

Topic:	Post Visit Lesson Plan for the Environmental Monitoring Interactive Stations: <i>Air Quality</i>
Lesson Title:	Clean Air and Loving Every Minute of It!
Grade Level:	4th - 5th Grades
Science Domain:	Earth and Human Activity
Purpose:	Students will learn how to share information learned as a result of the field trip to the INFINITY Science Center in order to inform others about the Environmental Monitoring Stations.

Connecting to the Next Generation Science Standards

Students who demonstrate understanding can:	
Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. 4-ESS3-1 Earth and Human Activity	
The materials/lessons/activities outlined below are intended to help students reach the Performance Expectations listed below.	
Performance Expectations:	Connections to Classroom Activity Students:
<i>Science and Engineering Practices</i>	
Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluate the merit and accuracy of ideas and methods. • Obtain and combine information from books and other reliable media to explain phenomena.	I can gather (read, collect, record) information about air pollution on a website, book or other resource and share with others.
<i>Disciplinary Core Idea</i>	
ESS3.A: Natural Resources • Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not.	I can collect data on Air Quality from a website and enter the data in a table. I can look for patterns to determine how the way we use energy and fuels affects the environment in multiple ways.

Crosscutting Concept

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change.

Connections to Engineering, Technology, and Applications of Science Interdependence of Science, Engineering, and Technology

- Knowledge of relevant scientific concepts and research findings is important in engineering. Influence of Engineering, Technology, and Science on Society and the Natural World
- Over time, people's needs and wants change, as do their demands for new and improved technologies.

I can identify and explain cause and effect relationships between humans and air pollution.

Teacher Background Information

After your visit to The INFINITY Science Center in Pearlinton, Mississippi, take time to review what your students discovered as a result of the lessons and interactions within the Environmental Monitoring exhibit. This exhibit showcases specific environment monitoring and research programs and capabilities resident in the Stennis Federal complex. Live data feeds from all parts of the globe, in particular the Gulf Coast region and immediate surrounds at Stennis, are used by visitors to explore their environment while learning about the role of data collection in scientific research. Within the exhibit you and your students had the opportunity to interact with six stations covering three topics: ocean conditions, air quality, and river conditions.

Primary Content:

Scientists collect a wide array of environmental data at Stennis and across the nation

- Researchers use a variety of interesting techniques to collect this data
- Once collected, environmental data reveal insights that are fascinating in their own right and often prove essential to the public's health and safety.

Statement of Learning Objective: ABCs – Audience, Behavior, Condition

Student will learn how the information learned at the Environmental Monitoring Stations at the INFINITY Science Center and the activities in the classroom can be used to improve the quality of life of a citizen.

Common Learner Misconceptions:

Review the student misconceptions from the “previsit” lesson plan to The INFINITY Science Center. How can you formatively assess whether or not a student holds firm to these beliefs?

- Students may think that gases make things lighter and that air has no weight, color, or odor and is in effect invisible and inconsequential. The correct concept: Gas (air) has mass, takes up space, and is affected by energy.
- Students may think that global warming is caused by the ozone hole, which was created by chemicals like hair spray. The correct concept: The ozone layer in the stratosphere protects the planet from the sun's harmful radiation. Holes in the ozone, caused by chemicals released by humans, let more harmful radiation from the sun reach the surface of Earth. This is not the same

<p>phenomenon as global warming.</p> <ul style="list-style-type: none"> Source: http://beyondpenguins.ehe.osu.edu/issue/climate-change-and-the-polar-regions/climate-misconceptions-a-top-10-list
<p>Materials:</p> <ul style="list-style-type: none"> Digital photos of the field trip to place into a slide show for review Drawing paper, crayons and/or markers
<p>Vocabulary:</p> <ul style="list-style-type: none"> Environment Pollution Air quality
<p>Safety: Normal safety rules apply with this lesson for school activities.</p>
<p>Adaptations/Accommodations for Exceptional Students: English Language Learners may need help with understanding the vocabulary. Pair students with a partner to help with directions and label the materials with the English word and also the student's native language when learning new material. Considering pairing students who may need additional help while researching the information in the computer lab or in the classroom. Follow any special guidelines needed for students with an IEP for Special Education.</p>
<p>Literacy Connections: Before reading any books aloud to students, take the moment to preview for appropriateness for the grade level and topic.</p> <p>Ajmera, M., & Browning, D. (2016) Every breath we take. Watertown, MA: Charlesbridge.</p> <p>Barrett H. (2011) Mars, Jimmy, and me. Bloomington, IN: AuthorHouse.</p> <p>Earhart, K. & Bracken, C. (2007) The magic school bus gets cleaned up. New York, NY: Scholastic.</p> <p>http://www.amightygirl.com/books The Mighty Girl website has a large selection of "girl-empowering" videos and books on a variety of topics.</p>

