James & Anne Robinson Nature Center

Howard County Recreation & Parks
Robinson Nature Center
6692 Cedar Lane, Columbia, MD 21044
www.howardcountymd.gov/RobinsonNatureCenter.htm
410-313-0400

Happening Habitats – Teacher Pre-visit information

Concepts

Adaptations are everywhere in the natural world and there is no better place to investigate this than by exploring the habitats found at the nature center.

Program Activities

The indoor introduction explores how animals and plants have adapted to living in specific environments. Students will compare man-made tools with wildlife characteristics in order to determine how adaptations help an organism meet its basic needs.

The outdoor hike will focus on

Pre-visit Suggestions

Read *How do Animals Adapt?* by Bobbie Kalman
Or *Animal Adaptations* by Julie K. Lundgren
Do activity called "*Why are Feathers Special*"

Vocabulary

Habitat – the place or environment where a plant or animal naturally or normally lives and grows
Adaptation – a change in an organism, over time, that better enables it to survive and multiply
Camouflage– a way of hiding something by covering or coloring it so that it looks like its surroundings
Mimicry- the imitation by an organism of its environment or of other organisms as a means of survival

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Wildlife Wonders – Teacher Post-visit information

Dear Teacher,
We hope you enjoyed your recent field trip to the Robinson Nature Center. To help with follow-up in the classroom, we have developed the following post-visit materials:

1) Follow-up discussion
2) Follow-up activities

Follow-up Discussion

1) Review the definition of habitat
    a. A place where a plant or animal gets its:
        i. Food
        ii. Water
        iii. Space/air and shelter

2) Review the three habitats that we visited at Robinson.
    a. Stream
    b. Garden/meadow
    c. Forest

3) Review some adaptations that animals have and the human equivalent
    a. Box turtle – hard hat
    b. Wineberry – fly swatter
    c. Pileated woodpecker – drill
    d. Skunk –bug spray
    e. Deer – camo fabric
    f. Butterfly – straw
    g. Cosmos- joggers vest
    h. Red tailed hawk – binoculars
    i. Mole- shovel
    j. Beaver – cleaning gloves
    k. Duck – strainer
    l. Fish – oar
    m. Frog - flippers

Follow-up Activities

How Do Birds Adapt to Eating – Use this lesson to match kitchen utensils to different bird beak types. The kitchen utensils are used in a similar way that different birds use their beaks

What are Some Other Eating Adaptations – This activity relates kitchen utensils to different animal mouth types and further distinguishes the type of food these animals eat.

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WHY ARE FEATHERS SPECIAL?

Materials needed

Bird flight feathers (one per student)
Hand lens (magnifying glass) – one per student

Procedure

1. Use the hand lens to examine your feather. Notice that it is made up of a strong ***shaft*** or ***spine***, with many small threadlike pieces or ***filaments*** attached on either side of the spine.
2. Examine the shaft. Hold it by the thicker end and carefully bend the opposite end a little bit. What happens when you release the bent end?
3. Carefully separate the threadlike filaments near the middle of your feather. Notice they seem to stick together. Although you probably will not be able to see them with a small hand lens, each filament has hundreds of tiny hooks, called ***barbules***, which hold the filaments together to make a long, flat surface called a ***vane***.
4. Beginning at the shaft, use your fingers to gently stroke the area where you separated the filaments. Can you describe what happens and why? Can you think of man-made devices similar to this?

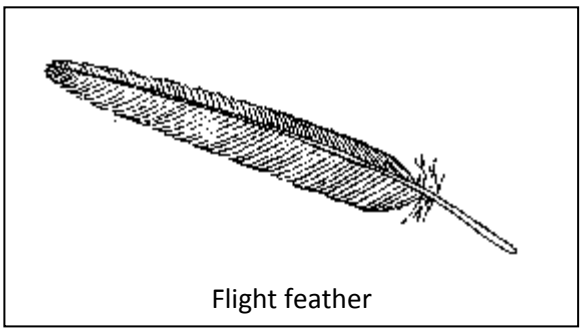
Teacher Information

Before you use feathers, certain precautions should be taken. Be certain they are clean and free of dust and tiny insects such as fleas and lice. Most feathers can be rinsed in warm water (no soap), and when dry, placed in a microwave oven for one to two minutes.

