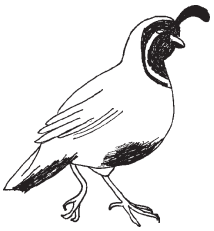
Information for Teachers and Suggested Activities



The purpose of the attached material is to introduce you and your students to Tohono Chul Park's Outreach program — *For the Birds*. The materials are offered as preparation for our presentation, and as ideas for additional activities in your classroom. These are suggestions only, but we hope that you will incorporate them into a unit on bats, mammals in general, or animals of the Sonoran Desert. If you have any questions, please give us a call at 742-6455 x 241.

Outreach Programs and the Arizona Standards
Depending on the grade level of your class, this docent-conducted Outreach program will cover some or all of the following Arizona Standards:

Arizona Science Standards

Standard 1: Science as Inquiry

- 1SC-R2. Ask questions about the natural world
- 1SC-R6. Communicate observations and comparisons through various means
- 1SC-F4. Describe relationships among parts of a familiar system

Standard 3: Personal and Social Perspectives in Science and Technology

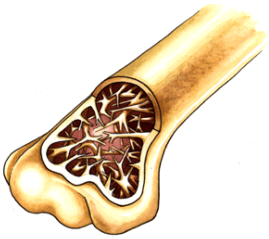
- 3SC-F3. Describe and explain the interrelationship of populations, resources and environments
- 3SC-P4. Identify and describe the basic processes of the natural ecosystems and how these processes affect, and are affected by, humans
- 3SC-P5. Describe and explain factors that affect population size and growth (e.g., quality of environment)

Standard 4: Life Science

- 4SC-R1. Distinguish living from non-living things
- 4SC-R2. Describe the basic needs of living organisms
- 4SC-R3. Recognize and distinguish similarities and differences in diverse species
- 4SC-F1. Describe and explain cause-and-effect relationships in living systems
- 4SC-F2. Trace the life cycles of various organisms
- 4SC-F3. Identify the basic structures and functions of plants and animals
- 4SC-F4. Identify characteristics of plants and animals (including extinct organisms) that allow them to live in specific environments
- 4SC-F7. Explain the interaction of living and non-living components within ecosystems
- 4SC-E1. Construct classification systems based on the structure of organisms
- 4SC-E7. Explain and model the interaction and interdependence of living and non-living components within ecosystems, including the adaptation of plants and animals to their environment

Birds

The evolutionary stage between reptiles and mammals is birds. They branched off from reptiles about the same time that mammals first made an appearance in the Jurassic period. Today birds maintain many of the characteristics of reptiles, such as scales on the feet, but they have also advanced beyond reptiles, becoming endothermic (warm-blooded) and acquiring a four-chambered heart. Birds are one of the largest classes of vertebrates (over 8,500 species), exceeded only by fish.



If asked to name some of the distinguishing characteristics of birds, flight and feathers come to mind first. A bird's skeletal structure contributes greatly to its ability to fly. A bird has fewer bones to begin with and some are hollow, for less weight; the insides are reinforced with internal struts.The backbone and rib cage are fused for rigidity; and the breastbone is keeled to accommodate and support the large muscles needed for flight. There are extra vertebrae in the neck for flexibility.

Flight makes enormous energy demands on a bird's body. Once airborne, a bird may save energy by gliding, but the initial takeoff requires tremendous power. The speed at which a bird can burn food and turn it into energy results in a high metabolic rate. Birds have the highest body temperatures of all warm-blooded animals — up to 110°F. A bird's heart beats incredibly fast — around 600 times a minute for a robin. Feathers, highly insulating, preserve body temperature.

Since birds are toothless, they have evolved a digestive system that breaks down all their food. In birds that eat plant matter, the **gizzard**, a muscular bag kept filled with gravel and stones, grinds the food to a digestible pulp. Predatory birds, like owls which feed on small mammals, rip and tear their prey with beak and talons, but frequently swallow it whole. This means they also swallow large quantities of fur, bones and feathers. Once or twice a day they regurgitate these undigestibles in the form of a **pellet**, or **casting**. Pellet shapes can identify the species which produced it and the contents will indicate what the bird has been eating.

