The Nature Conservancy | NATURE LAB

LEARNING GUIDE | GRADES K - 5

Tiny Creatures, Big Jobs: The Bugs That Make Food Possible

What roles do bugs play in the health of our soil and the food we eat?

Purpose

The purpose of this module is to help students understand how soil, insects and decomposers work together to support healthy ecosystems and food growth. It encourages children to explore the hidden world beneath their feet and discover how living and nonliving parts of nature are connected. Through hands-on investigations, students learn that pollinators and decomposers play essential roles in cycling nutrients and helping plants grow. The lessons build observation, modeling and reasoning skills while fostering curiosity about the natural world. Overall, the module aims to inspire environmental awareness and appreciation for the tiny creatures that keep our planet thriving.

Students Will:

1. Students will observe and describe how soil, plants, insects and decomposers are connected in an ecosystem.
2. Students will model and explain the roles of pollinators, decomposers and other bugs in growing the food we eat.
3. Students will investigate and record evidence of change in living and nonliving components of soil and compost and explain how human actions can help keep ecosystems healthy.

Next Generation Science Standards +

Activities

Soil Safari
Pollinator Parade
Compost in a Bottle

Resources

Learning Guide	**Tiny Creatures, Big Jobs: The Bugs That Make Food Possible**
Grades & Performance Expectation	**Grades K-5**

Disciplinary Core Ideas

LS1.C: Organization for Matter and Energy Flow in Organisms
LS1.B: Growth and Development of Organisms
LS2.A: Interdependent Relationships in Ecosystems
LS2.B: Cycles of Matter and Energy Transfer in Ecosystems
ESS2.E: Biogeology
ESS3.A: Natural Resources
ESS3.C: Human Impacts on Earth Systems

Crosscutting Concepts

- Systems and System Models
- Energy and Matter
- Structure and Function
- Cause and Effect
- Patterns
- Stability and Change

Science & Engineering Practices

- Asking Questions and Defining Problems
- Planning and Carrying Out Investigations
- Developing and Using Models
- Analyzing and Interpreting Data
- Constructing Explanations and Designing Solutions
- Engaging in Argument from Evidence
- Obtaining, Evaluating, and Communicating Information

Activities in this lesson can help support achievement of these Performance Expectations

KINDERGARTEN:

K-LS1-1: Use observations to describe patterns of what plants and animals (including humans) need to survive.
K-ESS2-2: Construct an argument for how plants and animals can change the environment to meet their needs.
K-ESS3-1: Use a model to represent relationships between the needs of plants and animals and their environments.

GRADE 1:

1-LS3-1: Make observations to construct evidence-based accounts that young plants and animals are like, but not exactly like, their parents.

GRADE 2:

2-LS2-1: Plan and conduct an investigation to determine if plants need sunlight and water to grow.
2-LS2-2: Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.
2-LS4-1: Make observations of plants and animals to compare the diversity of life in different habitats.

GRADE 3:

3-LS1-1: Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

GRADE 4:

4-LS1-1: Construct an argument that animals have internal and external structures that support survival, growth, behavior, and reproduction.
4-ESS3-2: Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

GRADE 5:

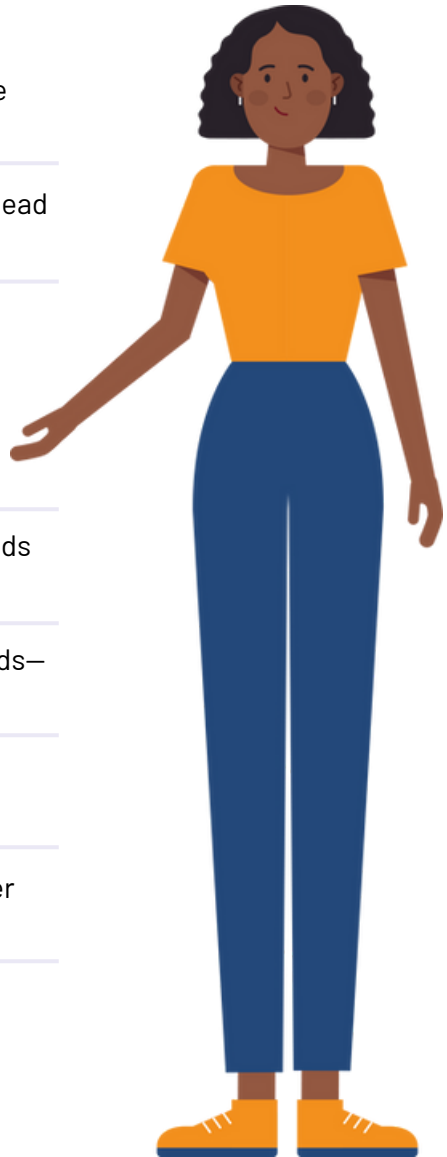
5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Background

