Title: Ecosystem Chorus

Adapted from *4-H Earth Connections*, by permission of the University of Maine Extension Services.

Theme: All parts of an ecosystem are connected and interdependent.

Objectives:

- Students will learn the importance of living (biotic) and non-living (abiotic) factors in an ecosystem.
- Students will understand how human impacts can disrupt an ecosystem.
- Students will compile a list of ways to protect and restore ecosystems.

Duration: 20-30 minutes

Age Range: Kindergarten-6th Grade

Materials:

- Blanket
- Plastic Bags

Background:

This activity helps students understand how energy travels within an ecosystem and how all components of an ecosystem are important and interconnected. It is a great introduction activity for studying any ecosystem in-depth because it introduces key categories of living (biotic) and non-living (abiotic) components. Once the chorus is put together, it provides a great tool to illustrate how human disruptions to an ecosystem can dramatically change the ecosystem. Oil spills are one such impact, but there are many other human impacts that can be included. This activity works best with 20-50 students.

Introduction:

Lead a song familiar to all students (i.e. Old MacDonald) and define the word chorus as a group of singers. Sing the song again, but take away some of the low or high voices. Ask all students to describe the differences. Ask them what parts are more important than others. Remove the parts identified as "less important" to illustrate how any missing parts change the chorus. Ask students to think about how all parts of the chorus are important as they do the next activity.

Activities & Procedures:

Have all students stand in a large circle. Ask students to name "something that is not alive today, has never been alive, and will not be alive in the future." Choose one student with a raised hand, have them share an abiotic component, and place them in the middle of the circle. Ask for other abiotic factor and continue to place these students in the middle of the circle until water, air, soil, and sun have been identified. Other abiotic factors can also be included. Have these students stand together. Explain that these abiotic factors are the foundation and pulse of the ecosystem. Have these students begin humming quietly.

Ask the remaining students, "What needs sunlight, water, air, and soil and can make it's own food?" With younger students, use more hints. As soon as one student identifies this group as plants or producers, have a number of other students name plants. This group should be the largest group of living factors since they produce the food that supports the animals. Have the plants form a circle around the abiotic factors that they use to produce food and grow. The plant-people should quietly practice their part in the chorus: "grow, grow, grow."

Ask the remaining students to name some organisms that consume plants, animals, or both. These students should form a loose circle around the producers. Consumers (or "animals") eat plants and other animals, which tends to be a noisy process. The animal-people should loudly practice their part in the chorus: "crunch, munch, crunch, munch."

Ask the group if plants and animals live forever. Describe a world without decomposers, where scat and dead plants and animals keep piling up and up. Explain how important the FBI (fungus, bacteria, and some invertebrates) really are as they recycle nutrients through the ecosystem. Have the remaining students name a few decomposers (mushrooms, bacteria, worms, etc.), form a circle around all of the other ecosystem components, and practice their part in the chorus: "rot, rot, rot."

Begin the ecosystem chorus performance by having all children practice their parts. Keep the chorus going by directing all of the parts to get louder and louder, then softer and softer.

Then introduce a pollutant or litter to the ecosystem chorus. It works well to start with something simple, like littered plastic bags. Explain that when plastic bags are littered and blow into an ecosystem, they can cover and suffocate different living things and also can be eaten by animals. Cover parts of the ecosystem with the plastic bags (make sure not to cover any heads!) and remove these victims from the chorus. Does it sound the same?

Then, ask students what could be done to restore the ecosystem and make the chorus strong again. Probe them to suggest things like picking up litter and reminding people not to litter with signs, posters, public service announcements,

etc. Have the students that suggest these things take the plastic bags off of the ecosystem parts. Try the chorus again.

If you would like, introduce the more complicated concept of an oil spill disrupting an ecosystem. Explain that when the *Exxon Valdez* Oil Spill happened, oil gushed out of the tanker and was like many blankets on the water, covering rocks, animals, plants, and decomposers. Cover these parts of the ecosystem with blankets. Explain that after a while, the oil broke up into tarballs (roll up a blanket) and mousse (blow air into the blanket so it expands) that affected other parts of the ecosystem. Cover more victims. Then have students try the chorus again. What does it sound like?

Again, ask students what could be done to restore the ecosystem or prevent an oil spill. Have the students that offer suggestions take the blankets off of the ecosystem parts. Try the chorus again.

Wrap-up:

Ask students how the chorus sounded before the pollutant was added. Explain that, like a chorus, an ecosystem may appear to have no order and make little sense. Only after examining nature closely does order emerge and the importance of each piece of the "chorus" or ecosystem become clear. Explain that these categories – abiotic, producers, consumers, and decomposers – can be found in every ecosystem, but they have unique forms and play different roles in sustaining the ecosystem.

Explain that humans can also play an important role in ecosystems. Compile a list of ways students can have positive effects on local ecosystems. Put at least one of the ideas into action as a class (i.e. picking up litter) and challenge students to enact the other ideas too.

Evaluation:

Observe student participation in the activity and contribution of ideas for restoring the "disturbed" ecosystem chorus. Use the wrap-up discussion as a formative assessment to assess student understanding of the importance of abiotic factors, producers, consumers, and decomposers in an ecosystem. Use an "Exit Ticket" to do additional evaluation: ask students to identify the important roles, an example of each in the ecosystem, and a way to protect that part of the ecosystem on a piece of paper and turn it in before leaving.

Ecosystem Chorus Standards

Science As Inquiry and Process: Students develop an understanding of the processes and applications of scientific inquiry.

SA3
Students develop an understanding that culture, local knowledge, history, and interaction with the environment contribute to the development of scientific knowledge, and that local applications provide opportunity for understanding scientific concepts and global issues.

The student demonstrates an understanding that interactions with the environment provide an opportunity for understanding scientific concepts by:

[4, 5] SA3.1 identifying the local limiting factors (e.g., weather, human influence, species interactions) that determine which plants and/or animals survive

Concepts of Life Science: Students develop an understanding of the concepts, models, theories, facts, evidence, systems, and processes of life science.

SC3
Students develop an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy.

The student demonstrates an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy by:

[4] SC3.1 identifying examples of living and non-living things and the relationship between them(e.g., living things need water, herbivores need plants)

[3] SC3.2 organizing a simple food chain of familiar plants and animals

[4] SC3.2 identifying a simple food chain of familiar plants and animals, diagramming how energy flows through it; describing the effects of removing one link

[5] SC3.2 organizing a simple food chain of familiar plants and animals that traces the source of the energy back to sunlight