A bird's lungs are unique. An extensive system of air sacs is connected to the lungs to help distribute air needed for buoyancy and to regulate internal temperature in the absence of sweat glands. This series of additional air sacs allows air to flow continuously through the lungs, both on in- and exhalation; more oxygen is absorbed.

ACTIVITY – Owl Pellets

To learn more about birds of prey and the food web, students canissect barn owl pellets (available from Pellets, Inc. at www.pelletsinc.com or Carolina Biological Supply at www.carolina.com/guide/pellets.asp).

Begin with a discussion of owls as predators, their role in the food chain and how they digest their food. Place the pellets in disposable dishes (aluminum pie plates work well); add just enough water to moisten the pellet. Using bamboo skewers or small tweezers (toothpicks will work too) carefully work the pellet apart, discarding the fur and feathers. The bones found can be identified by consulting bone charts provided in the teacher's kit from Pellets, Inc. Once the animal has been identified, students can try to reconstruct the skeleton, gluing the small pieces to index cards or poster board.

Discuss the elements of a food chain and ask students to construct a food web on a bulletin board, using yarn to connect all the plants and animals that depend upon each other. Where does the food we eat come from? Do we grow or hunt our own food? Who does it for us?

Feathers

The **feather** itself is at least 140 million years old. Feathers, actually modified scales, are the most significant physical feature of birds, separating them from all other animals. The four main types of feathers — down, body, wing and tail — serve two primary functions, thermoregulation and flight. This includes insulation from heat and cold, waterproofing, buoyancy, padding and protection of the skin. Feathers also provide camouflage, and sexual recognition and attraction. Down feathers trap air for insulation; body feathers streamline and protect the bird; wing feathers smooth the flow of air over the wing and provide the power for flight; and tail feathers are used for steering, balance and display.

A large bird may have as many as 25,000 feathers. Feathers are made of keratin, a protein which gives them great strength and flexibility. They begin growing as pulp inside of a tubular **feather sheath**, emerging to unroll and split apart to form a flat blade, the sheath eventually falling away. The **vane** of each feather grows out of the

shaft, or **quill**. It is made up of filaments, or **barbs**. Fine **barbules** line the sides of each barb. They are equipped with microscopic hooks which lock into each other in much the same way as the two sides of a zipper fit together. This allows a bird to return its feathers quickly to functional condition. A flight feather has to form a single, continuous surface for air to flow over. Using its beak, a bird will "zip" damaged feathers back together again, restoring their aerodynamic, insulation and waterproofing abilities. Owls' wings are almost furry; fringed feather edges reduce air disturbance and cut down on wind noise, thus producing silent flight. Feathers are kept clean by regular preening. Feathers have to be replaced periodically, and birds do this through a process called **molting**. All birds molt at least once a year, usually in late summer following the nesting season. Many large birds of prey may take up to several years to complete a molt, losing flight feathers in bilateral pairs for balance.

ACTIVITY – Feathers

Many local craft stores carry large chicken and turkey feathers. Using a simple, hand-held magnifying glass, students can actually see the interlocking barbules. Carefully pull the barbules apart, and then "zip" them back together!

Students can also use construction paper to make examples of the different kinds of feathers found on a bird's body — wing feathers, down feathers, tail feathers, etc. The class can make a bulletin board display, covering their drawing of a bird with all the right feathers in all the right places. They can also label the various parts of the bird. Feathers can lift up to reveal the insides of the bird — heart, lungs, gizzard, etc.

Flight

Only a few animals are capable of powered flight — insects, bats and birds. Birds are the largest, fastest and most powerful of fliers. Wing design is the secret to their success. A wing is slightly curved from front to back, producing an airfoil profile that pulls the bird upward as it moves. Wing feathers are divided into several different groups, depending on function. The **flight feathers** produce the power needed for flying; nearly all being narrower on the leading edge for lift. The **primaries** are used for steering; the **secondaries** form the curve the provides the needed "lift".

