

Section 1

Objectives

- Children will understand what animal adaptations are.
- Children will be able to explain why animal adaptations are important.
- Children will be able to explain different types of animal adaptations and how they serve different animals.

Animal Adaptations -- Vocabulary

Adaptation

A body part, body covering, or behavior that helps an animal survive in its environment.

Behavior

The actions of an animal.

Camouflage

A color or shape in an animal's body covering that helps it blend into its environment.

Environment

Everything that surrounds and affects a living thing. The environment includes non-living things, such as water and air, as well as other living things.

Habitat

The place where an animal lives. The physical characteristics of an animal's surroundings.

Inborn Behavior (instinct)

A behavior an animal is born with and does not have to learn.

Mimicry

An adaptation in which an otherwise harmless animal looks like a harmful animal in order to protect itself.

Predator

An animal that hunts and eats other animals for food.

Prey

An animal that is taken and eaten by another animal (predator) for food.

Survive/Survival

Using adaptations to continue to live.

Section 2

Adaptations

Adaptations are any behavioral or physical characteristics of an animal that help it to survive in its environment. These characteristics fall into three main categories: body parts, body coverings, and behaviors. Any or all of these types of adaptations play a critical role in the survival of an animal.

Adaptations can be either physical or behavioral. A *physical adaptation* is some type of structural modification made to a part of the body. A *behavioral adaptation* is something an animal does - how it acts - usually in response to some type of external stimulus. When you look at an animal, you usually can see some of its adaptations -- like what it is able to eat, how it moves, or how it may protect itself. Different animals have many different ways of trying to stay alive. Their adaptations are matched to their way of surviving. Each group of animals has its own general adaptations. These groups are: fish, amphibians, reptiles, birds, and mammals. Some of these adaptations make it easy to identify which group an animal belongs to. A good example of an animal adaptation is the way in which an animal moves from one place to another.

Animals have evolved their adaptations. This means a long period of slow change resulted in an animal's adaptation(s). The spots on the snow leopard, for example, did not emerge overnight. Instead, this process took generation upon generation of snow leopards physically adapting to their environment for characteristic spot patterns to evolve. Those snow leopards with spot patterns were able to hide more successfully, therefore surviving longer than those without spots. This allowed the longer surviving snow leopards to reproduce and create more snow leopards with spot patterns like their own. Indeed, this process of change over time is the key to how many organisms develop adaptations. Some adaptations can arise quickly through genetic mutations; these mutations also may be deadly.

In the sections that follow, different types of distinctly visible adaptations and their importance will be discussed. Since behavioral adaptations are far more difficult to observe, these will not be discussed. However, the visible adaptations mentioned are easy to recognize on most animals at the Zoo and should be of special interest to children.

Body Parts

Many animals have developed specific parts of the body adapted to survival in a certain environment. Among them are webbed feet, sharp claws, whiskers, sharp teeth, large beaks, wings, and hooves.

Webbed Feet



In most aquatic animals, swimming is a must. To aid swimming, many animals have adapted and evolved with webbed feet. Webbed feet help animals propel themselves through the water with ease. This can help the animal swim faster to catch prey or escape a predator. Also, if an animal has to swim long distances, webbed feet can help it save energy so it can swim farther. One animal that can be observed at the Zoo with webbed feet is the rockhopper penguin. Other animals with slightly webbed feet: the polar bear and otter.

Sharp Claws

Many land and sea animals alike have developed sharp claws. Sharp claws can be used for many different purposes. For instance, many herbivores use their sharp claws for digging for berries, roots, and herbs or burrowing for shelter. Animals that eat meat may use their claws for killing their prey or tearing meat from their kills. Also, claws can be used to increase traction to run faster, as in the case of the cheetah. Other times, sharp claws have evolved for use in defense. For some animals, showing of claws is enough warning for their predators or competitors to back off. There are many animals at the Milwaukee County Zoo with sharp claws, including many of the bears and felines, as well as aquatic animals like the California sea lion.

Whiskers



Although not usually thought of as an adaptation, whiskers serve an important purpose for many animals. In most cases, whiskers around the face, specifically the mouth area, help the animal feel its way through tight spots. In a way, they serve as "feelers," telling the animal whether or not it can fit into a specific area. One example is that of the North American river otter, which can use its whiskers both on land and in water. On land, they are used to feel their way through narrow channels, with a similar purpose for the whiskers under water. They are also useful to sense prey.

Sharp Teeth



One of the most visible adaptations on many animals, sharp teeth help an animal eat meat. Found primarily on meat-eating animals, or carnivores, sharp teeth are used mainly for the tearing and chewing of an animal's prey. Rather than developing the dull teeth of plant-eaters, or herbivores, carnivores rely on their sharp teeth to allow them to eat and survive. Sharp teeth can serve another purpose: defense. In some animals, bearing a large set of sharp teeth can show power or fear. The Milwaukee County Zoo features many animals with sharp teeth. Unfortunately, it is often difficult to see this distinctive feature. Some animals that we suggest you watch are the snow leopard, cheetah, African lion, mandrill and lowland gorilla.

