

INSTRUCTOR INFORMATION

Investigate Your Local Weather

1. This activity was written to introduce students to connecting and using the Go Direct Weather Sensor. We recommend that you take time to introduce students to the sensor and the software before performing the experiment.
2. You may want to have the sensors connected and set up with the correct channels and units prior to class starting to help students collect data more quickly. Students can then skip the first few steps of the procedure in the student handout.
3. We recommend having each group test one of the three variables, temperature, relative humidity, and wind speed for simplicity. Other channels can be used in addition to, or instead of, the ones recommended for this activity. Groups can also measure more than one variable if desired.
4. Any website that gives hourly weather information can be used by the students to compare their data with that of the forecasted data. Some websites include Dark Sky, The Weather Channel, and Weather Underground. Your local news website might also have hourly weather information. At the time of publication, we found Dark Sky to be the easiest site to use. We recommend that you determine which site will work best for your location and needs before beginning the activity with students.
5. Weather websites have options that allow you to change the units of measurement. During the procedure, facilitate a discussion in which students determine what units they will use to measure their weather conditions. Guide the discussion so students use units that will match the weather forecast or site that you will use.
6. In Graphical Analysis app, some channels for the Weather Sensor, such as Temperature and Wind Speed, have a variety of units available, (e.g., temperature can be displayed as °C or °F). To change displayed units, click or tap the appropriate meter at the bottom of the screen and select the desired units from the menu. Units can be changed after data collection if the sensor is still connected.
7. **Important:** While the Go Direct Weather is water resistant; it is not waterproof. It is not recommended to use or leave the sensor outside in the rain. For additional information, visit <https://www.vernier.com/manuals/gdx-wthr>
8. Warmer, sunnier days will tend to generate more interesting data.

9. You and your students will be outside to collect data for this experiment. Monitor students for exposure to the elements.
10. If you want to measure wind direction, the Go Direct Weather Vane (order code: WTHR-VANE) is recommended. In addition, you will need to set the correct magnetic declination in the Go Direct Weather Sensor attributes. For information on how to do this, visit <https://www.vernier.com/ti/7400>
11. Many variations of this experiment are possible, including short-term or long-term studies. Some examples of researchable questions students can ask and investigate include the following:
 - How does elevation affect air temperature?
 - How does elevation affect relative humidity?
 - How does temperature affect relative humidity?
 - How would weather measurements made in an open area compare to those made in a nearby wooded area?
 - How would weather measurements made within a city compare to those made in the nearby countryside?
 - How would weather measurements made on an athletic field compare to those made in a nearby parking lot?
 - How does proximity to a body of water affect weather?

NGSS Standards

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting concepts
Analyzing and Interpreting Data	ESS2.D: Weather and Climate	Patterns

Estimated Time

We estimate that this experiment can be completed in two, 45-minute class periods. During the first session, describe the experiment and introduce students to the sensors and software. During the second session, collect and analyze data.

Sample Data

All data were collected in Beaverton, OR.

	Location 1		Location 2	
Date and time	June 4, 2020 11:20am		June 4, 2020 11:30am	
Description and observations	On a sidewalk next to a building. Partly cloudy with light wind. 		On a trail in a forested area. Partly cloudy with light wind. 	
Height above ground surface (cm)	10	90	10	90
Wind speed (m/s)	1.103	1.381	0.355	0
Temperature (°C)	19.7	19.7	19.7	20.9
Relative humidity (%)	45.6	45.1	45.5	43.2

Forecast from darksky.net:

Location	Beaverton, OR
Date and time	June 4, 2020 11:30am
Wind speed (m/s)	2
Temperature (°C)	18
Relative humidity (%)	60

Answers to Analysis Questions

- Answers will vary based on your location. It is important for students to measure at two very different locations to see any differences. Something as simple as a parking lot compared to a playground or athletic field can be used.

2. Answers will vary. For some measurements, such as wind speed, you might see a difference between the two heights due to variances of where the wind is blowing. You might also see differences or similarities in the other readings due to how wet or dry the area is. This question does not have a correct or incorrect answer, it is to have the students think about if it would be possible or not.
3. Answers will vary based on your location and time of year. Students should see readings that are similar but not exact to the forecast. There are many variations that can cause these differences such as buildings, amount of sunlight, wind gusts, etc. Also forecasts cover a large area of an entire city or similar while the students were measuring in a very localized, small area.
4. Answers will vary based on your location.
5. Answers will vary. An ideal location would be in an open area without obstruction and high off the ground. Often weather stations are mounted on top of buildings because of this.