



ECO-MEET

“Bird Biology”

STUDY PACKET

SILVER BLUFF AUDUBON

South Carolina Common Core Standards

6-1.2 Differentiate between observation and inference during the analysis and interpretation of data.

6-1.3 Classify organisms, objects, and materials according to their physical characteristics by using a dichotomous key

6-3.2 Summarize the basic functions of the structures of animals that allow them to defend themselves, to move, and to obtain resources

6-3.4 Explain how environmental stimuli cause physical responses in animals (including shedding, blinking, shivering, sweating, panting, and food gathering).

6-3.5 Illustrate animal behavioral responses (including hibernation, migration, defense, and courtship) to environmental stimuli.

6-3.6 Summarize how the internal stimuli (including hunger, thirst, and sleep) of animals ensure their survival.

Standard 7-4: The student will demonstrate an understanding of how organisms interact with and respond to the biotic and abiotic components of their environment

8-2.1 Explain how biological adaptations of populations enhance their survival in a particular environment.

8-2.7 Summarize the factors, both natural and man-made, that can contribute to the extinction of a species.

Georgia Curriculum Correlations

S6CS4. Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities.

S6CS10. Students will enhance reading in all curriculum areas by (c) Building vocabulary knowledge

S7CS10. Students will enhance reading in all curriculum areas by (c) Building vocabulary knowledge, and (d) Explore understanding of new words found in subject area texts

S7L1. Students will investigate the diversity of living organisms and how they can be compared scientifically

S7L4. Students will examine the dependence of organisms on one another and their environments

S7L5. Students will examine the evolution of living organisms through inherited characteristics that promote survival of organisms and the survival of successive generations of their offspring; (b) Describe ways in which species on earth have evolved due to natural selection, and (c) Trace evidence that the fossil record found in sedimentary rock provides evidence for the long history of changing life forms.

S8CS2. Students will use standard safety practices for all classroom laboratory and field investigations.

S8CS10. Students will enhance reading in all curriculum areas by; (a) reading technical texts related to various subject areas, and (c) building vocabulary knowledge

On Bird Categories:

Why group birds into different categories?

Birds are split into general categories based on their behavior, eating habits, appearance, and sometimes habitat.

- Learning the different bird categories is a great way to begin bird watching. It is much easier to identify a hawk as a “bird of prey” than specifically as a Sharp-shinned Hawk.
- Most bird field guides list birds by bird categories. For example, ducks are listed in the waterfowl section. Familiarity with the general bird groupings makes identifying an individual species from a field guide much easier.

What are the most common categories of birds?

- **Birds of Prey:** These are large birds, which feed on other animals, including other birds. They have sharp, curved talons (claws) and curved bills for tearing and eating animal flesh, and have keen eyesight. They are generally seen soaring above the treetops or over fields in search of food, or perched on telephone poles and power lines. This group, also known as “raptors,” includes hawks, kites, falcons, eagles, owls and vultures.
- **Wading Birds:** These birds have long legs for wading, long, sharp, dagger-like bills for capturing prey in the water, and long necks that can reach down under the water level. They feed on frogs, fish, crayfish, snakes, and aquatic insects. Wading birds are found mainly in wetlands and near water bodies and are often seen standing motionless in the water. This group includes herons, egrets, ibis, and bitterns. The smaller wading birds, known as rails, are often included in this group.
- **Perching Birds (passerines or songbirds):** This is a large group whose members tend to be small and varied. Their eating habits are directly related to their bill shape, though many eat a variety of nuts, seeds, berries, and insects. Many of these species are migratory and move between North American and Central and South America. This group could be further separated into sparrows, warblers, thrushes, blackbirds, finches, vireos, chickadees, wrens, and a great many more.



- **Waterfowl:** This group includes ducks, geese, and swans.

Most of the waterfowl in the CSRA are migratory and arrive for the winter during fall migration. Some year-round residents include Mallards, Wood Ducks, and Canada Geese. They are mostly seen on water and have webbed feet to aid in swimming. Their bills are generally wide and flat. Ducks can be further divided into dabbling or diving ducks. Dabbling ducks tip up at the surface to feed on aquatic plants in shallow water. Often all you can see is their tail sticking up. Their legs are positioned in the middle of their body so they can move easily on land. Diving ducks are adapted to dive into deeper water and catch fish and aquatic insects. They have streamlined tails and their legs are positioned more towards the rear of the bird, making travel on land difficult.



- **Other Swimming Birds:** This group of birds is often incorrectly grouped with the waterfowl. Many of these birds might look like ducks at first glance, but often have different bill shapes and feet. This group includes cormorants, grebes, anhingas, coots, and moorhens.



- **Shorebirds:** Many in this group, also known as small waders, have long bills to probe along the soils for aquatic insects and other invertebrates. They are typically seen along the coast, but may be seen wintering in the CSRA or passing through in migration. The Killdeer is one exception, as it is a year-round resident. This group includes snipe, plovers, and

sandpipers.

- **Woodpeckers and other nonpasserine land birds:** Woodpeckers have chisel-like bills for boring insects out of trees and remarkably long tongues. To aid in climbing trees, they have stiff tails that act as props, two forward toes and two backward toes. Other land birds include doves, kingfishers, swifts, and swallows.

On Bird Identification:

What do I look for when I see a bird?

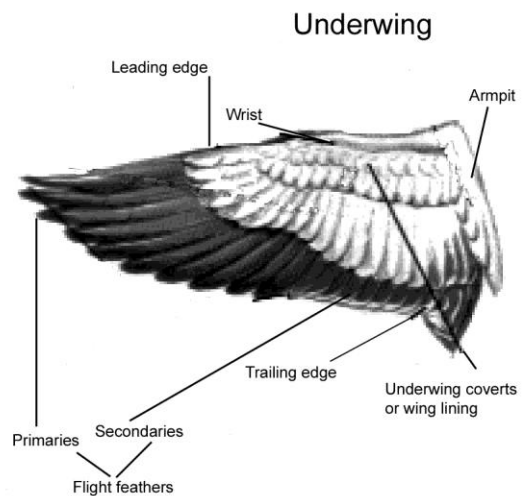
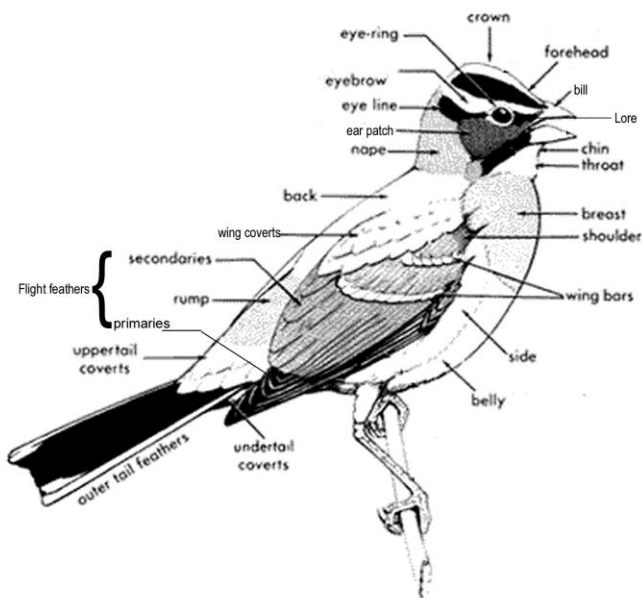
These factors will help put the bird in the correct bird category and some of these observations might even lead to naming the exact species.

