Mapping a Garden Food Web

Summary: In this lesson, students expand on what they learned in the previous lesson about *biotic interactions* to begin mapping a food web of the garden. This lesson forms the foundation for the next lessons in which students will consider how matter and energy flow through a garden ecosystem. After creating their own food web based on observations, students reflect on how understanding the full web of biotic interactions in a garden, including feeding relationships, might support them in developing a planting plan for the garden. This is the eighth of a 12-lesson series in which students will explore the basic ecological principle of interdependence through the lens of common organic farming practices.

Time: 45 minutes

Teacher Notes:

- For sections that instruct students to READ, you can record yourself reading aloud and send it to students. Invite them to read along with the recording. This is a helpful strategy for differentiating learning that supports all students, especially English Language Learners.
- This lesson is designed to build off of what students explored in the previous lesson about biotic relationships by adding the layer of feeding relationships to their exploration. This lesson is also foundational to the explorations that come next about how matter and energy move through an ecosystem. Resist the urge to give students the answer to the question of whether there are any organisms they *can't* see. They will be learning about decomposers in the Compost lesson.
- At some point during this lesson, have students return to the garden bed in which they are conducting the plant start investigation (Lesson 3: Cultivation). They should record their observations about the plants and soil on the Plant Start Investigation worksheet found in lesson 3: Cultivation.

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Vocabulary

- **Interdependence:** the dependence of two or more people, organisms, or things on one another.
- **Biotic interaction:** the effect that a pair of organisms living together in a biological community have on each other. Biotic interactions can occur between organisms of the same species, or of different species.
- **Predator:** an animal that hunts, kills, and eats other organisms in order to survive.
- **Prey:** an animal that is hunted and killed by another for food.
- **Producers:** organisms that create their own food.
- **Consumers:** organisms that need to eat other organisms in order to obtain energy.
- **Food web:** a group of food chains within an ecosystem.

THINK-PAIR-SHARE: Reflect on the questions below, and then discuss your answers with a partner or the whole class. You may want to write, or you may just think about your answer.

- What relationships have you observed in the garden? Describe them. What impacts did the organisms or things involved have on one another?
- What relationships have you personally experienced in the garden? What impacts have these relationships had on you?

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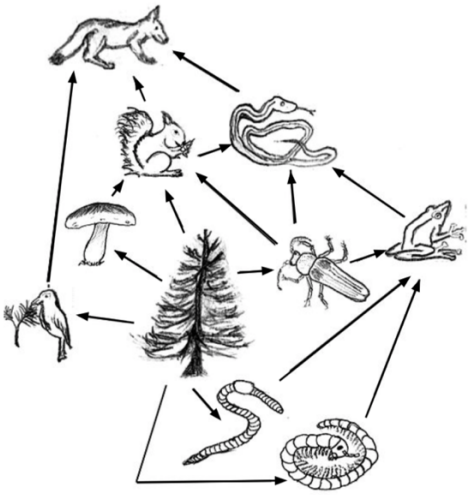
Mapping a Garden Food Web: Reading

READ: In the previous lesson you explored the many biotic interactions that occur in the garden ecosystem. In this lesson, we're going to dig into one very important type of interaction: *feeding relationships*.

One of the most important ways that organisms in ecosystems can be connected to one another is in how they get their food. Plants and other organisms that make their own food using energy from the sun are called **producers**. Organisms that need to eat other organisms in order to survive are called **consumers**. As a general rule of thumb, any plant you see is a producer, whereas all animals, whether they eat plants or other animals, are consumers—they are not capable of creating their own food. All the energy you, or any other consumer, has ever used or taken in came originally from the sun by way of plants. Without plants and other producers (such as certain kinds of bacteria), humans and all other consumers would not be able to survive!

A **food web** is one way of representing the feeding relationships in an ecosystem. Generally, producers appear at the bottom, and consumers appear above. The arrows between organisms indicate who/what an organism eats or is eaten by. For example, in the ecosystem represented in the food web below, the bird eats the pine cones off of the pine trees. The fox eats birds, and also eats squirrels and snakes.



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THINK-PAIR-SHARE: Food webs can help us visualize how organisms in an ecosystem are connected. Take some time to reflect on the questions below, then discuss with a partner or as a class.

- What do you think might happen to the birds in this ecosystem if all the pine trees got cut down?
- What other organisms would be affected if the pine trees got cut down? How do you anticipate they would be affected?

OBSERVE: Now you're going to see if you can observe this principle of **interdependence** in our garden. Take some time to wander through the garden. As you wander, use the questions below to guide your observations:

- How many organisms can you see? List as many as you can.
- Which of these organisms are *producers*? Which are *consumers*?
- Do you think there are any organisms that you can't see? Explain.
- Who is eating whom in this ecosystem? Create a food web that illustrates where each of the organisms you observed gets their food. (It's okay if you aren't sure—just make your best guess). Be sure to include garden crops on your food web.

