

**TITLE:** Dew Point vs. Relative Humidity  
5-8

**CONNECTIONS TO THE CURRICULUM: Math/Science**

**OVERVIEW:**

Relative humidity and dew point (or dewpoint temperature) are two parameters which describe the amount of water vapor in the atmosphere. However, dew point is a substantially better indicator of the actual water content of the air. Relative humidity is dependent not only on the amount of moisture in the air, but also on the air temperature. Dew point, on the other hand, is only dependent on the amount of moisture in the air.

**STANDARDS:**

**Core Content**

MA-05-1.1.3

Students will compare ( $<$ ,  $>$ ,  $=$ ) and order whole numbers), fractions and decimals, and explain the relationships (equivalence, order) between and among them.

MA-05-1.2.1

Students will apply and describe appropriate strategies for estimating quantities of objects and computational results in real-world problems.

**Program of Studies**

MA-05-2.2.2

Students will describe, define, give examples of and use to solve real-world and mathematical problems nonstandard and standard (U.S. Customary, metric) units of measurement.

MA-05-2.1.3

Students will use measurements to identify, describe, sort and compare attributes of objects and apply these to solve real-world and mathematical problems.

**GEOGRAPHIC SKILLS:**

Acquiring Geographic Information

Organizing Geographic Information

Answering Geographic Questions

Analyzing Geographic Information

**TIME:** 60 minutes

**MATERIALS REQUIRED:**

Computer connected to the internet

Downloaded Mesonet Data

Excel Software

Computer lab (optional)

Graph Paper (optional)

Paper/Pencil

**OBJECTIVES:**

Given a 24-hour graph of air temperature, relative humidity, and dew point, the student will be able to describe, for each plot, at least one reason why the variables change (or don't change) during the day.

Given scenarios which include illustrations of the dependence of relative humidity on temperature, the student will be able to identify and describe the problems with using relative humidity as the indicator of moisture in the air.

Be able to describe the advantages of using dew point temperature as an indicator of moisture in the air.

**SUGGESTED PROCEDURE:****Opening**

1. Review the terms following terms before initiating lesson:
  - Dew Point Temperature
  - Relative Humidity
  - Air Temperature
2. Introduce the mathematical terminology and equations used for the lesson:
  - Numerator and Denominator
  - $AC/PC = RH$ 
    - Actual Content/Potential Content = Relative Humidity
    - AC= How much water is in the air, vs. PC how much water could be in the air at a specific temperature.
3. Demonstrate with an empty cup of water and asking how much potential content does the cup have. Fill the cup partially full and ask how much actual content is in the cup. This would give a concrete example of the relationship of relative humidity.

**Strategies/Activities**

1. Log on to the Mesonet website and explore the current data for air temperature, relative humidity, and dew point temperature. <http://www.kymesonet.org/>
2. Download excel spreadsheet of 15 minute data designed for this activity at the following link: [http://www.kymesonet.org/docs/DataSet\\_1.xls](http://www.kymesonet.org/docs/DataSet_1.xls)  
Note: This data set has been simplified for your students. Explore the data tab to find an answer key (DataSet\_1a), and a complete list of data associated with this Lesson (DataSet\_1c). Graph paper from <http://www.printfreegraphpaper.com/> is available under the data tab as well.
3. Using Microsoft Excel, graph the air temperature and relative humidity every 15 minutes on one graph (use 0% and 100% as the minimum and maximum, respectively, on the relative humidity axis).
4. Graph the air temperature and dew point every 15 minutes on a second graph.
5. Use the same maximum and minimum temperatures on the axes for both graphs.

## **Closing**

1. Describe how the air temperature, dew point temperature and relative humidity change throughout the day.
2. Does the amount of moisture in the air change throughout the day? If so, when?
3. Is relative humidity a good indicator of moisture content? Why or why not?
4. Is dew point a good indicator of moisture content? Why or why not?
5. Compare any patterns you see or any trends that may continue.

## **SUGGESTED STUDENT ASSESSMENT:**

- Evaluation of the charts and graphs that are produced with the Microsoft Excel Software.
- Informal assessment by mere observation during guided and independent practice will help the teacher gain insight on student comprehension of the relationships between relative humidity, air temperature, and dew point temperature through participation and charts.

## **EXTENDING THE LESSON:**

In the winter, static charge sometimes makes a spark between your finger and a piece of metal. This occurs more frequently inside a house than outside a house. Can you explain why?

Can you name a situation when the relative humidity may be high, but there is little moisture in the air?

## **ADAPTIONS:**

### **Challenged Learner:**

Have these children chart their results on graph paper instead of the Microsoft Excel Software.

### **Challenging Learner:**

Extend this lesson to a different area outside of Kentucky to the Mesonet Network in Oklahoma and have these students compare Kentucky and Oklahoma and their similarities and differences with their air temperature, relative humidity, and dew point temperature.

## **RELATED LINKS:**

- [Kentucky Mesonet Website](http://www.kymesonet.org/) (http://www.kymesonet.org/)
- [Oklahoma Mesonet Website](http://www.mesonet.org/) (http://www.mesonet.org/)
- [Oklahoma EarthStorm Website](http://earthstorm.mesonet.org/) (http://earthstorm.mesonet.org/)
- [National Weather Service Website](http://www.nws.noaa.gov/) (http://www.nws.noaa.gov/)

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Adapted from Oklahoma Mesonet Site