

Station 1: Adiabatic Decompression

Materials:

- Can of compressed air
- Infrared thermometer
- Graph paper

Procedure:

1. Using the digital thermometer, take the initial temperature of the can and record it on the table on the activity sheet. **Take all measurements with the laser dot in the center of the can.**
2. Keeping the thermometer pointed at the can, allow gas to spray out of the can for 1 minute. Record the temperature reading every 10 seconds.
3. After 1 minute, stop spraying gas from the can. Continue to take temperature readings at 10 second intervals for another 2 minutes.
4. Use the data you have collected to create a graph of temperature versus time.

Station 2: Convection Cell

Materials:

- Clear, 500 mL beaker filled with water containing pencil shavings or parsley flakes settled on the bottom
- Bunsen burner and striker
- Hand and eye protection (safety glasses and oven mitt or tongs, etc.)
- Blue and red colored pencils

Procedure:

1. Set the beaker on the ring stand.
2. Wearing hand and eye protection, use the striker to light the burner.
3. Position the burner so that the flame is near one edge, not centered.
4. Note what happens to the shavings in the water after you put the burner under the beaker. Draw the behavior of the particles on the activity sheet using the colored pencils. Use the red pencil to show where the particles are moving upwards and blue for where they are moving downward.
5. Extinguish the burner and, using hand protection, move the beaker of water to the side to cool. (Be careful not to touch the ring stand as it will be hot.)

Station 3: Measuring Dew Point by Evaporation

Materials:

- 2 identical thermometers (Fahrenheit)
- 1" piece of cotton shoelace
- Piece of cardboard big enough to accommodate the two thermometers
- Tape
- Marker
- Table of Relative Humidity and Dew Point appropriate for your elevation

Procedure:

1. Attach the two thermometers side by side on the cardboard with tape.
2. Label one thermometer "wet-bulb" and the other "dry-bulb." (This step will not need to be repeated after the first group.)
3. Wet the piece of shoelace thoroughly and slip it over the bulb of the wet-bulb thermometer.
4. Gently wave the assembly back and forth until the temperature reading on the wet-bulb side has stabilized. (Make sure the thermometers are attached securely!)
5. Record the final temperature readings from both thermometers.
6. Disassemble the apparatus in preparation for the next group.
7. Calculate the Dew Point using the table.

Station 4: Measuring Dew Point by Condensation

Materials:

- 250 mL beaker of room temperature water
- Bucket of crushed ice
- Thermometer (Fahrenheit)
- Stir-stick or spoon

Procedure:

1. Put the thermometer into the beaker of water and record the initial temperature.
2. Begin adding crushed ice to the water to slowly lower its temperature.
3. Stir the water gently to make sure that the temperature is even over the whole beaker. **Don't stir with the thermometer. It might break.**
4. Observe the side of the beaker and record the temperature at which the first signs of moisture condensation occur.

Station 5: Energy Calculation

Materials:

- Color print outs of sea surface temperature before and after Hurricane Dennis in 2005.
- Ruler
- Calculator

Procedure:

1. Compare the images of sea surface temperature
2. Estimate the area of water that was visibly cooled
3. Based on some assumptions, use the area to estimate the volume of water that was cooled.
4. Calculate the amount of heat absorbed by Hurricane Dennis from that portion of the Gulf of Mexico.

Station 6: Science Article Review

Materials:

Copies of these news articles:

- [Energy release from hurricanes](#)
- [Hurricanes: Tempests in a greenhouse](#)
- [A phenomenon that may improve hurricane forecasts](#)

Procedure:

1. Everyone in the group should pick an article to read. Everyone should take a different one unless there are more group members than articles.
2. Spend the first few minutes reading your article and then write a paragraph summary (on your activity sheet) of what the main points of the article were and what you learned from it.
3. When everyone is finished, each person should spend 1 minute telling the rest of the group about the article and fielding any questions their group-mates might have about the material.
4. Keep an eye on the time so that everyone gets a chance to share what they learned!
5. In your own words, write a couple of sentences based on the summary that your group-mates give of their articles.
6. Leave the articles for the other groups to use when you move on to your next lab station.