- When you see a bird, try to notice things like the bird's size, shape, and behavior. Is it large (like a bird of prey), medium (like a robin or blue jay), or small (like a sparrow or warbler)? Is it long and slender, or plump? Is it on the ground, in the water, soaring, climbing a tree, or perched on a limb?
- Other things you might try to notice include the shape of its bill, wings, and tail. Some birds have thick, rounded wings, while others may have slender, sharply pointed wings. The tail might be deeply forked, square-tipped, rounded, pointed, or very short.

What is a field mark?

Field marks are used more to identify the exact species than the bird group. They usually require more detailed observation than just shapes and behavior.

- Field marks include marks around the eyes (stripes or rings), tail patterns, breast spots, or streaks, stripes on the crown, rump patches, stripes on the wings (also known as wing bars), and head crests.
- See the following figure on field marks:



Why is the bill important?

By observing the bill you can often place the bird in a specific category and find out a good deal about its eating habits. All bills have both a lower and upper mandible.

- If the bill is stout and short, the bird is usually a seedeater. Some seedeaters include sparrows, buntings, grosbeaks, and finches.
- A slender relatively short bill usually indicates an insect-eater. Insect eaters include warblers, swifts, and swallows.
- Hook-tipped bills are usually found on birds of prey such as hawks, owls, and eagles and are used for tearing and eating animal flesh. Vireos (considered a perching bird) also have a hook on their bill used for ripping up caterpillars.
- The long slender bills of sandpipers and other shorebirds are used for probing the sand or mud for aquatic invertebrates,
- The needlepoint bill of the hummingbird is used for reaching nectar deep in flowers.



On Bird Characteristics:

What makes a bird a bird?



Birds are in the *Animal Kingdom*, the Phylum *Chordata* (they have backbones), and the Class *Aves*.

- Birds have feathers, wings, and two scaly feet. Feathers are used for insulation, flight, to attract a mate, and sometimes to provide camouflage.
- Birds are warm-blooded (endothermic) animals, which lay eggs to produce their young.
- Bird bodies are modified for flight. Their

wings are curved on top and flat on the bottom, aiding in lift. Each wing has large, powerful pectoral muscles, which attach to an enlarged breastbone called a keel. The bones are hollow and light, decreasing the overall body weight for flight. Feathers also aid in flight.



The following resources may be used to enhance knowledge and interest in birds.

Eco-Meet test questions will not be drawn from these sources.

- National Audubon Society's First Field Guide for Birds, by Scott Weidensaul
- The Audubon Society: Encyclopedia of North American Birds, by John K. Terres
- The Birder's Handbook: A Field Guide to the North American Birds, by Paul Ehrlich, David S. Dobkin, and Darryl Wheye
- National Audubon Society: The Sibley Guide to Bird Life & Behavior, by David Allen Sibley
- Peterson Field Guides: Eastern Birds, by Roger Tory Peterson
- Stokes Field Guide to Birds: Eastern Region, by Donald and Lillian Stokes
- Golden Guide to Field Identification: Birds of North America
- National Audubon Society: The Sibley Guide to Birds, by David Allen Sibley
- Kaufman Focus Guides: Birds of North America, by Ken Kaufman
- National Geographic Society: Field Guide to the Birds of North America

Websites:

www.audubon.org





NATIONAL
AUDUBON
SOCIETY®

FIRST
FIELD
GUIDE

BIRDS

Scholastic Inc.

New York Toronto London Auckland Sydney
Mexico City New Delhi Hong Kong

What is a naturalist?

A naturalist is an explorer of nature—someone curious about the natural world and how all its parts work together. Most naturalists are ordinary people, but some are scientists (such as ornithologists,



John James Audubon

who study birds). You can be a naturalist, too. All you need to do is to go outside and observe nature yourself.

SOLDIER NATURALISTS

In the 1800s on the western frontier, many Army officers were naturalists—often despite great danger. In 1872 one military naturalist barely escaped the Apaches with the egg of a rare hawk hidden in his mouth!

Margaret Morse Nice

SELF-TAUGHT NATURALISTS

Perhaps the most famous naturalist to study birds was John James Audubon, who was born in Haiti and came to the United States in 1803 as

Florida Scrub Jays by John James Audubon

a young man. Audubon was a self-taught artist who was fascinated by nature. He spent most of his life discovering and painting many new species of birds and mammals. Another respected naturalist was Margaret Morse Nice, an early American ornithologist who studied the Song Sparrows living near her home in Columbus, Ohio. Nice became one of the founders of behavioral science and was the first woman president of any ornithological society. She died in 1974.

Song Sparrow page 134



Essential equipment

The most important thing to take with you when you go birding is a good pair of binoculars. Take a small notebook and pencil, too, to record your observations. Many important discoveries have been made by amateur naturalists. You will also need a field guide, like this one, to help you identify species. Identification is the first step toward understanding the natural world.

A naturalist's code of ethics

- Be respectful of the natural world. In a sense you are a visitor in the home of others—the birds, mammals, and other animals living there.
- Be quiet and careful. Good observers have no effect on what they watch.
- Don't disturb nesting birds or collect birds' feathers, eggs, or nests. Leave baby birds alone.
- Learn about the environment and how to live in harmony with nature.

From Audubon's *First Field Guide to Birds*, 1999.

The world of birds



Arctic Tern

HOMEODIES AND WANDERERS

Some birds are stay-at-homes, like the Downy Woodpecker, which rarely travels more than a few miles from its birthplace. The Arctic Tern, on the other hand, commutes from Alaska and northern Canada to Antarctica twice each year, a trip of more than 22,000 miles!



Cedar Waxwing page 133



Peregrine Falcon page 83

AVIAN SPEEDSTERS

The fastest animals on earth, Peregrine Falcons, may dive for prey at over 200 miles per hour.



Wood Stork page 49

STREAMLINED SWALLOWS TO BULKY STORKS

Some birds, like the Tree Swallow, are sleek and streamlined, perfectly suited to flight. Others, such as the spindly-legged Wood Stork, appear too tall and gangling to take off. Despite its awkward appearance, however, the Wood Stork is an expert flier, soaring as high as 5,000 feet and flying up to 80 miles nonstop in search of the shallow pools in which it feeds.

EATING LIKE A BIRD

Some birds devour most anything that they happen upon; others are finicky and stick to just a few foods. The Common Grackle, for example, consumes seeds, insects, worms, frogs, even birds' eggs. The Cedar Waxwing, on the other hand, eats mostly fruit.



Common Loon page 50

GLIDERS, SPRINTERS, AND DIVERS

The hunting behavior of birds varies as much as their sizes and shapes. Turkey Vultures spend most of their time aloft, searching for dead animals on the ground. Roadrunners hunt on foot for desert insects and lizards, seldom taking to the air. Loons walk awkwardly and find most of their food by diving in the sea or in northern ponds.

FROM TINY HUMMERS TO MASSIVE VULTURES

Our native birds range in size from the tiny three-inch Calliope Hummingbird, which weighs less than a nickel and sips nectar, to the giant California Condor, a vulture that has a nine-foot wingspan and feeds only on dead animals.



California Condor



Calliope Hummingbird

What's in a name?

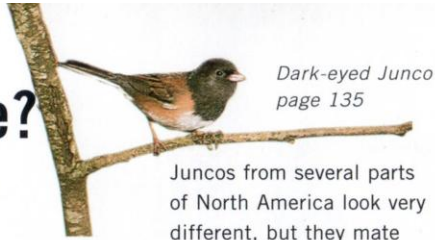
The study of how living things are classified is called taxonomy. Every plant or animal belongs to several groups. The largest group is the kingdom. The animal kingdom includes any and all animals. This kingdom is separated into phyla. Each phylum breaks down into classes. The class Aves, which includes all birds, has 29 orders. Each order is broken down into families. Every family is divided into genera, which are subdivided into species.