From the **soil** beneath our feet to the buzzing **pollinators** in the air, every living thing plays a part in helping sustain our planet. In this set of hands-on lessons—Soil Safari, Pollinator Parade and Compost in a Bottle—students will dig into the hidden world of soil, discover the important work of insects and **decomposers** and explore how all these tiny helpers make it possible for plants (and people!) to thrive. Through observation, modeling and investigation, students will uncover the connections between plants, animals and the environment—learning that healthy soil and pollinators are essential for the food we eat. These activities are designed to build curiosity and scientific thinking while meeting Next Generation Science Standards (NGSS) for grades K–5. Whether students are exploring the living layers of soil, simulating how bees carry **pollen** or creating mini compost systems, they'll see how nature's smallest workers keep our world healthy. Together, these lessons encourage a sense of wonder, responsibility and appreciation for the **ecosystems** that sustain life.

Vocabulary

Soil	The loose, top layer of the Earth where plants grow. It's made of tiny rocks, dead plants and animals, water and air.
Decomposer	A living thing, like a worm, fungus or bug, that breaks down dead plants and animals and turns them into soil.
Nutrients	Tiny materials in soil and food that plants and animals need to grow and stay healthy.
Pollinator	An animal, like a bee, butterfly or bird, that helps plants make seeds by moving pollen from one flower to another.
Pollen	A yellow powder made by flowers that helps plants make seeds when it moves from one flower to another.
Habitat	The place where a plant or animal lives and finds what it needs—like food, water and shelter.
Compost	A mix of food scraps, leaves and other natural materials that decompose and turn into rich soil.
Ecosystem	A community of living and nonliving things that work together in the same environment.
Cycle	A pattern that repeats, like the way nutrients move from soil to plants to animals and back to the soil again.



Questions

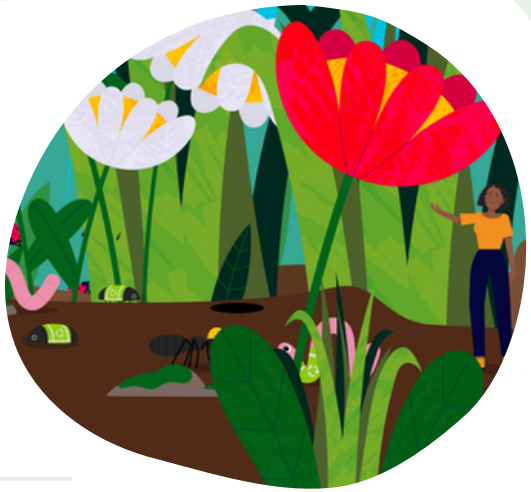
1 What lives in the soil, and how do these living things help plants grow?

2 How does soil provide what plants and animals need to survive?

3 What would happen if there were no worms, bugs or decomposers in the soil?

ACTIVITY 1 HANDS-ON LEARNING

Soil Safari



1. Gather students in an outdoor space with accessible soil, or prepare indoor soil trays.
2. Explain that they will go on a "safari" to discover small animals living in the soil.
3. Demonstrate gentle digging—lift soil carefully, observe for movement and avoid harming critters.
4. Students use magnifying glasses to observe worms, beetles, ants or other small creatures.
5. After observation, gently return animals and soil to their original spot.
6. As a class, create a list of the living things they found and discuss how these creatures help recycle dead plants into nutrients.

