

BIRD BEAK BUFFET

Lawrence Hall of Science Teachers' Guide to WETLANDS

Discipline: Biological Science

Themes: Evolution, Systems & Interactions

KEY CONCEPT: *Different types of birds can feed together in one habitat using different beaks adapted to feed efficiently on specific foods.*

SYNOPSIS: Students role-play species of birds with bills of different shapes and sizes. Students gather different food items with different beak types and compare feeding success.

FOR THE TEACHER: Marshes and Mudflats support countless numbers of shorebirds, all seeming to feed in the same area, and yet the different species are actually rarely competing for food. Where shorebirds appear to be feeding together, their sizes, shapes, food tastes, and behavior patterns help them gather the food items for which they are most well adapted. In a marsh of mudflat habitat, many different kinds of birds can feed together because there are many different kinds of food items available.

Small birds like sanderlings and dunlin pluck tiny insects from the surface or first inch of mud. Plovers and dowitchers pick up small crabs and shrimp from the next deeper inch of mud or sand (on a beach). Willets and marbled godwits with bills 3-5 inches long pull out small clams, worms, and other burrowing animals. The long-billed curlew specializes in robbing the burrows of the fat innkeeper worm for ghost shrimp.

SCIENCE PROCESS SKILLS: Observing, communicating, comparing, organizing.

VOCABULARY: adaptation, competition, habitat, shorebird, resources

MATERIALS:

(for a class of 30)

paper cups (1 per student)

food items: marbles (150-200)

toothpicks (150-200)

pennies or 3/16 washers (150-200)

beak types: spoons (10)

tweezers or clothespins (10)

popsicle sticks or tongue depressors(20)

butcher paper for brainstorming and graphing activities

colored construction paper squares for tokens or small post-its

bird beak chart

bird poster or pictures of birds
pictures of people eating in a variety of manners/settings

INTO

Activities:

1. **Tea Party**
 - a) Where have you seen birds? Have you seen them by the Ocean?
 - b) What do birds eat? What do birds eat by the ocean?
 - c) What do you eat? What do you use to help you eat?
 - d) How do birds eat? What do they use to help them eat?
 - e) How do birds compete for food?

2. **Individual Recording using Advance Organizer**
 Have students complete the Advance Organizer before and after they do the THROUGH activity.

	BEFORE	AFTER
Where have you seen birds? by the ocean?		
What do birds eat? by the ocean?		
What do you eat? What do you use to help you eat?		
How do birds eat? What do they use to help them eat?		
How do birds compete for food?		

3. **Coop Groups/Clustering**

Groups of four meet to share and organize their brainstorming by clustering the following categories: (a) what people eat;(b) how people eat;(c) what "tools" people use to help them eat;(d) what birds eat;(e) how birds eat;(f) what "tools" birds use to help them eat.

Develop two questions they hope to have answered. Share cluster/questions with class.

4. **Class Brainstorming**

Teacher writes the word "beak" on the board. Students in groups of four do a roundtable to brainstorm as many words as they can come up with that tell something about what the word "beak" means or that relate to "beak".

5. **Class Cluster Diagram**

Student groups share the results of their brainstorming, and the teacher records these ideas on a class cluster diagram.

6. Fable: Fox & Stork

- a. Teacher, using the cover picture for the fable, asks students to predict what they think the story will be about. Students' responses can be recorded on the board.
- b. Teacher dramatizes the fable "The Fox and the Stork" pausing once or twice during the telling of the story to ask students to predict what will happen next.
- c. After telling the story, teacher asks students to work in trios to illustrate what they understand to be an important learning/message of the story. Then students describe their drawing to the class.
- d. Teacher posts drawings on the walls and asks students to consider why this particular fable was shared with them and how it might relate to the upcoming lesson. The teacher then explains that they will come back to their drawings later.

(Debriefing: Focus students on the social objectives: How well did they do? Students can rate themselves or their group at this point)

7. Predicting

- a. Teacher shows the class a variety of pictures/photographs/drawings of birds with different types of beaks, and of birds eating, and explains that they will be participating in an activity called "Bird Beak Buffet."
- b. Teacher asks students to predict what they think the activity will involve. Teacher records students' responses on butcher/easel paper and explains that as the activity progresses, the students will be able to note which of their predictions were on target.

