

Temperature, Dew Point, and Wind Activities Using Davis Instruments

Lessons for Grades 3-5: Teacher's Notes

Part I: Graphing the Temperature and Dew Point

The student will use temperatures and dew points plotted every two hours to compare and contrast the readings for each day for a week. The student will be able to identify wetter and drier days by noting when the air temperature approaches dew point temperature.

The teacher will provide the **temperatures** and **dew points** for **seven days**, with the data plotted every **two hours**. The lesson may be done with one or two graphs, depending on the student's ability to read and interpret graphs. Using two graphs creates a simpler activity than using a single graph with all data plotted.

Objective

The student will identify readings for temperature and dew point plotted on a graph, compare and contrast readings, and make inferences about whether the air is “wet” or “dry” on given days.

Materials Needed

1. Temperature and dew point graph or graphs as described below (see examples provided)
2. Student Answer Sheet or teacher-prepared answer sheet
3. (Optional) Ruler to help students line up temperature plots with time

To Plot Two Graphs

Temperature is plotted on one graph, and the dew point is plotted on another graph. Use the WeatherLink[®] software to create a graph showing temperature as follows:

On graph 1 (Outside temperature)

1. Label the left y (vertical) axis “Temperature”
2. Label the x (horizontal) axis with the days of the week
3. Plot span = 1 week; interval = 2 hours; scale = 0°-100°

On graph 2 (Dew point)

1. Label the right y-axis “Dew Point”
2. Label the x-axis with the days of the week
3. Plot span = 1 week; interval = 2 hours; scale = 0° - 100°

To Plot One Graph that Includes Temperature and Dew Point

Use the WeatherLink software to create one graph:

1. Label the left y axis “Temperature”
2. Plot span = 1 week; interval = 2 hours; scale = 0° - 100°
3. Label the right y axis “Dew point”
4. Plot span = 1 week; interval = 2 hours; scale = 0° - 100°
5. Label the bottom x axis with the days of the week

All finished graph(s) will show 12 plots of temperature and 12 plots of the dew point for each day. The graph will have seven days plotted. Vertical dashed lines show midnight between each day so that other times can be calculated in two-hour intervals.

For Discussion

1. Discuss how the temperature is plotted on that portion of the graph.
2. Review the procedure for finding the time (in two-hour intervals) on the x axis on the graph(s).
3. Review the concepts of dew point and condensation that occur when air becomes saturated with moisture.

Temperature and Dew Point Activity

Objective

Use the graph showing temperature and dew point readings from your site. Find out whether the air was warm or cool. Find out whether the air became cool enough to reach the dew point. The **dew point** is reached when the air is *full of moisture and can hold no more*. Any moisture that the air cannot hold settles to the ground in the form of **dew**. If the grass is wet in the morning and it did not rain during the night, the air cooled to the dew point temperature and dew formed.

Materials

1. A graph showing the temperatures and dew points for one week from the Davis Instruments Weather Station at your school
2. Ruler (might be helpful)

Procedure

Use the graph to find the temperatures and dew points during the week. Be as thorough as possible when you answer the questions about your weather. Use a ruler if you need to line up a temperature with the time of day shown on the bottom of the graph.

Questions for review:

1. What was the **warmest temperature** during the week? ____ On what **day** did the warmest temperature occur? _____
2. Was the warmest temperature in the **morning, afternoon,** or at **night**?

3. What was the **coolest temperature**? _____ On what **day** did it occur?

4. Each mark along the bottom of the graph is two hours. Dashed lines between days mark midnight on the graph. At what time this week did your station have the coolest temperature? _____
5. Study the **dew point temperatures** on your graph. Which **day** had the highest dew point? _____ At what **time** did the highest dew point occur? _____

6. *At any time* was the temperature **the same as** the dew point? _____ If you answered “yes,” at what **time** and on what **day** did the dew form?

If you answered “NO,” give the **time** and **day** when temperature and dew point were the **closest**. _____

7. A **dry** day (not much water in the air) occurs when the temperature and dew point are **far apart**. This means that the air temperature is much **higher than** the dew point temperature.

Example: Temperature = 80, Dew Point = 40: **Drier**
Temperature = 80, Dew Point = 60: **Wetter**

Which **day** of the week was the **driest**? _____

8. Describe a time when you went outside in the morning and saw that dew had formed. What time of year was it? What kinds of things were covered in dew?

9. Do you think the air temperature will cool to the dew point tonight and dew will form by morning? Why or why not?

Part II - Wind Speeds

Objective

The student will use average wind speeds and high wind speeds plotted every six hours for at least one week to compare and contrast their data with that of other cities. The student will be able to discern average wind speeds from peak gusts and describe types of weather that might cause high gusts.

The teacher will need to provide a graph with the **wind speeds** plotted **every six hours** for **at least one week**. On the same graph, the **high wind speed** for the same time period may be plotted. To avoid confusion for the students, the teacher may set the **scale** on the left axis to be the same as the scale on the right axis. This allows students to make direct comparisons without having to continually note what speeds are given.

