

Lesson 3: Nature's FBI

Lesson Summary

Students will learn more about producers, consumers, and decomposers by exploring nurse logs and soil. They will learn about nature's FBI (fungus, bacteria, and invertebrates) and add these organisms to their riparian zone model.

Materials

- Cornell Lab of Ornithology Afterschool Investigators Nature Detective Kit: Producer, Consumer, Decomposer signs, Food Web Tangle Poster, Student Art Posters
- Access to nurse logs and soil (either outside or samples that the teacher brings into the classroom)
- Magnifying glasses or microscopes if available
- Plain (unlined) paper
- Pencils
- Pictures of nature's FBI (fungus, bacteria, and invertebrates)

Key Vocabulary

- Organism
- Producers -Consumers
- Decomposers
- Decomposition
- Fungus -Bacteria
- Invertebrate
- Nurse log -Nutrient
- Micro habitat

Next Generation Science Standards:

Performance Expectations: 5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.	Disciplinary Core Ideas: 5-LS2.A: Interdependent Relationships in Ecosystems LS2.B: Cycles of Matter and Energy Transfer in Ecosystems
Performance Expectations: Developing and Using Models Modeling in 3–5 builds on K–2 models and progresses to building and revising simple models and using models to represent events and design solutions. <ul style="list-style-type: none">• Develop a model to describe phenomena.	Cross Cutting Concepts: Systems and System Models <ul style="list-style-type: none">• A system can be described in terms of its components and their interactions.

Instructors Notes:

- Activity #3 and the materials provided in the Cornell Lab of Ornithology Afterschool Investigators Nature Detective kit will be included in this activity.
- This activity will have students add nature's FBI (fungus, bacteria, and invertebrates) and their role in decomposition to their model.

Introduction:

Explain to students that you are now going to learn even more about the riparian zone as a habitat, including food webs.

Procedure:

1. Briefly review what students learned about Producers, Consumers, and Decomposers.
2. Do Activity 3 #2: Where do you get your Energy with students from the Cornell Lab of Ornithology's Afterschool Investigators Nature Detective kit.

3. Explain that students are going to learn more about decomposers and nature's FBI (Fungus, Bacteria, and Invertebrates).
4. Ask: Why are our forests not piled high with fallen trees, branches, and leaves? What happens to trees after they die? Which organism might get its energy from these trees, branches, and leaves (decomposers)?

Explain: Nature's FBI break down trees and other dead organisms (along with the non-living: wind, rain, etc.), in order to return the nutrients to the soil and atmosphere. Invertebrates such as: termites, sow bugs, carpenter ants, and wood roaches break down the large pieces of dead material into smaller bits that the fungus and bacteria can use to convert the dead material into nutrients. (Lichens release a weak acid helping break down wood, and moss helps to keep it moist. This process helps create the organic material found in soil (humus), and helps create habitat for other animals).

5. Hold up a small decomposing log. Ask students what are you holding (looking at)? Is it dead or alive? (Dead). How do they know? (No roots or leaves). Do you think this might be someone's small specialized habitat (micro habitat)? Whose? (Decomposers such as nature's FBI). Tell students that there is a treasure locked inside the log. Does anyone know what that treasure is? (Nutrients). Healthy ecosystems require that these nutrients be released back to nature to support the food cycle. How does nature release the nutrients from the log? (Decomposition).
6. Demonstrate how this is part of a cycle by asking students questions like: Who will use the nutrients once they are back in the soil? (Producers such as plants). Who or what relies on plants? (Consumers such as animals). What happens when these plants and animals die? (Nature's FBI recycle their nutrients back into the system). Etc...
7. Have students pair up or form small groups. Now tell students that they will observe, sketch and take notes about organisms found on and within decomposing logs in the classroom or outside. They can identify what they see in the field or with their pictures back in the classroom.
8. Talk to students about observing habitats respectfully, by not harming insects or anything else living on the logs, and by not kicking logs (especially if going outside). If students are collecting critters in containers they will want to gently return them to where they found them. Ask students to share what they found.
9. Ask students guiding questions like: Why are there holes in the logs? (Beetles and other invertebrates are scavengers/decomposers burrowing into the wood). Who might be living and/or hiding there? (Invertebrates, newts, other plants, etc.). What are they eating? (The wood, bark, and tree tissue). Is anyone eating them? (Yes! Predators such as centipedes and spiders eat the scavenger insects, and they all become food for birds, skunks and other animals that tear into logs for food). Did you see other plants, mosses, lichens, or tree saplings on the log? Why are decaying trees sometimes called nurse logs? (Because they are providing essential components for survival, such as food, safety, water, etc., much like a nurse or nursery).
10. Explain: As big trees fall in the forest they slowly decompose providing a habitat that provides food, water, shade, and cover for wildlife, and upon which new trees and plants grow. Oftentimes big trees may take decades to completely decompose, therefore providing this important service to new generations.
11. Review the riparian food web cycle: The fish and birds in the riparian zone depend upon this decomposition cycle for food. What would trout, salmon, woodpeckers, or red-winged blackbirds eat in the riparian zone to get their nutrients? (Plants, seeds, or macroinvertebrates in their different stages). How do the macroinvertebrates get their nutrients? (Eating other bugs or plant material). Where does the plant material get its nutrients? (Soil). How did the soil get its nutrients? (Decomposing plant and animal material).

12. Have students add to their model drawing and sketch out what materials they will use and how they will add FBI to their models.
13. Have students add Nature's FBI and nurse logs to their model.
14. Reflect as a class. What did they place in their models? Where? Why? Is anything missing? Do they need other materials? How might these new additions and their model change during the seasons?

Resources:

Columbia Springs Environmental Center. Natures FBI: Decomposers.

American Forest Foundation. Project Learning Tree: PreK-8 Environmental Education Activity Guide.

Cornell Lab of Ornithology's Afterschool Investigators Bird Sleuth: Nature Detective Kit.

University of Colorado Boulder, Integrated Teaching and Learning Program, College of Engineering:

www.TeachEngineering.org.