LATIN SCIENTIFIC NAMES

Ornithologists give each bird a Latin scientific name, so people around the world will recognize it. A scientific name has two parts, the capitalized genus name and the species name. *Anas platyrhynchos*, the Mallard, and *Anas rubripes*, the American Black Duck, both belong to the same genus. The Wood Duck, *Aix sponsa*, does not.

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From Audubon's *First Field Guide to Birds*, 1999.



Dark-eyed Junco
page 135

Juncos from several parts of North America look very different, but they mate with each other so they are lumped together as one species, the Dark-eyed Junco.



American Kestrel
page 84

TWO BIRD SPECIES CLASSIFIED

A Great Blue Heron and an Orchard Oriole both belong to the animal kingdom, of course. They also belong to the same phylum—Chordata—and to the same class—Aves—which means “birds” in Latin. Here the similarity ends, however. Each bird belongs to a different family, genus, and species.

FROM MANY ENGLISH NAMES TO ONE

The same birds used to have different names in different places. To end confusion, scientists gave each species a single English name. Now, a falcon, once called a windhover in one area and a killy-hawk in another, is known only as the American Kestrel.

WHAT'S A SPECIES?

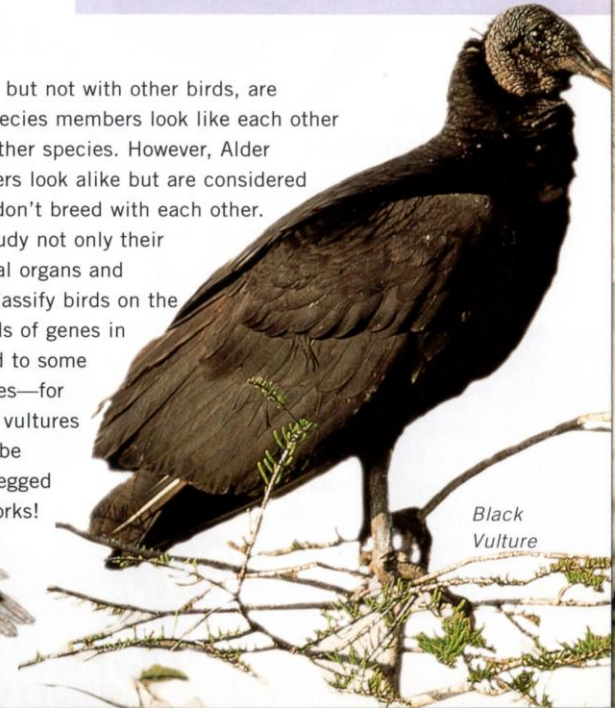
Birds that breed with each other, but not with other birds, are considered to be one species. Species members look like each other and usually look different from other species. However, Alder Flycatchers and Willow Flycatchers look alike but are considered separate species because they don't breed with each other.

To classify birds, scientists study not only their appearances but also internal organs and behavior. Scientists also classify birds on the basis of DNA, tiny strands of genes in their cells. This has led to some surprising discoveries—for instance, some vultures may really be short-legged storks!



Kingdom: Animalia
Phylum: Chordata
Class: Aves
Order: Ciconiiformes
(herons, storks, flamingos)
Family: Ardeidae
(all herons)
Genus: *Ardea*
(large herons)
Species: *herodias*
(Great Blue Heron)

Kingdom: Animalia
Phylum: Chordata
Class: Aves
Order: Passeriformes
(all perching birds)
Family: Icteridae
(meadowlarks and blackbirds)
Genus: *Icterus* (all orioles)
Species: *spurius*
(Orchard Oriole)



Black Vulture

Avian anatomy

Equipped with feathers (nature's lightest and most effective insulating material), keen eyesight, and incredibly efficient hearts, birds are superbly built for flying. Their real secret, however, is in their

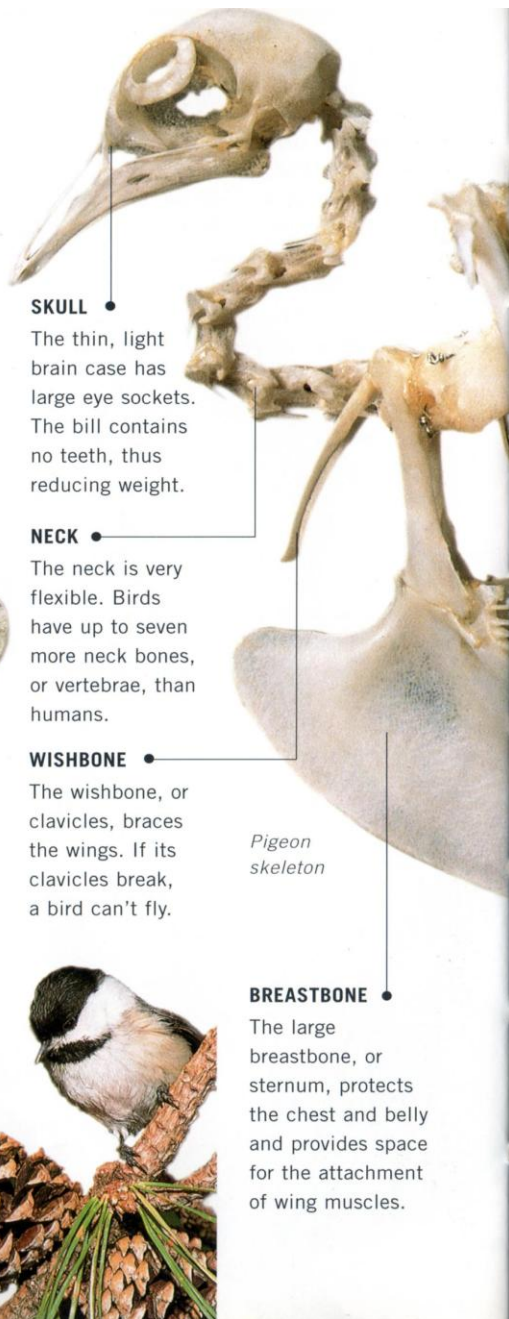


Bird bone cross section

bones. Many bird bones are hollow, saving weight, yet they have dozens of braces to strengthen them.

BIRDS' HEARTS BEAT FAST

Your pulse is usually about 70 to 90 beats per minute, but a Black-capped Chickadee's pounds away 500 times a minute. A hummingbird's heart may race at 1,260 beats a minute during the day, but drop to just 36 at night, when it slips into a deep sleep. *Black-capped Chickadee page 114*



Pigeon skeleton

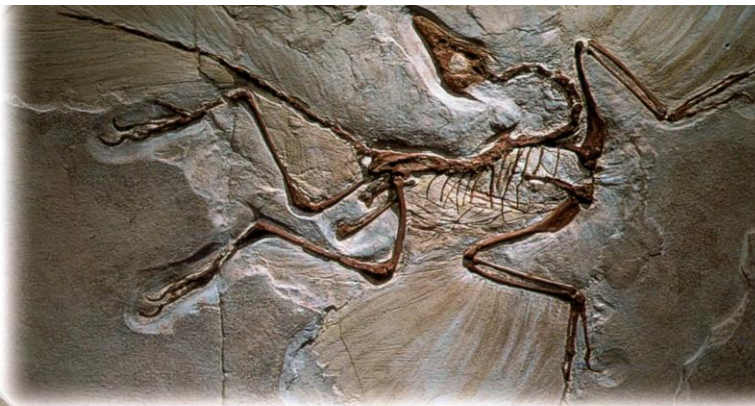
SKULL • The thin, light brain case has large eye sockets. The bill contains no teeth, thus reducing weight.

