

Bird Buffet

Utah Science - Heredity



Time: 60 - 90 minutes

Grade Level: 5

Science, Standard 5

Students will understand that traits are passed from the parent organisms to their offspring, and that sometimes the offspring may possess variations of these traits that may help or hinder survival in a given environment.

Objective 2

Describe how some characteristics could give a species a survival advantage in a particular environment.

- Compare the traits of similar species for physical abilities, instinctual behaviors, and specialized body structures that increase the survival of one species in a specific environment over another species (e.g., difference between the feet of snowshoe hare and cottontail rabbit, differences in leaves of plants growing at different altitudes, differences between the feathers of an owl and a hummingbird, differences in parental behavior among various fish).
- Identify that some environments give one species a survival advantage over another (e.g., warm water favors fish such as carp, cold water favors fish such as trout, environments that burn regularly favor grasses, environments that do not often burn favor trees).
- Describe how a particular physical attribute may provide an advantage for survival in one environment but not in another (e.g., heavy fur in arctic climates keeps animals warm whereas in hot desert climates it would cause overheating; flippers on such animals as sea lions and seals provide excellent swimming structures in the water but become clumsy and awkward on land; cacti retain the right amount of water in arid regions but would develop root rot in a more temperate region; fish gills have the ability to absorb oxygen in water but not on land).
- Research a specific plant or animal and report how specific physical attributes provide an advantage for survival in a specific environment.

Materials

- ◆ a variety of carpenter and woodsman tools
- ◆ Bird Identification Sheet for each group of students
- ◆ bird identification books, such as National Audubon Society or Peterson's Guides
- ◆ several paper plates for each group
- ◆ a small cup for each student
- ◆ 4 types of food resources (see "Food and Tool Ideas" below)
- ◆ 1 tool and/or utensil (see "Food and Tool Ideas" below) for each student

Representative food	Actual Food	Simulated beak tool	Birds with this beak
Red Kool-Aid in a narrow vase	Nectar in a tubular flower	Drinking Straw	Hummingbirds
Mixed nuts in the shell	Seeds	Nutcracker or pliers	Finches and Grosbeaks
Gummy worms buried in crushed cereal	Worms in soil	Chopstick or clothespin	Woodcocks and Robins
Puffed rice floating in a dish of water	Floating aquatic vegetation	Slotted spoon or strainer	Ducks
M&M's tucked into a piece of foam or Styrofoam	Crawling insects	Tweezers	Nuthatches and Warblers
Mini-marshmallows under an upside-down egg carton with small holes cut in each egg holder	Insects in wood	Barbeque or shish kabob skewer	Woodpeckers
Goldfish crackers	Minnows	Large flat serving spoon	Spoonbills

Background

Instead of using hands and forelimbs to perform survival tasks, birds have a unique tool: their beaks. Birds use their beaks as multi-functional tools to groom feathers, weave nests, attack rivals, defend territories, communicate, and most importantly, to capture or gather food. A wide diversity of bird beaks have evolved over time.

Each bird's beak creates a survival advantage which allows that bird to reproduce and pass its inherited traits on to the next generation. For example, the heron and the woodpecker both have long pointed beaks. However, the heron's beak is better for catching fish, while a woodpecker's is better for drilling into wood for catching insects. Over time, herons have become more numerous in marshlands than woodpeckers. This is why it is so hard to find a woodpecker feeding in marshland. It simply does not have what it takes to survive in that environment.

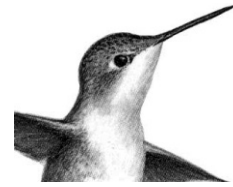
Hummingbirds feed on flower nectar and are attracted to red,

tube-shaped flowers. Consequently, they need a beak that can fit into those flowers and a long, tubular tongue to collect the nectar. Seed-eating birds, such as cardinals, have short, thick beaks enabling them to break seeds open as easily as a nutcracker. Some birds have frail beaks that would break if they tried to crack open a hard seed. However, they have large mouths that more than make up for their weak beaks. Purple martins and whippoorwills use their over-sized beaks to catch insects while in flight. Their mouths function like huge insect nets.

While some birds, such as hummingbirds, are food specialists, others are food generalists. Blue jays, for example, eat berries, seeds, grains, nuts, insects, fruit, snails, frogs, small birds, salamanders and eggs. Their ability to eat a wide variety of food provides a survival advantage by enabling them to live in a greater variety of environments than food specialists. However, they may face more competition for each type of food.

