

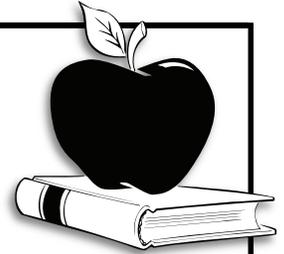
SUGGESTED GRADE LEVELS: 3 - 4

NEXT GENERATION SCIENCE STANDARDS:
3-LS4-3, 4-LS1-1

SKILLS/PROCESSES: observation, classification, comparison

OBJECTIVE: Students will recognize general types of bird beaks and the food each beak is best adapted for.

TEACHER'S GUIDE



UNIT 1 ■ LESSON 4

Natural Tools

BACKGROUND

The bird world contains an amazing variety of beaks. Beaks are used for eating, defense, feeding young, gathering nesting materials, building nests, **preening**, scratching, courting and attacking. The shape and size of each **species'** bill is specific for the type of food it gathers. Northern cardinals and sparrows have a heavy thick bill used to crack seeds. Meat-eaters, like the bald eagle, have a sharp, hooked bill to tear flesh. American robins and other birds with a varied diet have a bill shape that allows them to eat a variety of foods, such as worms and fruit. The American woodcock has a **prehensile** tip on its bill adapted for grasping, which allows it to probe the soil and grab earthworms.

Birds use their tongue for a variety of functions, also. Not only is the tongue used to drink, but also to hold,

pierce and tear food. Since birds consume great amounts of food, they have a **crop** (sac) which stores food until it is transferred to the gizzard. Small stones and grit picked up with food remain in the gizzard, grinding the food to aid digestion. The gizzard is made of extremely strong muscles, which in the wood duck can break down a whole acorn and in the canvasback duck grind fingernail clams to aid in the digestive process.

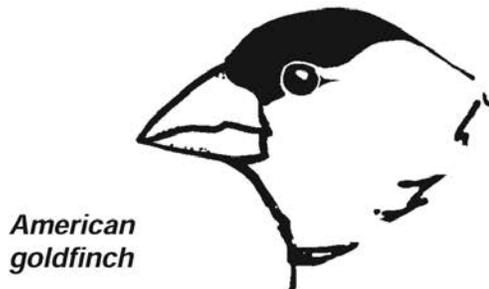
Birds have a high **metabolic rate** and, to survive, must frequently eat large quantities of food. Small birds eat large amounts of food in proportion to their size. Hummingbirds must eat twice their weight daily, while perching birds consume 10 to 30 percent of their weight each day. Most birds must continually search for food. Only a few birds, such as blue jays, woodpeckers, American crows and nuthatches store food for future use.



*ruby-throated
hummingbird*



bald eagle



*American
goldfinch*



*great crested
flycatcher*

PROJECTS AND ACTIVITIES

1. Set up eight different stations, each with a special type of "food" that fits one of the eight beaks described. At each station you will need three different tools. Also, have a sign at each station that tells what type of food is represented (Station #1, fish in shallow water; Station #2, flying insects). Identified below are a selection of tools and the one (*) that best fits each type of food.

STATION 1: rubber erasers in a container of water to represent fish in a shallow water area (fish-eating beak)

Tools

needlenose pliers* (bird examples: great blue heron, kingfisher)
eyedropper or straw
spatula

STATION 2: popcorn or tiny marshmallows tossed and caught in the air to represent flying insects (insect-catching beak)

Tools

envelope or fishnet* (bird examples: swallows; whip-poor-will; flycatchers)
tweezers
chopsticks

STATION 3: whole walnuts or other nuts to represent seeds with hard coverings (seed-eating beak)

Tools

nutcracker or pliers* (bird examples: sparrows; rose-breasted grosbeak; northern cardinal)
tongs
slotted spoon

STATION 4: bunch of grapes hanging from a string to represent fruit hanging on a tree (fruit-, insect-eating beak)

Tools

tweezers* (bird examples: cedar waxwing, brown thrasher, American robin)
strainer
nutcracker

STATION 5: large container with tiny marshmallows to represent aquatic plants and animals (water and mud-sifting beak)

Tools

slotted spoon* (bird examples: mallard, Canada goose)
tablespoon
chopsticks

STATION 6: rice scattered on and in a small log with a hole (or rice in a container with a small opening) to represent insects in a hollow tree (chisel beak)

Tools

tweezers or forceps* (bird examples: woodpeckers, nuthatches, brown creeper)
spoon
pliers

STATION 7: bread to represent a mouse or other small animal (preying beak)

Tools

channel-lock pliers* (bird examples: hawks, owls, eagles)
straw
tweezers

STATION 8: bowl filled with dry oatmeal with gummy worms on the bottom to represent worms buried in mud (probing beak)

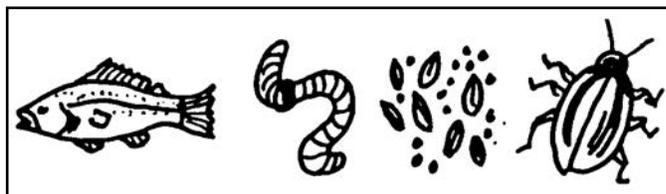
Tools

forceps, tweezers* (bird examples: sandpipers, snipe)
straw
screwdriver

2. Divide the group into eight teams and have them rotate around the stations. From the three tools at each station the group is to decide which is most efficient for the specific food type. Encourage students to try each tool.
3. Afterward, discuss the beak and tool choices. What particular features made one tool "fit" better than others? Since the straw was not used in this activity, have students name a bird whose beak would function like a straw (hummingbird as a nectar-sipper).

