**Anemometer Activity**

Anemometers are tools used to measure wind speed. In this lab, you will be using anemometers to find the average wind speed of your campus to determine the best location to site a new wind turbine. Before you start collecting data, follow the first few steps to gather background information on your site.

1. Use an Internet mapping tool, such as Google Earth, to locate the school’s location including city, state, latitude and longitude, and elevation. Record this information on your Data Collection worksheet.

2. Using the map, sketch your campus below and label the geographical features of your campus. Hypothesize where you think wind speeds will be consistently strong based on the topography.

3. Build your anemometer based on the instructions on the attached worksheet using your paper cups, straws, and pencil. Mark one cup with a clearly visible X.

In groups, bring your anemometers outside. Each group will rotate to three locations on campus and will test each location over three days.

4. Determine the wind direction and record it on your Data Collection worksheet.

Measure the wind speed by holding your anemometer away from your body and determine the revolutions per ten seconds by counting how many times the cup with the marked X makes a full revolution in ten seconds. Record your individual measurement on your Data Collection worksheet.

5. Rotate to the next two locations and repeat step 4 for each location.

Repeat this lab on two other days at different times of the day if possible to record the average wind speed of each location on your campus.

**Data Collection Worksheet**

**Sketch your campus below and label each site where you record wind speeds:**

**Site: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Latitude:\_\_\_\_\_\_\_\_\_\_ Longitude:\_\_\_\_\_\_\_\_\_\_ Elevation:\_\_\_\_\_\_\_\_\_\_**

Turbine Location: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Data Collection Time: (Day 1)\_\_\_\_\_\_\_\_\_\_\_\_\_ (Day 2\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Day 3)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Day 1 | Day 2 | Day 3 | Mean |
| Temperature |  |  |  |  |
| Humidity |  |  |  |  |
| Wind Speed (per minute) |  |  |  |  |
| Wind Speed (MPH) |  |  |  |  |
| Wind Direction |  |  |  |  |

Turbine Location: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Data Collection Time: (Day 1)\_\_\_\_\_\_\_\_\_\_\_\_\_ (Day 2\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Day 3)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Day 1 | Day 2 | Day 3 | Mean |
| Temperature |  |  |  |  |
| Humidity |  |  |  |  |
| Wind Speed (per minute) |  |  |  |  |
| Wind Speed (MPH) |  |  |  |  |
| Wind Direction |  |  |  |  |

Turbine Location: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Data Collection Time: (Day 1)\_\_\_\_\_\_\_\_\_\_\_\_\_ (Day 2\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Day 3)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Day 1 | Day 2 | Day 3 | Mean |
| Temperature |  |  |  |  |
| Humidity |  |  |  |  |
| Wind Speed (per minute) |  |  |  |  |
| Wind Speed (MPH) |  |  |  |  |
| Wind Direction |  |  |  |  |

**Results**

Convert your revolutions per ten seconds to miles per hour using the table on the left.

Share your data with the other groups in the class. Make sure each group has all the data.

Calculate the mean values for each location by averaging the RPMs and averaging the wind speeds.

Calculate the mean wind speed across campus by averaging all of the values that were recorded.

Average wind speed:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mph

**Discussion**

After testing the three locations, discuss your results with your group. Which location had the highest wind speed? Why did that location have different results than the others? If one location had a similar wind speed to another, why do you think that occurred? Do trees or buildings block the wind? Where would you place the new wind turbine?

**Additional activities**

1. Label the mean wind speeds at the test sites on your satellite image of campus
2. Using the satellite image of your campus as a guide, draw a map of your campus and make a key for the relative wind speeds (low to high). Draw a map showing the windier and less windy areas using the color key you developed.