

**MEMO TO M.I.C.E. CONCERNING C.H.E.E.S.E.**  
**Teaching Guidelines**

**Subject:** Science

**Topics:** The Nature of Science and Technology , Physics, Meteorology

**Grades:** 7 - 10

**Concepts:**

- Understands the concept and types of "experimental error"
- Understands the concept "relative humidity"

**Knowledge and Skills:**

- Understands that matter absorbs heat energy when melting or evaporating
- Can create a chart for the collection of experimental results
- Can present experimental results clearly in written form
- Understands what factors contribute to rate of evaporation.

**Materials:** For each team: Thermometer, paper towel or napkin.

**Procedure:** This project should be done by teams of two, three or four students. Distribute the handout and discuss it. Be sure that all students understand the experimental procedure.

Discuss also the physical principles that underlie the design of the experiment: evaporation of water cools a surface by carrying away energy, and the rate of evaporation of water will depend on the amount of water vapor already in the air—that is, the current humidity level.

**IMPORTANT!**

**Memo to M.I.C.E. concerning C.H.E.E.S.E.**

**To: Meteorological Instrument Creation Experts**

**Re: Collection of Humidity Estimates by Electronic Sensing Experiment**

As you all know, the amount of humidity in the air at a location is an important part of the weather picture.

We are considering using a new instrument for measuring the humidity in the air, but we need to determine if it is reliable. I would therefore like all of you to carry out this test, working in teams of two or three MICE each.

The scientific principles behind this form of measurement are these:

- Water evaporating from the surface of an object will cause that object to get colder.
- Water evaporates more quickly in dry air than in humid air.

Please proceed as follows:

- 1) Warm the thermometer up to body temperature. Then, measure and record how the temperature changes when exposed to the air for 10 minutes.
- 2) Repeat the above procedure, but this time wrap the thermometer in a damp paper towel or napkin before warming it to body temperature.

We expect that the temperature of the probe will cool more quickly when it is wrapped in a wet paper towel. How much more quickly will depend on the existing humidity, and this will be measured in future tests.

We particularly need to know if the results of this experiment are repeatable. Therefore we want this experiment done several times in the same location and at roughly the same time to see if the results are the same.

Please turn in a clear report describing exactly what you did and the results, including a discussion of the experimental error and any factors that may contribute to inaccurate results.

**Warning: Do an excellent job, or I will have to turn this project over to the Realistic Atmospheric Test Scientists!**