NECK • The neck is very flexible. Birds have up to seven more neck bones, or vertebrae, than humans.

WISHBONE • The wishbone, or clavicles, braces the wings. If its clavicles break, a bird can't fly.

BREASTBONE • The large breastbone, or sternum, protects the chest and belly and provides space for the attachment of wing muscles.

Fossil of ancient toothed bird



TOOTHED BIRDS

During the Cretaceous Period, the time of *Tyrannosaurus rex*, there were many toothed birds. All of them had rows of small teeth set in bony jaws. The toothed birds became extinct with the dinosaurs 65 million years ago.

A REPTILIAN PAST

Look at a bird, and you can see hints of its reptilian ancestors. It lays eggs with shells. Its legs are covered with scales. (In fact, bird feathers evolved from scales.) Other features birds share with reptiles are the shape of their skulls, inner ear bones, leg bones, and blood cells.

TAIL • The tail has four to nine vertebrae ending in a terminal bone. The flexibility of the tail is vital in flight.

WING • The bones in a bird's wing, resembling bones in our arms, wrists, and hands, support the wing feathers.

Foot of Ring-necked Pheasant



What makes a bird a bird? Feathers!

Birds are the only creatures with feathers. "Light as a feather" is no exaggeration. Feathers weigh very little, but birds could not live without them. Feathers allow flight, provide terrific insulation, and keep rain and snow away from the skin. They can be colorful as a rainbow or make a bird blend in perfectly with its surroundings.



Mountain Bluebird preening, page 121

Feather barb

A FEATHER CLOSE-UP

You need a microscope to see that each barb in a feather's vanes is covered with tiny hooks that grip each other like miniature zippers. You can pull the barbs apart, then stroke them back together again with your fingertips. A bird does this with its beak when it preens.



SHAFT

The shaft is the long stiff quill that runs up the middle of every feather.

Contour feather

VANE

DOWN FEATHER

Soft and fluffy, down feathers grow under the body feathers and provide insulation.

VANE

The vanes on both sides of the shaft are made up of thousands of tiny strands called barbs.

Out with the old

Most birds replace their feathers every year, a few at a time, in a process called molting. A new feather grows out of the skin, inside a covering that looks like a straw; when it is fully grown, the cover peels away. Ducks and geese lose all their big wing feathers at once, so they are flightless for a few weeks in summer while the new ones grow in.

CONTOUR FEATHER

A contour feather may be a large, stiff feather on the wing or tail like this one, or a smaller body feather. Every feather on a bird's body is controlled by a set of tiny muscles, which allows the bird to raise or lower them—fluffing its feathers on a cold day, for example.

AN INCREDIBLE QUANTITY OF FEATHERS

All the feathers on a bird's body are called its plumage. A tiny Ruby-throated Hummingbird has about 1,000 feathers; a White-throated Sparrow has about 2,000. A scientist once counted every feather on a Tundra Swan, from the largest wing quills to the tiniest fluff of down, and came up with 25,216.

Tundra Swan page 57



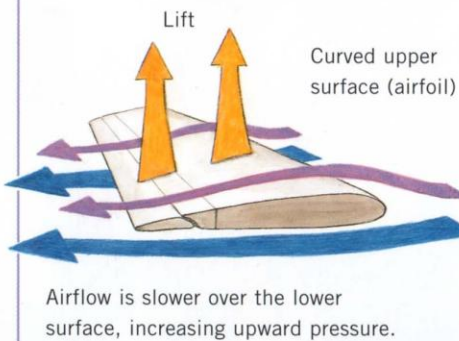
How does a bird fly?

Just like an airplane's wing, a bird's wing is curved from front to back in a shape scientists call an airfoil. As the bird's wing flaps, air flows faster over the upward-curved top than it does across the bottom. Fast-moving air has less pressure than slow-moving air, so there is more pressure pushing up on the wing than there is pushing down, creating what scientists call lift. Lift is what gets a bird (or an airplane) into the air and helps keep it there.

FLIGHT SCHOOL

A baby bird leaving the nest knows instinctively how to flap its wings. But it takes time for a young bird to become good at flying—time to practice and time for muscles to strengthen.

Airfoil



The fastest fliers

Most songbirds can fly about 20 to 30 miles per hour, but Common Eiders can fly nearly 50 miles per hour, and Dunlins (shorebirds) once caught up with and passed a plane flying 100 miles per hour. Peregrine Falcons are considered the fastest birds. Experts think they may reach 200 miles per hour in dives.

Female
Mallard in
gliding
flight
page 58

Four ways to fly



HOVERING

The best hoverers, hummingbirds, can stop in midair, flapping their wings over 50 times a second. Hummingbirds can also fly backward on purpose. No other birds can.



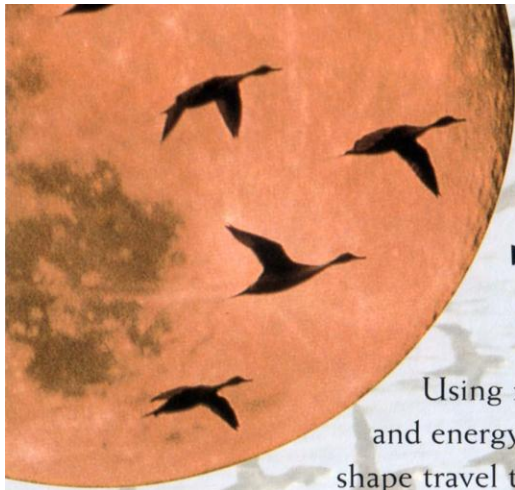
SOARING

Soaring is like gliding, but a bird finds warm, rising air to carry it upward. Hawks, eagles, and vultures are all excellent soarers; so are storks, cranes, and many other large birds.



FLAPPING

This is the most common kind of flight, but it uses a lot of energy. Most really fast birds use flapping flight.



How do birds migrate?

The seasonal trips made by birds are among the wonders of nature.

Using nothing but muscles, feathers, and energy, birds of every size and shape travel thousands of miles.

Migrating waterfowl pass in front of the full moon.

FINDING THE WAY DURING THE DAY

Birds that fly by day use the sun along with the landscape to navigate. Hawks follow mountain ridges, and waterfowl stick close to major rivers.

CHAMPION MIGRATORS

Swainson's Hawks fly 7,000 miles from the western prairies to Argentina. Pacific Golden-Plovers fly more than 2,000 miles from Alaska to Hawaii—beating their wings twice a second for 35 hours without a rest. Many forest songbirds, such as warblers, vireos, and tanagers, migrate to the rain forests of Central and South America. Seabirds, like albatrosses and shearwaters, may fly entirely around the Pacific Ocean, not setting foot on land for almost a year.

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From Audubon's *First Field Guide to Birds*, 1999.

Swainson's Hawk



WHY MIGRATE?

Birds migrate because they have to, not because they like to travel. Most migratory birds nest in the north, where it gets very cold in the winter. Cold weather itself isn't dangerous to birds (their feathers keep them insulated), but it makes it much harder to find foods such as insects, worms, frogs, or snakes. Lakes and ponds freeze in winter, forcing waterfowl, like ducks and geese, to migrate. But it isn't weather that tells a bird it's time to fly—it's the changing length of the day as spring or autumn approaches.



