

## WHAT'S FOR DINNER? (2-6)

**Overview:** In this activity, students will use tools that represent a variety of birds' beaks to discover that birds have adaptations to feed on different foods in different habitats.

**Content Standards Correlations:** Science, p. 309

**Grades:** 2-6

**Key Concepts:** Birds are dependent upon the five Refuge habitats (upland, salt marsh, salt pond, slough, and mudflats). Each bird has a beak adapted to feed on different organisms in different habitats.

**Objectives:**

Students will be able to:

- describe beak adaptations of birds
- describe how beak adaptations relate to feeding behavior
- name five habitats at the Refuge

**Materials:**

**Provided by the Refuge:**

- 5 habitat clue cards with photos
- 2 posters of bird adaptations and habitats
- 12 set cups (*stomachs*)

**FOOD AND HABITATS**

- marbles (*mud creatures*) in holes drilled in board of wood (*mudflats*)
- green plastic pieces (*plankton*) floating in water (*slough*)
- red plastic pieces (*shrimp*) floating in water (*former salt pond*)
- ping pong balls (*small mammals in salt marsh*)
- water in bottles (*nectar in flowers in upland*)

**BEAKS (one beak per student)**

- 4 spoons
- 4 tweezers
- 4 eyedroppers
- 4 tongs

### TIME FRAME FOR CONDUCTING THIS ACTIVITY

**Recommended Time:** 30 minutes

**Introduction (5 minutes)**

- lead a discussion about bird beak adaptations
- show the bird beak poster

**Habitat Clues (5 minutes)**

- walk to each habitat, reading the clue card for each
- when the students name the correct habitat, turn the habitat label right side up

**Playing the Activity (15 minutes)**

- distribute "beaks" and "stomachs" to the students
- discuss rules of play
- begin each type of beak at a different habitat and allow students to "feed" for 2 to 3 minutes
- have the students rotate through all five of the habitats

**Discussion (5 minutes)**

- ask students which habitat was easiest to feed in with their beak
- show the poster with birds, habitats, and food
- discuss the importance of the refuge's habitats for birds

### HOW THIS ACTIVITY RELATES TO THE REFUGE'S RESOURCES

**What are the Refuge's resources?**

- significant wildlife habitat
- endangered species
- migratory birds

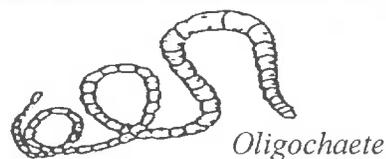
**What makes it necessary to manage the resources?**

- Loss of wetland habitats for migratory birds due to development, such as landfills, salt ponds, buildings, roads, airports, etc.

**What can students do to help?**

Refuge staff acquire and preserve wetland habitats, but we need your help.

- Reduce, reuse, and recycle, decreasing the need for landfills
- Teach others what you have learned about birds and habitats



*Oligochaete*

## SUPPORTING INFORMATION FOR THIS ACTIVITY

- At Don Edwards San Francisco Bay National Wildlife Refuge, there are a number of habitats.
  - The **upland** is the higher and drier land at the refuge. Freshwater plants grow in the upland, and small upland birds feed and nest in the upland.
  - The **salt pond** is a human-made habitat that was used for the production of salt. In the 1930's levees (dirt walls) were built around the salt marsh (the natural habitat) and the land was flooded with water from the Bay to make solar salt evaporation ponds that were used to make salt. Today, these ponds are part of the Salt Pond Restoration Project. This project will restore and enhance 15,000 acres to salt marshes, mudflats, and other wetland habitats. The water in this pond used to be saltier than ocean water; it is now brackish (mix of fresh and salt) water from the Bay. Some animals that live in the water are zooplankton, shrimp, water boatman, and a variety of fish.
  - The **salt marsh** is the transition between the Bay and upland. The salt marsh is a tidal, saltwater wetland. Bay water enters the marsh through sloughs twice a day (with the tides) and floods the salt loving plants. Salt marsh harvest mice (endangered species), shrews, and rats live in the salt marsh.
  - The **slough** is a finger of the Bay that winds through the salt marsh, carrying bay water into the salt marsh. The slough is full of zooplankton (small, drifting animals, such as copepods, isopods, and the eggs and larva of aquatic animals), phytoplankton (small, drifting plants), and detritus (decomposing marsh plants). The plankton and detritus are important food sources for fish, mud creatures, and birds.
- The **mudflats** are beneath the slough and are exposed when the tide goes out. In a single handful of mud, there may be more than 40,000 living organisms, such as clams, snails, worms, crabs, amphipods, copepods, and isopods. These mud creatures feed on detritus (decomposing salt marsh plants) and plankton (small, drifting plants and animals) and are in turn eaten by birds.
- The habitats at the Refuge provide many birds with food. Each bird at the Refuge has a unique diet that depends on its beak adaptations.
  - Many birds have **tweezer** beaks, such as sandpipers, dowitchers, and egrets. Tweezer-beak birds can probe in the mudflats for small mud creatures; they can stab at small mammals in the salt marsh. Tweezer-beaks can also feed on shrimp in the former salt pond and plankton and detritus in the slough.
  - Birds such as ducks and pelicans have **spoon** beaks. Spoon-beak birds scoop up plankton (tiny plants and animals) and detritus (decomposing salt marsh plants) in the slough, and aquatic organisms such as shrimp in the former salt pond.
  - Hummingbirds have **eyedropper** beaks and feed on the nectar in upland flowers.
  - Birds of prey grab their prey with talons and use their **tong** beak to either tear apart their prey or swallow their prey whole. Tong-beak birds, such as owls, hawks, peregrine falcons, and kestrels, feed on small mammals in the marsh.