Assessment:

- Students name at least one decomposer and explain how it helps soil health.
- Teacher uses a checklist to note student participation in observation and discussion.
- Optional: Students draw one soil creature they found and label it.

Materials

- ☐ Magnifying glasses *(optional)*
- ☐ Small trowels or spoons
- ☐ Plastic trays or shallow bins *(if indoors)*
- ☐ Garden bed, schoolyard patch or soil-filled container
- ☐ Chart paper or board for recording findings

ACTIVITY 2 HANDS-ON LEARNING

Pollinator Parade

Students will model the process of pollination and explain how pollinators help plants produce the food we eat.

1. Explain that some insects (like bees, butterflies and beetles) visit flowers for food and accidentally carry pollen from one flower to another.
2. Give each student a cotton ball "bee."
3. Place paper flowers around the room, each sprinkled with a small amount of "pollen."
4. Students move from flower to flower, pressing their cotton ball into the pollen, then onto the next flower.
5. After several "visits," gather students to observe how pollen has spread to many flowers.
6. Connect the activity to real-world food production—without pollinators, many fruits and vegetables wouldn't grow.

Assessment:

- Students explain (in their own words) what pollination is and why it is important.
- Teacher notes if students demonstrate the movement of pollen correctly during the activity.
- *Optional: Students draw a bee visiting a flower and label the pollen.*

Materials

- ☐ Cotton balls (one per student)
- ☐ Small paper cups or clothespins to act as "bee bodies"
- ☐ Paper flowers (construction paper or printed)
- ☐ Colored chalk dust, powdered drink mix, or cornmeal as "pollen"
- ☐ Space to move between "flowers"

ACTIVITY 3 HANDS-ON LEARNING

Compost in a Bottle

Students will observe how decomposers and microorganisms break down organic matter over time, creating healthy soil for plants.

1 Show students examples of compost and explain how it's made by decomposers breaking down plant waste.

2 In small groups, layer the bottle/jar with:
- Soil (base)
- Food scraps
- Leaves/paper
- More soil

3 Lightly spray with water to keep it moist (not soggy).

4 Place in a warm, sunny spot and cover loosely with the bottle top or lid for airflow.

5 Observe changes over several weeks, recording observations weekly in a class chart or journal.

6 Discuss what's happening and how compost returns nutrients to the soil for growing food.

Assessment:
- Students describe at least one visible change in the compost over time.
- Teacher checks student journals for recorded observations and reflections.
- Optional: Students compare the compost jar to regular soil and note differences.

Materials

- ☐ Clear 2-liter plastic bottles (cut in half, keeping the top as a "lid") or clear jars
- ☐ Soil
- ☐ Small food scraps (fruit peels, vegetable ends—avoid meat or dairy)
- ☐ Leaves or shredded paper
- ☐ Spray bottles with water
- ☐ Labels for each bottle

Nature Lab Sustainability Commitment

Each component of a Nature Lab collection is designed to embrace the concepts of recycling, upcycling and sustainability.

Additional Resources

Visit nature.org/NatureLab for more educator resources.

Sign up for our e-newsletters to stay up-to-date on the latest teaching guides and videos.

Follow @TNCNatureLab on your favorite social channel to see how people and nature thrive together.

Tiny Creatures, Big Jobs: The Bugs That Make Food Possible

Buzz, crawl and flutter along on a virtual adventure all about bugs and the important jobs they do to help our food grow.

Pollinators: Putting Food on the Table

Show students the incredible importance of pollinators to agriculture and landscapes with this video filmed in Colorado's Yampa Valley. Students build a pollinator garden and learn how little of their picnic would be possible without pollinators.

Global Gardens

Students explore how a garden works as a living natural system. A garden filters water, provides habitat, improves soil, reduces your carbon footprint and engages the community.