

Bird Herd Buffet

Wyoming Science, Language Arts

Objectives:

- Students will compare the traits of similar species for physical abilities, instinctual behaviors, and specialized body structures that increase the survival of that species in a specific environment over another species.
- Students will identify environments which give one species a survival advantage over another.
- Students will describe how a particular physical attribute may provide an advantage for survival in one environment but not in another.
- Students will research and report on a specific plant or animal's specific physical attributes which provide an advantage for its survival in a specific environment.

Background:

Consider what you would list for your basic survival needs. Would you list food, shelter, clothing, water? Most people would list those items. Perhaps, some items may be wants rather than needs. What if you were told that you were going to be sent to a deserted island with only one tool? What would you choose? Would you choose a different tool if you knew you were going to be left in a swamp, the mountains, or the arctic? The tool you choose may be what allows you to survive in that environment. An environment is the natural world within which people, animals and plants live. All of these external conditions surround and influence people and affect the way they live. Environments affect the life of an organism by influencing factors such as light, heat, water and food supply.

A bird cannot use a specialized tool such as a wrench or spoon to help it survive in its environment. It must rely on a specialized body structure, a built-in tool, its beak. Birds have many different kinds of beaks, depending on what they eat and where their food source is located. Sifting, sucking, cracking, crushing, spearing, tearing, picking, probing. These are just a few of the things birds can do with their beaks.

A bird's beak or bill is actually a part of its skull that is covered with a tough layer of skin. The beak is covered with skin that produces keratin, the same material found in human fingernails and hair. On most birds, the keratin condenses and dries, forming the beak's hard, glossy, outer covering. The tip and cutting edges of the beak are constantly renewed as they wear away, just like human nails. Although some birds use their beaks to defend their territories, gather nesting materials or to weave a nest, the main purpose of the



Standards

Science

Life Systems:

1.2, 1.3, 1.4, 1.5, 1.6

History & Nature of Science in
Personal and Social Decisions:

3.2a; 3.2c

Language Arts

5th Grade:

Reading: 1.3A, 1.3B, 1.3C

Writing: 1.1A, 1.1B, 1.1C,
1.1D, 1.1E, 1.1F

6th Grade:

Reading: 1.3C, 1.3D

Writing: 2.1A, 2.1B, 2.1D,
2.1E, 2.1F, 2.1G

Materials

- Bird Identification Sheet, one for each group
- Paper plates for each group
- Small cups, one for each student
- Large sheet of butcher paper for each group
- Markers, crayons or other art materials
- Bird feeder and seed
- Binoculars
- List continued on pg # 2

Estimated Time

90 Minutes

Grades 5-6

Materials:

SUGGESTED FOOD RESOURCES

Four different food resources for each group.

- Gummy worms
- Sunflower seeds
- Raisins
- Cold cereals
- Goldfish crackers
- Mini-marshmallows
- Styrofoam pieces floating in a plastic dish filled with water
- Tea leaves or herbs floating in a plastic dish filled with water
- Tall, thin glass of Kool-Aid or colored water
- M&M candies tucked into a piece of styrofoam

SUGGESTED BEAKS

Each group member should have a different tool.

- Clothespin
- Toothpick
- Straw
- Spoon
- Tweezers
- Chopsticks or skewers
- Nutcrackers
- Slotted spoons or strainers

beak is to obtain food in the easiest and most effective way possible.

Can you imagine an eagle trying to eat a mouse using a duck's bill? That would be ridiculous. Rather, eagles, hawks and other raptors have strong, sharp, hooked beaks designed for tearing prey apart. A duck's bill, on the other hand is flattened with tooth-like edges for straining food out of water.

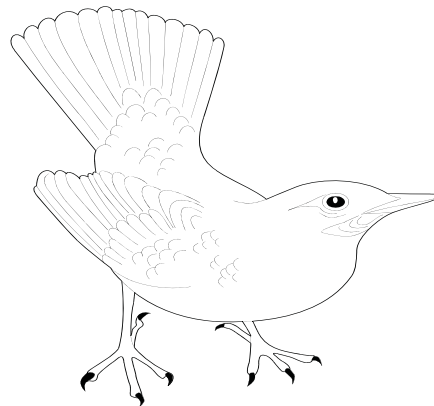
Hummingbirds feed on flower nectar and are attracted to red, tube-shaped flowers. Consequently, they need a beak that can fit into those flowers. Hummingbird beaks are long and slender and work like straws to suck nectar out of flowers. Seed-eating birds, such as cardinals, have short, thick beaks enabling 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 big mouths that more than make up for their weak beaks.