A Magnolia Warbler with an insect

NIGHT AND DAY

It's no surprise that owls migrate at night, but many songbirds that are usually active in daylight also migrate after dark—birds such as warblers, tanagers, thrushes, and vireos. They probably do this for a couple of reasons. They are protected from hawks, and flying at night leaves the daytime hours for feeding and resting. Plus, the nighttime air is cooler and damper, so they won't overheat as easily.

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Telling birds apart

How does a naturalist tell one bird from another at a glance? By looking for clues—called field marks—to the bird's identity. These are special markings, colors, or ways of behaving that set it apart from others.



Western Bluebird (male)

Know how to look

When you see a bird you don't recognize, ask yourself these questions: Does this bird look as big as a robin or as small as a sparrow? Is it fat and round or long and skinny? (There's more about bird shapes on pages 30 and 31.) Then look at the color. If it is shiny dark blue all over and the size of a sparrow, it may be a male Indigo Bunting. But if it is larger, with an orangish breast and a blue back, it is a male bluebird—but which type? If it has a blue throat, it is a Western Bluebird. If its throat is orangish, it is an Eastern Bluebird. Look at the face and head because many field marks are found there, such as the crest of a Blue Jay or the black mask of a Cedar Waxwing.

Field marks

As you read through a field guide, you may come across unfamiliar words like "eye line" and "wing bar." These are terms that naturalists use to describe particular field marks. You can think of them as clues that will help you solve the mystery of which bird you're watching.



Indigo Bunting (male) page 121

WING BARS

Bars, either light or dark, that you can see near the front of the folded wings, like the white bars on this Yellow-rumped Warbler.

RUMP

The feathers just in front of the top of the tail. Many birds have light rumps, such as the Northern Flicker.

EYE RING

A thin circle of color—usually black, sometimes red or white—around the bird's eye.

EYE LINE

Stripe above or across the bird's eye, like the black and white lines on a Red-eyed Vireo.



Red-eyed Vireo page 126



Northern Flicker page 101

Yellow-rumped Warbler page 128

FLASH MARKS

Markings seen only when the bird flies, like the white wing and tail markings of a mockingbird, or the yellow underwings of a Northern Flicker.

Why are birds different colors?



American Goldfinch (male) page 144

Colors help birds recognize their own kind, attract mates, and warn rivals. Usually the males of a species are more colorful than the females. A male American Goldfinch, for example, has a yellow body and black forehead and wings, but the female is duller, making her less conspicuous as she sits on their nest.

GROWING UP

As birds grow up, they molt their feathers several times, changing markings with each molt. Bald Eagles are brown when they leave the nest. It takes them five years to grow white head- and tail-feathers. Young robins have spotted breasts that don't turn orange until they get adult feathers late in summer.



Immature Bald Eagles page 80

WHAT CAUSES IRIDESCENCE

The flashing red of a hummingbird's throat, or the deep blue of a Western Bluebird, are created by special cells in the feather barbs. These cells reflect only certain colors in sunlight back to your eyes, depending on the angle at which light hits them. That's why an Indigo Bunting can look blue one moment or almost black the next, if the bird moves slightly.

Feather colors

Some colors you can see in a feather are caused by substances called pigments. Reds, oranges, and yellows come from pigments known as carotenoids. Melanins are pigments that give feathers their black, brownish, or gray colors. Melanins make a feather stronger, which is why white birds, such as gulls and terns, have black at their wing ends, protecting the feather tips from wear and tear. The white color of the plumage of birds such as ptarmigans and gulls, on the other hand, is caused by cells containing no pigments.



Western Tanager (male) page 139

HIDING, SHOWING OFF

A bird's plumage can either help it blend in with its surroundings, like the speckled feathers of a Ruffed Grouse or Common Nighthawk, or make it more visible, like the bright colors of a male Baltimore Oriole or Western Tanager. Markings that help a bird hide (called camouflage) are a defense against predators. American Bitterns have stripes like the marsh reeds where they live, and ptarmigans, which live in the Arctic and in snow-covered mountains, grow white feathers in winter.

Ptarmigan (winter plumage)



From Audubon's *First Field Guide to Birds*, 1999.

Looking at shapes

Bird-watchers can often identify birds that are very far away, or are silhouetted against the sky. They can't see the



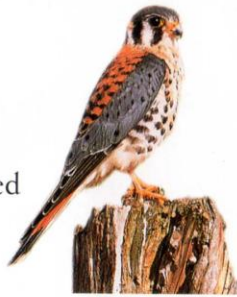
Mourning Dove page 90

bird's field marks, so how do they know what it is?

The answer lies in the bird's shape. For example, an American Kestrel and a Mourning Dove are about the same size, but their shapes are very different.

A kestrel has a long, squared tail and a large head. The dove has a long, pointy tail and a small head.

Most birds fit into about a dozen basic body shapes (see page 44), and knowing them will help you narrow down the possibilities.



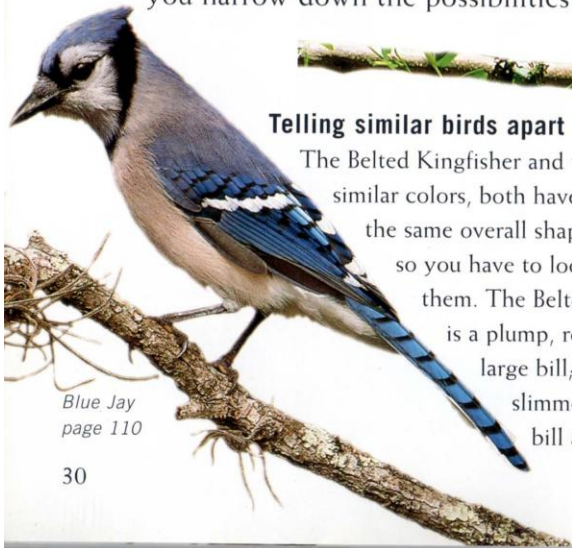
American Kestrel page 84



Belted Kingfisher page 111

Telling similar birds apart

The Belted Kingfisher and the Blue Jay have similar colors, both have crests, and they share the same overall shape of a perching bird, so you have to look closely to distinguish them. The Belted Kingfisher (above) is a plump, roundish bird with a very large bill, the Blue Jay (left) is slimmer with a much shorter bill and a smaller head.



