

Eco-Connections

Environmental Education Lesson
EDWARDS CAMP AND CONFERENCE CENTER

Summary

Ecosystems are made up of complex relationships between many different living and non-living factors. In this class the students will cover several concepts about the interconnectivity between all living things in an ecosystem. Through a variety of games and activities they will cover concepts of food chains and webs, predation, transmission of energy, limiting resources, and human impacts on the ecosystem.

Usage - Grade levels: K– 9th. All year

IL Standards

11.A.1a; 12.B.1a; 12.B.1b; 12.C.1a;
11.A.2c; 12.B.2a; 12.B.2b;
12.B.3a; 12.B.3b

Objectives

Students will be able to

- Identify and define producer, primary and secondary consumers and decomposer as roles of organisms in the movement of energy through an ecosystem.
- Trace the transmission of energy in an ecosystem in terms of a food chain.
- Talk about different adaptations that allow the animals to survive and thrive in their environment.
- Distinguish between the roles of predator and prey in the energy movement in an ecosystem.
- Describe how all organisms in an ecosystem acquire energy directly or indirectly from sunlight.
- Explain the positive and negative impacts of human activity on food webs of the earth.
- Define an ecosystem as patterns of interdependence and interrelationships among living things.

Materials

- Cones
- Food Chain Cards
- 5 Hula Hoops
- Food Tokens
- White board and markers to chart animal populations

Set-Up

- Place out cones for the play area
- Separate food chain cards
- Make sure all class materials are in working order

Introduction (10 Minutes)

“Today we are going to be talking about ecosystems. What is an Ecosystem?”

“Ecosystems are made up of complicated interactions between living things and their environment but we can simplify some of it down to a food chain. What starts off a food chain?”

The Sun

“What then uses the energy from the sun?”

Plants - Producers

Talk about different niches (roles) in the food chain including; herbivores, carnivores, scavengers, decomposers, predators, and prey.

Pit (20 Minutes)

Now that you have an idea about food chains we are going to assemble our own food chain.

For this activity you need to divide the class into 4 groups.

Each group should be given seven random cards from the food chain deck that they should not look at.

They should be placed around the boundary square each at a cone.

Once the game has started they will try to assemble their cards into a working food chain

Sun → Plants → Cricket → Frog → Snake → Hawk → Bacteria

If they do not have the appropriate cards then they will need to trade their cards in the “Pit”

- Only one member of a team is allowed in the boundary at a time
- That person may only have one card with them
- No one is allowed to talk or look at any cards while in the boundary
- The only place and trades can occur is within the boundary of the “pit”

The first team to assemble their cards in the correct order and call the instructor over wins.

Quick Frozen Critters (20 Minutes)

Within the boundary place several hula hoops spread apart and place the food tokens at one end of the play field.

Let the students know that they will be taking on the role of predator and prey animals for this next activity. You should pick one or two students to be foxes and the rest will be rabbits. The goal for the rabbits is to get a total of 3 food pieces back to their den.

- A rabbit may only carry one food token at a time.
- If a fox tags a rabbit then they are out and must drop any food they have back where they got it and leave the play area.
- There are only three ways that a rabbit can be safe from a fox.
 1. If the Rabbit is behind the line of cones at the start location
 2. If the rabbit is standing with both feet within a Temporary Shelter (Hula Hoop)
 3. If the Rabbit is frozen still (They may blink and breathe but nothing else.)
- In order to make the game run faster there is a time limit for the rabbits to be frozen or hide in a temporary shelter, usually about 10 seconds but read your group.

Once the activity has finished with all of the rabbits either well fed or dead, gather the students up and discuss the activity.

“What strategies did you use as a fox or rabbit?”

“How did the game change with less rabbits on the field?”

“Did everyone have enough food to survive?”

Oh Deer (20 Minutes)

Select ¼ of the students to be “Deer” and have them line up together between 2 of the cones. Facing them have everybody else line up between the opposite two cones. Explain that all living things need food, water, and shelter. For this activity the basic necessities will be represented by placing your hands on your stomach for food, holding your hands up to your mouth for water, and bringing your hands together in an “A” over your head for shelter.

Have the deer turn away from the other participants (the resources). Ask the resources to choose resource to represent and demonstrate it. While they are demonstrating their symbol have the deer choose a symbol and demonstrate it. Then explain that when you say “Oh Deer”, the deer will need to turn and go and tag ONE resource representing the same symbol that they were demonstrating and bring them back to their line. Resources are NOT allowed to run away. If there were enough resources for the deer their number should have doubled. Repeat the process having the deer turn away, resources choose a symbol, deer choose a symbol, and you say “Oh Deer” to have them turn and tag. Eventually a deer will choose a resource that is not available, and unfortunately will die, decompose, and grow back as a resource joining that line instead.

As the activity continues you should recognize how at times there will be too many deer and not enough resources for them all to survive. This is called over-population, and will require balancing of an ecosystem. You can show the issue again by introducing wolves into the mix. Pull one student out and explain to them that they are a wolf and they are hungry. Go get something to eat (tag a deer).

The Ultimate Predator or Prey (10 min)

Every species have specific adaptations that help them to live in their habitat. Predator and prey, as groups, have general adaptations to help them survive. Start off with brainstorm the adaptation that predators and prey have to help them survive. After the students have an understanding of the difference between predator and prey adaptations have them create their own species. Have the students draw a picture of what they think the best predator or prey would be and with what special features it will have to help the animal survive.

Predator adaptations:

1. Eyes in the front of their head “Eyes in the front they like to hunt” (making it easier for judging distance and better depth perception)
2. Sharp claws, beak or teeth (used like a knife and fork for catching prey and tearing the meat)
3. Stingers or venom (assist in killing prey)
4. Keen hearing (detection of prey at long distances)
5. The ability to detect vibration or inferred (feel the prey move or the heat they give off)
6. Speed (the ability to out run prey for short distances)

Prey adaptations:

1. Eyes to the side of their head “Eyes on the side they like to hide” (easier to see the whole area around them)
2. Camouflage or disguise (blending with habitat or looking like another object)
3. Bright and distinctive colors (a sign of being poisonous or dangerous)
4. Mimicry (looking like a poisonous species but is not one)
5. Inaccessibility (living in places where predator do not fit, for example in borrows)
6. Defense mechanisms (ways of warding off predators, for example spines, bad taste, antlers, shells, unpleasant smells)
7. Herds (protection through numbers)

Conclusion (10 Minutes)

Students have now had a chance to understand special adaptations that predators and prey have in order to survive and see what happens to a population as species interact to find food and fight for survival. With the web of life it becomes apparent that if a food chain is disturbed it causes repercussions further down the chain. With the specific food chain of deer and wolves students should now understand the population numbers do not stay constant. When one population changes it effects the rest of the populations in the system. Predator and prey have a cyclical cycle that they travel through. One population is increasing and the other is decreasing and they are continually changing places. This continuously cycles around the carrying capacity, the population which the ecosystem can support. This can change because of limiting factors. Outside forces that inhibit population growth.

“What caused the populations to fluctuate?”

“How to predators and prey interact?”

“What role/affect do humans have on a food chain?”

“What are limiting factors and how do they affect a population?”

“How do adaptations evolve?”

“How can humans help animal populations?”

“Where do humans fit in the food chain?”

“Can pollutants be passed through a food chain?”

“How do adaptations help an animal?”

“What happens when something is removed from a food chain?”