Procedures

1. Bring a variety of carpenter and woodsman tools and set them on a table. Tell students that finding food, shelter, clothing, and water are basic to survival needs. Ask students: If you were sent to a deserted island with only one of these tools, which one would you choose? Remember, the tool you choose would be the only thing you had to use to collect food, build shelter, make clothes and collect water. Have students discuss what they would choose and what survival advantage it would give them. Now ask students: Would you choose a different tool if you knew you were going to be left in the jungle, the mountains, or the arctic? Have them discuss how each environment would affect their choice of tool.
2. Tell students they are going to participate in an activity which demonstrates how birds use their beaks as one main tool in survival.
3. Divide the class into groups of 4-5 students.
4. Distribute one different type of "beak" (tool) to each student. Instruct students to hold the tool with one hand and put the other behind their backs.
5. Place a "stomach" (cup) in front of each student.
6. Place one type of food at each group's feeding area (paper plate). Instruct students that, at your signal, they must compete for as much of that particular food resource as they can gather with their "beaks." All food **MUST** go into their cups. Remind students that their survival depends on their ability to gather food.
7. Give the signal and allow the group one minute to "feed." After saying, "Stop!" have students discuss which beak was most successful in gathering what type of food.
8. Repeat this procedure at least three more times, each time with a different "food" source. Have students discuss their experience after each stop signal.
9. Have each student sort the food in their "stomach" into piles. Have each group construct a data table to record how much of each food type they collected for each type of beak. Also have them list which bird(s) had a survival advantage with each food



Broad-tailed Hummingbirds have long, tubular bills that resemble straws, which they use to sip nectar from flowers. They are numerous in the Rocky Mountain region.



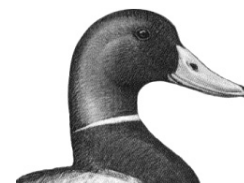
Acorn Woodpeckers have a strong, long, chisel-like bill to make holes in oak trees for winter storage of acorns.



Vermilion Flycatchers have a wide bill surrounded by a net of bristles that works to funnel flying insects into its mouth while the flycatcher is in the air.



Mergansers have a long bill with serrated edges and a hooked point, adapted for grabbing fish.



The edges of a Mallard Duck's bill are fringed to strain plants, seeds, and small animals from the mud and water. Mallards are very common in Utah.

item. Compare and discuss the data gathered by the different groups. Were any of the beaks food specialists? Food generalists?

10. Ask the students to compare each food item to things that birds really eat, such as insects, worms and seeds.
11. Have students use the Bird Identification Sheet to find which bird beak most resembles their tool. For example, a student who had a pair of pliers would identify the Evening Grosbeak.
12. Using a bird identification book (such as National Audubon Society's Guide to North American Birds) or other resources (see "Additional Resources" below) have students write a short paragraph on a particular bird's environment and what specialized structures give it a survival advantage in that environment.

Questions for Discussion, Investigation & Assessment

1. Why can a large variety of birds eat in the same geographical area?
2. Do birds use their beaks for purposes other than eating?
3. Are birds adapted to certain geographical areas according to beak structure?
4. How do a bird's feet help it to eat? What other survival advantage may a bird have according to the type of feet it has?
5. What might happen to a bird population if its environment experienced a natural disaster where all the flora or fauna were wiped out?
6. Are we as dependent on food sources in our environment as birds are in theirs? Are other animals? Are plants?
7. Could migration patterns be linked to survival in a certain environment? (Yes, some animals move because of the climate, while others migrate because a food source moves to a different climate for better survival chances. Then predators follow them.)
8. Why don't farm animals exhibit survival advantages like wild animals? (They have been domesticated and rely upon people for their food, shelter and care.)

Additional Activities, What's Next?

- Prepare a bird observation area by hanging one or more bird feeders near a classroom window. If using multiple bird feeders, use different types of food to attract different types of birds. Have a bird identification book and a pair of binoculars placed where students can use these tools for observation and identification.
- Integrate social studies concepts by having students examine Old and New World plants and animals. Did these plants need to adapt to new climates and conditions or were there greater changes in the culture of the people? Use the Internet to find information on Teosinte, a native grass that was changed over time to eventually become maize, a staple for the Native American diet.
- Have students explore how a changing environment provided different survival advantages for the English peppered moth. These moths occur in two forms: a light gray form with dark splotches, and a uniformly dark form. Peppered moths rest during the day on trees and rocks encrusted with light-colored lichens which camouflage the light form, but expose the dark form to



Western Meadowlarks use their long pointed bills to probe for insects in the ground. Meadowlarks have a rich flute-like song.