ACTIVITY – Paper Airplanes

Have students experiment with the dynamics of flight by designing and building paper airplanes. Which ones fly the best? Why? For some starter ideas, here are several websites with instructions for making a variety of models:

www.paperairplanes.co.uk
www.bestpaperairplanes.com
www.amazingpaperairplanes.com
www.paperplane.org

Beaks and Feet

Birds rely on beaks and/or feet for food-gathering. Beaks, or bills, are made of keratin, the same material as hair, scales and claws. The shape of the beak is indicative of its function. Birds of prey will have sharp, hooked beaks for holding and tearing their prey apart; seed-eaters will display a strong, thick beak, perfectly suited for cracking seeds open. An insect-eating bird will have a beak shaped more like a pair of tweezers. Some birds, like parrots, will use their beaks as tools, much as humans use their hands. Also unique among birds, doves and pigeons can use their pointed bills like a straw when drinking.

The shape of a bird's feet and legs indicates how they are used. Most birds have four or three toes (ostrich has two). Many rely heavily on catching and holding prey with feet as well as beaks. Birds of prey have clawed feet, adapted to clutch and hold their meal. Generally speaking, they are poor walkers as a result. Owls, again to provide for silent flight, have feathered legs and feet. Swimming birds, such as ducks, have webbed feet. Wading birds have elongated toes, an efficient way of distributing their weight and keeping them from sinking in the mud. They may also have very long legs, for wading in deep water.

The largest group is the perching birds. The muscles in a bird's leg are bunched at the top, so that the leg is merely a skin-covered bone attached to the tendons. When a perching bird lands on a branch, a unique mechanism comes into play — the bird's weight causes the leg tendons to tighten and clamp the toes, three in front and a single hind toe, tightly around the branch, allowing them to securely grip the perch and not fall off when asleep. It takes concentrated effort to open the foot again, contracting toe muscles to spring the grip.

ACTIVITY – Beaks and Feet

Let students design their own beaks/feet matching games. They can create a "pin-the-tail-on-the-donkey" type of activity or make flash cards that show beaks and feet and then ask what kinds of birds they belong to. Birds beaks can also be compared to tools that humans use everyday. Check out these websites for background information and ideas:

www.sciencenetlinks.com/lessons.cfm?DocId=81
www.normanbirdsanctuary.org/beak_adaptations.shtml or /feet_adaptations.shtml
www.fsc.fernbank.edu/birding/classroom.htm

Other Senses

Birds in general have extremely acute eyesight and a wide field of vision. Their eyes are large in comparison to their body size. It is believed that a hawk can see 8x better than a human. Man's eyes are set in the front of the head and look forward - binocular vision. Except for birds of prey, most birds have eyes set on both sides of the head. This gives a 360 field of vision. This is advantageous when keeping a lookout for predators. Birds of prey with eyes placed forward, have greater long-range, binocular vision which assists in locating prey from the air. A bird's eyes also have built-in windshield wipers. The **nictitating membrane** is a fine film, like a third eyelid, that sweeps across the surface of the eye, moistening and cleansing it of dust and dirt.

The other senses of touch, taste and smell are not well developed in birds, but hearing is another matter. In many birds it is very well developed and for some, such as owls, it borders on echo-location, using sound to navigate much the same way a bat does.

Nesting

Two of the most important influences on when a bird will begin nest-building and egg-laying are the amount of available food and the weather. At the same time, a bird will collect nest materials and begin fashioning them into the finished product. Nest materials have two main functions — support and insulation. Many birds will use sticks or twigs for the nest foundation; others will rely on grasses. All will include a variety of materials, both natural and manmade — twine, hair, fur, feathers, paper, seeds, spider webs and plant material. As new material is added to a developing nest, the bird will push it roughly into place then sit in the center, turning

around and around, pushing downward and outward with its breast to shape the nest.

Birds lay eggs; those birds with shorter life expectancies tend to lay more eggs. Birds nesting in cavities or other secluded enclosures will lay white or light colored eggs. There are more visible in the darkness of the nest area and there is no advantage to camouflage. The most recognizable cavity nest in the Sonoran Desert is the football-shaped nest of the cactus wren. With a small opening at one end, the nest is primarily constructed of grasses and is built between the spiny joints of a cholla cactus. Birds that nest in the open generally lay camouflaged eggs — speckled, blotched or otherwise cryptically colored — Gambel's quail is an example. Unlike their reptile relatives, birds incubate and guard their clutches.