### EXAMPLES OF BIRDS TO MATCH BEAK TYPES

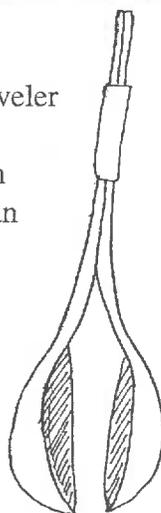
#### *tweezer beak*

great egret  
snowy egret  
dowitcher  
Ca. clapper rail  
western sandpiper  
great blue heron



#### *spoon beak*

northern shoveler  
mallard  
white pelican  
brown pelican



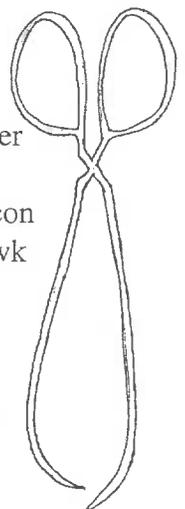
#### *eyedropper beak*

Anna's hummingbird



#### *tong beak*

northern harrier  
barn owl  
peregrine falcon  
red-tailed hawk



## HOW TO LEAD THIS ACTIVITY BY FOLLOWING THE "DO, READ, ASK" TEACHING FORMAT

### Introduction (5 minutes)

#### Do

Ask the students to sit facing you and begin the activity with a general discussion about bird beak types.

#### Read

"Each bird has a beak designed to eat the food it needs to survive. We will find out what types of beaks birds need to feed in the San Francisco Bay's habitats. Each of you will become a bird with a particular beak."

#### Ask

- ? Do all birds feed on the same food? (No.)
- ? What does adaptation mean? (An adjustment to environmental conditions; a change in an organism that helps it survive.)
- ? What is one part of a bird that is adapted to feed on a particular food? (Beak.)
- ? What kind of beaks have you seen on birds? (Take a number of answers.)
- ? Can you describe a duck's beak? (A duck, such as a mallard, has a spoon-like bill; show students the spoon.)
- ? What other birds have a spoon-like beak? (Pelicans.)
- ? Can you describe a hummingbird's beak? (A hummingbird has a beak like a straw or eyedropper; show students the eyedropper.)
- ? Can you describe an owl's beak? (Owl's use their beaks to tear apart or swallow whole small mammals; show students the tongs.)
- ? What other birds feed like an owl? (Other birds of prey, such as hawks, falcons, kestrels, and eagles.)
- ? Can you describe a shorebird's beak? (Shorebirds, such as sandpipers and dowitchers, probe with a tweezer-like beak in the mud or stab at food such as shrimp or small mammals; show students the tweezers.)
- ? What other birds have a tweezer-like beak? (Egrets, herons, and California clapper rail.)

#### Do

Show the students the poster with different birds grouped according to their type of beak: the tweezer beaks, tong beaks, spoon beaks, and eyedropper beaks.

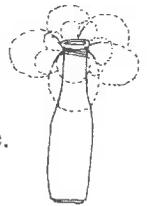
### Habitat Clues (5 minutes)

#### Do

Walk to the five different habitats, reading the clue card for each habitat to help the students guess the habitat. Let the students guess after each clue. Turn the habitat label right side up after the students answer correctly:

At the **upland** habitat (the "flowers" with water or "nectar"), read the following clues:

1. "I am a large piece of land on the Refuge.
2. By standing on me you can get a great view of the Refuge.
3. Plants that cannot stand salty water like me.
4. I am safe from the tides, and trees and shrubs can grow on me.
5. Flowers grow amongst the grasses on my dry land.
6. I am the upland!



