



BIRDS

MATERIALS INVENTORY	
<ul style="list-style-type: none"> • Feathers • Refractive glasses • Materials from Carnegie Museum • Owl pellets • Laminated vole skeleton sheets • Tin trays 	<ul style="list-style-type: none"> • Sticks to pick apart owl pellets • Sandwich bags to take skeletons home • Markers to write names of students on each bag for skeletons • Small garbage bags for cleanup • Hand sanitizer
ADVANCE PREPARATION	
<ul style="list-style-type: none"> • Pickup Carnegie Museum materials a week before SIP • Verify material above 	
MORNING SETUP	
<ul style="list-style-type: none"> • Put out tarp on which children sit 	

INSTRUCTION:

Overview: Students are introduced to the amazing variety and adaptations of birds.

Gather Group at Lower Junction Trail. Welcome students to the station and introduce adult leader and high school volunteers

Welcome to the bird habitat. Do you hear any birds?

Birds sing to attract a mate and establish their territory (songs tell other birds to “keep out”). Most of the birds we hear singing are males.

Birds also use other sounds (calls) to communicate with other birds. They use calls to keep in touch while flying or migrating. They also use alarm calls in response to predators, both to warn other birds of the predator, and to let the predator know that it has been spotted.

Can you tell me the name of a bird? Would it live in this park?

What is a bird scientist called? (optional)

Ornithologist.

Feathers

What is one feature that makes birds different from other animals?

Feathers.



Why do birds have feathers?

Feathers are used for flight, warmth, waterproofing, camouflage, finding a mate (color & pattern impact how attractive birds are to potential mates). Most birds have at least 1,000 feathers; a swan has 25,000 feathers.

Let's look at a feather. SHOW FEATHERS.

- 1 Feathers are made from keratin-same protein that is found in your hair and fingernails. Keratin is very strong.
- 2 Part of feather closest to the body (calamus) is hollow which makes them light.
- 3 There are different kinds of feathers. Flight, body, down feathers.
 - a. Contour feathers are those you see when you look at a bird. They provide the shape and color of the bird. **SHOW RAPTOR SPECIMEN**
 - b. Contour feathers on the wing are called flight feathers. Primary flight feathers-feathers nearest the wing tips. These are important for flying and steering. Secondary flight feathers-that's the inner wing. Overlapped by coverts. Gives the wing a smooth, curved surface for the air to flow over. **SHOW WING**
 - c. Under the contour feathers many birds have a layer of fluffy down feathers that help them stay warm.
- 4 Feathers surface (vanes) made of parallel barbs that are attached to the central shaft called rachis.

How do you think birds keep their feathers neat and ready for flight?

1. Preening: As a bird moves around the barbs may pull apart. When this happens, the bird “zips” them up again by drawing the feather through its beak – this is known as preening the feathers. Birds work hard to keep their feathers in good flying order.
2. Molting: Sometimes feathers get damaged, so once or twice a year birds molt, or shed old feathers. Damaged feathers are replaced during the molt.

Birds can be very colorful. How is the color formed?

Color in feathers can be formed in two different ways: (1) pigments or (2) by the way light interacts with the feather

1. Pigments:
 - a. Carotenoids make red, orange and yellow feathers (flamingo). Birds get these pigments by eating plants.
 - b. Melanin makes black or brown feathers. Birds produce these pigments and deposit in feathers.
2. Blue-Tindall Scattering



Blue feathers are the result of interaction of light with the structure of the feather. Green--a mix of feather structure (blue) and carotenoids (yellow).

What do birds eat?

Have you heard the expression "eat like a bird". To really eat like a bird you would have to spend all day eating.

Can you name some foods that birds eat?

Seeds, nuts, fruit, eggshells, fish, rodents, insects, dead prey (vultures).

Birds require a lot of energy and eat more food than other animals of the same size. Hummingbirds eat every 10 minute slurping down twice their body weight in nectar every day.

A bird's bill or beak helps it gather its food, so looking at its beak can give us clues about what a bird eats. For example, a hummingbird has a long, thin beak. It is specialized to reach deep into long flowers.

There are many types of birds, each adapted to its particular habitat with specialized body features.

Let's talk about owls.

SHOW DISPLAY OWL

What kind of bird is this? Great Homed Owl. A smaller owl called screech owls lives in Bird Park.

What do you know about owls?