Incubation of eggs may be done by one or both parents, depending on the species. The incubation period can be from 11 to 80 days. The parent sheds feathers from the abdomen and breast to create a bare patch of skin called the **brood patch**. The skin, richly supplied with blood vessels, quickly warms when the bird settles onto the clutch. This will provide the heat needed to incubate the developing chick embryo. A few birds will incubate constantly until the eggs hatch, never leaving the nest, eating not at all or only food brought by the other parent. In other species the parents take turns sitting on the nest. The baby chick hatches by **pipping** the egg with an egg-tooth, similar to that found in immature reptiles. This is a horny appendage on the upper beak, shed soon after hatching, which may take several hours. Chicks also have a powerful muscle behind the head that powers the egg tooth's blows. **Altricial** chicks will be helpless, blind, usually featherless and totally dependent on its parents for food and protection. **Precocial** chicks (usually ground-nesting birds) are well-developed, alert, fully-feathered and very mobile almost immediately after hatching.

ACTIVITY – Nest Building

Divide children into two-person teams, each team choosing a desert bird to represent (cactus wren, Gambel's quail, etc.). On the school grounds, have each team gather the kinds of materials used to build the nest of the bird they have chosen. Put limitations on their gathering — one piece at a time, use only one hand, etc., so they develop a better sense of what birds accomplish with only a beak and two feet! While on the school grounds, do some investigating and see what kinds of bird nests are around — do you have saguaros with gila woodpecker holes? Who else is using them besides the woodpeckers?

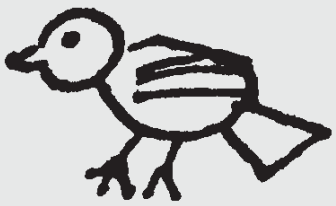
Desert Adaptations

As with plants and other animals, the distribution of birds is limited primarily by climate. Unlike plants and most other animals, birds have the ability to escape undesirable changes in the weather. Migration allows them to alter their surroundings. Those birds that do not migrate have adapted to climatic changes in a variety of ways. They adapt to their desert life more through behavior than morphology (body structure).

Water in the Sonoran Desert plays a key role in the survival of both migratory and resident bird species. Those birds adapted to survival in the arid ecosystem may derive most of their moisture needs from the foods that they eat. Seed-eating birds are never more than a day's flight from a water source while carnivorous birds get their moisture from the insects and animal flesh they eat. Those birds that eat the fruit of some of the cactus plants obtain water in that way. Bird wastes are excreted as uric acid instead of urea. This saves a great deal of moisture. Urea must be kept in solution in order for it to be eliminated from the body. Birds, and reptiles, discharge uric acid with feces in a semisolid mass.

Heat is tolerated through a combination of adaptations. Activity may be confined to the cooler hours of the day. Wings may be spread away from the body or feathers ruffled to allow the release of heat through the skin. Birds may also utilize a **gular flutter**, panting much the way dogs do to release heat (birds have no sweat glands). If the heat becomes too much, they can always fly to a more suitable environment — a shaded branch, a cooling updraft at higher altitudes where soaring requires little effort, or migration.

ACTIVITY – Create-a-Bird



Give each student, or group of students, drawing materials and ask them to design their very own bird — a brand new species! Relying on what they have learned about birds, they must select adaptations based on where their bird lives, what it eats, how it hides from predators, and how it raises its young. You may want to set parameters by giving each group a specific location, describing the climate, terrain and vegetation; or generate a list of adaptations that students must select from specific to: body form (fat, thin), tail (wide, short, curled), coloration (plain, striped, spotted), beak style (hooked, thin, flat), etc.

Bird Watching Etiquette

Responsible birdwatchers use several methods to locate birds. These include walking slowly and quietly, alone or in small groups. Large, noisy groups not only scare the birds away, but disrupt their normal routines. Playing tapes of bird calls is also distracting and can cause harm to some bird species by creating confusion and disharmony.

