

Post-Visit Activity #2

Cave Food Web

Overview Students will create a “web of life” to show how cave creatures are connected to one another and survive in an environment where there is a small amount of energy input.

Objectives Students will investigate that cave ecosystems are made up of interdependent organisms and other organic components through discussion and simulations.

Subjects Science

(4.9) Organisms and Environments. The student knows and understands that living organisms within an ecosystem interact with one another and with their environment. The student is expected to:

- B. describe the flow of energy through food webs, beginning with the Sun, and predict how changes in the ecosystem affect the food web such as a fire in a forest.

Materials

Information sheets

Ball of yarn

Background

A food chain is a simplified way of showing energy relationships between plants and animals in an ecosystem. For example, a food chain showing sun→plant seed→mouse→owl shows that a seed is eaten by a mouse, which in turn is eaten by an owl. However, in reality it is rare for an animal to eat only one type of food. A food web describes the interconnection of the food chains in an ecosystem and gives a clearer picture of how plants and animals in an ecosystem depend on one other.

Getting Ready

This activity is dependent on your students understanding how energy enters the food web, and the roles of producers and consumers. It is highly recommended that they are taught **TEKS (4.9) A: investigate that most producers need sunlight, water, and carbon dioxide to make their own food, while consumers are dependent on other organisms for food** before completing this activity.

Print and cut out the information sheets. Try to have a higher number of producers and primary consumers than secondary consumers. Each student should have his or her own information sheet.

Ice Age Food Web

Doing the Activity

1. Brainstorm as a class all the necessary components for a healthy ecosystem.
2. Pass out the info sheets for the ice age animals.
3. Once the students have had a chance to review their animal or plant, have a representative for each read their info aloud.
(Optional: Have the students create a nametag for their plant or animal.)
4. Arrange the students in a circle so that they are not sitting beside someone with the same animal. Have the students hold or wear their sheet or tag so it is visible to the whole group.
5. Give the ball of yarn to one student. Have that student name a connection to another plant or animal (“I am eaten by Columbian Mammoths”) and toss the yarn to a student with that animal. Continue this process until all students have at least one connection in the web. Have the students slide back so the yarn is taught.
6. Explain to your students that everyone in the web is connected to one another. Demonstrate this by directing one student to begin gently tugging the yarn. When a student feels a tug, have him/her tug gently in response. Through this mechanism, vibration will spread through the food web until everyone is tugging and the whole web is shaking.
7. Ask your students how the tugging demonstration might illustrate what happens when one of the links in an ecosystem is damaged through natural or human-made stress. (The rest of the ecosystem feels the effects.)
8. Ask your students to pick one organism that seems less important than the others, and have it drop out of the web. Ask if any other organisms should drop out because they depended on that organism. After one or more have dropped out, ask the students again to identify an organism that seems less important, and repeat the procedure. Then ask the following questions:
 - What happens when we remove a link in the ecosystem? (Organisms that depend on it are affected.)
 - Were the changes more dramatic when the system was composed of many parts or when it had fewer parts? (fewer)
 - What can we say about the relationship between how many parts the system has (its complexity or diversity) and how stable it is? (In general, complexity makes it more stable.)
 - What would happen if humans were introduced to the web?

Troglobitic Food Web

Vocabulary

Arthropod – an invertebrate animal with a segmented body, such as an insect or spider

Larva– the active immature form of an insect

Troglobite – an organism adapted and restricted to a cave environment

Troglophile – an animal which often completes its life cycle inside caves, but is not confined to them

Background

A traditional food web begins with one energy source-the Sun. Producers (plants) use the Sun's energy to create their own food, while consumers eat the plants for energy. In a cave like Inner Space, where there is no natural light, living creatures must find a source of energy other than photosynthesizing producers. The bottom of a food web in a cave is organic material, called detritus, (dead leaves and animals, bat guano, etc.) that is brought in from outside the system. Dead leaves are blown in through the entrance, an animal enters the cave and dies, or bats eat insects and defecate in the cave. The original source of energy for this material is still the sun, but the base of the food web in the cave system is detritus.

Doing the Activity

1. Print out and go over the cave food web diagram with your students.
2. Pass out the info sheets for the cave critters.
3. Repeat the food web activity using the cave critters instead of the ice age animals.

Supplement

Have the students stand shoulder to shoulder in the circle. Ask the students to turn to their right (so they are facing the back of another student's head) and take a step towards the center of the circle. The students should place their hands on the person's shoulders in front of them. On the count of three, have the students sit down slowly on the knees of the person behind them, keeping their own knees together to support the person in front of them. (The circle may fall apart at this point! If it does, start the lap-sit over again.) Remind the students what they have learned regarding the interdependency of life-forms in an ecosystem. Once the circle is stable, remove an element of the food web. At this point, the circle will either collapse or suffer some other disruption.

Assessment

Have your students draw the food web for Inner Space Cavern and write an example of something humans can do to affect the cave system. Encourage them to be as detailed as possible when describing the cascading effects of our actions on the cave. If one species is affected, the species dependent on it will be affected as well. This does not have to be negative! Putting a humidity barrier at the entrance of a cave that still allows bats in and out but preserves the delicate environment of the cave is a positive effect humans can have on a cave system.

Bonus!

People shed skin cells all the time. When you visited the cave, you left some of those cells behind along the pathway. Considering this fact, and reconsidering your cave food web, where do people belong in the cave ecosystem? (At the bottom!)