

BEAKS TO SURVIVE

Performance Standard 12B/11A.D

Students will apply the processes of scientific inquiry to examine relationships among organisms in their environment accordingly:

- *Knowledge*: Identify and describe the physical features that help animals (birds) adapt to and/or survive in their environments.
- *Application*: Model the features (beaks) of animals (birds) that help them adapt and/or affect their chances for survival.
- *Communication*: Explain how physical features help them adapt to and/or survive in their environments.

Procedures

1. ***In order to know and apply concepts that describe how living things interact with each other and with their environment (12B) and the processes, concepts and principles of scientific inquiry (11A)***, students should experience sufficient learning opportunities to develop the following:
 - Formulate inquiry questions associated with the comparative body structures and functions as related to the adaptive possibilities in differing environments.
 - Propose and conduct inquiry investigation which finds answers to posed hypotheses/questions with limited variables.
 - Research resources for comparative photographs, environmental factors, food resources, etc. (data) for analysis to resolve proposed hypothesis statements.
 - Communicate the findings associated with adaptations related to the environment and structures and/or functions.
 - Generate further questions for future investigations.

Note to teacher: This activity relates to knowledge associated with the standard 12 B, while addressing the performance descriptors for stage D within standard 11A. This classroom suggestion is shortened from its original source at Science NetLinks: <http://www.sciencenetlinks.com/lessons.cfm?BenchmarkID=5&DocID=81> It was collaboratively created using materials and resources from The Oakland Zoo, SeaWorld, eNature.com, Peterson Online, the National Aquarium in Baltimore, the Missouri Department of Conservation, A Children's Guide to Birdwatching, and Wild About Birds websites. Permission is granted for educational purposes. The direct hyperlinked resources and activities provide extraordinary examples and strategies for classroom use. An interesting, optional extension will incorporate the processes of technological design (11B) in an assessment activity, using the Build a Bird activity from the National Aquarium in Baltimore.
2. Have students review and discuss the assessment task and how the rubric will be used to evaluate their work.
3. Begin contextual inquiry investigation for Patterns of Adaptations in Animals with questions such as: What do birds beaks do? How? What are the similarities between all beaks? What kinds of distinctions are there between different birds and their beaks? How does the food source relate to the beak's structure, etc.? Guide students toward answering their questions and stating their understanding using appropriate scientific vocabulary terms and resources. Introduce the investigation's premise of studying beaks of birds to study environmental adaptation variations. Using the process suggested at Science NetLinks for the Bird Beaks activity, students will compare pictures of varieties of birds to the kinds of foods that they eat in their natural habitats. They will use a variety of tools, mimicking beak types, such as "spoons, chopsticks, tweezers" to retrieve a variety of foods for birds, such as "glass marbles, pennies, toothpicks" in timed, competitive attempts, graphing their results. Following the discussion of their results, students should respond to the following suggested questions:
 - Which beak collected the most of which food item?
 - What do you think would happen to your bird if only one food item was available?
 - Which of the beak types feed most successfully on which food item?
 - Was one beak type successful with more than one food item?
 - Did your earlier observations about beak types help you to understand how birds feed side by side but utilize different food items?

4. Encourage students to generate further questions which could follow from this initial investigation. Science NetLinks suggests ideas such as predicting habitats where one beak type is best suited for the foods found there, finding other beak types and correlations to types of “tools”, considering if certain beak types are more successful in multiple kinds of environments.
5. Evaluate each student’s work using the Science Rubric as follows and add the scores to determine the performance level:
 - *Knowledge*: The identification and descriptions of the birds' physical features and their food source types were complete and correct,
 - *Application*: The information on the charts was complete and well-organized.
 - *Communication*: The explanations were complete and accurate. Questions for future studies were pertinent and applicable.

Examples of Student Work not available

Resources

Time Requirements

- Two to three 25 to 30 minutes sessions, depending on Internet access to resources and choices of options

- Internet access for students in small groups
- Beak practice materials: spoons, chopsticks, tweezers, marbles, pennies, tooth picks, etc.
- Clock/stopwatch
- Science Rubric