



Decomposer Tag

Grade Level: 4-8

Length: 30-45 Minutes

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NGSS Standards

5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Crosscutting Concepts

Energy and Matter Tracking energy and matter flows into, out of, and within systems helps one understand their system's behavior.

Systems and System Models A system is an organized group of related objects or components. Models can be used for understanding and predicting the behavior of systems.

Related Resources

Pair With Web of Life Lesson

Overview

Producers, consumers, and decomposers all play important roles in ecosystems.

Objectives

- Students will be able to describe the roles of producers, consumers, and decomposers.
- Students will understand the importance of decomposers as nutrient recyclers.

Materials

- Paper or Science Notebooks
- Pencils or Pens
- Whiteboard or Easel

Background

This game is meant to introduce students to three different types of organisms: producers, consumers, and decomposers. Playing in an ecosystem that only includes producers and consumers, students will soon realize the necessity of disturbance and decomposers.

Preparation

Clear a large area in the classroom, move to the gym/multi-purpose room, or head outside to the playground.

Notes

Introducing the Lesson

Ask students to think about how organisms get their energy. Brainstorm local producers (plants can produce their own sugar using water, soil, sunlight, and carbon dioxide), herbivores (animals that feed on plants), and carnivores (animals that feed on animals).

Activity

1. Divide students into three groups.
2. The first group, representing about $\frac{1}{2}$ the class, will be fireweed. Explain that as fireweed, each student must stay rooted in one place and hold out two hands as leaves.
3. Select a second group of students, representing about $\frac{1}{2}$ of the class, to be snowshoe hares. Demonstrate that snowshoe hares must hop around on two legs to get to a fireweed plant. When they tag a fireweed plant, the plant removes one of its leaves by putting one of its hands down. Then the snowshoe hare must travel to a different plant before returning to eat more from that plant. When both leaves on a plant have been consumed by snowshoe hares, enough energy has been transferred to the snowshoe hare population to support offspring and the fireweed “becomes” a snowshoe hare.
4. The final group of students left will be coyotes. Demonstrate how they must crawl on all fours to catch a snowshoe hare. When the snowshoe hare is tagged, that energy moves to the coyote population, which is then able to support young, so the hare “becomes” a coyote.
5. Begin the game and play for a few minutes. Soon the ecosystem will begin to deteriorate. Likely, you will end up with a few fireweed plants left and many coyotes, but no snowshoe hares.
6. Pause the game. Ask students what will happen to the coyotes without any prey to consume. These coyotes will starve.
7. At this point, introduce “death” or “disturbance” to the game. It usually works best for the instructor to serve this role. Explain that the disturbance could be something like lack of food, disease, injury, fire, etc. and that when any organism is tagged by disturbance it must fall to the ground and die.

>>Educator Tip: An alternate option instead of tagging coyotes is to use a whistle to freeze the game. Then select a number of coyotes, snowshoe hares, and/or fireweed plants to “die.” This allows you to have more precise control with each disturbance, and you don’t have to do any chasing!

8. Something is still missing though. Ask students what else is necessary in the ecosystem. How will the nutrients in the dead organisms get recycled back into soil for new fireweed to grow?
9. Explain the important role of decomposers and choose 1-2 students to be decomposers. These decomposers will find the dead organisms; after chanting decompose, decompose, decompose three times, the dead organisms will be recycled into soil. The soil can then support plants, so the student that was a dead plant or animal will “become” a new fireweed plant.
10. Restart the game. It works best if you start with a large number of producers, medium number of herbivores, and a small number of carnivores. Not only does it make the game go more smoothly, but it is fairly true to trophic levels in natural ecosystems. Make sure to have a teacher as disturbance and 1-2 students as decomposers. The disturbance should occasionally select an organism from each category (except decomposers) to die off. If it looks like food is scarce for a category of animals, the disturbance should tag more of those animals to represent the starvation that will occur. With all these components of an ecosystem, and a wise selection by disturbance, the game should be able to continue for a very long time as nutrients cycle through the ecosystem.

Wrap-up

Bring the group together. Ask students what types of organisms make up a healthy ecosystem. Working on the whiteboard/easel, have students help you create a visual model of how energy from the sun and matter flow through the ecosystem modelled in the game. Label the types of organisms (decomposer, producer, consumer – herbivore, carnivore, scavenger) as well as abiotic factors like sun, soil, and water. Use different colored arrows to show how energy and matter are flowing through the ecosystem. Reiterate the importance of decomposers in this process and ask students to brainstorm local decomposers. If you'd like, you can introduce students to the concept of the decomposer FBI: fungus, bacteria, and invertebrates. You can go out in search of the FBI by carefully looking under logs and rocks in forests or fields. Just be sure to return the objects and organisms to their original place.

Assessment

Option 1: In their science notebooks or on a piece of paper, ask students to create a visual model of how matter and energy flow in a different ecosystem. Ecosystems are very complicated, so let students know that it is okay to simplify their example ecosystem and include 4-5 species of organisms as well as 2-3 abiotic factors. Students who successfully meet the performance expectation will clearly show energy flowing from the sun to producers to consumers, as well as decomposers at various points along the food web; they will also show matter flowing from soil to producers and then on to consumers (as well as decomposers at various points, and from decomposers back into soil) and/or matter flowing from water sources directly to producers, consumers, and decomposers and back to water sources.

Option 2: After you have created your classroom model of the simplified ecosystem from decomposer tag, ask students to respond to the following questions through writing in their science notebooks and/or verbal discussion in small groups:

- How is the model in the game similar to a real ecosystem?
- How is it different?
- What would you change about the game to make it more real-to-life?
- This game focuses on how energy flows through an ecosystem. What would you change about the game to make it more accurate to how matter flows through an ecosystem?

Students who meet the performance expectation will be able to identify at least one way in which the model is similar to a real ecosystem and one way in which the model is different. They will identify at least one clear change that can be made to the game to make it more accurate in how matter flows through the ecosystem. Examples: Matter moves through the ecosystem in animal wastes like urine, scat, or lost feathers/fur/skin cells so the game includes one of these waste products. Water, a type of matter, moves through the ecosystem due to plant transpiration, animal respiration, and animal urine, so the game includes one or more of the processes.

Pair With

- Web of Life Lesson Plan