

Bird Adaptations and Ecosystems

Science and Engineering Practices (SEP) – *Asking Questions & Defining Problems*

Disciplinary Core Ideas (DCI) – *From Molecules to Organisms: Structures and Processes*

Objective: Students will explore adaptations through examining birds and their habitats

Background: An adaptation is a physical characteristic or behavior that helps an animal survive in its environment. Birds are a wonderful introduction into the exploration of animal adaptations because they are easily found in most habitats and geographic locations. Moreover, their adaptations are also easy to see and understand.

For example:

- Owls have large eyes to help them see at night when they are most active.
- Hummingbirds have long, narrow beaks to help them reach the flower nectar they eat.
- Females tend to be less colorful than males so that they are camouflaged while incubating eggs on their nests.

Essential Vocabulary:

- Bird physiology: above, below, crest, beak, wing, sharp vision, bars, etc.
- Bird behavior: perch, soar, wade, nest, refurbish, stab, etc.
- Habitat names and descriptors: marsh, forest, chaparral, coast, niche, etc.

Activity:

Awaken student's prior knowledge by asking them to think about birds and bird adaptations

What kinds of birds do we see in our community?

Can you think of some adaptations that are unique to birds?

Students may brainstorm in small groups and then come together as a class to share ideas. To cultivate a deeper understanding, bird adaptations can be grouped into functional purposes – Eating, reproduction, camouflage, etc.

This kit features three locally-found birds:

- **Great Egret:** These stunning white birds are tall and long-legged, which makes them well suited to the salt or fresh water marshes they call home. They typically wade or stand still in the water, waiting for prey (such as fish or amphibians) to pass by, which they then stab quickly with their long necks and dagger-like beaks. They are also the symbol of the Audubon Society!
- **Eastern Phoebe:** This plump songbird is brownish-grey above and off-white below. They are active, and prefer low, isolated perches (such as branches, reeds, or grass), usually near water, so that they can easily zip off and capture insects to eat. They are one of only a few birds to use the same nests year after year, and will even refurbish the nests of other species for their use!
- **Red-tailed Hawk:** In flight, this raptor can be easily identified by a dark bar on their under-wing between shoulder and wrist. Their long wings allow it to soar easily, so they are often found circling above fields. Alternatively, they will perch atop telephone poles or trees and use their sharp vision to search for prey (small mammals and birds) below, which they capture in their curved talons. The most common hawk in North America, their piercing cry is iconic!

1) Introduce each of these birds to your class

Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior and reproduction.

Encourage students to think about the following questions.

What are some features that you notice about this bird?

What do you think it eats?

How do the features you notice help it obtain its food?

Where would you guess this bird lives?

What about its appearance makes you think it lives there?



2) Each student (or pair) should then receive one habitat page and a set of bird magnets.

On one side, all of the habitat pages have the local habitat of Stevens Creek at Shoreline Park in Mountain View, CA. This park has a developed area, including an artificial lake, a golf course, and several paved and unpaved trails. It also includes an undeveloped wildlife refuge at the edge of the bay which is home to several species of birds, including:

- Western Burrowing Owls (a Species of Special Concern)
- Pelicans & Gulls
- Hawks
- Many species of duck and other water fowl
- Many shore birds, including Egrets, Herons, Plovers, etc.
- Many species of song bird

3) Using the magnets, the students should place the birds into the shoreline environment.

Use prior knowledge to describe problems that can be solved

Why did you place each bird in its particular place?

Most likely, the Red-tailed hawk will be in the trees, the Great Egret in the water, and the Eastern Phoebe in the grass – but the students might have other ideas. Perhaps they place the hawk in the grass because it has just struck a ground squirrel and is busy eating it!

Take a moment to discuss why each bird is specifically suited to its proper location. On the back of the habitat page, each student or pair will find a different habitat. After checking that each student recognizes and understands their new habitat, there are several options for different activities.

The habitats include:

coastal forest

grassland

chaparral

desert

snow

oak woodland

evergreen forest

coast

river

Have students apply scientific ideas to solve a design challenge

Ask students to consider the new environment and design a bird that would be ideally suited to survival there. Included in the kit are blank field guides for students to complete! Include **labels** and **descriptions**.

What would your bird eat?

What adaptations does your bird have to help it obtain its food?

Do the females and males of your bird species look identical, or are they different? How?

Does your bird need to camouflage into its environment? How does it do this?

How does your bird ward off predators?

Where does your bird lay her eggs?

Consider these questions to complete the field guide.



Ask questions about what would happen if a variable is changed

Have students place the three birds into the new habitat and consider their chance of survival.

Most animals are adapted to survive in specific habitats – why do you think their birds would or would not survive in this new habitat?

If one of their birds managed to survive in its new environment, which traits would help its offspring to thrive?

How would the species change over dozens of generations?

Why would those changes prevent the species from going extinct? (For example, the hawk's descendants might develop lighter-colored plumage if forced to survive in a snowy environment.)

Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.

Using what students know about bird adaptations, have them choose which real-life birds are suited to live in a similar habitat. Distribute the bird images (found in kit) to the students and have them construct an argument to support their claim

Why or why not would each bird survive in the new habitat?



