

Sec.: _____ Name: _____

Experiment: Clouds (E. Science 9-16-1e)

Purpose: To observe cloud formation, identify clouds, and to identify the weather associated with the cloud types.

Materials: 6 - plastic soft drink bottles (1 L) ice table. 10-1/10-2 of textbook psychrometer classroom barometer 6 - temperature strips matches

Methods: **Part A: Cloud Formation**

1. Slide the temperature strip - straw assembly into the clean, dry bottle. Screw on the cap tightly. Record the beginning temperature.
2. Compress the bottle for about half a minute then record the temperature.
3. Now release the pressure and record the temperature that results after one minute.
4. Open the bottle and pour a few drops of water inside. Cap tightly and twist and turn the bottle to wet the inner surface. Place bottle on its side, open the bottle and push down to flatten the bottle to about half its normal diameter. Have someone light a match, blow it out, and insert the smoking end into the open bottle, as the lab partner quickly releases their pressure on the bottle so it returns to its original shape and the smoke from the extinguished match flows inside. Quickly cap the bottle.
5. Now apply pressure & record temperature and any other observations in bottle the.
6. Keeping cap on the bottle release the pressure and record resulting temperature and any resulting observations found in the bottle.

Part B: Weather Observations

1. Observe and record the cloud cover and cloud type today in class and tomorrow in class. Observe and record the general weather also. Record all data in results table.

Finish the entire lab (except Part B day 2) to turn in within the first five minutes of next class period).

2. **Estimate cloud cover.** Record the cloud cover using the following symbols and abbreviations: **CLF** = free of clouds **SCT** = scattered clouds (1/2 or less sky covered) **BKN** = Broken clouds (more than half the sky covered, but still see blue sky)

OVC = overcast (no blue visible) **X** = Obscured (fog, smoke, haze completely covers the sky)

3. Use the following symbols to record the **type(s) of clouds** you observe:

Cl = Cirrus

Cu = Cumulus

St = Stratus

Cb = Cumulonimbus

Ns = Nimbostratus

Ac = Altocumulus

As = Altostratus

4. Use the psychrometer, from the previous lab, to determine the **relative humidity**.
5. Use classroom barometer to record **air pressure**.

Results: **Part A: Cloud Formation**

1. Beginning Temperature: _____ °F
2. Pressure temperature: _____ °F
3. No pressure temperature _____ °F
5. Temp. _____ °F observations: _____
6. Temp. _____ °F observations: _____

Part B: Weather Observations

Date	Temp. (<u>oC</u>)	pressure (<u>mm Hg</u>)	cloud cover	cloud type	wind direction	precip. (<u>in.</u>)	humidity (<u>%</u>)

Conclusions: (Circle correct choice in parentheses to properly complete the sentence for 1-7.)

- When air is compressed, its temperature (decreases, increases), and when air expands, its temperature (decreases, increases).
- Air pressure decreases with an increase in altitude. Air rising through the atmosphere expands as the pressure lowers and, in turn, its temperature (decreases, increases).
- Air sinking in the atmosphere is compressed as the air pressure acting on it increases, and its temperature (decreases, increases).
- The cloud was formed when the pressure was (applied, released) and the temperature (increased, decreased).
- Most clouds in the atmosphere form in the same basic way as the cloud in the bottle. With the temperature change due to expansion, some of the water vapor in the saturated air must (condense, evaporate), thereby forming cloud droplets.
- The cloud in the bottle disappears when the air temperature is raised by (compression, expansion). The change in temperature results in evaporation of the cloud droplets.
- It can be inferred from this activity that in the open atmosphere where it is cloudy, air is generally (rising, sinking). Where it is clear, the air is generally (rising, sinking).
- What type of weather is associated with:
 cirrus clouds? _____ cumulonimbus clouds? _____
 cumulus clouds? _____ nimbostratus clouds? _____

Discussion:

- Based on your observations, write a description of each of the 3 basic cloud forms:
 cirrus: _____
 cumulus: _____
 stratus: _____
- Answer the Applying Math questions on textbook page 457 in the following space.
 - Water vapor saturation at 35°C is: _____, multiply this by 50 % = _____
 water vapor saturation at 20°C is: _____,
 will there be enough vapor for precipitation at 20°C. _____
 - Water vapor saturation at 25°C is: _____, multiply this by 30 % = _____
 water vapor saturation at 15°C is: _____,
 will there be enough vapor for precipitation at 15°C. _____
- 3a. Read Joshua 10: 11. What destroyed more of Israel's enemies than the sword?
 3b. From this text comment on God's ability to control what aspect of the weather?
- 4a. During the end times events what will God send down (from the seventh angel) from Heaven during one of the plagues (Rev. 16: 17 - 21)?
 4b. How large will these objects (question 4a) be?