

Air Quality in the Community

Introduction

Have you ever wondered what kind of air quality you live in and breathe every day? Not all air is good for your health and wellbeing. The Speck sensor can be used to analyze the air and particulate matter. It can give you a good idea of how clean the air that you breathe is. In this activity, students will gather information about the air quality around their community during different times of the day/week. They will use this information to draw conclusions about air quality in their community, and come up with recommendations for how to either improve the air quality or ways to maintain a healthy air quality around the community.

Targeted Grade Level

10-12 (if doing project around community – students must drive to selected locations)

6-8 (if doing project around school campus)

Time Required

1 week for monitoring, plus class period for analysis and additional time for extension activities

Learning Outcomes

- Students will be able to assess the air quality using Speck sensors.
- Students will brainstorm areas that are frequented by community members, and analyze the air quality at these locations over one week.
- Students will draw conclusions about why the air quality is good or bad, and come up with suggestions to either improve or maintain the air quality depending on their results.

Materials

- Speck Sensor
- Portable battery pack
- Data table (attached)

Directions

1. Have the students think of a list of places that members of the community often visit. Some suggestions would include the public library, gas station, restaurants, schools, parks, etc. Have a student volunteer record the list on the board as students think of places. Ideally, you need one location for each Speck sensor that you will be using.
 - a. If you are working with students who are not able to drive to locations in the community, come up with a list of places that you can walk to as a class. This would include locations within the school building or campus.
2. Ask students to think about the air quality at the places that they listed. Where do the students think the air quality is the best? Where do they think it is the worst? Have them defend their opinions. (This could be a pre-lab writing assignment.)
3. Show students a Speck sensor, and explain how to use it. Make sure that the Speck sensor is plugged into a battery pack, and that the units are on “C.” Show students the

air intake opening on the Speck, and remind them not to cover that opening when they are holding the Speck. Explain how the Speck sensor is taking in air through that opening, and analyzing it to see how many small particles (smaller than the human eye can see) and reporting that number on the screen.

4. Give groups of students (about 2-3 students per group) a Speck sensor, and allow them to practice turning the sensor on and getting readings from different areas in the room.
5. Hand out the data table. Explain to students that they will be using Speck sensors to gather data from the areas that they brainstormed in Step 1 throughout the next week.
6. Assign locations to student groups, and have the students develop a plan to share the testing days and the Speck sensors. Each group will also need to pick a very specific place that the testing will be done at their location (at a specific table in the library or at a restaurant, by a specific gas pump at the gas station, etc.) to avoid extra variables.
7. Each day that the students collect data, they will need to record the Speck sensor reading as well as the time of day and any other observations (foggy, raining, etc.) that they make at the time. Data should be recorded in the data table. (Or, the data could be submitted using Google Docs.)
8. Encourage students to vary the time of day that they collect data throughout the week.
9. Once the data has been collected, make copies of the data from each location and provide each student group with a master data table (including all data from all locations).
10. Have the students work in groups to develop some conclusions:
 - a. When and where was the air quality the best? When and where was it the worst? Why do they think this might be?
 - b. How does the sampling time affect air quality? Why might this be?
 - c. What areas are in need of air quality improvement plans?
 - d. What areas are in need of air quality maintenance plans?
11. Have students brainstorm ideas for air quality improvement/maintenance plans for each area.

Extension Activities

- The next step of this project is to communicate the results with the community. Students could make posters or pamphlets about the air quality improvement/maintenance plans for areas and hand them out at that location.
- Students could contact local government officials to report their results and offer suggestions for the community.

Name: _____

Date: _____

Period: _____

Air Quality in the Community: Student Data Sheet

Assigned Location: _____

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Speck Sensor Reading (make sure the mode is C)							
Time of Day (be sure to include AM or PM)							
Other Observations (including weather for outdoor locations, or any unusual activity for indoor locations)							
Student Name (keep track of which group member tested each day)							