Fill the Bill

Bird Adaptations

Purpose:

- This activity provides resources that foster an understanding of bird bill adaptations, and the types of food for which different bills are designed.

Appropriate Grade Level: 3rd-8th

Time Required: 45 minutes + cleanup time

NGSS:

3-LS4-2: Use evidence to support the explanation that traits can be influenced by the environment.

MS-LS4-4: Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.

Objectives:

- Students will simulate bird beaks by attempting to harvest food with tools representing different beak types.
- Students will compare and contrast bird beaks and how they correlate with the environment the bird lives in.

Materials:

Provided:

- Mounts illustrating beak types
- Box marked Fill the Bill full of various utensils
- Fill the Bill Student Worksheet (*in teacher binder*)
- PowerPoint presentation "Birds and What they Eat" (*on flash drive*)

Not Provided:

- Water
- Mud/Oatmeal
- Styrofoam packing peanuts
- Rice

Activity:

Introduction	• The beaks of birds are varied and serve diverse functions. This activity is designed to let students explore the various adaptations of bird beaks by attempting to use different tools to accomplish a task. • On the flash drive, there is a PowerPoint presentation titled "Birds and What they Eat". This presentation will be a useful tool for providing students with examples of regional birds with each bill type.

	• Prior to showing students the presentation, review vocabulary found in the Glossary section (Adaptation, Environment, Habitat) and introduce the purpose of the lesson.
	• Sample introductory messages for this lesson:
	  ○ "Today we will be learning about how birds are very different from one another in both where they live, and what they eat. Where a bird lives (ocean, desert, lake, forest, grassland) determines what food may be available for its dinner. Over thousands of years birds have evolved beaks of varying shapes and sizes in order to eat food available in their habitat. Let's go over a few birds living in different habitats in Southern Oregon..."
	  ○ "By the end of our activity, you will be able to explain why a bird's beak allows it to eat its food in its habitat."

Body	• Set up six stations (directions on following page). Each station should have one "food" specific to bill type and feeding behavior (vase with water, plastic insects, nuts, styrofoam packing peanuts, walnuts, rice) and three bill types from the white box labeled Fill the Bill (straws, oven mitt, slotted spoons, chopsticks, pliers, strainers, tongs, tweezers). • Students rotate through the stations, at each station attempting to harvest the food with each of the three tools provided. Students determine which works best for each type of food and record their results. You may also have students predict which will work best prior to testing the tools. Have the students answer questions on their worksheet (Fill the Bill, Bird Adaptations Worksheet) as they move through the stations.

Closure	• Have the students illustrate their understanding of the concept of beak adaptations by completing the provided worksheet. Students should draw several beak types along with examples of the foods each is best suited to eat on their worksheet.
	• For assessment, ask the students to write a short description of the beak and food source next to each picture on their worksheet, explaining why they go together.
	• Following completion of the worksheet, have students cooperate in a discussion.
	• Sample Discussion Questions:
	  ○ From your activity, can someone give me an example of something you could pick up at the station and an example of something could not pick up from the station? Why do think this was the case?
	  ○ Can you name three differences in the types of beaks you experimented with today? What about three similarities?
	  ○ If you were a bird who ate [insects, fish, nuts, plants, etc.] what shape of beak would you want and why?

	○ Some birds live in completely different habitats (such as a forest and a prairie) but have similar beak shapes. Why do you think this is? ■ Prompting questions: could there be similar foods in these habitats? ○ What shapes and sizes of beaks do birds have that live near your home? What do you think they might be eating? ○ Why do you think a bird's habitat is important in determining what it's beak shape is?

Modifications:

Turn Fill The Bill into a game!

Clear a large space, either outdoors or indoors. Set up a variety of the food types from the activity in the space (recommendations provided on the Fill the Bill Game Worksheet). After reviewing the introductory PowerPoint, have students form groups of 2-4, depending on class size. Each group will take turns playing the game. Students will select one bill they would like to use to pick up the food objects. Have students from one group race to see how much food they can collect using their bill in 20 seconds. At the end of the 20 seconds, they should record how much of each type of food they collected on their worksheet.

Assessment:

After all the groups have gone, have students Think Pair Share with a partner that had a different bill. You may have them write down their answers on the "notes" section of the worksheet.

Sample questions (including those from the lesson's assessment section) :

- Why do you think some of the food objects were harder to pick up than others?
- If you were a bird that had this bill adaptation, what kinds of food would you eat? How would that determine where you live?

High School:

Instead of using the introductory PowerPoint, have students research different birds that live in the area and come to their own conclusions about the correlations between beak shape, food type, and environment. Bringing in themes of adaptation and evolution may be appropriate in order to fit standards (NGSS Standards: HS-LS4).

Glossary:

Adaptation: An alteration in the structure or function of an organism that results in the organism becoming better fitted to survive and multiply in its environment.

Environment: The external factors (air, water, minerals, organisms) surrounding and affecting a given organism at any time.

Habitat: An organism's natural environment. All organisms require a habitat that provides food, water, and shelter.

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Setting up the Stations for Fill the Bill

You'll need to set up 6 different stations. Each station will have a special type of food, along with three different tools – one that works well (indicated by *) and two that don't. Signs are provided to put at each station labeled with the food. You may wish to substitute tools other than those provided in the kit. Here's what you'll need at each station:

Station 1: Nectar

- Water in a vase to represent nectar in a flower.
- Eyedropper or straw*
- Fishnet
- Slotted spoon

Station 2: Worms in the Mud

- Large bowl filled with mud/oatmeal, with plastic insects at the bottom.
- Chopsticks*
- Plier
- Strainer

Station 3: Seeds with a hard covering

- Nuts
- Plier*
- Tongs
- Chopsticks

Station 4: Fish in the water

- Styrofoam chunks floating in a bowl of water
- Slotted spoon*
- Eyedropper or straw
- Chopsticks

Station 5: Tiny aquatic plants and animals

- Rice in a bowl of water
- Strainer*
- Tweezers
- Tongs

Station 6: Insects and caterpillars

- Fake insects on the table
- Tweezers*
- Oven Mitt
- Pliers