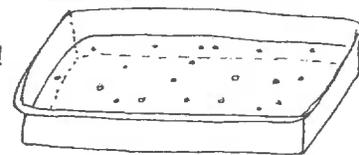
At the **salt marsh** habitat (the ping pong balls or "mice"), **read** the following clues:

1. 100 years ago, you would have seen me surround the Bay.
2. "I am sometimes covered with bay water.
3. Don't try to walk on me or you'll sink in the mud.
4. Only certain plants can live in my salty soil.
5. The salt marsh harvest mouse lives among my pickleweed plants.
6. I am the salt marsh!



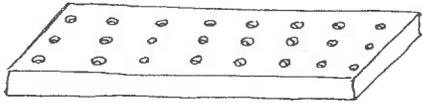
At the **slough** habitat (the water with green plastic bits or "plankton"), **read** the following clues:

1. I am long and winding.
2. Twice a day I am full of water, twice a day I am not.
3. I mix fresh and salt water.
4. I am connected to the Bay.
5. I am full of tiny floating plants and animals, called plankton.
6. I am the slough!



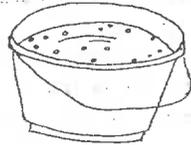
At the **mudflat** habitat (the board with marbles or "mud creatures"), **read** the following clues:

1. I am covered by water twice a day.
2. You can only see me when the tide goes out.
3. Don't step on me or you may sink.
4. I am full of tiny creatures, such as snails and worms.
5. I am the mudflats!



At the **salt pond** habitat (the water with red plastic bits or "shrimp"), **read** the following clues:

1. Birds like to rest and feed on me.
2. I was originally created by humans to make salt, but I no longer make salt.
3. My water comes from the Bay through tide gates.
4. I am in the process of being restored to salt marshes, mudflats, and other wetland habitats.
5. Zooplankton and fish swim in my waters.
6. I am the salt pond!



### **Playing the Activity** (15 minutes)

#### **Do**

- After all the habitats are named and labeled, hand out beaks and stomachs to the students.
- Each student should receive one "stomach" or cup and one beak that they keep for the remainder of the activity.
- Hand out a similar number of each type of beak, i.e. three tweezer beaks, three spoon beaks, two tong beaks, and two eyedropper beaks.

#### **Read**

"The tweezer beaks need to gather at the upland habitat, the tong beaks need to gather at the slough habitat, the eyedropper beaks need to gather at the salt marsh habitat, and the spoon beaks need to gather at the mudflat habitat. You have to follow these rules:

- "Birds do not have hands and fingers; use only your beak to pick up food.
- "Place your food in your stomach, but do not scoop up food with your stomach or throw food into your stomach; the stomach must be held upright.
- "You can only feed once you are told to do so.
- "Some of your beaks will only feed at one or two habitats. As you visit the different habitats, you will find where you feed best."

#### **Do**

- Announce that it is time to feed. Allow two or three minutes for feeding; walk among the students, making sure they are following the rules and asking them how they are doing.
- Announce when it is time to stop feeding. Ask the students how easy was it to get food.
- Ask the students to put the food back in the habitat and move in a clockwise direction to the next habitat.
- Allow two to three minutes for feeding. Have the groups feed at each habitat in the same way.
- After all the students have tried all five of the habitats, have the students sit next to the habitat that they feed at best.

#### **Discussion** (5 minutes)

##### **Ask**

- ? **Where did the hummingbirds (eyedroppers) find it easiest to feed?** (The upland.)
- ? **Where did the shorebirds, egrets, and herons (tweezers) find it easiest to feed?** (Mudflats, salt pond, slough, possibly salt marsh.)
- ? **Where did the ducks and pelicans (spoons) find it easiest to feed?** (Slough, salt pond.)
- ? **Where did the owls and hawks (tong beaks) find it easiest to feed?** (Salt Marsh.)

##### **Do**

Collect the beaks and stomachs. Show the students the poster, with birds and the food of each habitat.

##### **Ask**

- ? **What would happen if all birds had the same beak?** (They would eat the same food; they would compete; they would all use the same habitats; they might eat up all the food.)
- ? **What would happen if some of the habitats were destroyed? Would the birds be able to go to other habitats?** (Some birds would be able to find other food sources, but not all birds.)
- ? **One reason the refuge exists is to preserve habitat for birds; how can you help preserve habitat for birds?** (Reduce, reuse, and recycle to cut down on landfills; write letters to legislators about the importance of preserving habitats; don't litter and participate in Coast Clean-Ups so that habitats stay clean; plant native plants, etc.)