Blue Jay page 110

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Green Heron page 47

Shapes change

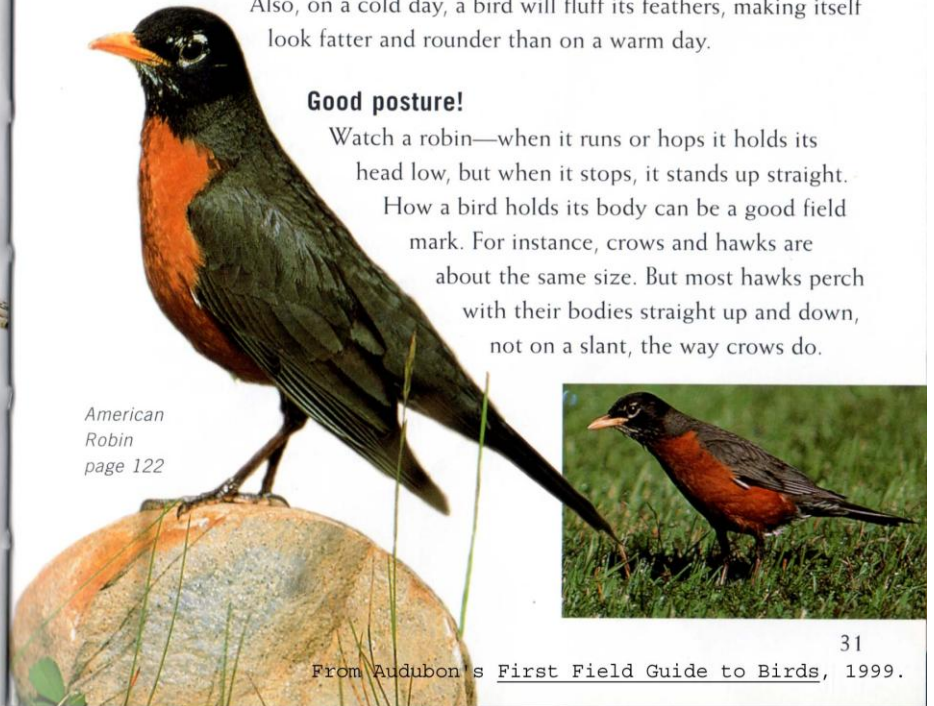
Legs and beaks make a big difference in a bird's shape. A Green Heron and a small duck are about the same size, but the heron's long legs, neck, and bill give it a much different shape. Remember that a bird's shape can change. You may be fooled at first

by a heron sitting with its neck folded tightly against its body. Also, on a cold day, a bird will fluff its feathers, making itself look fatter and rounder than on a warm day.

Good posture!

Watch a robin—when it runs or hops it holds its head low, but when it stops, it stands up straight.

How a bird holds its body can be a good field mark. For instance, crows and hawks are about the same size. But most hawks perch with their bodies straight up and down, not on a slant, the way crows do.



American Robin page 122

From Audubon's *First Field Guide to Birds*, 1999.

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Bills and beaks

Long or short, straight or curved, flattened like a spoon or twisted like a screw, bird bills come in almost every size and shape you can imagine. A bill or beak (you can use either word) is bony inside but is covered with a living, growing layer made up of keratin—the same material as your fingernails.

Being a bill detective

A naturalist can tell a lot about a bird's eating habits just by looking at its bill. If you watch shorebirds along a beach, you'll see how each species uses its beak in a different way. Long-billed Curlews reach deep into the sand for worms, while Semipalmated Sandpipers, with their short bills, probe near the surface. Ruddy Turnstones have stubby beaks with which they flip over rocks to find food. Of course, not all birds have such specialized beaks. Crows, which eat a lot of different foods, have a "generalized" bill shape, suiting many needs.



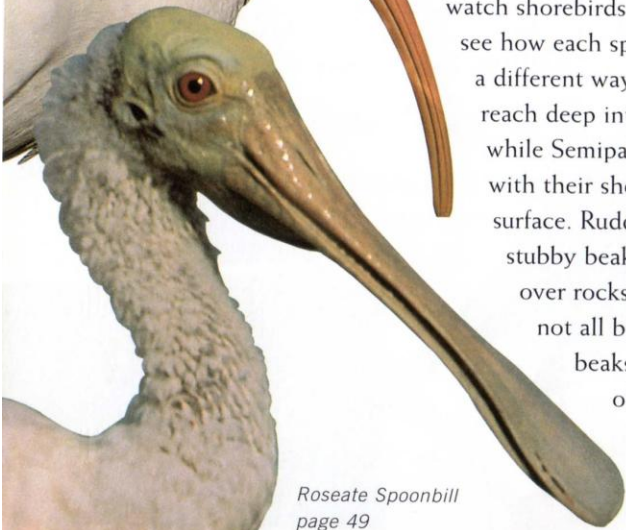
Red Crossbill
(female)



Black
Skimmer
page 77



White
Ibis



Roseate Spoonbill
page 49



Broad-billed
Hummingbird
(male)

Look—no hands!

Birds have no fingers, so bills are their tools for finding and eating food. Watch a cardinal feeding on sunflower seeds; its heavy beak works like pliers to crack the tough shells. Chickadees like seeds, too, but their bills are short and stubby—bad for crushing seeds. So the chickadee holds a sunflower seed between its toes and bangs away until the shell breaks.

WHAT OTHER BILL-TOOLS DO BIRDS USE?

Woodpeckers have built-in chisels. The hooked beak of a hawk or owl works like a knife. Herons and loons have long spears for grabbing fish, and many small songbirds have thin bills just right for reaching into nooks and crannies for insects. The beak of the crossbill, a large finch, is just what you'd expect from its name—its tips overlap at the end. The crossbill can slip the tips of its bill inside a pinecone, pry it open, and reveal the seeds.



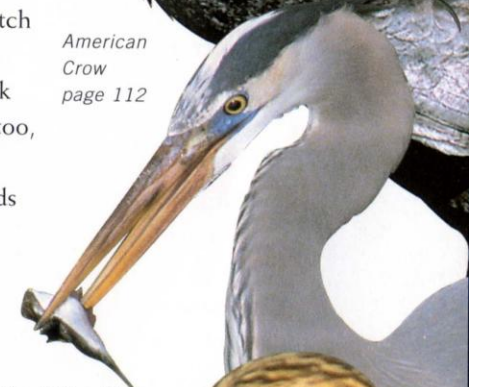
Atlantic Puffin

Yellow-billed
Magpie

Evening Grosbeak
(male) page 145

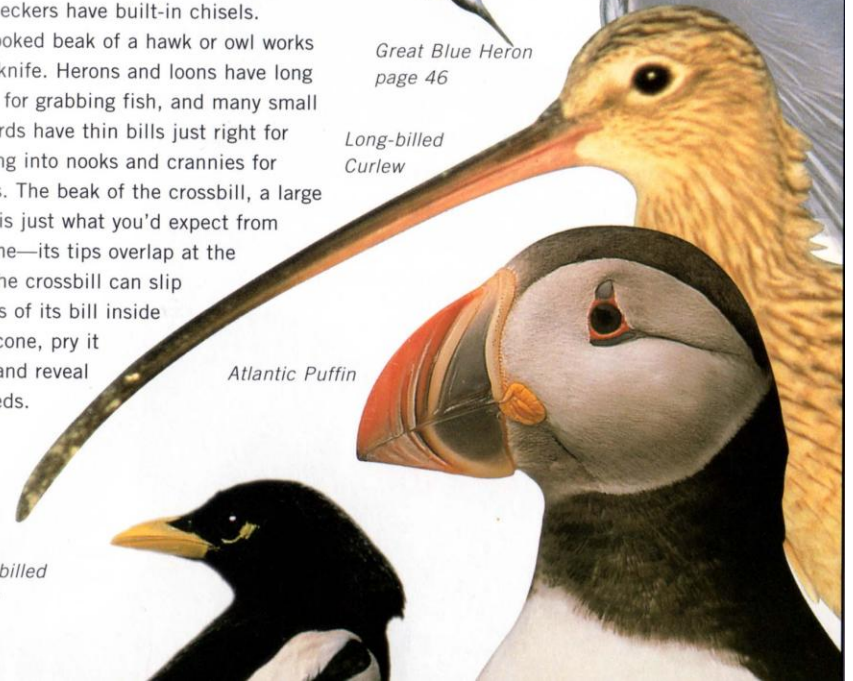


American
Crow
page 112



Great Blue Heron
page 46

Long-billed
Curlew



Wings and tails

The shape of its wings determines whether a bird flies fast or slow, with lots of flapping or effortless soaring. So when you see a bird in flight, notice the outlines of its wings and how it flies; both are important clues to its identity.



