

Cycles of Matter and Energy

GRADES 3–5

Guiding Question

Where do the plants and animals in our neighborhood get the food and energy they need to survive?

Connecting Concepts

- Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, water, and minerals from the environment and release waste matter (gas, liquid, or solid) back into the environment. (NGSS, LS2.B: Cycles of Matter and Energy Transfer in Ecosystems)
- Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. Plants acquire their material for growth chiefly from air and water. (NGSS, LS1.C: Organization for Matter and Energy Flow in Organisms)
- As part of the forest ecosystem, trees have various roles. These roles include supplying oxygen, producing food, providing habitat for wildlife, stabilizing soil, moderating temperature, capturing and storing carbon, and cycling water and nutrients. (PLT FLF, 1.B.6)
- Forest ecosystems include processes such as photosynthesis, energy flow, and the cycling of nutrients, water, carbon, and other matter. (PLT FLF, 1.C.3)

Scope and Sequence

The collection and order of content below supports an intentional student learning progression.

Activity	Description
Web of Life	By conducting research and modeling a food web, students take a close look at an ecosystem and discover ways that plants and animals are connected through the cycling of food energy.
Every Tree for Itself	Students engage in an active simulation to learn what resources trees need to live and grow and how trees must compete for resources.
Tree Cookies	Students examine a tree's growth rings, which show patterns of change in the matter and energy available to the tree.
Fallen Log	Students observe fallen logs or other decomposing pieces of wood and gain a deeper understanding of how matter cycles.

See plt.org/academic-standards for detailed standards correlations for each activity.

Storyline

Students participate in experiences that will help them understand that matter cycles within an ecosystem.

- Begin with the activity Web of Life to introduce the concept that plants and animals are interconnected through food chains and the food web. Plants form the basis because they are able to convert the sun's energy into food.
- The activity Every Tree for Itself reinforces the role of plants in the food web. Be sure to emphasize that plants not only need sunlight and rain to grow, but also carbon dioxide from the air. Use the first Grades 6–8 variation and have students draw a "growth ring" to represent how much their tree grows each year.
- In Tree Cookies, students look at the growth rings of trees, and then in Part B they research events and correlate them to events in the tree's life. After they have completed this work, ask your students what happens to the tree after it dies.
- Conclude with Fallen Log, which focuses on the role of decomposers in food chains.