As an example, the teacher might construct a graph with the following:

1. **Wind speed** on the left axis
2. **High wind speed** on the right axis
3. **Scale** set for *no more than* the highest wind that has occurred recently
4. **Plot span** for one week. More than one week per graph may be confusing.
5. Set the days so that you can create several graphs each with one of several consecutive weeks.
6. Set the interval for up to six hours (two hours if it's not confusing)

All finished graphs will show the time interval and day of the week across the bottom of the graph (x-axis). Midnight will be shown as **dashed lines** between days.

Procedure

1. Discuss how the average wind speed is plotted on the graph every 6 hours (or other interval).
2. Explain high wind speed as the highest wind recorded during that time period and that averages are computed with *all speeds* that occurred during the time period.
3. Review the procedure for finding the time (in six-hour intervals, etc.) on the x-axis on the graph.
4. Introduce the chart, showing average wind speeds by month and peak gusts. (Your site may not show any high peak gusts if the weather was calm during the time span that you picked). Discuss any geographical topics relating to windy or calm climates that are appropriate.

How *Windy* Is It at Your School?

Use the chart and graph provided to find out how windy it is at your school. Compare your readings with those from other cities to see if your site is windier. Chicago is sometimes called “The Windy City”. How does your site compare to Chicago? Is it *really* that windy?

Materials

A graph showing average wind speeds and peak gusts that occurred at your site

A chart showing average wind speeds and peak gusts from other locations

A ruler (might be helpful)

Procedure

Use the graph of readings from your site to compare and contrast with the chart showing other locations. After you have studied the graph and chart, answer each question as completely as possible.

1. What is the **highest** wind speed from your site? _____ When did it occur?

2. At the same time, what was the **average** wind speed? _____

3. Look at the chart of other cities. Find the same month as the one in which your readings are taken. For each city below, report whether your site is **windier** or **less** windy.

Chicago _____ New York City _____ Los Angeles _____

4. From studying the data, tell **which city** seems to have wind speeds most like your site. Explain why you have picked this city.

5. Write about the **windiest** time that you can remember. When was it? What happened? Did it affect people or their property? If so, how?

Average Wind Speeds and Peak Gusts for Selected Cities

Chicago

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
avg	11.6	11.5	11.9	12.0	10.6	9.2	8.2	8.1	8.8	9.9	11.0	10.3
peak	58.0	54.0	55.0	69.0	55.0	63.0	54.0	64.0	58.0	49.0	48.0	52.0

Los Angeles

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
avg	6.8	6.9	7.0	6.6	6.3	5.7	5.4	5.3	5.3	5.7	6.4	6.6
peak	49.0	40.0	47.0	40.0	39.0	32.0	21.0	24.0	27.0	48.0	42.0	44.0

New York City

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
avg	13.4	13.6	13.7	13.2	11.7	10.8	10.4	10.2	10.6	11.2	12.5	12.9
peak	47.0	60.0	61.0	51.0	71.0	49.0	54.0	41.0	58.0	49.0	58.0	55.0

Did your station record any peak gusts as high as these?

What kind of weather do you think was occurring when these gusts occurred?

What kind of weather that might produce gusty winds occurs in your area?

Answer Key for Part I

1. Check for highest temperature on graph; note day of the week on which it occurred.
2. Check time for highest temperature: answer will be morning, afternoon, or night.
3. Check for the lowest temperature reading on graph; note day of the week on which it occurred.
4. Time for lowest temperature is given here.
5. Day for highest dew point temperature is given here.
6. If temperature and dew point are *exactly the same* at any time, then student will answer “yes” and give time and day when it occurred; if not, then student will give the time and day when temperature and dew point are the closest.
7. Check for day of the week when temperature and dew point are the *farthest apart*.
8. Student should describe a time at which they noticed dew had formed, give the time of year, and discuss objects that were covered by dew.
9. Student should justify why they think that dew will or will not form tomorrow; answers might include what they noticed today or that it seemed wet or dry today.

Answer Key for Part II

1. Check wind speed graph for highest reading given; student should tell when this occurred.
2. Average wind speed given here should match the same time as the answer for #1.
3. Note whether student has chosen the same month to make comparisons before choosing windier or less windy.
4. Student should justify which site is most like their own or explain how their site is not the same as any of the others.
5. Student should describe the windiest time that they remember, noting time of the event, details, and effects on people or property.

Wind Chart Questions

1. Yes or no; probably “no”, unless the readings were taken during were stormy weather.
2. Student should discuss some type of stormy weather or unstable weather that could lead to such strong gusts of wind. Examples are thunderstorms, blizzards, hurricanes, tornadoes, and cold fronts passing.
3. Student should discuss the type(s) of weather that could occur in your area that might lead to gusty winds.