



Birds: Engineers by Instinct

**Activities for children and
adults that build upon Play Trail
experiences outdoors**



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Getting children comfortable in the outdoors may be one of the greatest gifts we can offer the next generation. Given what we know about the physical and psychological consequences of a sedentary, electronic media-dominated lifestyle, it also might be one of greatest health tips we can offer. A childhood rich in outdoor experiences provides an inexpensive antidote for a number of medical problems, including depression, attention deficit disorder, and obesity.

But there is more. Letting young children freely explore their world outdoors can instill a lifelong connection to the environment. It can also help cultivate an ethic of caring for the environment.

The role of adults in this process focuses less on teaching and more on coaching. While most children want to explore their world, some may be hesitant or even fearful. Parents and other caregivers need to be there to offer encouragement and guidance without stifling the important work called play.

Tips for adults

We offer the following tips to help make the most of your Play Trail explorations.

1. Find activities in these booklets that are appropriate for your child's age and interests, as well as environments that are readily accessible to you.
2. Share the booklet with your child in advance.
3. Let your child initiate the exploration, but be ready to offer suggestions in the event encouragement is needed. Consider the booklet's investigations to be jumping-off points that pique curiosity.
4. Avoid the tendency to teach. Share the information you glean from these booklets as "incidental" points of interest.
5. Model positive behaviors and respectful attitudes toward nature.
6. Respect your child's fears. Never force a child to touch something they do not want to touch. Courage and interest come about through positive, graduated experiences.
7. Foster play and accept the fact that dirty hands, mud-caked shoes, and wet clothes often come with it.
8. Avoid the tendency to "helicopter." Too often we over-protect and stifle explorations inadvertently.

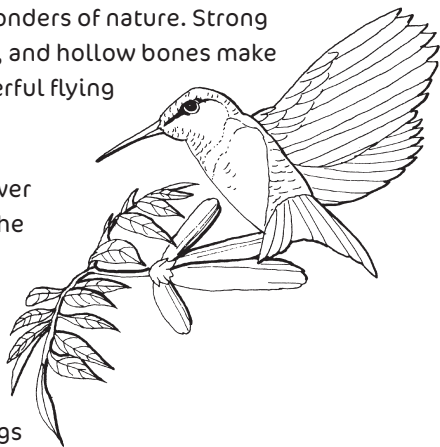
Built for flight

Birds are aerodynamic wonders of nature. Strong muscles, wings, feathers, and hollow bones make for lightweight, but powerful flying machines.

Large breast muscles power each wing stroke, while the stroke itself determines speed and movement.

Hummingbird wings work like a helicopter, rotating rapidly to allow for hovering. Vulture wings are long and broad. They work like a glider. Penguin wings are shaped like paddles. While too small for flying in the air, they work perfectly for “flying” underwater. Some birds, like ostriches and kiwis, don’t fly at all.

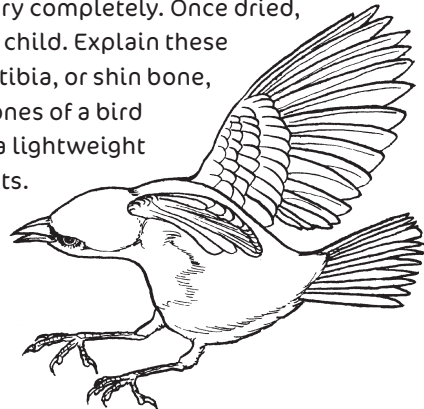
Other features help birds take flight as well. Instead of heavy teeth, birds have lightweight bills made of keratin, just like your fingernails. In addition to insulating a bird’s body (as well as camouflaging it or helping in communication and courtship) feathers also help a bird fly. Flight feathers help propel the bird through the air, sustain flight, or allow for twisting, turning, and even braking.



Chicken bone science

After the meat of a “drumstick” of a chicken or turkey is removed, wash the bones and cut the larger one in half. Set it aside on a windowsill to dry completely. Once dried, share the bones with your child. Explain these two bone halves form the tibia, or shin bone, of the bird. Many of the bones of a bird are hollow, supported by a lightweight series of crisscrossed struts.

Can you see in this in the “drumstick?” Why is weight so important to an animal that flies?



Safety tip: If you find a feather on the ground, enjoy it and study it, but avoid picking it up. Some feathers are home to parasites.

Zipping up a feather

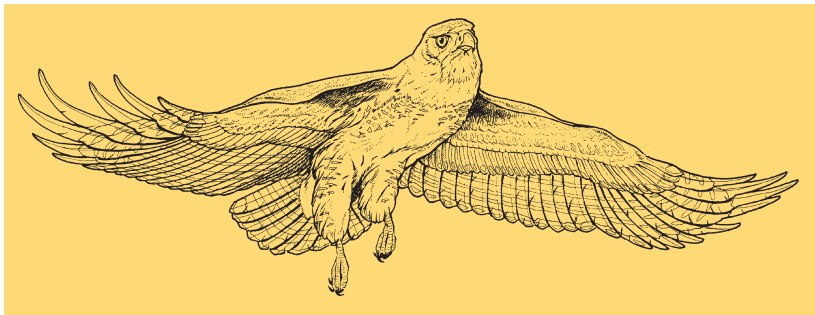
Only birds have feathers. Depending on shape and composition, they do different jobs. Contour or flight feathers have a stiff shaft. They form the outline of the body, wings, and tail, and assist in flight. Soft, fluffy down feathers lay under contour feathers where they work as insulation. Small contour feathers (ear coverts) around the ear openings improve hearing,



particularly among owls, parrots, and hawks. Semiplumes combine a large shaft with down. They help with insulation, as well as flexibility in movement.

