and water) and the atmosphere." (Earth Science, p. 480)

III. Hypothesis

- Given this back ground, write your hypothesis. Use an “IF” and “then” sentence. <DO NOT WRITE THE INSTRUCTIONS>
- Write a hypothesis based on what you think will happen.

IV. Procedure

1. Fill the clear plastic 2-liter bottle one-third full of warm water and place the cap on. As warm water evaporates, it adds water vapor to the air inside the bottle. This is the first ingredient to make a cloud.

2. Squeeze and release the bottle and observe what happens. You'll notice that nothing happens. Why? The squeeze represents the warming that occurs in the atmosphere. The release represents the cooling that occurs in the atmosphere. If the inside of the bottle becomes covered with condensation or water droplets, just shake the bottle to get rid of them.

3. Take the cap off the bottle. Carefully light a match and hold the match near the opening of the bottle.

4. Then drop the match in the bottle and quickly put on the cap, trapping the smoke inside. Dust, smoke or other particles in the air is the second ingredient to make a cloud.

5. Once again, slowly squeeze the bottle hard and release. What happens? A cloud appears when you release and disappears when you squeeze. The third ingredient in clouds is a drop in air pressure.

V. Data

- Record your observations for each phase of the experiment.

VI. Analysis and Conclusion

1. What are naturally or unnaturally forms of particulate matter in the atmosphere?
2. How does particulate matter effect cloud formation?
3. How does a cloud form?
4. What is the relationship between water vapor and temperature in cloud formation?
5. From what you know about phase changes and cloud formation, what happens with the cloud when it rains?

Analysis and Conclusion

- Write a conclusion revisiting your hypothesis. Was it correct or incorrect. Site evidence from your lab analysis that supports your findings.

- Extend your thought. What variables could account for your findings? How could we do the experiment differently to affect the outcomes?