

Lessons at a Glance

Science Content: Big Ideas

The Nature's Recyclers Unit concentrates on the following Big Ideas. Along with the scientific Habits of Mind discussed on pages 6–7, these concepts are reinforced throughout the unit. The lessons in which each Big Idea is introduced or is a major focus are indicated in parentheses.

Lessons

- Nature's waste and remains don't just pile up. They decompose. (Lessons 1 and 2)
- Nature's recyclers—scavengers, fungi, and bacteria—feed on dead organisms and waste. They carry out the process of decomposition. (Lessons 3, 4, 5, 6, 7, 8, 9, 10, and 11)
- Nature's recyclers return nutrients to the soil (or water) to be used by plants and other organisms. (Lessons 12, 13, 14, and 15)

Skill Building Activities

- Paying attention to a book's organization can assist reading comprehension. (Skill Building Activity: Reading Science Books)
- Observation is a powerful tool for learning about something. Detailed and accurate descriptions of your observations help you communicate them to others. (Skill Building Activity: Observing and Describing)
- Scientists plan and design fair tests so they can determine how the one variable being changed affects the results of an experiment. (Skill Building Activity: Designing a Fair Test)
- Line graphs are charts that can be used to measure how data changes over a period of time. (Skill Building Activity: Making Line Graphs)

Lesson Overviews

The following overviews briefly summarize each lesson in the Nature’s Recyclers Unit. Suggestions for scheduling are shown in gray. Asterisks with the lesson title indicate a core lesson.

Lesson 0: Doing Science

Students sharpen their awareness of scientific thinking and become familiar with the “I Wonder” circle as they conduct a self-directed exploration and then reflect on the processes they engaged in. In the context of these experiences, they are introduced to the work of scientists and to the Science Companion “I Wonder” circle, which provides a visual representation of many of the facets of scientific inquiry, exploration, and discovery.

Lesson 1: Wondering About Nature’s Waste*

In this introduction to the Nature’s Recyclers Unit, students discuss what the term “waste” means and examine “mystery bags” that are filled with different examples of natural waste. They explore the concept of natural waste and share ideas about why the world is not covered in organic remains.

If taught in two sessions, the introductory discussion is suitable for flexible implementation with language arts. Consider teaching the Skill Building Activity “Reading Science Books” on pages 300–309 after this lesson to orient your students to the *Nature’s Recyclers Student Reference Book*.

Lesson 2: Nature’s Breakdown*

This lesson offers pre-assessment of students’ understanding about the sequence and process of decomposition. Students arrange illustrations showing the progressive decomposition of organisms (a tree and an animal) into the correct sequence. They speculate about why organisms decompose.

Lesson 3: Nature’s Cleanup Crew*

Students begin this lesson by considering some of the animals that decompose and recycle nature’s waste and remains. They study carrion beetles and dung beetles, and discuss what would happen if there weren’t any scavengers.

Lesson 4: Looking at Worms*

This lesson introduces students to one type of scavenger, the earthworm. While there are many types of earthworms, students will have the opportunity to care for and examine live composting worms. Students develop their observational skills by drawings and writing about what they see. They also practice attentive handling and care of the worms and their environment.

This lesson is conducted over two sessions.

Consider teaching the Skill Building Activity “Observing and Describing” on pages 310–319 prior to this lesson.

Lesson 5: Feeding Worms*

Students investigate the effects that earthworms have on the process of decomposition. They prepare two decomposition cups to investigate and observe how composting worms break down plant remains. After about five days, they compare the changes in each cup.

This is a three-session lesson. Session 2 is an optional reading session.

Lesson 6: From Decomposers to Soil*

In Session 1 of this lesson, students examine a variety of inorganic and organic planting materials. They discuss the connections between the work of nature’s recyclers, soil, and plant development.

In Session 2, students continue investigating the connection by planting some seeds in potting soil and some in perlite. Over a few weeks, they observe and think about how each material may affect plant growth. They will graph their observations and discuss their conclusions in Lesson 12.

This lesson is conducted over two sessions.

Lesson 7: How Fungi Feed*

Students are introduced to another of nature’s recyclers, fungi. Students compare a bare wooden plug to a plug covered with fungal mycelium, and then set up an experiment with the plugs. After about a week, they observe how the mycelium grew into the coffee grounds. They discuss the process of how fungi obtain nutrients from organic materials.