Portfolio Assessment:

Active Participation in all activities; at least 5 items recorded on Individual Record Sheet; Cluster Diagrams; Group Drawings
Individual Predictions
Group/Individual Rating Sheets for Active Listening/Turn-Taking

THROUGH

Activities: 1. Storytelling Variation

(a) Set Up

Teacher asks students to sit in a circle on a carpeted floor. Teacher gives each student a paper cup for collecting food items. This cup is the bird's "stomach." The students are the birds. Then the teacher gives each student either a spoon, tweezers or two popsicle sticks. These are their "beaks."

(b) Modeling and Demonstration

Teacher establishes a reference guide for students by drawing on the board or on an overhead the "student-birds," "cup-stomachs," and "spoons, tweezers, popsicle sticks-beaks." The teacher then introduces the food items: pennies, marbles, round toothpicks; and adds them to the reference guide.

Teacher explains the procedure the students are to follow, modeling each, and, where possible, drawing a symbol or brief description for each step so that students have a graphic reminder. (Refer to Activity 2(a).)

Teacher selects a student (who teacher knows can be successful) to demonstrate the procedures for the entire class. A second student repeats the demonstration.

(c) Debriefing

In groups of 3-4, students review the procedures that have just been modelled and demonstrated.

(d) Numbered Heads Together

Each student in the group receives a number. Teacher asks for the first step, then gives the groups a minute to discuss the group's response. Teacher calls out a number, and in each group the student who holds that number stands as quickly as possible, prepared to respond.

Teacher can award points for (a) correct answers;(b) using "we" rather than "I" in the response;(c) being the first to stand.

Teacher follows the same process in asking for subsequent steps.

2. Text Reconstruction**(a) Hands-On Whole Class Demonstration, Trial 1**

Teacher spreads food item #1(marbles) over the carpeted areas.

Teacher gives birds (students) a prearranged signal (i.e., bell) to start picking up food items on the floor with their beaks (spoons, tweezers, popsicle sticks) to drop food(marbles) into their stomachs (cups).

Time: 30 seconds

Teacher asks each bird to count the number of food items in its stomach and to report that number to the class.

Teacher rounds off each number to nearest multiple of five and uses paper tokens to represent each group of five food items eaten.

Teacher tallies up the number of food items eaten for each "beak" and tapes that number of tokens on the graph(see attachment).

(b) Demonstration, Trial 2

Repeat(a) above, using food item #2(round toothpicks).

(c) Demonstration, Trial 3

Repeat(a) above, using food item #3(pennies).

(d) Debriefing

Students return to their groups of 3-4 to discuss the results on the graph. Each group comes up with 2-3 statements they'd like to make regarding how the results compare. These statements are shared and noted on the class observation log.

(e) Demonstration, Trial 4

Repeat(a) above, now using all three food items at the same time. Record results on a new graph.

(f) Discussion of Fable

At this point, it may be helpful to return to a discussion of the fable introduced during the "into" activities. Students can expand their discussion of how the fable relates to this lesson.

(g) Student Posters:

Each group selects one of the following topics to discuss and graphically portray what they learned from the activity. Have each group share their poster with the rest of the class.

Topics:

1. Which beak type gathered the most marbles? the most pennies? the most toothpicks?
2. What could a bird do if the only food item available in the habitat was marbles, and it was not effective in gathering marbles?
3. In the last experiment, when all three items were available, did all the birds get something to eat?
4. Why are some birds (students) with the same beak type more successful than others with the same beak type in gathering a particular food item? **
5. Compare your beaks to real birds. What real birds are like the simulated ones?
6. Was it easier to get food when one item or all three food items were available? Why?

* Teacher Note: If all species of birds are competing for the same limited resource, even those birds most well adapted to gather a particular food item may be adversely affected by the increased competition and and crowding. If

more than one food item is present, each bird can specialize on the prey species they are most well adapted to capture. The more diverse the ecosystem, the greater the number of birds that can share the habitat.

****Teacher Note:** Individual student abilities or aggressiveness may give them an advantage which would show up as increased feeding efficiency; in the birds' world, age and experience of an individual may also give an advantage.

(h) Class Book on Birds and Their Beaks

Students can work individually or in pairs or trios to develop a one page contribution to the class book. Students are to create a bird with a specific beak which is particularly well adapted for a specific food item.