Laysan Albatross

Shape of the wing

Birds such as vultures and hawks, which soar without flapping, have wide wings to catch the lift of rising warm air, and their primaries stick out like fingers on a hand. Very fast fliers, like falcons, swifts, and swallows, have long, pointy wings built for speed. Grouse and pheasants have stubby wings that allow them to take off quickly, dodging trees. But they can't fly for long; because they must flap so hard, they tire quickly. Albatrosses have long, thin wings that let them glide on ocean winds. Most songbirds have short wings, but songbirds that migrate long distances usually have longer primary feathers than those that don't.

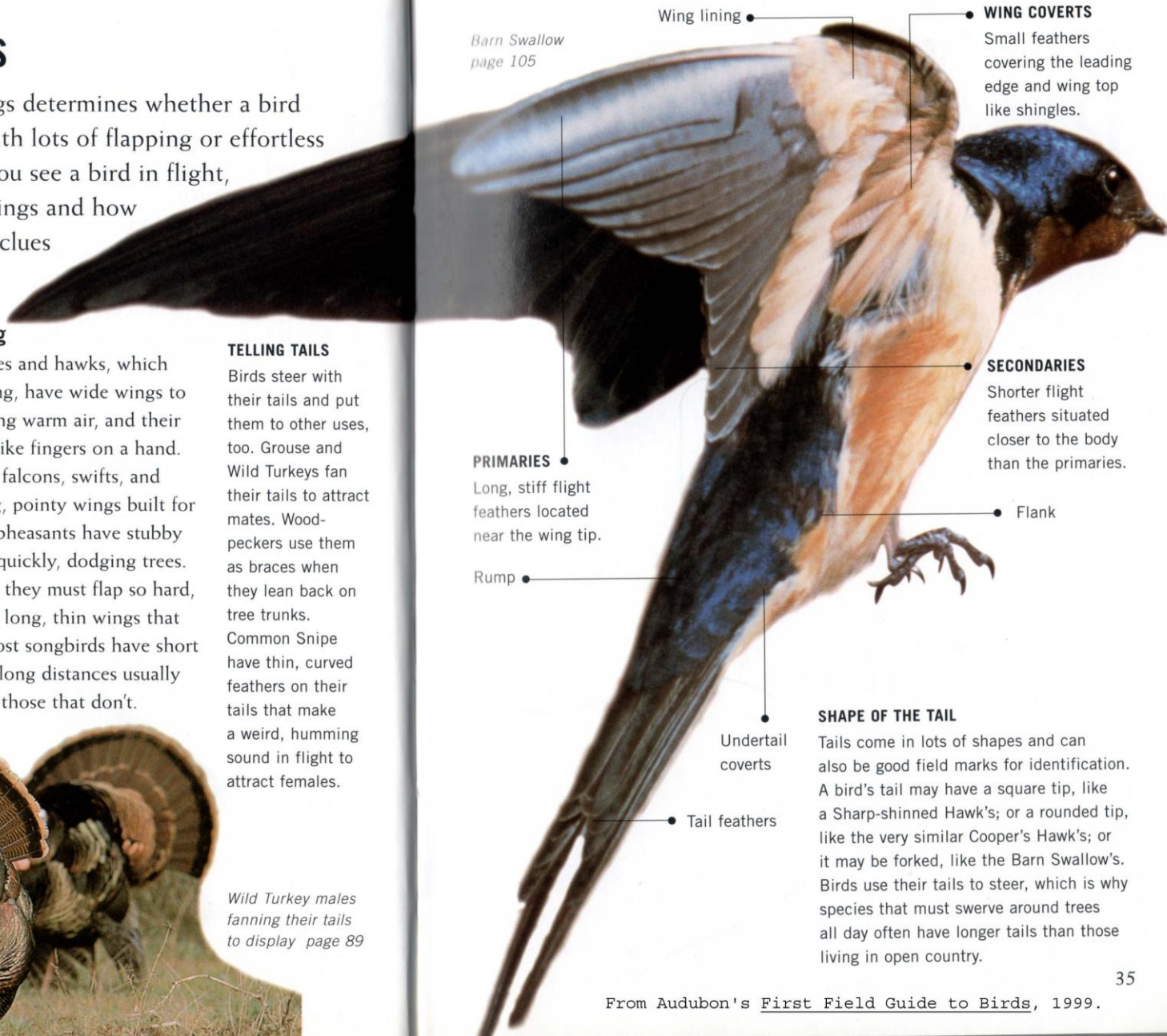


Wild Turkey males fanning their tails to display page 89

TELLING TAILS

Birds steer with their tails and put them to other uses, too. Grouse and Wild Turkeys fan their tails to attract mates. Woodpeckers use them as braces when they lean back on tree trunks. Common Snipe have thin, curved feathers on their tails that make a weird, humming sound in flight to attract females.

Barn Swallow page 105



Wing lining

WING COVERTS

Small feathers covering the leading edge and wing top like shingles.

SECONDARIES

Shorter flight feathers situated closer to the body than the primaries.

PRIMARIES

Long, stiff flight feathers located near the wing tip.

Flank

Rump

Undertail coverts

Tail feathers

SHAPE OF THE TAIL

Tails come in lots of shapes and can also be good field marks for identification. A bird's tail may have a square tip, like a Sharp-shinned Hawk's; or a rounded tip, like the very similar Cooper's Hawk's; or it may be forked, like the Barn Swallow's. Birds use their tails to steer, which is why species that must swerve around trees all day often have longer tails than those living in open country.

Why do birds sing?

Birds sing to mark their territory and to attract mates. As though they were posting "No Trespassing" signs around their nests, birds sing songs that others of their species recognize and respect. The singing sounds beautiful and lighthearted but is serious business for the birds.

Spreading the word

In most bird species, the male does all the singing (one exception is the Northern Cardinal, in which both sexes sing). The time of greatest activity is spring and early summer—the nesting season. Songs not only attract females, they scare away other males. Scientists think birds developed songs to spread their message over a long distance, even in forests where the birds are hidden.

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From Audubon's *First Field Guide to Birds*, 1999.



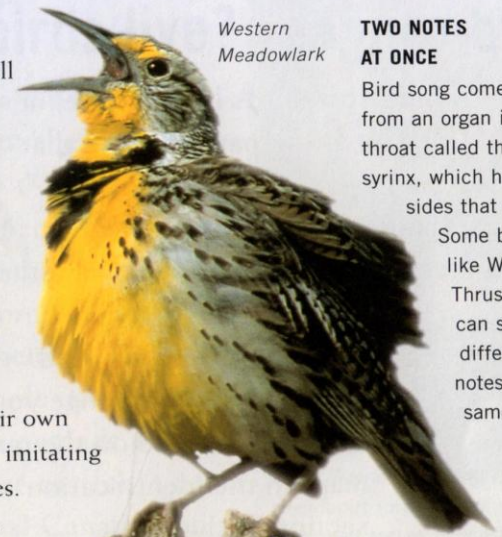
Yellow-headed Blackbird

Song and dance routines

Birds of the open country combine songs with courtship flights. If you are in a field where Bobolinks nest, you'll see one male after another bounce into the air, circle on quivering wings, and sing a bubbling version of their name while gliding to earth.

Learning bird songs

Often the only way to tell birds apart is by their songs. To remember the songs, most birders put words to them—for example, the *whicity-whicity-whicity* of a Common Yellowthroat or the American Robin's rolling *cheerily-cheery-me*. But not all birds sing their own songs. Some are mimics, imitating the songs of other species. Northern Mockingbirds, Brown Thrashers, Gray Catbirds, starlings, and Yellow-breasted Chats are all mimics; a single Brown Thrasher may sing 1,000 different songs.



