

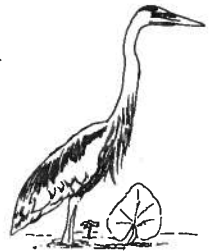
Food to Fit the Bill

Subject: Science

Objectives: Students will investigate the diversity in bird beaks.

Materials:

- slotted spoon
- nutcracker
- medicine dropper
- sponge
- 4 sets of tongs
- 3 sets of tweezers
- potato peeler
- chopsticks
- straw
- strainer
- tablespoon
- scissors
- ladle
- turkey baster
- envelope
- Food to Fit the Bill Worksheet
- whole walnuts
- 5 pans or dishes
- Styrofoam cubes or peanuts
- tall, thin vase
- potting soil
- gummy worms
- food coloring for colored water
- popped corn
- loose-leaf tea or herbs
- rice grains
- bark or piece of Styrofoam
- molding clay
- stick or pencil
- bunch of grapes
- string
- illustrations of bird beaks



Procedure:

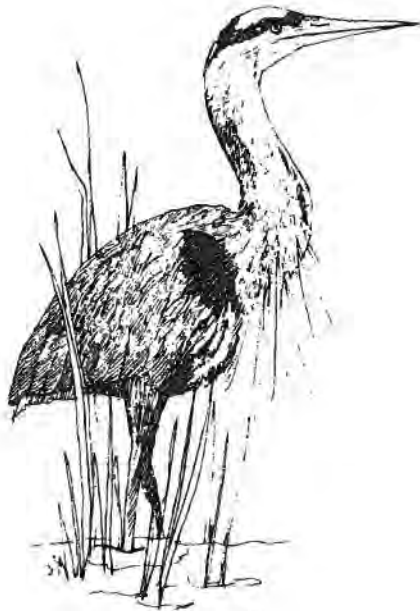
1. Prior to the lesson set up the following stations:
 - Station One: A tall, thin vase filled with colored water, medicine dropper and sponge.
 - Station Two: A dish of potting soil with gummy worms buried throughout, tongs and straw.
 - Station Three: Whole walnuts or other nuts spread throughout a pan, tweezers and nutcracker.
 - Station Four: A dish of water with one-inch Styrofoam cubes floating in shallow water, chopsticks and tongs.
 - Station Five: A dish of water with loose-leaf tea or herbs, strainer and slotted spoon.
 - Station Six: Popped popcorn, tongs and an envelope.
 - Station Seven: Rice grains tucked into the bark of a log (or Styrofoam), tweezers and tongs.
 - Station Eight: Molding clay wrapped around a stick, kids' scissors and a potato peeler.
 - Station Nine: A dish of water with one-inch Styrofoam cubes floating in shallow water, ladle and turkey baster.

- Station Ten: Bunch of grapes hanging from a string, tweezers and tablespoon.
2. Ask students to close their eyes and picture a bird. Go around the room and have students tell what bird they were visualizing. When all students have had the opportunity to share their bird, discuss diversity. There are so many types of birds, perhaps one student was thinking of a bird of prey, and another student was thinking of a hummingbird.
 3. Bring adaptations into the discussion. Why are there so many different kinds of birds? What makes the birds so different?
 4. Share some illustrations of different birds and discuss beaks and bills. Why are they so diverse? What purpose does the beak serve?
 5. Refer to the different stations around the classroom.
 6. Tell students that each station has items that represent a type of food eaten by various birds. Ask students if they can guess what each bird would have to do in order to reach their food supply. Does the shape of a bird's beak limit their food supply?
 - 1) Nectar (colored water) needs to be sucked out. (hummingbird)
 - 2) Worms (gummy worms) need to be dug and pulled out. (snipe & shore birds)
 - 3) Seeds (walnuts) need to be cracked open. (sparrows & finches)
 - 4) Fish (Styrofoam pieces) will probably need to be picked out of the water. (heron)
 - 5) Fine bits of vegetation (tea or herbs) need to be strained out of the water. (ducks, geese and swans)
 - 6) Flying insects (popcorn) need to be caught in wide openings. (swallows)
 - 7) Small insects (rice) need to be picked and pried out of small crevices. (woodpeckers)
 - 8) Meat (molding clay) needs to be pulled off of bones. (owls & hawks)
 - 9) Fish (Styrofoam cubes) need to be scooped out of the water. (pelicans)
 - 10) Fruit (grapes) need to be pulled off branches. (robin & cedar waxwing)
 7. Pass out Food to Fit the Bill worksheet. Divide the students into ten equally numbered groups. Each group is sent to a station. Have students predict which "beak" will be the most efficient at picking up or getting at the "food" provided. Then allow a few minutes for the students to try the "beaks" and write down their answers. Have students guess a species of bird whose beak works like the demonstration. Rotate students around to each station.
 8. After lab work is done, discuss with students their predictions, results and chosen bird species for each beak type.