EVALUATION

1. Have students review pictures of birds they commonly see, such as sparrows, woodpeckers, rock pigeons, northern cardinals, American crows and ducks. Classify the birds' feeding habits based on the type of bill (straining, cracking, etc.).



EXTENSIONS

- In the schoolyard look for birds and set up a feeding station with seeds, fruits and **suet** (winter only) and see which types of birds visit the feeders and what type of beak they have. Look for evidence of feeding activity, such as a tree ringed with yellow-bellied sapsucker holes, opened nuts, pellets or piles of butterfly wings left after the bodies have been eaten. Discuss your observations with the class.
- Discuss loss or modification of **habitat** and the resulting loss of food supplies for birds. Include in the discussion the fact that different species of birds require specific food types and that they do not

change their feeding habits because the preferred food is not available.

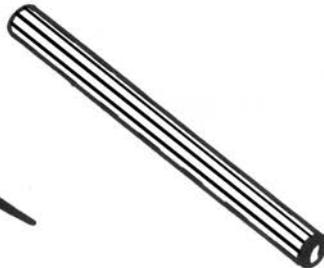
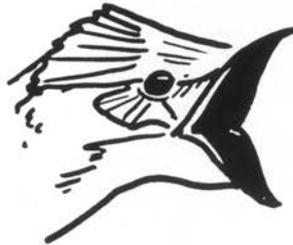
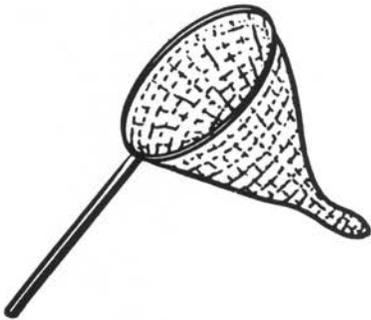
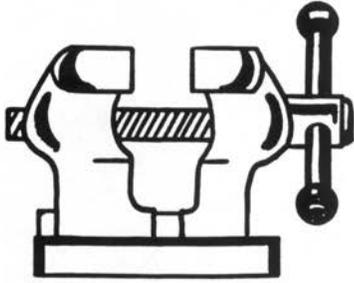
- Use the “3-D Eagle and Prey” activity to help students gain a better understanding of the bald eagle and its feeding habits

VOCABULARY

■ adapted	preening
■ crop	prehensile
■ habitat	species
■ metabolic rate	suet

Natural Tools

STUDENT'S GUIDE



The bird world contains an amazing variety of beaks (bills). Beaks are used for eating, defense, feeding young, gathering nesting materials, building nests, preening, scratching, courting and attacking. The shape and size of each species' bill is specific for the type of food it gathers. Northern cardinals have a heavy, thick bill used to crack seeds. Meat-eaters, like the eagle, have a sharp, hooked bill to tear flesh. American robins have a varied diet and a bill shape that permits eating a variety of foods (worms, fruits). Ruby-throated hummingbirds have a thin bill to sip nectar.

Birds use their tongue for a variety of jobs, also. Tongues are used in drinking and also to hold, pierce and tear food.

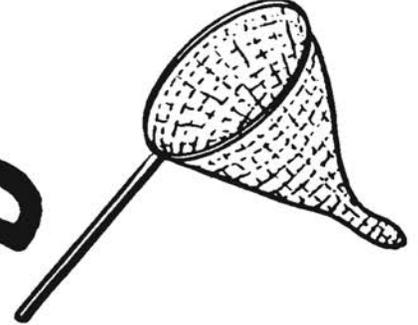
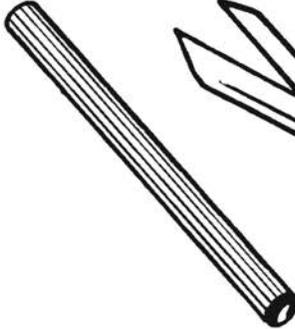
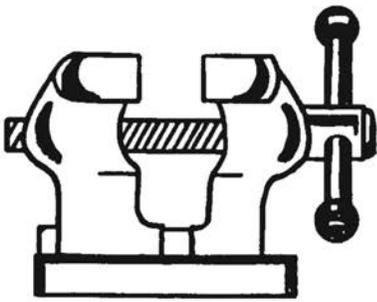
Since birds consume great amounts of food, they have a crop (sac) which stores food until it moves to the gizzard. Small stones and grit in the gizzard grind the food. The gizzard is made of strong muscles. In the wood duck those muscles can break down a whole acorn.

Birds have a high metabolic rate and must eat often to survive. Most birds must continually search for food. Only a few birds, such as American crows and nuthatches, store food for future use.

ACTIVITY PAGE

Beak Performance

Birds perform many tasks using their beak as a tool. Draw lines to match each beak to its corresponding human tool. Then draw a line to the correct name of the bird. Finish the activity with a line to its proper habitat.



bald eagle

great crested flycatcher

American goldfinch

ruby-throated hummingbird



red flowers
nectar-eater



river
fish-eater



grassland
seed-eater



dead tree
insect-eater