



SOIL

Lesson 3 ♦ Food Web

Grades 6th-8th

Key Words

Ecosystem, producers, consumers, decomposers, adaptation, trophic levels, biodiversity

Key Concepts

Identify the various roles of organisms within the food web and gain an understanding of how energy chains function in our soil.

Acknowledge the adaptations of garden organisms, recognizing the relation between structure and function.

Empower students to apply this information in practice, resulting in positive change on the garden ecosystem and their communities.

Lesson Outline

Follow up regarding the Compost in a Jar activity from Lesson 2.

Introduce the Lesson 3: Food Webs. What is a food web? A food web demonstrates the interconnection of food chains in an ecosystem.

Within the food web, there are several roles: Producers, consumers, and decomposers. Explain each role.

Producers- convert parts of the environment (sunlight, water, gases, etc.) into usable sugar/energy. Producers create their own food and acquire energy using the sun.

Consumers- consume other living things for their energy. This category consists of herbivores, carnivores and omnivores.

Decomposers- consumes dead organic matter (both producers and consumers) for energy.

Discuss how the FBI (fungi, bacteria and invertebrates) have special adaptations that help them to do their work in the compost pile and in the soil around the garden. These special structures on their bodies allow them to function in certain ways that help them to survive and help them to break down dead organic matter.

Show the example of a centipede by holding up a drawing of a centipede. Ask students to share some examples of structures on the centipede's body (legs, antennae, jaws, etc...) and ask the students to describe the functions of those body parts (crawling, feeling, biting, etc...). Introduce the vocab of adaptation to describe these special structures on the centipede's body.

Introduce the concept of trophic levels within the food chains in our soil food web. These levels indicate what level an organism is on the food chain; essentially, this is telling us who is eating who in our soil!

Level 1- Plants (producers)

Level 2- Animals that eat plants, or herbivores (primary consumers)

Level 3- Animals that eat herbivores & plants (secondary consumers, omnivores & carnivores)

Level 4- Animals that eat omnivores & carnivores (tertiary consumers, carnivores)

Level 5- Decomposers

Discuss the gardener's role in managing the populations of unwanted plants (weeds) and critters (pests). What determines if an organism is a pest? In general, a pest is any organism that has a negative effect on the garden ecosystem. This may be critters that harm or eat our plants like aphids, mites and caterpillars. Or critters that spread disease like mice, rats, slugs and snails. Or even different microbes that live in the soil and affect plant roots.

What are some ways we can help manage pests in the garden without using chemical pesticides? We use a method called integrated pest management. The first step is prevention. By starting your garden with healthy soil and seeds, plenty of sunlight and just the right amount of water for your plants, we can help prevent pests that thrive in wet conditions or by attacking unhealthy plants.

Our next step is to monitor the garden. It's important to correctly identify any problems with your plants early so you can fix the problem early. Most plants can handle a small amount of pests, but if they become overbearing, it can harm the plant, so early identification is key!

If we do need to intervene in a pest problem, there are many methods that don't use chemical pesticides. We want to avoid spraying chemicals on our plants and soil because the plants can absorb those chemicals and in turn, we can absorb them when we eat those plants.

By encouraging a healthy ecosystem, we can help keep pests away naturally. Many plants have pest resistant or repellent qualities; we call these companion plants. This includes basil, chamomile, onion, marigold, geranium, dahlias, and mint among many others.

By planting pest repelling plants throughout our garden, we can help to keep our fruits and veggies pest free. Many of these plants also have flowers that attract beneficial pollinators like bees and butterflies which also helps our garden ecosystem. Many varieties of wasps and dragonflies will eat garden pests as well.

By building healthy soil and supporting a biodiverse garden food web, we can help create a productive and healthy garden ecosystem. What are ways you can support a healthy ecosystem in your own community (building a garden)?

Video Lesson

[Soil Lesson 3 Video - Food Web](#)

Activities

- ACTIVITY: Ecosystem Hunt : Self guided garden exploration, sourced from Nourish Curriculum Guide, developed by the Center for Ecoliteracy. Courtesy of Center for Ecoliteracy
- HANDOUT: Food Web : A student worksheet to accompany the video lesson.

Additional Resources

- BACKGROUND INFO: Bug Handling Procedure : Please review these guidelines with students to protect themselves and the insects.
- VISUAL: Companion Planting: Excellent poster displaying companion plants (as well as plants that should not be planted near one another) and the effects of specific plants on the garden ecosystem *Courtesy of AfriStar Foundation*
- MULTIPLE: Do The Rot Thing : Do the Rot Thing - A Teacher's Guide to Compost Activities *Do the Rot Thing has been made available to educators through the efforts of the Central Vermont Solid Waste Management District in collaboration with the Northern Vermont Composting Partnership. Illustrations by Joal Morris, 2006*
 - The visual on page 19 shows enlarged pictures of critters found in compost and soil with a brief description of each on the following pages. To clarify, scroll within the pdf to where the pdf page # that pops up on your screen as you scroll shows 19, not the numbers printed on the pages, which are 15-17. Page 19 can be used as a scavenger hunt where students circle or color in the bugs they find.
 - Also see pages 31-33 for a Warming up to Worms worksheet.
 - Worm anatomy on Page 39.
 - Bonus: Compost Glossary on Page 51.
- VISUAL: Millipedes and Centipedes : Resource that highlights the structural differences between millipedes and centipedes
- [VIDEO: Companion Planting Basics](#) : 6 minute video made by Alberta Urban Garden on what and why to utilize companion planting. Expand the description below the video for time

stamps of what is covered if you want to focus on a certain subtopic. *Courtesy of Alberta Urban Garden*

NGSS - Next Generation Science Standards

- [6-8-LS1-5](#) Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
- [6-8-LS1-6](#) Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
- [6-8-LS2-2](#) Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

KAP - Kū 'Āina Pā Curriculum Map - Courtesy of the [Kohala Center](#)

- KAP_3:NF_6-8_2.4 Understand that discarded food is a valuable resource. Identify and apply practices that eliminate and/or redirect discarded food from landfill systems.
- KAP_3:NF_6-8_2.6 Identify, design, and practice techniques that build resilient food systems (e.g., seed saving, encouraging biodiversity, nutrient recycling and water conservation).
- KAP_4:ND_6-8_1.2 The Soil Food Web: a complex living system of organisms in the soil and their interactions with each other, the environment, plants and animals