Purple martins and whippoorwills use their over-sized mouths to catch insects while in flight. Their mouths are not much different than an insect net.

Woodpeckers eat insects, too, but these birds don't catch insects in the air. They prefer to drill holes into trees and use their extremely long tongues to get the insects out. Because woodpeckers are always hitting their heads against a tree, they require a skull and beak that is designed to take a beating.

The woodcock has a really strange beak which it uses to feel and probe for food. The top half of the woodcock's beak bends and is sensitive to touch.

There are as many different kinds of bird beaks as there are birds. Bird beaks help us to identify birds, the food they eat and the habitats they live in. Each bird's beak creates a survival advantage which allows that bird to reproduce and pass its inherited traits on to the next generation. The same "tools" that make a heron better at catching fish than a woodpecker means that over time populations of these animals will be more numerous than those without them. This is why it is so hard to find a woodpecker in a marshland-it simply doesn't have what it takes to survive in that environment.



Activity Procedures:

Activity 1 - Finding the Right Tools

1. Prepare a “bird beak observation area” by hanging a bird feeder (seed or hummingbird) near a classroom window. Have a bird identification book and a small pair of binoculars placed where students can use these tools for observation and identification. Allow the students to freely visit the area for at least one week.
2. As a class, have the students list which types of birds visited the feeding station most often and what time of day was the busiest. Also have them discuss which kinds of beaks were most frequently seen. Ask them if they think that the beak was directly related to what food was offered. Share the background information with the class.
3. Divide the class into groups of 4-5. Place each of these groups in a different location in the classroom either at a table or around a clean mat on the floor.
4. Distribute one different type of “beak” (utensil) to each student, instructing them to hold it in one hand and place the other hand behind their back.
5. Place a “stomach” (cup) in front of each student.
6. Place one type of food in each group’s feeding area (plate) and instruct students that, at your signal, they must compete for as much of that food resource as they can gather with their “beaks.” Remind them that their survival depends on their ability to gather food.
7. Give the signal, and then allow each group 5-10 seconds to “feed.” All food must go into their “stomach”! After giving the stop signal. Have the students tell which beak was most successful in gathering that type of food.
8. Repeat this procedure three more times, each time with a different “food” source. Have the students report their discoveries after each stop signal.
9. Have the groups sort their food items into small piles and construct a data table to record how much of each food they collected per beak. Have them list which birds had a survival advantage with each food item. Ask the students to compare each of the food items to things that birds really eat, like snails, grubs, worms, seeds, and other things
10. Using the “Bird Identification Sheet,” have each student find which bird beak most resembles their most successful tool. For example, a student who was most able to collect sunflower seeds and crack them open with a pair of pliers would identify with the Evening Grosbeak which has a thick conical beak

vocabulary:

- *environment*
- *keratin*
- *nectar*
- *marshland*
- *observation*
- *source*

notes:

11. Finally, ask them to identify specific environments in which these birds may find the appropriate food source (i.e., seeds are found on grasslands, prairies and cultivated farmland). Have them use the bird identification book for reference.
12. Have them present their data charts to the class.
13. If edible items have been used, allow the students to eat their reward.
14. Ask the class if they have noticed which type of beak creates a survival advantage for the kind of birds that visit their classroom bird observation area.

Objectives Assessment

- Have each student complete the “Survivor” worksheet.
- Have each student research a specific survival advantage of a plant or animal of their choice. Some may choose to do further investigation of the examples given in the activities.
- Give them the following guidelines for their reporting:
 - The name of the plant or animal
 - The specific environment in which the animal survives
 - The specific survival advantage
 - Determine if the survival advantage would be as beneficial in another environment, and if so, which one(s).
- Have each student present his or her findings to the class or in groups of 4-5 students.

Extensions/Adaptations/Integration

1. 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? Check out the web for information about Teosinte, a native grass that was changed over time to eventually become maize—a staple for the Native American diet.
2. Have students explore the survival advantages of the English Peppered Moth. These moths used to camouflage themselves against the white buildings in urban areas for protection in the 1900s. Pollution, however, was so great during the Industrial Revolution that the white moths were being devoured by birds. These moths were eventually able to adapt to the darker polluted walls of the city and survive. Today, white peppered moths can be found in rural areas and black peppered moths can be found in urban areas.