Food to Fit the Bill

At each station, first predict which “beak” will work best to retrieve the “food” provided. Try each “beak” and write down which beak was most effective. Write the name of a bird that has that type of beak.

Station	Food	Prediction	Best “Beak”	Bird with this Type of Beak
1	Nectar (colored water in vase)			
2	Worms (gummy worms)			
3	Seeds (nuts)			
4	Fish (Styrofoam pieces)			
5	Fine bits of plants (tea or herbs)			
6	Flying insects (popcorn)			
7	Insects in wood (rice)			
8	Meat on bone (clay on stick)			
9	Fish (Styrofoam pieces)			
10	Fruit on a tree branch (bunch of grapes)			



Nests Are Neat

Subjects: Math and Science

Objective:

Math: Students will use and understand numbers.

Science: 1. Students will investigate the diversity of animals.

2. Students simulate animal behavior.

Materials:

- Materials for nest making (students collect)
- Nests are Neat Worksheet
- Tape measure

Procedure:

1. Discuss what your students know about nests. Where are nests sometimes located? What materials do birds use to make nests? How are nests built?
2. Share pictures of nests. Remind the students that nests vary as much as the birds that make them. Some birds nest high in trees; some nest on the ground. Some birds plaster their nests to the sides of buildings or on rocky cliffs. Not all birds use the same things to build their nests either. Sticks, mud, grasses, spider webs, twine, twigs, leaves, foil and scraps of cloth are a few things birds might use building their nests.
3. Tell students they are going to build a bird nest. First, they will need to collect their materials. (Remind students not to pick flowers or pull up living plants.) To simulate a bird's beak, they may use only their thumb and index finger to pick up materials. They should use their fist to form a cup shape in the nest. Ask them to think about how a bird might form the nest into the cup shape. Many species will sit in the center of the nest and turn in circular motions, pushing and shaping the material into a cup shape.
4. Students should share their nests with one another when finished.
5. For the second part of this activity, students will be talking about nest sizes and figuring the area. Talk again about the shape of nests, most are round. The sizes vary from an eagle's nest (9 feet in diameter) to a hummingbird's nest (3 inches in diameter).
6. Measure a nine foot line on the floor. Have the students stand in a circle around this line. Tell them this is the size of an eagle's nest. When finished, tell them they are going to learn how to figure the area of a circle. Before they sit down, you might want to explain that area is the amount of room inside the circle.
7. Pass out the Nests are Neat Worksheet. Practice the formula with your students. When they are comfortable with the formula, have them figure the area for the following birds' nests.

Answers:

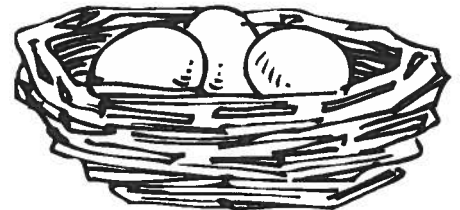
Great Blue Heron $A = 5.9 \text{ feet}^2$

Eagle $A = 63.6 \text{ feet}^2$

Hummingbird $A = 7.1 \text{ inches}^2$

Red-tailed hawk $A = 5.3 \text{ feet}^2$

8. Don't stop with the worksheet! Have the students do some research to find out nest sizes of other bird species.



Nests are Neat!

Figuring the area of circles is as easy as pi.

There are many things in our world that are circular in shape. Look around you, do you see any? Go to one of the objects and measure the distance around the circle. This is called the **circumference**. Next, measure the distance from one side of the circle to the other. This is called the **diameter**. Divide the circumference by the diameter. If you did your calculations carefully, you should have come up with a number very close to 3.14. This number is called **pi**.

For about twenty five hundred years, mathematicians have known this little “magic” trick. They have also used pi, which symbol looks like this π , to figure the area of a circle. **Area** is the amount of space inside the circle. It is measured in square units. Think of it like this, if you cut out a whole bunch of little squares, how many little squares could fit inside the circle?