1. Nocturnal Hunt at night (avoid competition with hawks). Good vision in low light.
2. Turn head almost all around. Owls have 14 neckbones (double the number you have). Can turn head 270 degrees in both directions.
3. Broad face (to reflect sound to ears) Its called a "facial disk."
4. Binocular vision (eyes forward) just like humans. (vs. monocular) Can't move eyes in socket. See skull.
5. Ears are positioned asymmetrically on sides of head to pinpoint sounds.
6. Large talons for catching prey. Sharp beak.
7. Very soft and special wing feather so they make little or no sound when flying. Why? To sneak up on prey.
8. Swallow their prey whole. What happens to the bones and fur?



Owl Pellets. Owls eat small animals like rats, mice, voles, and rabbits. They swallow their prey whole and regurgitate the ball of fur, and bones. We are going to dissect an owl pellet and see if we can figure out what the owl ate.



DISSECTING THE OWL PELLETT

Children enjoy this activity - make sure to leave enough time in session so that children can begin dissection.

The skeleton form in the drawing at the end of the packet is that of a vole, a creature most likely to be eaten by one of our owls.

1. Carefully separate the bones from the fur. (Any feathers in the pellet? That's a clue it's not a vole but a bird!)
2. Identify bones, using chart. Separate head, legs, body.
3. Place bones into a skeleton shape.
4. Students can take the owl pellet home in labeled plastic bag.

IF TIME PERMITS:

1. Beaks
 - a. A bird's bill or beak will tell you what or how it eats. Since they use their legs to fly, they can only eat and pick up things with their bill. So the bill and the tongue are important clues. A hummingbird's beak is long and thin. Why? It's specialized to reach deep into long flowers.
 - b. Oystercatchers have long thin bills that are kind of like chisels. Why? They need to break open shellfish.
 - c. Fish eating birds have straight and pointed ends to their bills. Why? They spear their food.
 - d. Mergansers take it one step further by having saw like edges on their bills to grip slippery fish.
 - e. Pelicans have expandable throat pouches to hold large fish or many fish. A Black Skimmer, another fish eating bird, has a bill where the lower part is longer than the upper part. Why? While skimming the surface of the water, the lower beak can snap up the fish.
 - f. Flamingoes have a bent bill with filtering structures for eating small organisms like shrimp from mud and water. They hold their bill upside down.
 - g. Birds that catch insects often have short, broad bills with wide gaps to gather up as many insects as possible when they are flying. Flycatchers even have hooks on their beaks to snap up individual insects.



2. Feet

- a. Birds' feet are very interesting. Birds of prey have "talons" or sharp, long claws. They are not feathered and are scaly. Most birds have 4 toes with one toe, the hallux, pointing backward. This is called anisodactyl.
- b. Some birds like parrots, woodpeckers, cuckoos have the second or fourth toe join the hallux in facing backwards. This is called zygodactyl.
- c. An owl and an osprey can do something neat-they can put their outer toe forward or backward.
- d. The form of the feet clearly suits the birds' habitats. Reversing toes helps to grab onto branches and perch. Some toes suggest the bird climbs a lot. Some are for capturing prey, carrying food, running and scratching (grouse), swimming (webbed) or lobed like grebes.

3. Nests

- a. Nests. Why do birds build nests? A nest isn't really a bird home-it's a bird nursery. Nests are built for babies. To protect their eggs and chicks, and to avoid being eaten themselves, birds take great care in how and where they make their nests. Many birds hide their nests where they cannot be seen. They tuck them in a tangle of shrubs or in tall grass near the ground. Others make nests that are easy to see but hard to get to. The kingfisher's tunnel makes it very difficult for any animals to attack its nest. The weaverbird's nest, high up in a tree, is safe from predators on the ground. Using tactics like this, each species of bird tries to give its young the best chance of survival.
- b. Birds do not have to learn how to build their nests. Instead they do it by instinct. This means that when a male weaverbird begins to build his first nest, he already knows exactly how to weave and knot the blades of grass, even though he has never done it before.
- c. Eagle-10 feet across and 10 feet deep. Reused until it becomes too heavy and crashes to the ground. Can weight up to 2 tons.
- d. Hummingbirds-quarter sized little cups woven from spider silk and thistle down.
- e. Kingfishers-hole dug deep inside river bank
- f. Owls-tree cavities
- g. Orioles-hanging nests.
- h. Osprey-junk piles year after year of sticks, seaweed, rubbish. Author John Steinbeck came upon a nest in his garden which contained 3 shirts, a bath towel, and his very own garden rake.
- i. Nests are made from the outside in. Grasses, twigs, bark, leaves for outside. Mud, moss, hair, fur, feathers and leaves for the inside.

CONCLUSION

Birds are amazing animals with many special adaptations to their environment.

