

# **TEACHER GUIDE**

**to**

## **ANIMAL ADAPTATION**

### ***PASS for Grade 7 Life Science***

- Standard 2.2** Specialized structures perform specific functions at all levels of complexity (ex. wings on birds).
- Standard 3.1** Characteristics of an organism result from inheritance and from interactions with the environment.
- Standard 3.2** Individual organisms with certain traits are more likely to survive and produce offspring.

### ***PASS for Grade 8 Life Science***

- Standard 3** Diversity and adaptations of organisms – adaptation involves the selection of naturally occurring variations in populations.

### **Text for the Bellringer**

Through adaptation, animal species have developed certain internal and external features. These features are essential to the animal's survival. Among vertebrate animals, birds offer many fascinating examples of animal adaptation.

Did you ever wonder how birds can fly? Here are some of the adaptations that make it possible for this group of animals to fly.

- 1) The large bones in birds are hollow. While strong, these bones are also lightweight.
- 2) Birds also have an efficient digestive system which quickly processes food.
- 3) Unlike mammals, birds do not have a heavy, toothed jaw.
- 4) Birds do not carry their young during pregnancy; instead they lay eggs. This minimizes the time that the female bird must fly with added weight.
- 5) And finally, birds have wings and feathers. Wings are essential for flight.

Because birds can fly, they are mobile. They can quickly move from one habitat to another. In some cases, birds migrate thousands of miles each year in order to improve their chances for survival.

In addition to adaptations for flight, birds have also developed many kinds of beaks, legs, and feet. These adaptations allow birds to survive in different habitats. These habitats contain the kinds of food that birds need for survival. These habitats also provide a place for a bird species to raise their young.

Now let's take a closer look at some of the birds that live in Oklahoma. Notice how each kind of bird has adapted their wings, legs, and feet to survive in habitats that are found here.

### Seed-Eating Birds

Seed-eating birds have short cone-shaped beaks (images of cardinals, chickadees, and other birds at a feeder). These strong beaks can crack open tough seeds.

### Gizzards Help Grind Hard Foods

Birds use their gizzards to grind food into small pieces (images of doves and wild turkeys feeding). These mourning doves and wild turkeys don't crack open seeds and acorns; they just gobble them whole. These birds have digestive systems that contain a chamber called a gizzard. Inside the gizzard are small bits of sand and gravel which the bird has intentionally swallowed. Called grit, these bits of gravel help the gizzard to mash the shells and seeds that the bird has eaten.

Humans do not need a gizzard because we use our molar teeth to grind our food into small pieces.

### Nectar-Sipping Birds

Through adaptation of their wings and tongue, tiny hummingbirds are able to sip nectar from flowers while hovering over a plant. Their long, slender tongues extend deep into the flower to reach the sugary nectar. Hummingbirds also sip sugar water in bird feeders.

### Insect-Eating Birds

Most birds, at some time in their life, are insect eaters. Some birds, like our state bird, the scissortail flycatcher, are able to catch insects in mid-air. To nab flying insects these birds must be agile flyers. The DVD also shows images of purple martins and cliff swallows.

Because flying insects are not available during Oklahoma's cold winters, insect-eating birds, like the scissortail flycatcher, must migrate to warm climate, tropical places in Central and South America during the winter season. Here these birds can still find insects. Birds that spend part of the year in North America and part of the year in tropical climates are called neotropical birds.

### Other Insect-Eating Birds

Other insect eaters, like woodpeckers, use their strong, pointed beaks to find insects by pecking through the bark of a tree. Their feet are adapted to help them climb trees as they hunt for insects.

Many insect-eating birds have fairly long, slender legs which help them hop on the ground. Robins eat insects as well as use their sharp beaks to grab worms.

### Fish-Eating Birds

Some fish-eating birds, like egrets and herons, are called wading birds. Their long legs help them to stalk fish and frogs in the shallow water of a marsh, pond, or lake. Wading birds also have sharp bills and long necks so that they can grab and swallow their prey.

Other fish-eating birds, like the American white pelican, have a large pouch that is attached to their long, slender bill. As the pelican pokes its head into the water, the pouch opens wide, like a balloon. When the pelican closes its bill, it traps any fish that swam into the pouch.

Two birds that dive into the water to catch fish are the kingfisher and the cormorant.

With its keen eyes, bald eagles are able to locate fish that swim near the water's surface. Powerful wings make the eagle a swift hunter. Its sharp and strong talons are just the right tools to nab a fish from the water.

### Dabbling Ducks

Some ducks, like mallards and pintails, eat insects, seeds, and small plants that are floating in lakes and ponds. These dabbling ducks have bristles along the edge of their bills. They use these bristles to separate food from the water and mud that fill the duck's bill as it feeds.

### Shorebirds

There are a large group of birds, called shorebirds, that feed on aquatic insects, snails, crustaceans, and worms that are in the muddy shoreline of ponds and lakes and sandy seashores. Shorebirds come in different sizes. Some are able to find food in shallow water, while smaller birds stay at the water's edge. Specially developed beaks and hunting techniques give each kind of shorebird its best chance for success.

Some species of shorebirds raise their young in the Arctic tundra regions of Alaska and Canada, and then migrate a distance of 10,000 miles to spend the winter at the southern tip of South America. Such migrations allow these birds to take advantage of the food that is found in both their winter and summer habitats. To make such migrations, stopover places for resting and feeding are very important to these birds. Such wildlife refuges as the Salt Plains National Wildlife Refuge are critical to the survival of these long-distance travelers.

### Birds of Prey

Hawks, eagles, and owls are called birds of prey because they hunt and eat small animals. Through adaptation, these birds have keen eyesight, as well as powerful wings, legs, and feet. Nighttime hunters, owls have also developed exceptional hearing so that they can locate their prey in almost total darkness. An owl's feathers have adapted so that these birds can fly without making a sound.

### Scavengers

Vultures are nature's sanitation department for they help to remove dead and decaying animal remains, also called carrion.

Vultures have strong wings that allow them to soar great distances with little expenditure of energy. Keen eyesight allows them to spot carrion from high in the sky. While most birds do not have a developed sense of smell, turkey vultures have an excellent sense of smell, which helps them to find carrion.

Notice that these birds do not have feathers on their head. This adaptation helps to keep decaying material off of their heads while they are feeding.

Vultures also have a specialized digestive system that allows them to eat carrion without getting sick. Carrion is filled with toxins and bacteria; things that can kill other animals.

### Closing

In closing, birds offer a fun way to study animal adaptation. Begin your research today by taking a closer look at Oklahoma's birds.

**Reference** The Sibley Guide to Bird Life and Behavior, by David Allen Sibley, published by Alfred A. Knopf, New York, 2001