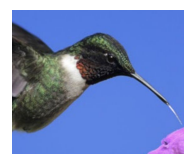
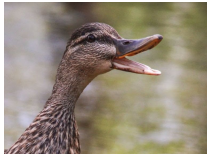


Adaptations		Grade 7 Biology
Lesson Plan	Safety Notes	Be careful when using scissors or other sharp objects.
<b>Description</b> In this lesson, students will learn about animal adaptations. The focus of adaptations will be on bird beaks specially adapted to their diet. This will help to better understand interactions between biotic elements within the environment and interactions in ecosystems.		
<b>Materials</b> -1 handful of rice -1 handful of legos or dried pasta -Playdough -Popsicle or skewer stick -Scoop or ladle -Eye dropper or straw -Strainer or a sieve -Food colouring -2 medium sized bowls -1 small bowl -Water -Scissors		
<b>Science Background</b> <p><b>Adaptations:</b> are modifications that are suitable for a new use or purpose. These modifications allowed living things to evolve to be more fit to exist under the changing conditions of the environment. Animals also develop physical and behavioural adaptations to improve their chance of survival.</p> <p>An animal that has many adaptations perfectly suited for their habitat and diet are: birds. The adaptations that vary greatly between bird species are feet and <b>beaks</b>. Beaks are made from keratin, the same structural proteins our hair and fingernails are made of. This keratin allows the beak to be strong and durable but also rebuilds as beaks wear down. Each beak is perfectly designed for a certain diet. Below are types of birds and descriptions of their adapted beaks:</p> <ul style="list-style-type: none"> <li>● <b>Ducks:</b> Ducks are omnivorous and they are constantly foraging for seeds, insects, plants and mollusks. Ducks have a little bump on their upper beak. This is used as a shovel so the ducks can dig to find food and will also swallow food whole. Ducks have a flat bill to eat aquatic plants and animals and this shape helps to crush that soft food without exerting much force. They also have a structure that looks like the teeth of a comb around the edge of their beaks and this helps filter the food, water and mud.</li> </ul>		

- **Raptors:** Raptors like eagles, hawks, falcons, owls and vultures have a hook shape beak to tear and pull the flesh and crush bones of their prey. The sharp edges of their beaks also help with this task. Thus, these birds are carnivorous. The size of their beaks gives you a big indication of what they like to eat. All of these raptors have very different diets but they all depend on their special beak to eat.
- **Pelicans:** A pelican's beak has a pouch attached to the lower beak that can expand and contract. Pelicans will swoop down and scoop up fish, while taking in large amounts of water. The pelican then opens their beak slightly and contracts the pouch to empty the water and keep the fish inside. These birds do not chew their food, but will reposition the fish in order to have the fish go down headfirst so it is easier to swallow.
- **Hummingbirds:** Hummingbirds are nectarivorous, meaning their food of choice is nectar. They need an elongated needle-like beak to reach the nectar within the flowers that other animals can't get to. Their beaks are adapted to fit a certain species of flower. The beak actually protects their very long tongue that is forked at the end in the shape of a Y and has little hairs and grooves that trap the nectar. As their tongue retracts back into their mouth, the nectar goes down the throat.



## Activity Procedure

In this activity, we will use household items to demonstrate the relation between different beaks with different types of food certain species eat. There will be four types of food and four different beaks, try and see which beak is the best suited for each type of food.

1. To begin, add some water in each bowl
2. In the medium bowl, add some rice (aquatic plants)
3. In the other medium bowl, add the legos or pasta (fish in water)
4. In the small bowl, add a few drops of food colouring and mix (nectar)
5. Next, wrap the playdough around the popsicle stick or skewer sticks (meat on bone)



6. Now we will compare different beaks of birds and see which beak is adapted for which food.
7. The four “beaks” we will be using are the strainer (duck bill), eye dropper (hummingbird beak), scissors (raptor beak) and scoop (pelican beak).

8. Through trial and error, figure out which beak is best adapted to each food item!
9. Answer questions 1-3 on the handout.

### Debrief

These beak adaptations help birds find, catch and eat the food which corresponds to the habitat they live in. We can see that beak adaptation in birds can vary tremendously between species just by exploring a handful of birds. Birds have more adaptations like colour, wing, size, feet, calls and behaviours which helps them survive in their habitats. Although this lesson focused on bird adaptations, every biotic creature has adaptations which help them survive including groups like insects, fish, mammals, reptiles, amphibians and plants.

## Adaptations

## Grade 7 Biology

### Handout

- Based on deductive reasoning, match the birds with their specially adapted feet:

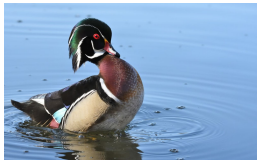
Bald Eagle



Cassowary



Wood Duck



African Jacana



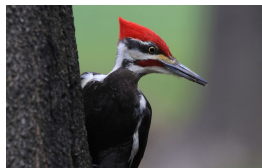
White-throated Sparrow



Great Blue Heron



Pileated Woodpecker



2. Complete the multiple choice below:

What are the woodpecker's feet adapted for:

- a) Tap dancing
- b) Crackings seeds
- c) Climbing trees
- d) Swimming

By looking at an eagle's large talons, what do you think it eats?

- a) Seeds
- b) Fish and animals
- c) Nectar
- d) Pizza

White-throated sparrows have a tendon that automatically flexes when weight is applied, this has adapted the sparrow to be able to \_\_\_\_\_ better?

- a) Crack seeds
- b) Hold onto prey
- c) Dance
- d) Perch on branches

The African jacana has long toes which are able to disturb its weight. What do you think this would be helpful for?

- a) Flying
- b) Moonwalking
- c) Walking on lily pads
- d) Perching on branches

If a bird has webbed feet, what habitat would you expect it to live in?

- a) Jungle
- b) Wetland
- c) Forest
- d) Grassland

3. When you used different household items as "beaks", which beak worked the best with each food item and why? Use specific bird species examples and site the adaptations for each beak.

## Handout (Answer Key)

1. Based on deductive reasoning, match the birds with their specially adapted feet:

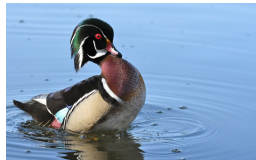
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Cassowary



Wood Duck



African Jacana



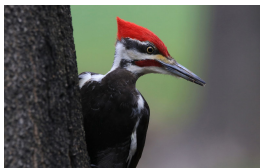
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- d) Grassland

3. When you used different household items as "beaks", which beak worked the best with each food item and why? Use specific bird species examples and site the adaptations for each beak.

Strainer (duck) → Rice in water (aquatic plants)  
 Scissors (raptor) → Playdough on popsicle stick (meant on bones)  
 Scoop (pelican) → Pasta in water (fish in water)  
 Eye dropper (hummingbird) → Dyed water (nectar)