Pollutant Posters

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Abstract

During this lesson students will apply their understanding of weather systems, air currents, and pollution to create an informational poster that will be presented in a mini science forum. The purpose of this lesson is for students to apply knowledge and skills to create posters that inform the public about a specific pollutant and suggest where people with specific respiratory illnesses might want to relocate (if they were able to) in order to alleviate symptoms.

Objectives

Students will be able to:

- Explain how a pollutant affects their community.
- Propose one solution to the problem.
- Make a recommendation where highly sensitive groups might consider relocating in order to alleviate symptoms.

National Science Education Standards

Content Standard D - STRUCTURE OF THE EARTH SYSTEM

The atmosphere is a mixture of nitrogen, oxygen, and trace gases that include water vapor. The atmosphere has different properties at different elevations. Clouds, formed by the condensation of water vapor, affect weather and climate.

Content Standard D - EARTH IN THE SOLAR SYSTEM

The sun is the major source of energy for phenomena on the earth's surface, such as growth of plants, winds, ocean currents, and the water cycle. Seasons result from variations in the amount of the sun's energy hitting the surface. This is due to the tilt of the earth's rotation on its axis and the length of the day.

Arizona Science Education Standards

Strand 6 - EARTH SCIENCE

Concept 1 – Structure of the Earth

PO 1. Describe the properties and the composition of the layers of the atmosphere.

PO 5. Describe ways scientists explore the Earth's atmosphere

Concept 2 – EARTH'S PROCESSES AND SYSTEMS

PO 5. Analyze the impact of large-scale weather systems on the local weather.

Teacher Background

Different parts of Tucson have higher concentrations of the different pollutants. PM tends to have a higher concentration on the Northwest side of town due to the prevailing winds that blow from the Southeast. Carbon Monoxide tends to be highest near 22nd and Alvernon due to the high traffic volume. Downtown also shows a higher level of CO (although the two aforementioned locations are below the national maximum allowable concentration). Carbon Monoxide levels are higher in the winter months due to inversion layers. Ozone levels are relatively consistent across the city, but slightly higher levels were noted near 22nd and Alvernon and at Children's Park in the River and La Cholla area. Ozone levels are highest in the summer months due to increased daylight hours.

For those not in Tucson, Arizona - Check out your local air quality district's website to get similar information on your community. In some communities, there may be only one air monitor in a city, so you will want to have the exercise be about your whole region. For example, in Long Beach, CA, there is only one monitoring station. When USC does this exercise, they will look at the City of Long Beach compared to other cities in the region. One place to start is at the EPA site
http://airnow.gov/index.cfm?action=airnow.local

Related and Resource Websites

http://coep.pharmacy.arizona.edu/air/
http://www.airinfonow.org/html/health.html
http://www.airinfonow.org/monsites/report.asp

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http://www.cdc.gov/nceh/airpollution/default.htm
http://www.deq.pima.gov/pdffolder/2001AnnualDataSummary.PDF
http://airnow.gov/index.cfm?action=airnow.local

Time	2-3 class periods (45 minutes)
Preparation Time	None
Materials	Poster or construction paper
Teacher Preparation	none

Activity

1. Tell students: "Today you will create an informational poster that could be placed here at school to teach other students about pollutants in the air. Tomorrow (or the next day) you will present that poster to the class in a science forum setting. Your poster should include the following basic information but you may include more."
    - Information you learned about the pollutant this week.
    - At least one idea about how the pollutant's presence can be reduced.
    - An advisory to sensitive groups about what parts of town are best/worst for their condition and why. (Make sure to explain which groups are sensitive to your pollutant.)
    - An explanation of how different socio-economic groups are impacted by the pollutant.
2. Allow students the remainder of class to complete the poster (and a bit of the next day if necessary). If you plan to use a rubric to grade the poster, hand it out at this time
3. When students have completed their posters, have them present their findings in a brief (5 minute) presentation to the class. They should present the data from their chart and be prepared to answer questions from the teacher and rest of the class. Groups studying the same pollutant should be encouraged to challenge any points they disagree with. As always, be sure to go over rules for proper etiquette before the forum begins.

Embedded Assessment

Have students assess themselves on a rubric created by you or the class, or you may choose to use the rubric provided.

5	Poster contains all elements required plus additional information. Poster is aesthetically pleasing and includes chart, graphs, maps, or tables to aid in understanding.
4	Poster contains all elements required. Poster is aesthetically pleasing and includes chart, graphs, maps, or tables to aid in understanding.
3	Poster contains most elements required– or - poster not is aesthetically pleasing but includes chart, graphs, maps, or tables to aid in understanding.
2	Poster contains some elements required– or - poster is not aesthetically pleasing and does not include chart, graphs, maps, or tables to aid in understanding.
1	Poster contains few elements required– and - poster is not aesthetically pleasing and does not include chart, graphs, maps, or tables to aid in understanding.

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