5E Instructional Process:

Engage:

Activity

- Gather the students together and ask them what they learned as a result of the field trip to The INFINITY Science Center. In particular, you want to know what they learned as a result of the Environmental Monitoring Exhibit and the Air Quality stations.
- Ask students to record their thoughts on the 3-2-1 formative assessment sheet. Point out that they have three different sections to record their thoughts: Tell me 3 things you learned, 2 interesting facts and 1 question
- After students are finished, allow time to share, and then take up their 3-2-1 sheets to review for clarity and/or provide additional lessons to clear up any misconceptions.

Guiding Questions

1. Tell me 3 things you learned, 2 interesting facts and 1 question you still have about the Air Quality station located at the Environmental Monitoring Station.

Explore:**Activity:**

1. Now that we have learned about Air Quality Monitoring and how scientists use the data they collect to inform citizens for safety reasons, what can we do reduce pollution on days that weather conditions make ground-level ozone a safety concern?
2. If time allows, share the following "Air Quality 101" YouTube video by the Louisiana Department of Environmental Quality. This video is 12 minutes long.
<https://www.youtube.com/watch?v=TC6jaewXYVg>

Always check the quality and to make sure that it is grade appropriate before showing to students. After viewing the video, ask students to share any new information they may have learned about the Environmental Protection Agency monitors the air quality in the state of Louisiana.

3. Form groups of no more than three students and allow time for the groups to brainstorm a list of ways to reduce air pollution.
4. After students have brainstormed their list, they are to choose their *Top 10 Ways to Reduce Air Pollution* and create a poster to display in various places throughout the school to inform other students.
5. You may choose to have students write in complete sentence and/or a bulleted list of ideas. The poster should have a title, be written neatly and correct spelling should be expected if the list if it is to be displayed in the school. All contributors should have an active part and his/her names should be included on the poster.

Guiding Questions:

1. What can we do to reduce pollution on days that weather conditions make ground-level ozone a safety concern?

Explain:**Activity**

1. After students have created their "Top 10 Ways to Reduce Air Pollution" and shared with the class, ask the students to "take action" and to commit to trying one of the ideas on their list at home.
2. What can you do at home to help prevent or reduce air pollution? Challenge the students to choose a task that would be an easy idea to fix and one that might be challenging.
3. Remind students that we are sharing the information we learned about Air Quality as a result of our previous lesson and visit to the INFINITY Science Center. Learning about environmental issues helps us with critical thinking skills, problem solving, and how to make informed responsible decisions.

Guiding Questions

1. What can you do at home to help prevent or reduce air pollution?

Elaborate:**Activity**

1. How can we inform others about what we learned at the INFINITY Science Center? After students have examined the class pictures and discussed the Environmental Monitoring Exhibit, give each student a piece of drawing paper and challenge them to create a brochure of the exhibit.

2. Show the students how to divide the drawing paper into thirds and fold. Plan to have examples of brochures from a Welcome Center near your area to have on hand to share as an example with students.
3. Label each of the three sections with the names of the stations: *Ocean Conditions*, *Air Quality and River Conditions*. Students should include three facts and a perhaps drawing of each station. Display pictures from the field trip for students to refer back to if needed.
4. Ask co-workers in other grade levels if your students can share their posters or brochures with students for informational purposes.
5. If available share a book with your students about air pollution. Ask your Media Specialist for a recommendation if any of the books listed in the lesson plan are not available.

Guiding Questions:

1. How can we inform others about what we learned at the Environmental Monitoring Exhibit at the INFINITY Science Center?

Evaluate:**Activity**

1. As a result of the class visit to the INFINITY Science Center, evaluate your student's prior knowledge about what they knew about the environment and how the lessons and field trip increased their awareness and understanding of the need to protect and preserve our local environmental needs. Using the 3-2-1 formative assessment piece from the beginning of the lesson, what will be your next steps? Plan time to clear up student misconceptions reviewed and to allow time for a student to pursue learning more about STEM careers if time allows.