The formula to find the area of a circle looks like this: **Area = 3.14 X r²**

Figure the area of the following nests. Here's how:

1. You're given the diameter (d), which is the length across the center of the nest. To use the formula you first need to get the radius (r), which is half the diameter.
2. Divide the diameter (d) by 2. This equals the radius (r).
3. Once you have the radius. Multiply it by itself. You've figured radius squared!
4. Lastly, multiply that number by π (3.14). Remember to write that little 2 above the unit of measure on your answer!

Great Blue Heron	d = 2.75 feet
Eagle	d = 9 feet
Hummingbird	d = 3 inches
Red-tailed hawk	d = 2.6 feet

Area of a great blue heron's nest = _____
Area of an eagle's nest = _____
Area of a hummingbird's nest = _____
Area of a red tailed hawk's nest = _____



Congratulations!
You're a circle master!!!



Avian Antics

Participants take part in this hilarious game of charades to discover the diversity and importance of courtship rituals for birds who are seeking mates.

Need to Know

Somersaults, fervent songs, strutting, bowing, dancing, and bringing special treats are just a few of the unusual antics that birds perform to attract mates.

Each species of bird has evolved with a unique set of *displays*—a set of behaviors that function like language to communicate emotions or intentions. Each spring, birds take part in courtship displays to attract mates. These rituals vary tremendously from one bird species to another. Male courtship displays may include behaviors from singing, strutting, and shaking their feathers to bringing special treats for the female friend to eat. Some ornithologists believe that courtship displays help to initiate and strengthen the bond between the mating pair. The displays also may help a bird judge how effective a possible mate may be at helping to raise young. Finding a mate is important for each bird, because a bird without a mate is a bird without offspring.

Getting Ready

1. To make the Courtship Behavior Cards, cut out large cards from sturdy paper or poster board. Copy the Courtship Behavior Cards pages, cut them out, and tape or glue them onto the white cards. If possible, laminate the cards to protect them. (Alternatively, you can follow the Courtship Behavior Cards and use a black permanent marker to write the courtship behavior information on one side of the card and the name of the bird on the other side.)
2. On the day of the festival, set up your station. Hang your station sign so participants can identify your booth. You may want to hang some interesting pictures of bird behavior to attract participants. Have the Courtship Behavior Cards and other props ready for use.

Unless participants are experienced bird watchers, they will not know the answers to this activity. The purpose of the activity is to introduce participants to the idea that different species of birds do different things to attract a mate—and that observing such behavior can be fun and interesting. To help participants have an easier time guessing, provide a list of answers with the eight possible bird behaviors and a poster with pictures of the birds.

NEED TO GET

- One or more large tables
- Hat or other container
- Copies of Courtship Behavior Cards pages
- Sturdy paper or poster board
- Orange balloons
- Red balloons
- 2 music sticks, drumsticks, or wooden rulers
- “Peacock” tail feathers made of sturdy green paper
- Thistle seeds or other seeds
- Pens or pencils
- Paper for keeping score
- A sturdy stool or chair for participants to stand on
- Tape or glue

Optional:

- Laminating materials
- List of possible bird behaviors
- Poster with bird pictures

TIME

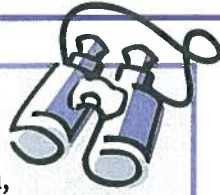
Preparation: 30 minutes
Activity: 45 minutes

TERM TO KNOW

displays



ZOOM IN, ZOOM OUT!



For this variation, you will need: Velcro tabs, heavy white poster paper, a large poster board, scissors, and permanent markers.

The Courtship Behavior Cards can be mounted on a large poster board with Velcro tabs. Make the writing on the cards large enough so that it can be easily read. Directions on how to play can be provided at the top of the board. The challenge is for participants to figure out what bird matches with a specific courtship behavior. The board can be set up with the answers on the back of the cards or as a matching game with possible answers to the side of the cards. Participants can play individually or in teams.

Each species of bird has evolved with a unique set of displays.

Taking Flight!

Festival participants gain knowledge of bird courtship behaviors by taking part in a playful game of charades.

1. Participants can play this game in small or large groups. You can keep score or let participants play just for fun. If keeping team scores, designate one of the station leaders as the scorekeeper.
2. To introduce this activity, say:

Have you ever watched birds as they look for food, sing, or build a nest? These are all different types of bird behaviors. (Behavior is the way the animal acts. For example, how birds react to each other, to other species, and to the environment.) Have you ever seen birds doing any unusual behaviors such as fanning their feathers, strutting, or doing what looks like a silly dance? These behaviors may be courtship displays. Each spring, birds perform these courtship displays, or "rituals," to help them find a mate or strengthen the bond between birds that mated in previous years.