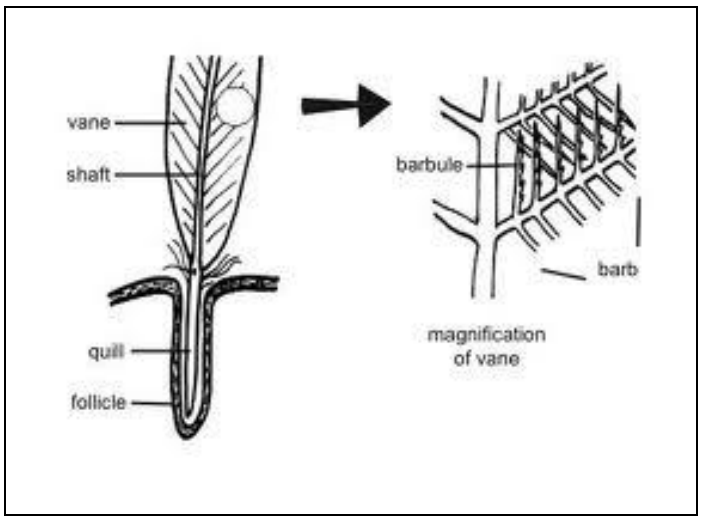
Feathers are remarkable examples of animal adaptation. Man has not been able to produce any material or system to match them, weight-for-weight, for strength, insulation or air-foil qualities.

The substance of which feathers are made is called ***keratin***, similar to the material in human fingernails. The tiny barbs on the filaments allow them to be separated and rejoined, much as we use zippers or Velcro fasteners.

The filaments of flight feathers lock together in an overlapping pattern, providing extra strength. If you have a large feather and a strong magnifier you may be able to see the overlapping by looking along the shaft from a nearly horizontal angle. Many of the following activities use birds as example of adaptation



Flight feather



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HOW DO BIRDS ADAPT TO EATING?

Materials Needed

Variety of pictures of birds with many kinds of beaks (names of food they eat written on back)

Teachers: food items can be found in the chart below, each food item is underlined

Photos of household utensils and tools

Procedure

1. Arrange the pictures of birds on a large table. Carefully study their beaks. What type of food do you think their beaks are best designed for?
2. Look at the household tools. Do any of them remind you of birds' beaks? Be sure you know how each one works.
3. Examine each household implement and put it next to the bird whose beak it most closely resembles. Can you think of other objects around your home or school that work the same as birds' beaks?
4. Test yourself by turning the bird pictures over. On the back is a list of foods they eat.

Teacher Information

Birds do not have teeth, but some of their beaks or bills are highly specialized depending on the food they usually eat. The terms beak and bill are generally used interchangeably. Some ornithologists reserve the term beak for the sharp, hooked beaks of hawks, eagles, owls and other birds of prey.

The most common beaks among land birds are varieties of the short, strong seed eaters. If you have a canary or parakeet visiting in your classroom, notice that before it eats some types of seeds, it uses its beak to split and remove the outer covering or husk.

Ducks and many other birds with flat bills often use them in water as strainers or sieves to draw in plants, snails, and small aquatic animals. The varieties, range, and eating habits of ducks make them easily available for study throughout the moderate climates of the world.

Some birds (for example, grebes and cormorants) with long scissor-like bills catch small fish by diving and swimming under the water for short periods of time. Other fishing birds (herons and egrets) stand on long legs and fish near the shore.

Marsh and shore birds (for example, sandpipers) have long, often curved bills to catch shrimp and other crustaceans in marshlands and at the seashore.

Some birds (terns, pelicans, kingfishers) circle in the air above the water and dive under to catch fish with their scissor-like bills.