The Evening Grosbeak has a thick, conical beak, which is necessary for opening the hard outer shells of seeds to reach the nutritious interior.



Golden Eagles tear prey, such as mice, into bitesized pieces with their strong, hooked bills. Eagles soar with their wings upcurved and hunt from perches.



Avocets, like many shore birds, have long, thin probing bills. These bills come in a variety of sizes to jab at different depths in the muck, allowing many species to live together without directly competing for food.

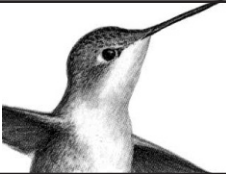


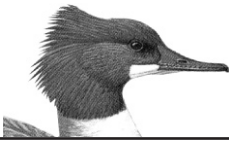
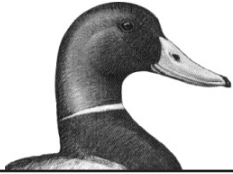




increased predation by birds. Before the Industrial Revolution, the dark moths were very rare. Pollution from the Industrial Revolution darkened the countryside in the late 1800s, killing the lichens. In this changed environment, the dark moths were concealed from birds, and the light moths became very rare.

Additional Resources

- Online Bird Guide from the Cornell University Lab of Ornithology includes color illustrations of each bird; engaging and informative text describing habitat, food preferences, breeding behavior and identification tips; sound clips of songs and calls; and range maps showing where each species occurs. It is available at <http://birds.cornell.edu/onlineguide/>.
- Citizen Science in the Classroom website from the Cornell Lab of Ornithology includes sections on “All About Birds” (detailed information on different types of bird feeders and food) and “Teaching with Citizen Science” (teaching materials and resources). It can be accessed at www.birds.cornell.edu/schoolyard/.
- Project Seasons, Shelburne Farms: Hands-on activities for discovering the wonders of the world. Written by Deborah Parrella and illustrated by Cat Bowman Smith. Available for free loan from Utah Agriculture in the Classroom. www.agclassroom.org/ut.
- Encarta. Check out the online encyclopedia (www.encyclopedia.msn.com) for survival advantages of specific organisms.

This lesson was created by Agriculture in the Classroom at Utah State University and is part of the Fifth Grade Science Teacher Resource Book (TRB3) <http://www.usoe.org/curr/science/core/5th/TRB5/>. The TRB3 was designed as a textbook for teaching science curriculum. This book covers all the objectives of each standard and benchmark. Students who comprehend the content in this lesson should do well on the End-of-Level (CRT) tests.

Bird Identification Sheet

Bird	Description
	<p>Broad-tailed Hummingbirds have long, tubular bills that resemble straws, which they use to sip nectar from flowers. They are numerous in the Rocky Mountain region.</p>
	<p>Acorn Woodpeckers have a strong, long, chisel-like bill to make holes in oak trees for winter storage of acorns.</p>
	<p>Vermilion Flycatchers have a wide bill surrounded by a net of bristles that works to funnel flying insects into its mouth while the flycatcher is in the air.</p>
	<p>Mergansers have a long bill with serrated edges and a hooked point, adapted for grabbing fish.</p>
	<p>The edges of a Mallard Duck's bill are fringed to strain plants, seeds, and small animals from the mud and water. Mallards are very common in Utah.</p>
	<p>Western Meadowlarks use their long pointed bills to probe for insects in the ground. Meadowlarks have a rich flute-like song.</p>
	<p>The Evening Grosbeak has a thick, conical beak, which is necessary for opening the hard outer shells of seeds to reach the nutritious interior.</p>
	<p>Golden Eagles tear prey, such as mice, into bitesized pieces with their strong, hooked bills. Eagles soar with their wings upcurved and hunt from perches.</p>
	<p>Avocets, like many shore birds, have long, thin probing bills. These bills come in a variety of sizes to jab at different depths in the muck, allowing many species to live together without directly competing for food.</p>