Western Meadowlark

TWO NOTES AT ONCE

Bird song comes from an organ in the throat called the syrinx, which has two sides that vibrate. Some birds, like Wood Thrushes, can sing two different notes at the same time.

HOW DOES A BIRD KNOW WHAT TO SING?

Scientists believe it's partly instinct and partly learned—when a young bird hears an adult singing its species' song, something is triggered in its brain, allowing the youngster to sing the same melody.



Northern Mockingbird (top) page 124
Song Sparrow (bottom) page 134



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Endangered birds

Birds play a vital role in the web of life. They eat countless insects and rodents, helping to keep the numbers of these creatures under control. They serve as food for many animals. They pollinate plants and spread seeds. They inspire us with their beauty and fascinating behavior. You can join people who are working to save our endangered birds and help make a difference. See the list of organizations on page 153.

Snail Kite

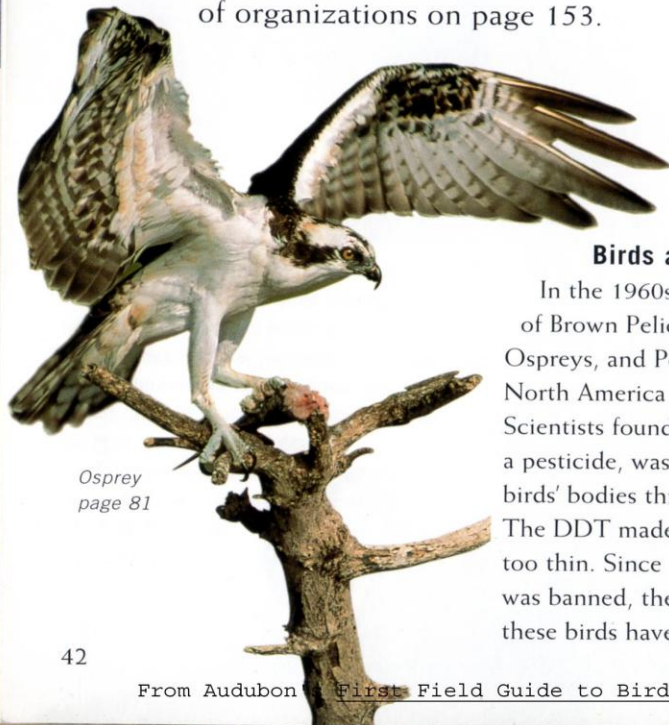


PROTECTING HABITATS

is the most important thing humans can do for birds. The Snail Kite of the Florida Everglades and the Kirtland's Warbler, which lives in a small part of Michigan, have very little habitat left for them.

Birds and DDT

In the 1960s, the numbers of Brown Pelicans, Bald Eagles, Ospreys, and Peregrine Falcons in North America were declining. Scientists found that DDT, a pesticide, was getting into the birds' bodies through their food. The DDT made the birds' eggshells too thin. Since 1972, when DDT was banned, the populations of these birds have increased.



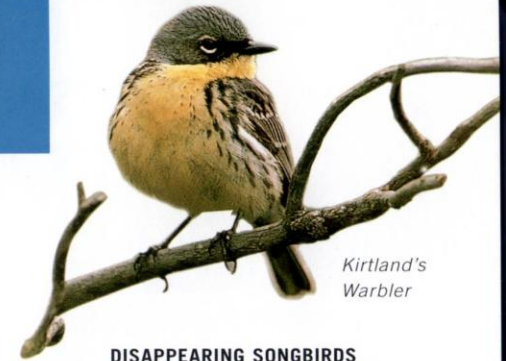
Osprey
page 81

PITY THE CALIFORNIA CONDOR

The California Condor used to live along the Pacific coast as well as in the mountains of Southern California, but by the 1940s it survived only in the mountains. Once egg-collecting and illegal shooting were the worst dangers, but today pesticides and too little habitat are the biggest problems. Most California Condors now live in cages, although scientists have returned some to the wild in California and the Grand Canyon.



California Condor



Kirtland's Warbler

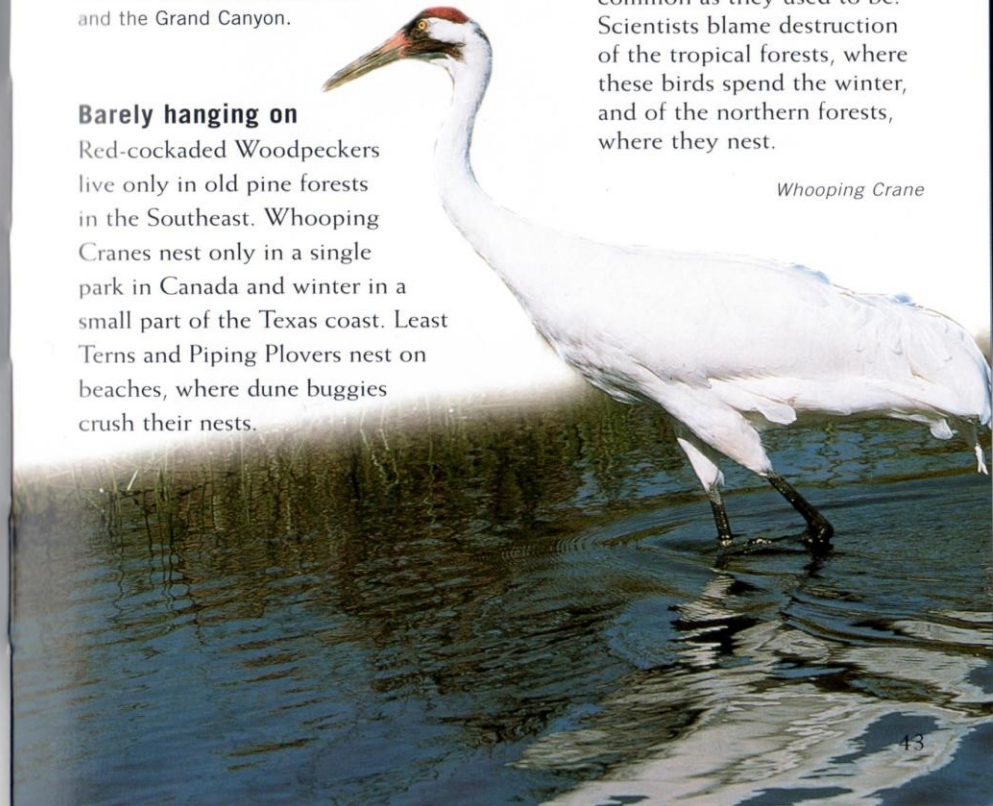
DISAPPEARING SONGBIRDS

Many naturalists worry that songbirds, such as orioles, warblers, and vireos, aren't as common as they used to be. Scientists blame destruction of the tropical forests, where these birds spend the winter, and of the northern forests, where they nest.

Barely hanging on

Red-cockaded Woodpeckers live only in old pine forests in the Southeast. Whooping Cranes nest only in a single park in Canada and winter in a small part of the Texas coast. Least Terns and Piping Plovers nest on beaches, where dune buggies crush their nests.

Whooping Crane



Please study the two links below, which give information about the “Flyways” that birds use as they migrate from one place to another. Questions on the test may be based on the information on these two websites.

<http://www.audubon.org/birds/flyways>

<http://www.audubon.org/atlantic-flyway>