Contour feathers work like Velcro. Tiny hooks on the barbules interlock with those of an adjoining barb. They zip together and form a smooth surface. This is important for flight!

Materials: Piece of Velcro and a contour feather from a domestic bird like a pheasant. (Domestic bird feathers can be purchased from most craft stores.)



Procedures: Explore a piece of Velcro with your child and discover how it zips together. Share the contour feather and explore ways it is similar to the Velcro. Can your child “unzip” the feather? Can your child “zip” it back up?

When you venture outdoors, watch for preening behavior among birds. When a bird appears to be nipping at feathers on its back, wings, and tail, it is actually realigning barbules and barbs, as well as picking at parasites and redistributing oil to its feathers to allow for a smooth, waterproof flight.

Family life

All birds lay eggs. Eggs come in a variety of sizes, depending on the species. The smallest egg—less than ½ inch long—belongs to the vervain hummingbird. The largest known egg—13 inches long—belongs to the now-extinct elephant bird. What most bird eggs hold in common is the presence of some sort of nest to hold them and a parent to incubate them.

All birds start their life inside an egg. There, the yolk provides the embryo with food. The egg white supports the yolk. Together with the shell and shell membrane, it also prevents the embryo from drying out. Two strands, called the chalaza, hold the yolk in place. A pocket of air at one end of the egg supplies the chick with air to breathe just before it hatches.

Chicken egg science

Materials: Chicken egg, bowl, and toothpick

Procedures: Crack a chicken egg into a bowl. Tell your child this is an egg that was not fertilized—there is no baby bird inside. Using a toothpick, let your child explore the parts of the egg. Remind them not to break open the yolk. Can your child find the yolk? The chalaza? The air space?

*The terms, bill and beak, mean the same thing, although beak is generally used in association with the large hooked bills of birds of prey.

Edible bird nests

Materials: 6 oz. semi-sweet chocolate morsels, ¾ cup peanut butter, five 5 large Shredded Wheat biscuits, M&Ms or jelly beans, wax paper, hammer or rolling pin

Procedures: Crush the Shredded Wheat biscuits with a hammer or rolling pin while the cereal is still in plastic pouches. Melt the chocolate morsels in a double broiler. Stir in the peanut butter. Remove the mixture from heat and pour the Shredded Wheat into it. Spoon a generous helping on wax paper and once cool, let your child shape it into a nest. Place the nest(s) in the freezer for approximately 20 minutes. Add M&Ms or jelly beans as “eggs” and enjoy your edible bird nest.

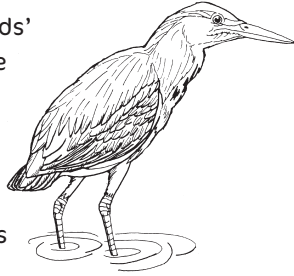
A bird’s toolbox

You can tell about a bird’s diet by studying its bill¹. Each bill is adapted to eating a particular set of foods. A long, narrow bill helps certain shorebirds probe for worms and crabs that burrow deep in the mud. A short, narrow bill helps other shorebirds probe for animals found in shallow mud. A slender, hollow bill enables a hummingbird or oriole to probe a flower for nectar, while a strainer-like bill enables a flamingo and certain ducks to filter tiny animals and plants from the water. A small, pointed bill lets warblers pick insects off leaves, while a small, cone-shaped bill lets sparrows and cardinals break apart hard seeds. Each bill is a toolbox that enables a bird to find and eat food.

Fitting the Bill

Take a bird hike through your backyard or nearby park. Bring child-friendly binoculars along if handy. As you walk, search for birds along the way. Likely birds include Canada geese and other waterfowl near lakes and large ponds; red-winged blackbirds, herons, and egrets in marshes; hawks and vultures in the air; songbirds near bird feeders; and robins on lawns.

Encourage your child to watch the birds' behavior. If the birds are feeding, note exactly what they are doing (stalking fish, dabbling at the water's surface, shelling seeds, probing for worms, sipping nectar). Does your child notice any patterns between bird bills and behavior? How are stalkers like herons different from seed crackers like cardinals?



Conservation message: Birds play many important roles in nature. They help control insect populations, pollinate plants, and disperse seeds. Yet, many species are threatened with extinction, mainly due to habitat loss. Setting aside and protecting wild lands will help bring bird populations back from the brink.

Citizen Science

Biologists conduct large research studies to catalog how many different kinds of birds exist regionally or even nationally at various times of the year. Sometimes they just focus on one particular species. Often they ask for help because the scope of their research is so large. “Citizen science” invites individuals to record their observations about birds on a website. By doing this, ordinary people contribute important information to a central database that is analyzed by trained biologists.

Your family can become involved in a bird-focused “citizen science” project. Project FeederWatch, sponsored by the Cornell Lab of Ornithology and Bird Studies Canada, encourages people to count and record the birds at their feeders from November through early April. The Great Backyard Bird Count takes place over four days in February each year. The National Audubon Society’s Christmas Bird Count take place on one day between mid-December and early January. The best way to find out about active projects in your area is to look them up on the Internet or check them out at www.thedailygreen.com. Citizen science projects often are conducted by universities, environmental organizations, natural history museums, and national parks.

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Bees: fantastic farmers

Butterflies: the magic of metamorphosis

Forest filtration: nature's air filter

Habitats: there's no place like home

Leaves: hidden colors

Pond Life: a busy ecosystem

Spiders: silk spinners

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