Additional Resources:

Project Seasons, Shelburne Farms: Hands-on activities for discovering the wonders of the world. Written by Deborah Parrella & Illustrated by Cat Bowman Smith.

Encarta, Check out the on-line encyclopedia for survival advantages of specific organisms. Go to www.encarta.msn.com.

Questions for Investigation:

1. Thick hair may benefit the polar bear in the arctic, but would those advantages still remain if the bear were moved to a warmer climate? (no, the bear would suffer from the heat)
2. Could migration patterns be linked to survival in a certain environment? (yes, some animals move because of the climate and others migrate because a food source may be moving to a different climate for better survival chances and predators would follow them)
3. Can humans have an effect on how other organisms may need to adapt? (yes, see the example of the English Peppered Moth in the Extensions section)
4. 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)

ANSWER KEY

F- Polar Bear
F- Herons & Egrets
C- Turtles
P- Lichen Katydid
C- Prickly Pear Cactus
F- Chameleons
P- Viceroy Butterflies
P- Scarlet Kingsnake
F- Tiger

notes:

Bird Feed Ideas

REPRESENTATIVE FOOD	ACTUAL FOOD	BEAK TOOL	BIRD TYPE
Colored water in a narrow vase	Nectar in a flower	Drinking straw	Hummingbirds
Mixed Nuts in the shell	Seeds	Nutcracker or pliers	Finches & Grosbeaks
M&M Candies tucked into a piece Styrofoam	Crawling insects	Tweezers	Nuthatches & Warblers
Gummy worms buried in crushed cold cereal	Worms in the soil	Chopsticks / Clothespins	Woodcock & Robins
Puffed rice or loose tea floating in a dish of water	Floating aquatic vegetation	Slotted Spoon or strainer	Ducks
Mini-marshmallows inside an upside-down egg carton with holes cut in each of the 12 sections	Insects in wood	Barbeque Skewers	Woodpeckers



Materials Adapted From Utah Agriculture in the Classroom

Bird Identification Sheet



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 Wyoming.



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 bite-sized 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.



Survival advantages any kind of inherited trait that improves the chances of survival and reproduction for an organism. Listed are three kinds of advantages that organisms use to survive in their environments. Read each paragraph and then determine which kind of advantages these organisms use in the clues given below. Fill in the blank with a "P" if it is a protection advantage, a "F" if it is a food advantage and a "C" if it is a climate advantage.

Protection

Many advantages provide protection. Some Organisms hide for predator with camouflage markings with blends them into their environment. Others use mimicry, which allows the organism to resemble another organism that may be dangerous, poisonous or unpleasant to eat.

Climate

Climate refers to the kind of weather or the changes in weather in a certain environment. Many organisms have specialized body systems or parts that allow them to survive in certain climates. Some climates, like the artic or the desert, are harsher than others and require that the organisms that live there be uniquely adapted.

Food

Organisms cannot survive without food. Food is often collected, gathered and hunted with specialized body structures that allow the organism to obtain food efficiently in its environment.

Long hair between the pads protects the polar bear's feet from the cold and provides traction on the ice. Stiff hairs on the forelegs, and very broad front feet, help the bear swim.



Hérons and egrets are long-legged birds with wading feet which allow them to walk in shallow water to look for insects and small fish.



When the weather cools, turtles retreat to the bottom of ponds, where they remain even when the ponds ice over. They are able to absorb all the oxygen they need from the water through the linings in their mouths and throats.

The Lichen (ly-ken) katydid is hidden from predators because it resembles the lichen on which it feeds.

The prickly pear cactus has thick fleshy leaves and stems that can hold moisture.

Chameleons have long sticky tongues that project with remarkable accuracy and speed to snatch up unsuspecting insects.

Viceroy butterflies have nearly the same rust and black marking as the Monarch butterfly. The Viceroy's predators stay away because they think it is the foul-tasting Monarch.



The colorful red, yellow, and black banded pattern of the nonvenomous scarlet kingsnake is similar to that of highly venomous coral snakes.



Tigers have flexible spines.

During a high speed chase, the belly muscles tighten, making the spine arch like a bow. When the muscles relax, the cat has explosive power for the next step. A long, flexible tail acts like a rudder to improve balance.