Lesson 31: Activity 1 – Using Collected Data

Time: 2-3 Class Periods

At the <u>end</u> of this lesson in the 'Putting it All Together' section, the teacher will LOGIN to the WDLC website and under 'Review Student Team Data' will make visible *the automatically generated graphs available* to the student groups and the class.

Objective:

- Students will observe and analyze data collected.
- Students will apply math skills and create and interpret graphs and plots.
- Students will use the collected data to draw conclusions about the effects of temperature, cloud cover and wind direction on the weather.

Teacher Overview: Students will take ownership of the data they collect and compare their own analysis to the WDLC generated graphs and plots. In addition to analyzing each parameter [temperature, cloud cover, wind direction] students will look for trends and relationships in data and make new, exciting connections between air temperature and cloud cover. They will explore relationships between wind direction and temperature. *Does temperature decrease or increase over time? Is it more or less warm where there are clouds? Are temperatures generally warmer or cooler with winds from the south?*

Student Tip

LOGIN to the WDLC website. Access the table of the weather data that your group collected over time. You will study each type of weather data separately. There will be activities and questions for each type. Let's start with temperature!

www.us-satellite.net/wdlc

Temperature:

1. Look at all of the temperatures collected. Choose one week (seven days) and use those temperatures to create a line graph. *Remember* – A line graph shows change over time. In this case, it shows how the temperature has changed over a period of seven days. Don't forget that your graph must have a title and labels! Be careful to choose a good scale, so the differences in temperatures will be easy to see.

   After you complete your graph, use the information--very much like a real meteorologist--to answer the following questions!

   a. What is the average temperature for the time period?
   b. What is the difference between the highest and lowest temperatures observed?
   c. Is there a mode? If so, what is it?
   d. What is the median temperature?
   e. What interval (distance between the numbers on the scale) did you use on your scale of numbers?

   Teacher Tip: It is not commonly known and would never be tested, but for when there is an even number of temperature values, or other elements, when determining the median, the median is the mean [average] of the two middle numbers.

2. Look at all the temperatures again for the entire time you collected data.

   a. What does the information tell you about the temperature over time? Is there a trend or something interesting that happens overall?
   b. Create <u>three</u> questions about your data that you can ask the other students in your class.

3. Using all the temperatures that you collected over time, separate each of the temperatures on your table into 'decades of numbers.' *For example*, days with temperatures in the 30 – 39 degree range, 40 – 49 degree range, 50 – 59 degree range, and so on. Create a bar graph comparing the number of days for each group of numbers. *Remember* – Bar graphs show comparisons of facts about groups. Give your graph a title and labels.

   After you complete your graph, use the information to answer the following questions!

   a. Which bar on your graph represents the most days in your table?
   b. How many days is that?

c. Which bar on your graph represents the fewest days in your table?
d. How many days total is that?
e. What does this tell you about the temperature during the entire time that you collected data?
Example response: it tended to go down over the two months in which we collected data

4. Answer the following questions using either your table or graphs.

a. What fraction of the days was above 50 º F?
b. What fraction of the days was below 50 º F?
c. What fraction of the days was 60º F or above?
d. What fraction of the days was 60º F or below?

Cloud Cover:

Study the 'cloud cover' column of your table to answer the following questions!

5. What fraction of the days on your table was it completely cloudy?
6. What fraction of the days did it rain when it was cloudy?
7. What fraction of the days had clear skies?
8. What was the average temperature on the days when the skies were clear?
9. What was the average temperature on the days when it was cloudy?
10. What conclusion can you draw from the answers to Questions 8 and 9?
Temperatures are warmer with more heat energy from the sun.
11. What conclusions can you draw from the answer to Question 6?
Likely answer: It rains on some cloudy days, but, not all of them.

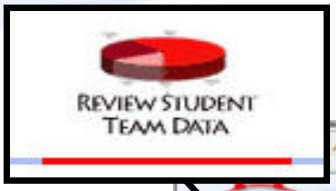
Wind Direction:

Study the column on 'wind direction' on your table. See if you can draw some conclusions after answering the following questions.

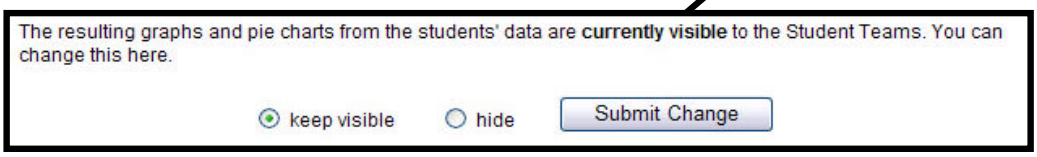
12. What is the average temperature on days when the wind is from the North, Northeast, or Northwest?
13. What is the average temperature on days when the wind is from the South, Southeast, or Southwest?
14. What conclusions you can draw from the effect of wind direction on temperature? Why?

Putting It All Together:

Teachers make the automatically generated WDLC weather analysis available to students by logging in with their teacher username and password. Go to **REVIEW STUDENT TEAM DATA**, select keep visible, and click **Submit Change**.



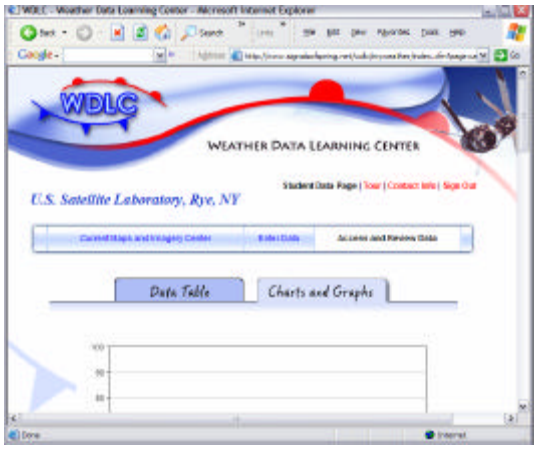
Logged in as Teacher



When students **LOGIN** to the WDLC website and go to **Access and Review Data**, they can now access **Charts and Graphs** representing the data they entered.

14. Print and study the graphs. Compare and contrast your line graph with the web site's graph. What differences do you observe?

15. Now that you have studied all of the data, write <u>five</u> things that you have learned about weather.



Logged in as Student

***Teacher Tip*:** If students are technologically advanced and have use of computers, they can input data into Microsoft Excel which can also electronically create graphs from the data.