



Title: Web of Life

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 understand that living (biotic) and non-living (abiotic) components of ecosystems are connected.
- Students will be familiar with predator-prey relationships.
- Students will understand how human impacts can disrupt an ecosystem.
- Students will brainstorm ways to protect and restore ecosystems.

Duration: 15-25 minutes

Age Range: 2nd – 6th Grade

Materials:

- Ball of yarn, twine, or rope
- Laminated photographs/drawings of ecosystem components:
 - sun
 - soil
 - water
 - air
 - producers
 - prey
 - predators
 - decomposers

Background:

This activity helps students understand how components within an ecosystem are interconnected and dependent upon one another. It works well to reinforce concepts of food webs, but extends to include abiotic factors as well. Once the web of life is constructed, it provides a great tool to illustrate the ripple effects of disturbances in an ecosystem. Oil spills are one such impact, but there are many other human impacts that can be included.

Preparation:

Prepare laminated photographs of components in an ecosystem. Be sure to include a wide variety of living organisms (predators, prey, plants, and decomposers) and non-living resources (sun, soil, water, air).

Introduction:

Ask students to discuss the members of their community. Who are they? What role do they play in the community? How does their work help others in the community? After you have compiled a thorough list, examine the interdependence among them. Discuss what might happen if people couldn't fill their roles (i.e. grocers shutting their stores = harder to acquire food).

Activities & Procedures:

Have students stand in a large circle. Explain that they are going to investigate how parts of natural communities and ecosystems depend upon each other. Pass out a laminated card to each student and tell them they are now this organism or abiotic (non-living) factor. Ask the students, "Who of you is the source of all energy on earth?" This will be the sun student. Hand this student the ball of yarn and have them hold onto the end. Then ask students if any of them is an organism that depends upon the sun. Unwind the yarn to this student and have them explain how their organism is connected to the sun. Then ask who is connected to this organism and continue to pass the yarn as their interdependence and relationships emerge. These relationships do not need to be simple predator/prey relationships. For example, the sun may pass the yarn to a blueberry bush (or any other organism or abiotic factor, as all are in some way connected to the sun). The blueberry bush could then pass the yarn to a bird that eats the berries, fungus that breaks down the dead leaves, soil that is built from the decomposing leaves, or water that is soaked up by the plant. Continue in this way – the yarn represents connections of any sort, not directional prey → predator or plant → consumer relationships.

Once the whole circle is connected, warn the students to hold tightly onto their yarn and have them carefully pull up any slack and raise the web above their heads to look through it. Bring the web back down. Pluck on the yarn to note how strongly connected everyone is in the ecosystem. Then introduce threats to the web. Begin with something the students are familiar with, such as litter. Pick 1-3 parts of the ecosystem to be affected and have them carefully drop the yarn to the floor. Anyone who feels slack in their yarn should also drop their yarn. Continue the process until everyone is disconnected.

Then, ask students what could be done to reconnect and restore the ecosystem. Probe them to suggest things like picking up litter and reminding people not to litter with signs, posters, public service announcements, etc. Have the initial parts of the ecosystem that were lost carefully pick up their piece of the yarn, and the students connected to them pick up their yarn until the ecosystem is complete again.

Alternately, if the yarn is a tangled mess, begin your web again from one of your healthy organisms.

If you would like, introduce the more complicated concept of an oil spill disrupting an ecosystem. Again, have students drop the yarn as they are affected and watch the effects ripple through the ecosystem until everything is disconnected. Brainstorm ways that an ecosystem can be restored after an oil spill and/or how oil spills can be prevented; use these ideas to reconnect parts of the ecosystem.

Wrap-up:

Discuss how components in an ecosystem are interconnected and even that ecosystems are connected to each other. Brainstorm how ecosystems around the school are connected to ocean ecosystems. Compile a list of ways students can have positive effects on the ecosystems around the school and community. Challenge students to take action, and put one of the ideas into action as a class (i.e. picking up litter around the playground, which will benefit that ecosystem and prevent the trash from ending up in the ocean!)

Evaluation:

Observe students during the activity for participation and respectful behavior. Assess student understanding throughout the activity as they link the food web together and discuss possible effects on the ecosystem.

Web of Life 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

[6] SC3.2 organizing a food web using familiar plants and animals

[7] SC3.2 classifying organisms within a food web as producers, consumers, or decomposers