All Year - Outdoor | 45 minute lesson

FBI Hunt

Connected Next Generation Science Standards

K-ESS2-2 Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.
5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Featured Science and Engineering Practices

Asking Questions & Defining Problems
Developing and Using Models

Featured Cross-Cutting Concepts

Stability and Change

Materials

- Teacher - small whiteboard or chalkboard. Photos of a Fungus, Invertebrate, and Bacteria (close-up)
- Garden journals or FBI Hunt worksheet and clipboards
- Pencil
- Hand trowels
- Access to soil
- Optional - field guides, and magnifying glasses

Overview

Have you heard of the FBI? In the garden, the FBI refers to fungi, bacteria, and invertebrates - organisms that make decomposition possible. Decomposers are essential for healthy and productive soils. During this lesson, students will discover that the FBI are everywhere and are an invaluable part of the garden food web.
Check out the end of the lesson for younger student adaptations.

Students will

- Search for decomposers and evidence of decomposers.
- Classify decomposers as fungi, bacteria, or invertebrates.
- Describe the role of decomposers in the garden or ecosystem.

Teacher Preparation

- Before this lesson, collect a few examples of decomposers or print pictures of mushrooms, mold, earthworms, bacteria, ants, or pill bugs.
- Optional: Locate and mark good locations to look for decomposers.

Guiding Question - How is dead matter broken down into smaller parts in the garden?

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FBI Hunt

Settings

- School garden or green space where students can dig in the soil
- Can be taught at any time of year that soil is not frozen

A **whip-around** is a fast-paced dscussion routine that allows all students to share out. Tell students they each must come up with 1-word only to respond, then quickly move through the class allowing each student to share out their 1-word answer.

Decomposition is rotting or the breaking down of something into smaller parts that become a part of the soil, water, or air.

Explore

- On your way out to the garden, ask students, What are some ways that dead plants might be broken down into smaller parts? (chewing, grinding, tearing, etc.)
- In the garden, ask students, What or who might be the suspects in the garden that are responsible for breaking dead matter down into smaller parts? Gather student responses with a **whip-around**.
- Tell students that today they will be scientists and detectives searching for **decomposers**: suspects that are responsible for decomposition.
- Define **decomposition** and **decomposers** (organisms that break down dead matter), if needed.
- Ask students to give some examples of where they might find decomposers in the garden.
- Decomposers will be found in areas with dead matter, like in the soil, under logs, below mulch, or in a compost pile. They can also record evidence they see of decomposers.
- Put students into pairs, then give each group a hand lens, hand trowel, and clipboard with scrap paper or a garden journal.
- Explain that they will have 5-10 minutes to search the garden for decomposers. They will record the decomposers and evidence in their garden journal or the worksheet
- Remind students how to gently handle garden animals.
- Circulate and help students identify or find decomposers as needed.

FBI Hunt

Fungi- Living things that are neither plant nor animal. Can vary from mushroom to fuzzy mold to small yeasts you can not see.
Bacteria- Living things that are all around and so small you can not see without a microscope. Some can make you sick, but many eat dead things which help the soil.
Invertebrates- Animals without a backbone like worms, insects, and spiders.

Digging Deeper

- After students have finished exploring, combine 2 pairs of students to compare what they discovered. What did they notice about the decomposers and where they live?
- Bring the students back together.
- Tell students that scientists frequently classify living things and they have done that with decomposers too!
- Introduce the students to the three types of decomposers by writing the acronym "FBI" on a board. Ask students if they have heard of the FBI, then explain that the FBI we are talking about stands for **Fungi**, **Bacteria**, and **Invertebrates**. Define each type of decomposer for the students, showing examples of fungi and invertebrates. Explain that some decomposers, such as bacteria, are too small to see.
- Ask students, if some decomposers are too small to be seen, what are some examples of evidence that you might find that tell you a decomposer was there? (spots or holes on leaves, rotten matter)

Making Connections

- Break students back into their pairs to divide the decomposers or evidence of decomposers they observed into Fungus, Bacteria, and Invertebrate. Allow students to look for additional decomposers and evidence of decomposers to add additional organisms to their chart.
- Bring the students back together.

FBI Hunt

Younger Student Variation
Young students love to dig so focus on collecting and counting invertebrates. Compare the number of animals found in the compost pile, under the logs, and in a garden bed. Students can draw or write a story about their favorite decomposer at the end.

- Have small groups compare their categorization of decomposers. What structures or evidence did they look for when putting the decomposers in each category? Do they agree or disagree with their friends?
- Finally, have students draw a picture of what they think the garden would look like if there were no FBI decomposers.
- Walking back to the garden, ask students, What changed about how you thought about decomposers today?

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