3. Next, participants take turns picking a card out of a hat. After pulling a card, the individual or team acts out the behavior described on the card. The other individual or team tries to guess what bird performs that specific behavior. If no one guesses the correct answer, tell them the answer and move on to the next card—this time the acting out is performed by the other individual or team.
4. Continue taking turns until all of the cards have been used. (If more than eight players want a chance to pick a card and act it out, the cards can be put back in the hat and used over again. Repeating the cards can help to reinforce the information.)
5. If you kept score, tally the results at the end of the activity. Ask participants if they have any questions before ending the activity.



Quiz Your Guests

1. What does "bird behavior" mean?
2. What are some examples of bird courtship behaviors?
3. Why are courtship displays so important to birds?
(One answer is that courtship rituals help birds attract and keep a mate, which is essential to having offspring. Also, courtship behaviors help birds establish their breeding territory by warning other birds away.)

IN STEP WITH SCIENCE STANDARDS

STANDARD C: LIFE SCIENCE

- Reproduction and heredity
- Regulation and behavior





Courtship Behavior Cards Use the this information to make the front of your cards.

When this male bird sings its courtship song, it often rises several feet off its perch, as if propelled by the passion of its song.

(Action: Sing your school song while jumping up and down.)

Flashing its handsome black and white crest, this bird swims around and around the females, then he leaps into the air and does a somersault before coming to rest on the water.

(Action: Run around in a circle, then do a somersault.)

This male bird makes loud drumming noises by tapping its beak on hollow branches or other objects, like telephone poles or the drainpipes on a house.

(Action: Tap two sticks together to make loud drumming noises.)

This male bird flaps its wings rapidly to make a muffled drumming sound. This is often done while standing on a log or large rock.

(Action: Stand on a sturdy stool or chair while quickly moving your arms up and down. Tap your legs with your arms to make a drumming sound.)

This male bird has a brilliant red throat patch that it inflates during its courtship display.

(Action: Tuck a red balloon under your chin and walk around showing it off.)

This male bird struts, bows, and makes a loud whistling sound by blowing up orange air sacs on its neck.

(Action: While holding an orange balloon on each side of your neck, walk with a strut, then take a bow. Try to whistle while you do this.)

This male bird brings special treats like thistle seed to win over a female bird.

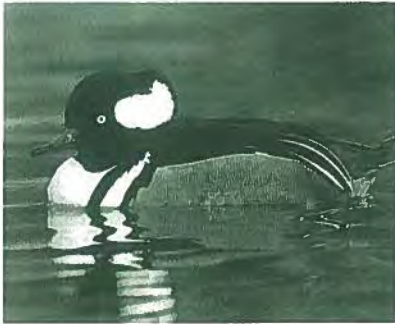
(Action: Collect and offer some seeds to a "female bird.")

This domesticated male bird has a long tail of green and bronze feathers that it fans and shakes during courtship.

(Action: Hold up a fan of long green paper "feathers" behind your back.)



Courtship Behavior Cards Use the this information to make the back of your cards.



Hooded Merganser



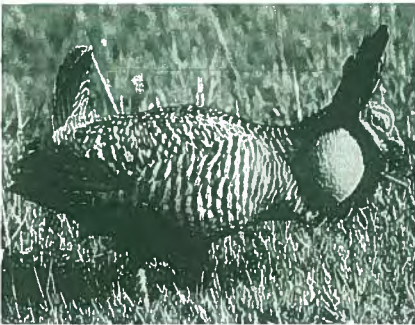
Orchard Oriole



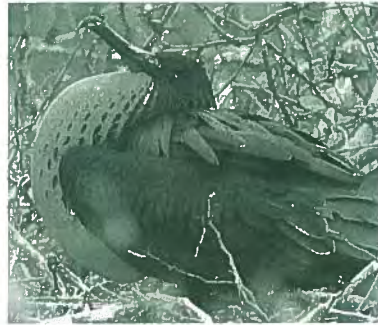
Ruffed Grouse



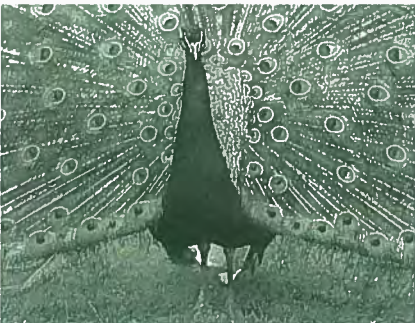
Downy Woodpecker



Greater Prairie-Chicken



Magnificent Frigatebird



Common Peafowl
(Males are called Peacocks)



Lesser Goldfinch