Each contribution to the class book should include graphics of some kind and should address the following:

Name of the Bird(should reflect beak type)
 Description of the Bird
 Description of the Beak Type
 Indication of the Preferred Food Items
 Description of the Habitat

Groups will each add at least one statement in one of the primary languages represented by the members of the group.

(Debriefing: Focus students on the social objectives: How well did they do? Students can rate themselves or their group at this point.)

Portfolio Assessment :

Class Observation Log

Student Posters

Participation in Demonstration Activities

Physical Responses

Class Book

Audio/videotapes of student retelling/discussion/sharing activities

Group/Individual Rating Sheets for Active Listening/Turn-taking

BEYOND

***Activities:* 1. Extended Experiments**

Students will work in cooperative groups to complete one of the following activities. Each group will present the results of its work to the entire class.

(a) The substrate has a major effect on the feeding efficiency of a beak type. Conduct more experiments using different substrates (e.g. grass, carpet, concrete, sand). How does feeding success change for each

beak type as the substrate changes? What other parts of the bird are important to its success in feeding on various substrates?

(b) Conduct experiments to test feeding success with variation in distribution. First distribute food items in a fairly even mix and test predator feeding behavior. Then clump each food item a few yards from each of the other food items and allow the predators to feed where they wish. What are the differences in feeding behavior when prey distribution is changed?

(c) Go bird watching and watch the actual birds feeding. Prepare a chart/poster/mural/video/slide presentation regarding your observations, discoveries, and conclusions.

2. Consequence Charts:

Students will work in cooperative groups to complete charts in which they detail consequences over time given the following scenario:

What would be the immediate, short-term, medium-term, and long-term consequences on birds' structure, their environment, and their feeding behaviors if a neighboring manufacturing plant decides to dump its waste materials in this area?

3. Debriefing- Coop Groups

Students work in cooperative groups to brainstorm what helped them accomplish their tasks successfully and what were road blocks to their progress.

Students discuss the results of their brainstorming, and a class list of "helpers" and "road blocks" is developed.

(Debriefing: Focus students on the social objectives" How well did they do? Students can rate themselves or their group at this point.)

8/25/91 ch

Written by Catherine Halversen

Adapted from an activity by Francisca Sanchez, Alameda County Office of Education.