Hanging around a nesting site can cause some birds to abandon that nest and, perhaps, cease nesting for the rest of the season. In fragile habitats, trampled vegetation can also cause nests to be abandoned.

The best behavior is responsible behavior:

- Avoid the use of tape recordings, especially of birds that are nesting.

- Observe nests from a distance great enough so that the parent birds and their activities are not disturbed. Avoid nesting colonies and raptor nests.

- Do not follow or harass rare birds. Photographing of birds should never include removing foliage from around the nest, or nestlings themselves.

- Respect the property of others. If you are birding on private land, have the permission of the owner.

- Do not associate with large groups that travel without responsible guides. A responsible guide should know the status of the species and habitat you are touring, the most efficient way to view the birds with a minimum of disturbance, and limits the size of the group in order to share his knowledge of the birds and their lifestyles.

Bird ID Tips

Look for such things as **size** — best stated by comparison to something else, e.g., bigger than a House Finch, smaller than a Mourning Dove; **overall shape and posture** -some birds are slim and sit upright, like the Phainopepla; some are chunky and short-tailed, like the Gambel's Quail; **bill shape** — often a clue to a bird's diet, by glancing at the bill you would never confuse a finch (thick, seed-cracking bill) with a flycatcher (thin, flat, insect-grabbing bill); **tail and wing shape** — tail may be notched, rounded, pointed or square-tipped; short, long or "average" and on flying birds, notice whether wingtips are pointed or rounded, long or short.

Field marks are certain kinds of markings that are very helpful in identifying birds, much more so than overall color. These include streaks, bars or spotting on chest or wings; rings around eyes; streaks of white or color edging wings or tail; and crests

and topknots. Lastly check the bird's **behavior** — on the ground, does the bird walk or hop? In a tree does it flit actively or perch quietly?

ACTIVITY – Field Checklist

Start with a few common desert birds and work with the students until they are able to identify them in any setting. Try starting with the bird ID cards in the appendix — cactus wren (Arizona state bird), curve-billed thrasher, cardinal, gila woodpecker, etc. You can provide the info cards or have students do background research on each bird and its habits. Perhaps read, or write, a story about one — "a day in the life." Set up regular birdwatching days, or whenever the students are out on the school grounds, have them keep an eye out for birds. How many different species can they recognize? Set up a bird checklist in the classroom and have students indicate everytime they see one of the birds under study. Keep track of dates, time of day and where seen. These can be plotted out on map of the school yard and students can deduce where birds are likely to be living and nesting. Consider a field trip to a local bird sanctuary or local park.

Attracting Birds

The easiest way to attract birds to your schoolyard is to provide them with the kind of cover (shelter), food and water sources they need. Start with native trees, shrubs, flowers and cactus. The following are some suggestions:

Trees
Acacia - seeds are eaten by many birds
Arizona Ash - provides nest sites for many birds and food for insectivores
Desert Willow - hummingbirds and verdins feed from flowers; others eat seeds
Mesquite - nest sites for doves, verdins, phainopeplas; seeds for doves, quail
Palo Verde - nest sites for verdins, cactus wrens, mockingbirds; seeds eaten by doves and quail; flowers eaten by house finches and orioles

Tall Shrubs
Chuparosa - flowers (orange-red) attract hummingbirds
Fairy Duster - flowers (red) attract hummingbirds; seeds eaten by quail, doves
Ocotillo - flowers (red) attract hummingbirds
Tree Tobacco - flowers (yellow) attract hummingbirds

Cactus/Succulents
Agave species - flowers attract hummingbirds
Aloe species - flowers attract hummingbirds
Cholla - nest sites for cactus wrens, thrashers, verdins
Prickly Pear - good escape cover
Saguaro - nest sites for gila woodpecker, flicker, etc.; nectar, pollen, fruit and seeds eaten by many birds, especially doves
Hedgehog (claret cup) - hummingbirds

Miscellaneous
Assorted native grasses (big galleta, blue grama, sideoats grama, alkali sacaton, cottontop, fluffgrass, green sprangletop) - seeds eaten by finches, sparrows, doves

