

## Birds and Their Environment

**Objective(s):** Students will (1) describe different roles that birds fill in an environment, (2) describe a bird's food web, and (3) describe how birds are impacted by environmental changes.

### Overview

Students will explore the interdependence of organisms in the environment.

### Georgia Standard(s) of Excellence (GSE)

SKL1; SKL2; S1L1; S2E3; S4L1; S5L1; S6E6; S7L1; S7L4; SB5; SEC1; SEC3; SEC5; SZ4; SZ5.

### Essential Terms

Community  
Decomposer  
Ecosystem  
Food Web  
Habitat  
Interdependence  
Primary Consumer  
Producer  
Secondary Consumer  
Tertiary Consumer  
Trophic Level

### Materials

- LAB: *Birds and Their Environment Student Guide*
- LAB: *Weave the Web activity cards*
- LAB: *Weave the Web handout*

### Additional Resources

- LAB: *Bird Conservation*
- LAB: *Bird Adaptations*
- LAB: *Nurturing Nature with Natives coloring book*

## Background

Birds offer students opportunities to observe first-hand how organisms interact and exchange energy within **ecosystems**, creating a **community**. This unit provides a framework for studying birds' roles in their environments, their relationships with other organisms, and how they are affected by environmental changes. As you explore bird habitats in your area, think about what defines an ecosystem or community. You will reveal a whole new dimension of your environment!

## The Flow of Energy

A **food web** graphically represents the **interdependence** and exchange of energy between organisms (who eats whom). The **trophic level** of an organism is the position it occupies in a food web, indicating how it obtains its energy.



The **sun** is the driving source of energy. It sustains life on Earth. The sun's rays provide the food for plants and algae to grow.



**Producers** make their own food by photosynthesizing sunlight for energy. They are at the bottom of the food chain because they are eaten by other organisms. *Example:* Oak trees not only provide acorns, but their leaves support the life cycles of insects that many birds and other consumers depend on.



**Primary Consumers** eat producers like plants or algae and may be preyed upon by upper-level consumers (predators). They are considered herbivores. *Example:* Mourning Doves eat mostly seeds but also consume grasses, herbs, and berries.



**Secondary Consumers** eat primary consumers and may also consume producers, making them omnivores. *Example:* A Downy Woodpecker's diet consists mostly of insect larvae, ants, and caterpillars, but also includes seeds and berries.



**Tertiary Consumers**, sometimes called apex predators, prey upon lower-level consumers and play a valuable role keeping ecosystems in balance. They have few, if any, natural predators themselves. *Example:* The Great Horned Owl consumes a diverse diet of prey, including mammals, reptiles, and other birds.



**Decomposers** feed off dead organisms (carrion). *Example:* Turkey vultures serve as nature's recyclers and sanitizers. By breaking down organic material, vultures cycle nutrients back into the environment, where energy exchange continues.

## We're All Connected

When habitat loss, invasive plant or animal species, disease, pollution, and other threats endanger bird populations, we lose those valuable environmental services and the balance of the whole food web. Ask students to consider how the food web shifts when:

- **Non-native species are introduced** (domestic cats, kudzu vine, pythons, etc.).

[Non-native predators like cats and pythons reduce the available prey for native species like owls and foxes. Invasive plants like kudzu can overtake an area, reducing the food and habitat available to wildlife.]

- **Pesticides and rodenticides are present.**

[Toxins reduce available prey and bioaccumulate in the food web, poisoning higher-level consumers.]

- **A trophic level is removed** (for example, an apex predator is eliminated).

[When an apex predator is removed, prey species may reproduce unchecked, potentially leading to overpopulation, overgrazing, starvation, disease, etc.]

## Preparing for Flight

The nice thing about birds is that they are readily found almost anywhere and need to eat a lot. Because they occupy almost every trophic level in their community, from primary to tertiary consumers to decomposers, they provide the perfect opportunity for students to observe trophic interactions.

Complete *LAB: We're All Connected* on the student guide to prepare students for the activities below.

## Activity 1: Weave the Web

**Students will illustrate the interconnectedness of organisms in food webs.**

Prior to leading this activity, print and/or laminate *LAB: Weave the Web cards*, holepunch the top of each picture, and tie a piece of yarn through each hole, long enough for students to wear over their necks. You will also need a ball of yarn. Alternatively, you may use the *LAB: Weave the Web Handout* as a worksheet.

1. Ask students to arrange themselves in a circle, with the teacher in the middle. Randomly distribute one *Weave the Web card* to each student. Explain that each student represents a native species in Georgia and that the group will recreate a food web using a ball of yarn. The teacher, playing the role of the sun—the driving force of energy that supports life on Earth—should toss the yarn to a producer.
2. Using the diet descriptions on each card, students will toss the ball of yarn to another organism with whom they have a trophic relationship (what they eat or what eats them). Challenge the group to connect all the organisms. Be sure to keep the string taut.
3. When completed, review how each organism connects to one another, reiterating the importance each trophic level plays in the overall food web. You may also use this time as an opportunity to introduce environmental disturbances and their potential impacts on the food web. Using the scenarios listed above (*We're All Connected*), ask the students who are affected by the disturbance to tug on the yarn and notice how many others feel the pull. Note the broad effects disturbances can have on an entire food web.

## Activity 2: Explore your Environment

**Students will make observations of ecological interactions in the environment.**

Review the definitions of ecosystem, environment, community, and habitat. Discuss how these concepts are related. A visual aid may be drawn to help illustrate.

1. Working in pairs or small groups, students will use two or more blocks of time to record observations about their outdoor environment around the school/facility. Students should record (a) types of organisms they see (plant descriptions may be broad) and where, (b) weather, (c) landforms, and (d) sources of water. Students may choose any format to record observations. If possible, provide field guides, binoculars, or hand lenses. Be sure students record at least one bird.
2. After data collection, conduct a group discussion to answer these questions:
  - a. What was the most numerous organism? What type of trophic interactions did you observe?
  - b. What role did the bird have? Do you think birds compete with other organisms?
  - c. Identify a mutually beneficial relationship between two organisms.
  - d. Pick a realistic environmental change that could occur in this environment (such as invasive species, drought, flooding, urbanization, pollution). Would it matter if one species disappeared? How would this affect the ecosystem?
3. Students will create an illustration of their observations to share with the group. Repeating this activity over time is encouraged to uncover possible patterns in observed species and trophic interactions.