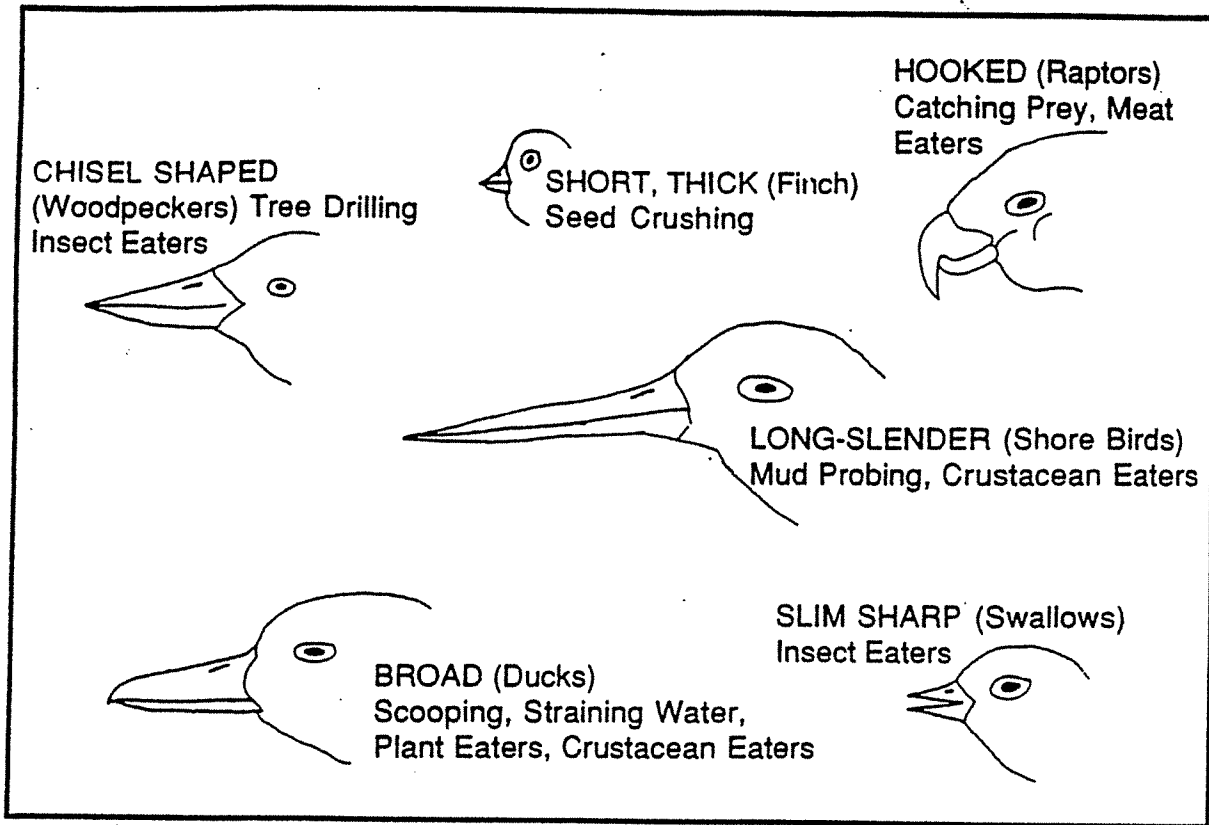


Figure 2 - Bird Beaks

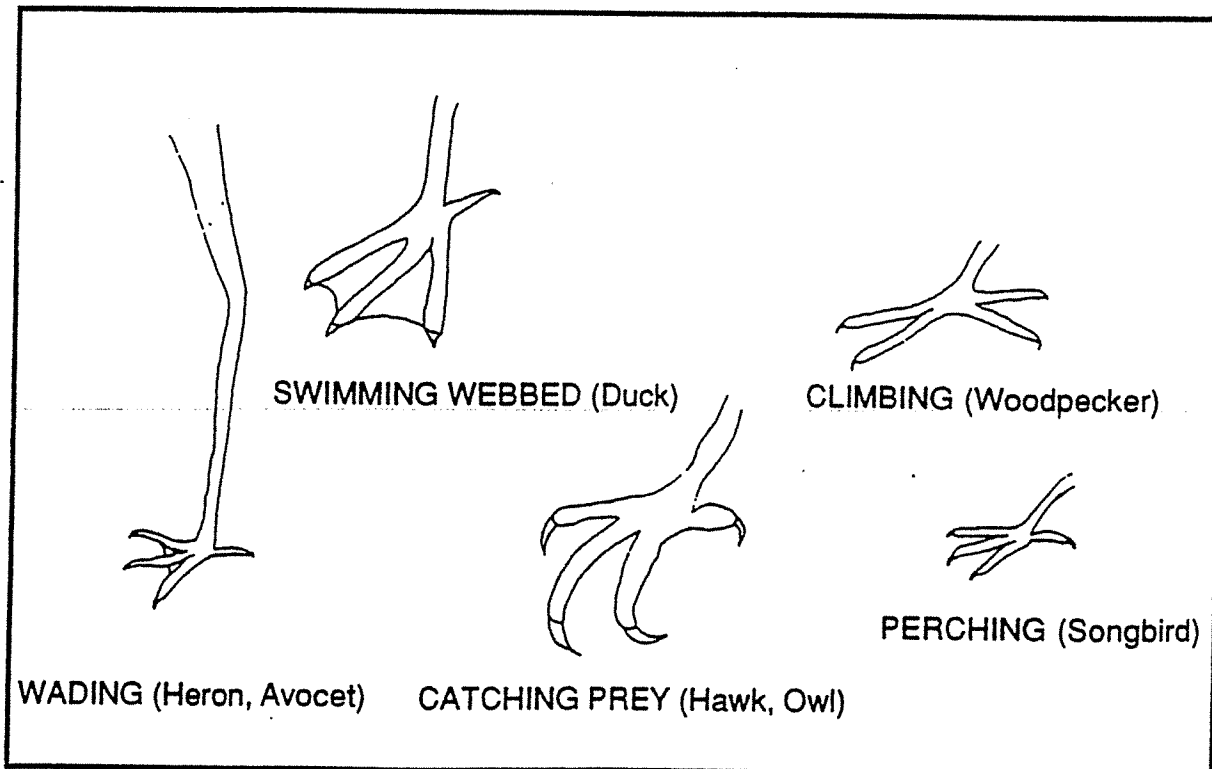


Figure 3 - Bird Feet