Hummingbird Flowers
Cardinal Flower
Columbine
Coral Bells
Honeysuckle
Owl Clover
Penstemon species
Red gilia
Salvia species

Wild bird seed may be ***scattered on the ground*** year round, covering as wide an area as possible, and changing areas periodically. Seeds included should be cracked yellow corn, sunflower seeds (several varieties), white millet, safflower, thistle, rape seed, and others favored by birds of the Southwest. A "quail block" is not always a good idea. It will certainly last a long time, but will also attract javelina and rodents; rodents in turn will attract snakes. Use of specilzed seed feeders is also a great way to attract particular species, like goldfinch and cardinal. Weighted perching bars allow only certain birds to feed. Always scatter only as much seed as the birds will eat in 20 minutes; and at all times, keep seed dry, stored in metal or plastic containers.

Hummingbirds can be attracted with feeders in the summer, by dissolving 1 part white sugar (**never honey**) in 4 parts water. Food coloring is not necessary. In warm weather, thoroughly wash and disinfect feeders daily to avoid infections, refilling with fresh nectar. Large quantities of nectar can be bottled and refrigerated.

Water is necessary for many birds and can be offered in a variety of ways, from a simple, shallow bird bath made from a garbage can lid filled daily; to an elaborate, recirculating, multi-level wading pool. Even a dripping faucet works (especially since birds are attracted to the "sound" of dripping water). The best is just a simple bird bath, located close to cover to allow birds an escape route from predators. Water dishes need to be cleaned frequently, especially in warm months to avoid the spread

of avian diseases like trichomoniasis (a deadly infection of the upper digestive system usually found in doves, pigeons, poultry and raptors). Run a drip emitter over a bed of gravel so that it does not form a pool, or, if using a conventional bird bath, wash and disinfect it daily and keep it away from your seed source.

Injured wildlife can be heartbreaking. A few guidelines: it is illegal for an unlicensed person to keep wildlife in captivity. "Orphaned" youngsters should be left where they are found, hard as it may be. Their parents will find them and continue to feed them. If you can see the nest, put the young bird back. If the whole nest has fallen, try to put it back in the tree. The parents will not abandoned the chick because you have handled it.

If a bird is injured, the best course of action, again a hard one, is to leave it alone. It amy not survive, but it will provide food for another link in the food chain. If a bird has flown into a window and appears stunned, you can put a large kitchen sieve over the groggy bird, thus protecting it from predators, until it recovers. If the weather is cold or rainy, bring the bird inside and put it under the sieve on a piece of newspaper. It should regain its senses in a matter of minutes or hours, then release it. To avoid window collisions, place predator silhouettes (owl or hawk) on the glass, or hang colored streamers in front to disrupt the clear reflection. There is a group of wildlife rehabilitators in Tucson and you can call their hotline for assistance with injured birds, as well as other wildlife:

520-903-1104
Wildlife Help Line

ACTIVITY – Habitat Homework

Discuss habitat and its components — food, water, shelter, space and arrangement. Ask students to survey the available habitat at school and at home. Are there places for birds to find shelter and build nests? Is there water and a variety of foods available? What about sufficent space? Are all of these elements "arranged" to the best advantage of the birds? Which habitat is better for birds, the schoolyard or the students' home? Why? Which is better for animals, a natural area or a developed one? What do people need in their habitat? Use the sample below as a guideline and create your own data sheets for collecting information.

Birds' Needs	School	Home
Water – for plants and drinking?		
Food – what kinds?		
Shelter – places to hide from predators, the sun, other dangers?		
Nest sites – for raising young, what kinds of choices?		
Noise – people, cars?		
Traffic – people, pets, bicycles, cars?		

