



Lesson 1:

What Makes Up My Ecosystem? Get Down and Dirty

Grade Level: 4-6

Time: 75 Minutes

Vocabulary:

Habitat, native, invasive, shelter, migration, pollution, government, industry, U.S. Environmental Protection Agency, common names for local species.

Great Lakes

Literacy Principles:

Principle 5

Concepts A, B, E, G, H

Principle 6

Concepts A, B, C

Summary:

Students learn about an environmental cleanup happening in their very own neighborhood. Students create a story and PowerPoint about their Area of Concern. They pot native seeds that they will grow in their classroom. They can then take the plants to the cleanup site to help restore the environment or plant them in a school garden.

Objectives:

- Describe the effect of historical pollution on today's environment.
- Describe the role of the U.S. Environmental Protection Agency (EPA).
- Relate EPA's role in the environmental cleanup in the students' neighborhood.

Materials:

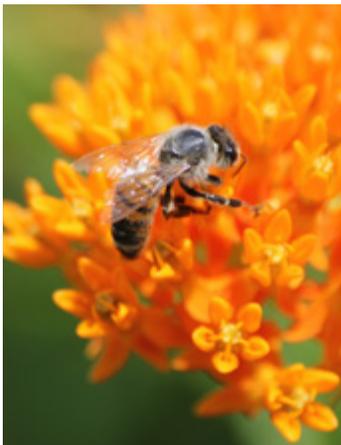
Native seeds, flats filled with potting soil, species stickers, and spray bottles. An example PowerPoint (editable .ppt file) and seed planting instructions can be found on www.greatlakesmud.org/education.html.

Procedure:

Find a well-lit space in the classroom for the seeds to grow in flats. Contact Illinois-Indiana Sea Grant for help obtaining native seeds. Administer the Cleanup Pre-test prior to the first lesson. Instruct students to complete the "Our Area of Concern" activities, including story and PowerPoint creation. Set up the materials for planting seeds in an outdoor location at the school. Deliver the story about the local ecosystem and review the plant guide PowerPoint and seed planting instructions with the students. Then take the students outside and pot the seeds. After planting, let the plants drain for an hour, then bring them inside.

Assessment:

Conduct the cleanup pretest prior to the first lesson. Have the students write reflections about their experience planting and learning about the species (See *Example Student Reflections*).



Name _____ Date ____/____/____

Part I: Multiple choice

Read each question carefully and circle the correct answer.

1) A(n) _____ is a group of individuals of one species that lives together in an area. It does not include other species or non-living things.

- a. ecosystem
- b. population
- c. community
- d. organism

2) Bioaccumulation is when_____.

- a. pollution is stored in the body of an animal and increases over time
- b. prey is able to successfully hide from its predator
- c. sediment at the bottom of a river attaches to chemical pollution
- d. a channel of water flows toward another body of water

3) Which of the following is NOT a component of a species' natural habitat?

- a. Shelter
- b. Space
- c. Food
- d. Invasive species

4) _____ ecosystems include rivers, wetlands, and marshes.

- a. Terrestrial
- b. Aquatic
- c. Arid

5) In the ecosystem, which of the following food chains is in the correct order? Note: the bottom of the food chain is listed first.

- a. Fish, benthos, bird of prey, bird
- b. Bird of prey, bird, benthos, fish
- c. Bird of prey, fish, benthos, bird
- d. Benthos, fish, bird, bird of prey

6) The _____ in the water body is/are being cleaned up this year because the pollution is harming the _____ that live(s) there.

- a. fish, air
- b. air, fish
- c. sediment, benthos
- d. benthos, sediment

7) Many environmental laws in the 1970s made it illegal for industries to pollute.

- a. True
- b. False

8) Scientists make _____ using their senses (smell, sight, etc.) to understand and make hypotheses about the world.

- a. observations
- b. guesses
- c. science

Part II: Fill in the Blank

Read each statement carefully and fill in the blank with the correct answer.

9) A(n) _____ species is supposed to live in the local ecosystem. It belongs there.

10) A(n) _____ species does not belong in the local ecosystem. It harms the species that belong in the ecosystem.

11) _____ is the wet, squishy mud found at the bottom of a river or lake.

Part III: Short Answer

Read each question carefully and provide an answer using a complete sentence.

12) What are two environmental problems that make the Area of Concern an unsuitable habitat for native animals?

13) Why is it important for scientists and engineers to work as a team to clean up a water body?

Our Area of Concern: Our Story

Introduction:

Every place has a story. From historical developments to personal stories from people who have seen the area change, it's all an important part of the story. When students construct a story that includes facts and personal viewpoints it helps to develop a sense of place and ownership.

Teacher instructions:

For this activity we are going to combine historical facts about your Area of Concern with personal stories from those who have been in the area for a long time (if available) as well as your connection to the area and what you hope to see once the remediation project is complete.

1. Just the facts:

- a. Where is the area located?
- b. What is the acreage?
- c. Who manages the area?
- d. What history is associated with the area?
- e. What pollutants have been found?
- f. What are possible sources?

2. Stories from long-term residents (optional): Ask parents, grandparents, neighbors or anyone that has lived in the area for many years about how they have seen the area change. Ask questions like:

- a. How long have you lived here?
- b. Why did you move here?
- c. What do you like about living here?
- d. What do you know about problems associated with the [Area of Concern]?
- e. What changes would you like to see in this area?

3. Your Story: Now tell us your story about living in the area. Here are a few starting questions, but feel free to add more information. Use complete sentences for your story.

- a. How long have you lived here?
- b. Were you born here or did you move here?
- c. What do you like about living here?
- d. What would you change about living here?
- e. Do you have a favorite place to hang out?
- f. What animals do you see living here?
- g. Do you feel connected to where you live?
- h. How long do you see yourself living here?

