

UC Davis Arboretum Outdoor Education Program

"Bird Beaks"

Goals:

To introduce students to the concept of adaptation in the local bird species.

Time: 30-45 minutes

Age: Grades 2-6

Materials:

Various household tools of different sizes and shapes, such as tweezers, pliers, wrenches, spoons, toothpicks, clothespins, and tongs.

Objects to manipulate with the tools, such as sticks, as dry rice, beans, beads, rubber worms, pennies, and paper clips.

A pie tin or paper plate for each group.

A cup for each student.

Photographs or pictures of birds with distinctive types of beaks.

Optional, but very helpful, these can be downloaded off the internet. Example site:

<http://www.joltersdorf.com/page-birds.htm>

Overview:

Children easily make connections to the analogy of body parts functioning as tools. This learning cycle gives students a hands-on experience in the employment of different tools in a variety of substrates to give them a feel for alternative tool/anatomy actions.

Background:

Adaptation is a fundamental, key concept of biology. On a basic level, adaptations are structures or behaviors that plants and animals have which help them survive in their environment. Scientists from many different areas within the field of biology study adaptations, for example animal behaviorists, ecologists, conservation biologists, even geneticists. The study of adaptation allows students to develop and use many science process skills,

such as observation and recording, inference, critical thinking, and presenting conclusions to peers. Unfortunately, students can easily form misconceptions about adaptation, such as the idea that plants and animals can change their body parts (“adapt”) when they want or need to.

Advance Preparation:

Students will need various tools and objects to manipulate with the tools (see the materials list above). Have the students arrange their desks into groups of four or sit in groups of four on the floor. Place a pie tin or plate in the middle of each group and some objects in the tin. Give each group four different tools, and a cup for every student.

Procedure:

- 1) **Exploration** Instruct students to choose a tool, and at your signal try to pick up as many of the objects and put them in their cups as they can before you tell them to stop. Give the students 5-10 seconds to try to pick up objects. No using fingers! (Hint: using a bell or whistle is a good way to start and stop each trial time.) Ask students to notice which tool they are using and which objects they have collected. Then have the students empty their cups back into the pie tin. Have the students switch tools and do the activity again, then switch and do it a third time.

- 2) **Concept invention** After the third time of collecting objects, the teacher can have the students discuss their observations. Through asking open-ended questions, students are guided to forming the concept: some tools are better for certain jobs than others. They may also notice that some tools are good for obtaining more than one kind of object and other tools were only good for one job.

- 3) **Expansion** This concept can now be expanded by suggesting that the students pretend that they are birds and the tools are their beaks. For the fourth trial, they can re-explore picking up the “foods” with their “beaks” and think about what kinds of real foods these objects might represent to birds. At the end of this trial, make a chart with each “beak type” and ask how many of which objects students got, and see if there is a pattern (maybe the students with spoons only got rice and beans, for example). These activities and discussions expand the original concept to: birds have different shapes and sizes of beaks which allow

them to eat different foods, and some beaks are better for getting some foods than others. This is an example of adaptation. This is a good time to show students photographs of birds with different beaks and have them talk about how their beak shapes allow them to eat the foods they do.

Lead the students to realize, however, that this is only one example of adaptation. You can explore with the students several other kinds of traits that differ, and guide them in discussions about how traits allow animals to survive in different environments.

Note: it is important that students realize birds do not get to choose what kind of beak they have and cannot change their beaks even if they 'want' or 'need' to eat other foods.

Discussion:

Adaptations are traits that allow organisms to survive better in their environment. Organisms are adapted to their habitat. Adaptations include structures, such as beak shapes, teeth, coloration, claws, hooves, etc., as well as behaviors. Again, reinforce the idea that individual animals do not choose their adaptations and cannot change them. A common misconception, even among college students, is that an individual animal can adapt to its environment by changing its traits.

Extension:

To apply their understanding, students connect their experience to real animals by looking at books and photographs of birds, and discussing what they eat and what their beaks look like. Look for patterns: do the students notice any trends? Using beak shape to try and match individual bird species with their preferred foods can be a fun activity.

UC Davis Arboretum Connection:

At the UC Davis Arboretum students will discover that plants and animals have adaptations that allow them to survive in different California

environments. To connect this theme to "Bird Beaks," discuss the kinds of birds the students already are familiar with and what birds they might see in the UC Davis Arboretum (examples include hawk, heron, magpie, crow, hummingbird, duck). See if the students can identify where the birds live, what kind of beak they have, and what they might eat. These real-life examples will help connect the hands-on activity with actual bird observation in the UC Davis Arboretum.

This activity was written by Susan Crider, UC Davis School of Education, 2003.