Resources

"For the Birds" Activity Sheet
www.tohonochulpark.org/PDF/forthebirdsactivitysheet.pdf

Cornell Laboratory of Ornithology
www.birds.cornell.edu

Online curriculum from Illinois
www.dnr.state.il.us/lands/education/virtualbird/educational.htm

Additional websites with bird related projects
www.nbii.gov/education/birds.html

Suggested Reading

Richard Cunningham	50 Common Birds of the Southwest
William A. Davis and Stephen M. Russell	Birds in Southeastern Arizona
Paul R. Ehrlich, David S. Dobkin and Darryl Wheye	The Birder's Handbook: A Field Guide to the Natural History of North American Birds
Kenn Kaufman	Birds of North America Lives of North American Birds
Lynn Hassler Kaufman	Hummingbirds of the American West Birds of the American Southwest
Pinau Merlin	A Guide to Southern Arizona Bird Nests and Eggs
National Geographic Society	Field Guide to the Birds of North America
Roger Tory Peterson	Peterson Field Guides: Western Birds
David Allen Sibley	The Sibley Guide to Birds The Sibley Guide to Bird Life and Behavior
Donald W. and Lillian Q. Stokes	A Guide to Bird Behavior
Tucson Audubon Society	Finding Birds in Southeast Arizona

Roadrunner

The Roadrunner is a large bird with crested head, long tail and strong legs for running. He usually travels along the ground but can glide through the air to escape predators. To warn off potential threats, the Roadrunner will also make a clicking sound and rattle his beak. This long, curved beak is designed for catching prey — lizards, snakes, small rodents, insects and young birds. The bird's track in the sand looks like an "X" because he has two toes pointing forward and two backward. This is called *zygodactyl*.

?Questions?

1. How does the Roadrunner cross the road?
2. Name two things a Roadrunner eats?
3. How many toes does a Roadrunner have?

Cactus Wren

The state bird of Arizona, the Cactus Wren is brown and buff and covered with spots. It is noisy and very active. Cactus Wrens will build large, football-shaped nests in chollas or other thorny bushes and trees; the thorns help protect the nest from *predators*. Snakes will sometimes climb a cholla to steal eggs or baby birds from the nest, so the Cactus Wren will build two or three nests as *decoys* to fool the snake. The Wrens eat insects, cactus fruits, seeds and spiders.

?Questions?

1. Describe a Cactus Wren's nest?
2. Why have more than one?
3. The Cactus Wren is the state bird of ____?

Black-chinned Hummingbird

Hummingbirds can fly up, down, sideways and back and forth; they can even turn a somersault in mid-air. The dazzling rainbow colors on the tiny birds are caused by sunlight reflecting off their feathers; the male Black-chinned Hummingbird has a black chin, but flashes of violet on his throat. A hummingbird's nest is very small and made of soft feathers, moss and spider webs. Their eggs are very small, no bigger than a jelly bean. A hummingbird's beak is long and slender, designed to suck *nectar* from long, tubular flowers (preferably red), but they also eat insects and spiders.

?Questions?

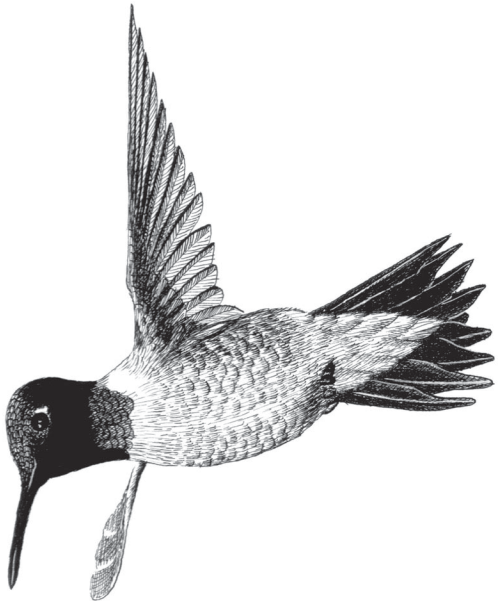
1. What shape flower does a hummer like?
2. Name three things a hummer might eat.
3. Why are their feathers so colorful?

Cardinal

The Cardinal has a cheerful song ("what cheer-cheer-cheer") and brilliant red feathers. It has a *crest* on its head and a black mask on its face. The Cardinal lives in the desert along washes and streams, but it also likes urban backyards. Its nests are round and made of grasses. A Cardinal's orange beak is thick and sharp, perfect for cracking its food — seeds of all kinds, but especially sunflower seeds. Immature Cardinals have black beaks.

?Questions?