4. Construct a classroom story about your Area of Concern. Use the information to construct several paragraphs using items that the class has gathered and is willing to share. Keep in mind that not all of the information will be used, but together the class should be able to create a well-rounded and well represented story.

Sources for historical information:

- GreatLakesMud.org > Waterbody > Your Neighborhood Cleanup Site
- EPA Great Lakes Areas of Concern (www.epa.gov/great-lakes-aocs)
- Internet Search > [Area of Concern] history
- Look for your state's Area of Concern website
- Look for information from local municipalities and NGOs
- Local museums or libraries

Once you have completed your story, share it with others including Illinois-Indiana Sea Grant.



Our Area of Concern: Planting Renewal

Introduction: Plants are part of what make an ecosystem viable, but some plants contribute more than others. Native plants typically provide shelter and are a food source for other native species. Invasive plant species, however, take over an area and do not support native organisms.

Teacher instructions: Students will create a PowerPoint slide about native and invasive plants in your Area of Concern. Depending on the number of species, this can be done by individual students, pairs, or small groups. Each slide will have key information about the plants:

1. The common and scientific name
2. A photo
3. 2-3 bullet point facts

When the slides are completed, compile them into one PowerPoint presentation, separating out the invasive from the native plants. Have the students present their plant to the class and encourage them to add one or two more verbal comments. The students might have a question about the plant that they couldn't find the answer to or an interesting fact about the plant. During the presentations, students should take notes on each plant. Encourage them to ask questions along the way.

Here is an **example** of a slide with speaking notes added at the bottom:



River bulrush
Schoenoplectus fluviatilis

- The plant grows about five feet tall.
- The thick sturdy stem was used in the past to build furniture.
- Humans can eat the roots.



- It is threatened by nutrients like fertilizers or sewage, which increase the success of the non-native plants.
- It is native to all states except New Hampshire, where the population was introduced in a human-created wetland.

Resources for Area of Concern Research:

Since habitat restoration in your area is dependent on decisions made by local, state, and federal partners, the list of plants will vary. There are plants that are specific to the water body in your region or site. Contact Illinois-Indiana Sea Grant to learn more about native plants being considered for site restoration in your area, as well as the invasive species that pose a threat.

Sources for General Information:

Indiana:

- Aquatic Invasive Plant Species <http://www.in.gov/dnr/6347.htm>
- Common Native and Exotic Aquatic Plants of Indiana Waters bit.ly/22XUIVg

Minnesota:

- Invasive Aquatic Plants <http://www.dnr.state.mn.us/invasives/aquaticplants/index.html>
- Minnesota Aquatic Plant Guide <http://dnr.state.mn.us/nr/plants/aquatic/index.html>

Michigan:

- The Field Guide to Invasive Plants of Aquatic and Wetland Habitats for Michigan bit.ly/21RhRq7
- Common Aquatic Plants of Michigan Guide <http://1.usa.gov/1VRy3rz>

Ohio:

- List of Ohio's Aquatic Invasive Species <http://ohiodnr.gov/ais>
- Go Native! (Ohio Department of Natural Resources) <http://ohiodnr.gov/gonative>

New York:

- New York Invasive Species Information <http://www.nyis.info/>
- Aquatic Plants: The Good & The Bad (helpful for identifying invasive from native) bit.ly/1pHFLIf

Wisconsin:

- Common Wetland Invasive Plants in Wisconsin 1.usa.gov/1MPTKRJ
- Wetland Plants of Wisconsin <http://bit.ly/1RNDvfu>

Note: As of 2016, all management actions for Areas of Concern in Illinois are complete, and all Areas of Concern in Pennsylvania have been delisted. If you are interested in the curriculum or possible projects in these states, contact Illinois-Indiana Sea Grant.

Example Student Reflections from Different Sites



Tuesday me and my classmates helped plant seeds for the Buffalo River. My teacher taught us about the Buffalo River. She told us a story about what happened to the Buffalo River. We learned proper steps to planting seeds. There are different kinds of plants we planted.

In Buffalo River there are plants invading Buffalo River. In the 1970's the government made a lot of laws to protect our environment. Birds and other animals used to stop there and rest. Now the animals don't come because of the pollution.

Here are the steps we took to plant the seeds. First we labeled the pots with a species sticker. Then we sprinkled three seeds with a spoon because the seeds were tiny. After that we covered the seeds with soil. Last we watered the seeds. Finally we put them in the sun so they could get sunshine.

I'm helping the Buffalo River because I don't want the animals to suffer. And, because the invasive species are invading the other plants. I want the plants to grow big and wide. The reason why I want them to grow big and wide is because then the animals could have a big shelter to stay in. I can't wait to plant them in the Buffalo River!



On Tuesday a special visitor came. She came to talk to us about the Roxana Marsh. Then the lady had a paper she read to us a paper about Roxana Marsh. She told us that it is one plant that does not belong in Roxana Marsh. People were throwing trash in Roxana Marsh. Then it was the factory's fault because it was the factory that was killing the Roxana Marsh plants. No animal went to Roxana Marsh because of the pollution.

The project is that we have to plant seeds. The plants are being affected because of pollution. We are going to plant more seeds to help them. It was a plant that does not belong in Roxana Marsh. The invasive plant is called phragmites.

The first step was we had to put a name sticker on the cup. Then we filled the pot with planting soil. Next, do not push the pot down. After, tap the filled pot on the ground to help the soil. Settle in. Later, spoon sprinkle seeds into each. Sprinkle a small amount of soil over the top. Push the seeds into the soil. Finally slowly water the pot.

I am helping Roxana Marsh because I want all the animals to come back to Roxana Marsh. And because I love plants. And I love nature. I love helping people out with their problems. I hope Roxana Marsh native plants grow and animals.