This is a three-session lesson. Session 2 is an optional reading session.

Lesson 8: Investigating Bread Mold Growth*

Students begin investigations of mold by considering its function as a fungus and as a decomposer. In Session 1, they look at some examples of moldy food items, and think about the environmental conditions that might encourage or discourage mold growth.

In Session 2, they choose one condition to vary for their own experiments with bread mold growth, learning about fair tests in the process. Session 3 is designed to teach students how to collect data during their experiment. They will graph their collected data in Lesson 11.

This lesson is conducted over three sessions.

Consider teaching the Skill Building Activity “Designing a Fair Test” on pages 320–329 prior to this lesson.

Lesson 9: Looking at Mushrooms

Students continue their observations of fungi from Lesson 7 by examining those most familiar to them: mushrooms. They learn about the life cycle of a mushroom, identify the parts of a mushroom, and start to think about how a mushroom reproduces. Then they make spore prints of mushrooms so they can see evidence of the microscopic parts of a fungus that enable it to reproduce.

Lesson 10: Agents and Evidence of Decomposition

Students take a field trip to search for evidence of decomposition and its agents. They observe and identify “FBI” (fungi, invertebrates, and bacteria) communities.

This lesson can be conducted any time after Lesson 9.

Lesson 11: Drawing Conclusions About Mold Growth*

Students draw a bar graph in Session 1 with the data they collected since Lesson 8 about their bread mold growth experiments. They compare how conditions affected mold growth and make conclusions from the results. They draw a line graph in Session 2, showing how the area of mold growth changed over time.

This lesson is conducted over two sessions. Either or both sessions are suitable for flexible implementation with mathematics.

Lesson 12: Soil Nutrients for Plants*

Students compare the results of the planting experiment from Lesson 6. In Session 1, they make their final observations of the plants grown in organic planting material—potting soil—and compare them to those grown in an inorganic material—perlite. In Session 2, they analyze data and conclude about how the plants in each of the planting materials grew. They continue to expand on their understanding of the role decomposers play in plant development.

This lesson is conducted over two sessions.

Lesson 13: Producers, Consumers, and Decomposers

With examples drawn from organisms that typically live in a tall grass prairie, this lesson introduces students to the roles of producers and consumers in a food chain and food web. As a Science Center activity, students create model food chains using pictures of native plants and animals from their own state or region. The lesson concludes with a class discussion about how scavengers and decomposers recycle nutrients from the organisms in a food chain.

Lesson 14: The Nutrient Game*

Students play a game in which a large container of blocks represents nutrients in the soil. They act out the roles of plants, herbivores, carnivores, and recyclers to appreciate the importance of recycling nutrients.

Lesson 15: Recycling Nutrients*

The students complete the Nature's Recyclers Unit by putting together a Mobius strip that models how nutrients are passed from one living thing to the next. Students' experience with the Mobius strip, along with the discussions in the lesson, solidifies their understanding of how producers, consumers, and decomposers all work together to ensure that nutrients are continually recycled in nature.

Skill Building Activity: Reading Science Books

Students familiarize themselves with the organization and layout of the *Nature's Recyclers Student Reference Book*. They are encouraged to look through each section before they begin reading so they can use visual and text cues—such as headings, margin notes, and illustrations—to help understand the material and its relationship to what they already know.

Ongoing reading strategies to help children absorb new information and vocabulary are included at the end of the lesson

Skill Building Activity: Observing and Describing

Children practice making accurate and detailed descriptions before and after observing a familiar object. They discover the importance of careful observations and detailed description in science.

Skill Building Activity: Designing a Fair Test*

An important aspect of any scientific experiment is designing a fair test. In this lesson, students analyze the elements of a fair test and discuss ways to make the test fair. They identify variables that could affect how high a ball bounces and strategize about how to change only one variable while keeping all other parts of the experiment the same.

Unless your students have prior experiences in designing a fair test, this Skill Building Activity is recommended before Lesson 8.

Skill Building Activity: Making Line Graphs*

Scientists rely on graphs to help them analyze data they collect. A line graph is especially useful to scientists when they need to measure how data changes over a period of time. This activity provides a basic introduction on how to organize data on a line graph and how to use it as a tool to understand the data displayed. By looking for trends on a line graph, the students learn how to make educated predictions, a skill need for many science activities.

This lesson is suitable for flexible implementation with mathematics and should be taught in conjunction with Lesson 11.