1. What are the upright feathers on a Cardinal's head called?
2. What sound does a Cardinal make?
3. How can you tell a young Cardinal from an adult?

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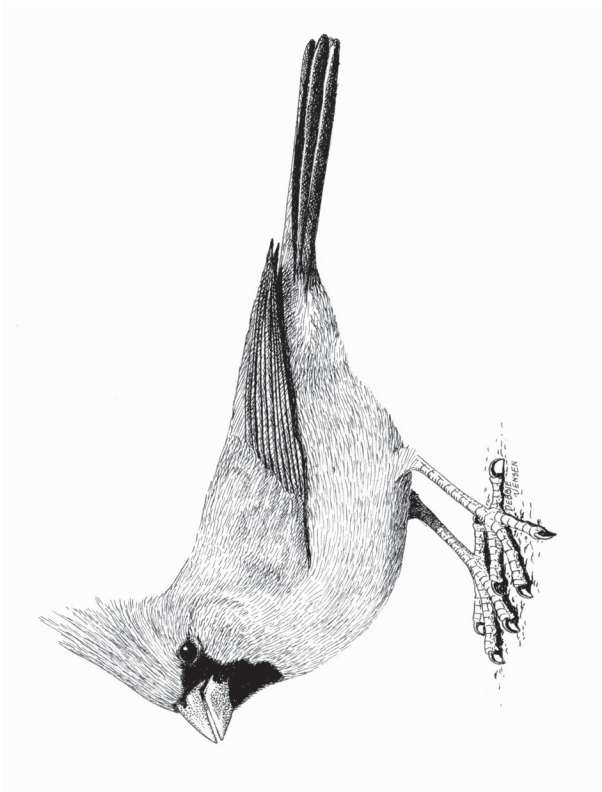
DEBBIE JENSEN


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Gambel's Quail

The Quail is a plump, ground-dwelling bird that travels in family groups. It can easily be recognized by the plume, or top-knot, on its head. Quail babies are called *precocial*, this means that shortly after they hatch they are ready to follow their parents through the desert, looking for seeds and insects. Female quail will lay up to 20 eggs, but many young quail are eaten by predators like roadrunners, snakes and coyotes. Gila monsters like to eat the eggs.

?Questions?

1. Does the Quail usually travel alone?
2. Why would it be a good thing to be precocial?
3. Why does a female Quail lay so many eggs?

Curve-billed Thrasher

The Thrasher is a brown bird with lightly speckled chest, orange eye and downward curved beak. This strong beak is *adapted* to poking in the ground for insects and tearing open cactus fruits for the pulp and seeds. Thrashers nest in chollas and yuccas, or other desert plants with thorns or spines. This natural armor helps protect the young birds in the nest. The eggs are pale blue with speckles. The Thrasher has a very beautiful singing voice and has a variety of calls and songs.

?Questions?

1. What color is a Thrasher's eye?
2. Is the Thrasher an *omnivore*?
3. Does the Thrasher sing well?

Gila Woodpecker

The Gila Woodpecker is striped black and white over most of its body; the male has a bright red cap on the top of his head. The Woodpecker drills a hole in a saguaro, a tree or even your house (if it's made of wood) and lives inside the resulting chamber. In a saguaro these are called "boots." Young Woodpeckers are *altricial*. They are born helpless, blind and naked, and must depend on their parents for food and warmth. When the Woodpecker is through using the hole, another bird will sometimes take over and build a nest inside, like the tiny Elf Owl.

?Questions?

1. Does the female Woodpecker have a red cap?
2. What is a saguaro "boot"?
3. Why live in a saguaro?

Red-tailed Hawk

This is a very large bird with a rusty red tail. It lives both in the desert and the mountains. It hunts for prey by soaring over the desert floor or sitting quietly on top of a tree or telephone pole and watching for movement - it has excellent eyesight. Hawks are *carnivores*. They eat rodents, snakes, rabbits and lizards. Big nests of sticks are built in a tree, the arms of a saguaro or on a cliff ledge.

?Questions?

1. Where would be a good place to look for Hawks?
2. Name two kinds of prey of a Red-tailed Hawk.
3. What is a Red-tail's nest made of?