The bills of woodpeckers are mostly long and sharp and have build-in shock absorbers to chisel out tree bark insects and construct nest holes. Some woodpeckers also eat acorns and other nuts, often drilling holes in trees as storage bins for their food.

Some birds (pigeons, jays, gulls) eat a wide variety of foods and many become bothersome intruders at picnics and campsites.

The tiny hummingbird uses its very long bill much like an eye dropper to draw in nectar and pollen. Despite its small size, the hummingbird is an excellent flyer and can hover, dart at high speeds, and even fly backward. Hummingbirds are highly territorial, somewhat aggressive, and usually friendly and curious.

Adaptations of birds are almost unlimited. Probably the most feared and respected are the predatory birds (eagles, hawks, ospreys, falcons, owls) with sharp, hooked beaks and powerful claws. Although of different scientific classifications, these birds are often referred to as raptors. They have strong, sharp beaks and claws, superior flying ability, and excellent eyesight.

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 cup or scoop	 Nutcracker
 Salad tongs	 tweezers
 chisel	 Shredder or grater

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 strainer	 spear
 probe	**(Some tools will be matched with more than one bird)**

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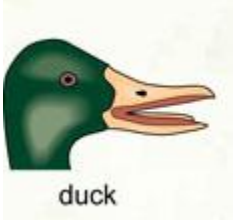
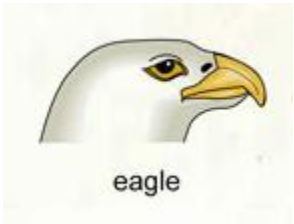
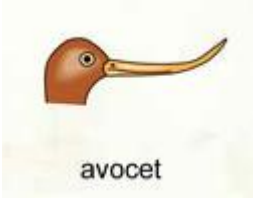
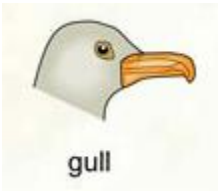
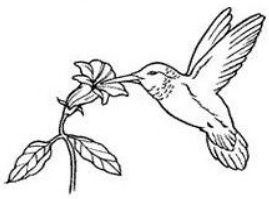
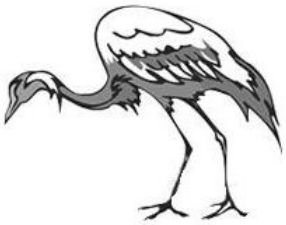
 duck	 eagle	 flamingo	 avocet
 gull	Hummingbird 	 parrot	 pelican
Owl 	Heron 	Sparrow 	Woodpecker 

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Answer Key and Food Clues		
Bird	**Adaptation**	**Bird Beak Tools**
Pelican	Pouch-like beaks to scoop fish from water	Cup or scoop
Hummingbird	Long slender beaks to probe flowers for nectar	probe
shorebirds	Long thin beaks to probe shallow water, mud and sand for small invertebrates	tongs
Woodpeckers	Strong pointed beaks to drill or chisel into wood and probe for insects	chisel
Owls, hawks, and eagles	Sharpe, curved beaks for tearing meat from mice and other animals	grater/shredder
Herons and egrets	Long sharp beaks for catching or spearing fish and amphibians	spear
Sparrows and finches	Short stout beaks to crack open and eat seeds and nuts	nutcracker
Flamingo, some Ducks and swans	Blunt spoon-like bills that have fine combs along upper and lower edges to strain aquatic plants and algae from water	strainer
Avocet	An upward-curving bill. In clear water, avocets wade into water and feed by sight by picking prey (insects, shrimp, and crustaceans) from the surface of water or mud, using its long, thin beak to pinch prey between upper and lower beaks.	tweezers
Parrot	Parrot beaks are extremely strong, and one of their primary tools for protecting themselves. The same beak strength a parrot uses to take down would-be predators allows him to enjoy a varied diet -- instead of just eating small or soft foods, he can easily bust open nuts and seeds that have hard outer shells.	nutcracker