DISCUSS: In pairs, groups, or as a full class, discuss the following questions:

- Which organisms most directly influence the crops in the garden? Describe their effect.
- Which organisms most directly influence the organisms that influence the crops? Describe their effect.
- Are there any organisms in the garden ecosystem that harm the crops? What do you anticipate would happen if the population of those organisms increased? Decreased? Disappeared altogether? Explain your answers.
- Are there any organisms in the garden ecosystem that harm the system overall? Explain your answer.

REFLECT: Take some time to reflect on the questions below. You may choose to write, draw, talk, or just reflect individually.

- How could understanding the food web in your garden support you in designing a planting plan for the garden? (You may want to reflect on what you learned in the previous lesson about different forms of "weed" and "pest" management).
- If you were to try and include humans on your food web, where would you put them?
- What questions do you still have about food webs or relationships in the garden ecosystem?

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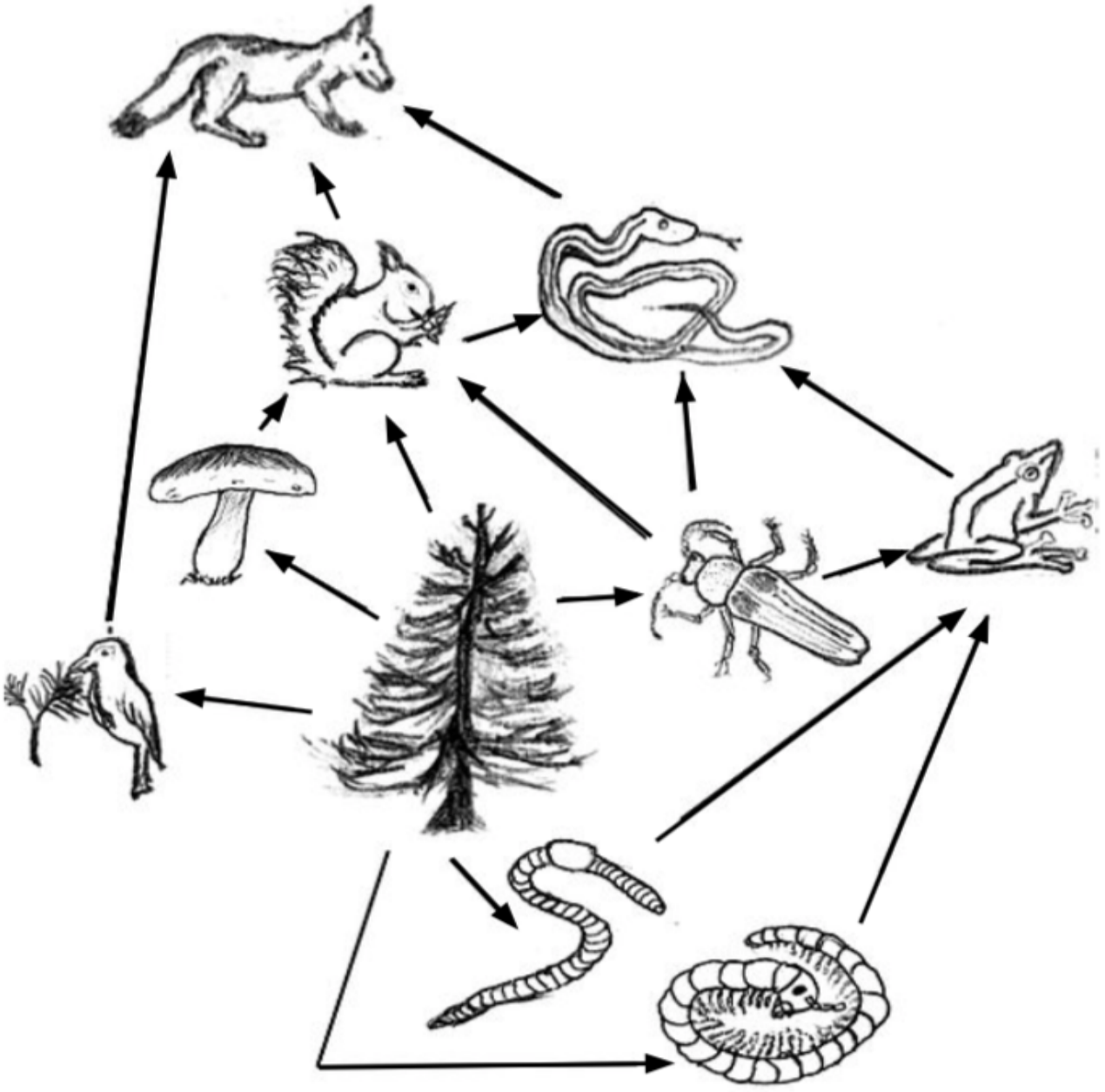

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