It's All Connected!

(An ecosystem simulation adapted from Halton Children's Water Festival)

Outdoor Wonders and Learning™

Students will play the roles of producers, consumers, and decomposers to simulate how a food chain works to maintain energy in an ecosystem.

Elaborate/Apply

Supplemental Reading

Producers, Consumers, and Decomposers

By Dava Pressberg

What Are Food Chains and Webs?

By Bobbie Kalman

Grade Levels:

3, 4, 5

Curriculum Correlation:

NCSCS—Science
3.L.2.1
4.L1.2
5.L.2.2, 5.L.2.3

Materials:

White board or Smart Board; colored identifiers—bandanas, headbands, etc.; approx. one dozen items (foam balls) that can be easily thrown; hoops or rope to mark a safety zone

Duration:

Part A 30 minutes, Part B 30 minutes

Location:

Classroom for introduction and Outdoor Study Area or open space for activity

Procedure:

Part A

1. ***Think, Pair, Share***: Ask the students: What have you heard about how energy and food are related? Give students an opportunity to either share with their neighbor, then out loud with the rest of the class. Make sure that students realize that the sun plays a critical role on Earth by introducing energy into every ecosystem, enabling producers to make their own food.
2. Next ask them to brainstorm a list of organisms that live in and around their school (including plants, animals, and fungi/bacteria/invertebrates). As they suggest organisms, write them on the board into three columns (producers, consumers, decomposers), unlabeled at first, without mentioning why the organisms are separated into different columns. Once a substantial list of **native** (no sharks or crocodiles) organisms have been made, ask the following questions:

   - What do you notice about these lists? How might you explain your ideas?

3. Based on the student answers to describing the columns, label them with the terms producers, consumers, and decomposers and have them define the terms.
4. Ask the students: How can we use what we've discussed about food, energy, and these groups of living things to create a food web?

   Group work: Have the students illustrate a food web on the whiteboard. Provide the same prompts for all groups. Where does the flow of energy start? Where does it go? What other ways can energy be moved around the food web?

   (Ideally they will start with the sun and follow the flow of energy from producers to consumers to decomposers and then back to producers, demonstrating how decomposers give energy back to the ecosystem by providing nutrients to producers. Make sure to use native plants and animals to highlight the school's local ecosystem and the organisms living there.)

It's All Connected!

(An ecosystem simulation adapted from Halton Children's Water Festival)

Outdoor Wonders and Learning™

Part B—The game involves the basic food chain: Starting with abiotic components taken up by producers being eaten by consumers broken down by decomposers return abiotic components to the environment. The overall idea is to maintain the ecosystem while each group fulfils its goal.

5. Explain that students will be randomly picked to be producers, consumers, or decomposers for the next simulation. Each organism has different needs that they must meet in order to survive and they will be playing a game similar to tag to get what they need.
6. Participants form three groups:
    - Decomposers – e.g., invertebrates, fungus, bacteria (about twice the number of producers)
    - Producers – e.g., plants and trees (about twice the number of consumers)
    - Consumers – e.g., a variety of animals like herbivores, omnivores and carnivores

    Have each student randomly choose an identifier that signifies what type of organism they are, example- green (producer), red (consumer), or brown (decomposer)
7. Set a boundary for the playing area which represents the environment. Players must remain in the playing area. Objects such as soft throwing items represent abiotic components (i.e. nutrients, sunlight, water). The number of items equals the number of producers. Place items in two or more piles within the playing area.
8. Producers are the only players who can take items from the piles. A safety zone (which represents the soil) around the pile protects the producer from being tagged only when he or she is picking up a ball. Their goal is to get all the items out of the safety zone and keep the items in the hands of the producers only.
    - Producers must always be holding the items they collect.
    - Consumers' goal is to obtain and hold on to as many items as possible. They can only get items by making a two-handed tag on a producer holding a ball.
    - Decomposers can only get items my making a two-handed tag on a consumer holding an item. They return items to the safety zone and their goal is to get all the items back to safety.
9. When the players are tagged, they must give up all the items they are holding. Players can toss and pass the items to members of their own group. Items cannot be intercepted during a pass.
10. Players continue as long as you wish (producers keep taking items, decomposers keep returning them).

It's All Connected!

(An ecosystem simulation adapted from Halton Children's Water Festival)

Outdoor Wonders and Learning™

11. After finishing the game, have students sit in the grass or head back to the classroom to discuss what happened over the course the game. Begin the conversation by asking what it felt being a part of the food chain?
    - Was it stressful? How might a wild animal feel?
    - What strategies did you use to avoid being caught? Do plants or animals use these strategies?
    - What strategies did you use to catch other students? Do plants or animals use these
    - What did you feel when you played the game. Is this how a wild animal might feel?
    - Did you use any strategies?
    - If humans were introduced to this game, what rules would you give them? What about disease? What about famine?
    - How are all the groups dependent on one another?

      Consumers need producers to take the nutrients out of the safety zone

      Decomposers need consumers to take nutrients from producers

      Producers need decomposers to put nutrients back in the safety zone
    - How does each group contribute to the continuous functioning of the ecosystem?

      The groups must balance their needs with each other to continue functioning

Learning Targets:

1. Identify the components of an ecosystem.
2. Summarize how energy is maintained in an ecosystem: Sun—> Producers—> Consumers—> Decomposers—> Producers
3. Describe the roles of producers, consumers, and decomposers in an ecosystem.
4. Interpret how humans might positively or negatively impact a North Carolina ecosystem and the natural resources within them.