Large Beaks



Just as in the case of sharp teeth, large beaks are often an adaptation used to help an animal eat. However, large (and often sharp) beaks can be a feature of both carnivores and herbivores. For instance, the large beak of the macaw has been adapted to help it crack open large nuts to reach the sweet fruit and pulp inside. On other birds however, the large beak is used to tear meat, as in the case of the rhinoceros hornbill. The rhinoceros hornbill uses its large beak to tear meat off of an animal it scavenges -- usually the result of another animal's kill.

Wings/Flying



Wings are another highly visible adaptation on many animals. Although most think of birds when it comes to wings, other animals like the vampire bat also have wing-like structures that help it fly. Of course, the primary function of wings is flight in most animals with wings. Animals like the golden eagle and peregrine falcon can reach speeds up to and above 60 miles per hour in flight. This flight is used to attack its prey. Other animals, like the Micronesian kingfisher, do not reach the speeds of other raptors, but still use their wings to travel from place to place. Finally, the Humboldt penguin does not use its wings to fly at all. Instead, it uses its wings as flippers to move through the water.

One point of interest with the vampire bat is that its wings are not really wings. Bats evolved separately from birds and thus their "wings" are structured much differently than the wings of birds. In fact, a vampire bat's wing structure is more similar to the hand of a human than the wing of a bird.

Hooves

Hooves are another body part that are an important adaptation for many large animals. In most cases, animals with hooves use their specially adapted feet to maneuver in a rocky environment. Hooves protect the feet of these animals and allow for greater mobility than unprotected feet. Animals at the Milwaukee County Zoo with hooves include the greater kudu, zebras, and the Dall sheep.

Body Coverings

An animal's body covering is one clearly visible adaptation. Body coverings help to protect animals in diverse environments -- from the land to water, from the arctic to the desert. Mammals have hair, or fur, that helps insulate their bodies. It keeps them warm in winter and can protect specific areas of the body, like eyelashes protecting the eyes. Some mammals have different coverings: the armadillo has plates, the porcupine has quills, and naked skin covers the dolphin. All of these help these mammals to survive in the different conditions in which they live. Birds also have a very protective covering: feathers. The feathers keep the bird warm in winter, help it fly or swim, and help fan the bird in hot weather.

Amphibians and reptiles have body coverings that protect them as well. Amphibians have moist, slick skin that is well suited for the water. Reptiles have tough, dry skin covered by scales. Insects, such as the cockroach, have coverings that enable them to squeeze into very small places. This allows them to find food and shelter. Many insects build nests (a behavioral adaptation) or cocoons (behavioral and structural adaptation) for the winter because their body coverings alone do not permit them to adjust to the cold. Many insects also have other adaptations included in their body coverings: cells that sense light and pigments that allow some insects to change colors in order to hide themselves from predators.

Striped Fur



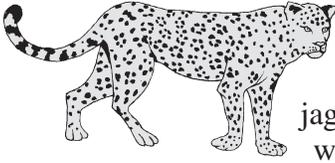
Striped fur is one variation of a special adaptation called camouflage. Striped fur, in most cases, helps animals blend into their environment. This helps the animal in one of several ways, including hiding from predators and sneaking up on prey. Striped fur, as in the case of a tiger's vertical stripes, serves the animal by helping it match the surrounding vegetation, thus making it nearly invisible to other animals. In other animals, like the skunk, the stripes serve as a warning to predators. In this way, the stripes serve as a defense mechanism.

Brightly Colored Feathers



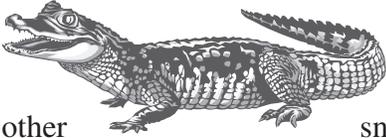
Found mostly in tropical rain forests, birds with brightly colored feathers are another example of an animal with an adaptive body covering. Brightly colored feathers can serve several purposes, including camouflage, defense, and mating. In some parts of the rain forest, the macaw and its brightly colored feathers can hide amid similarly brightly colored plants and flowers. The male peacock uses its bright feathers for another purpose: attracting a mate. In contrast to the male, the female peafowl has very dull colored feathers. This feature, common among female birds of most species, helps females hide while guarding their nest and protecting their young.

Spotted Fur



Another adaptive type of body coloring is spotted fur. Spotted fur is similar to striped fur in the fact that it serves as camouflage. Many animals with spotted fur live in heavily wooded forest areas. One example is the jaguar, which lives in the rain forest. The jaguar's spotted fur helps it blend in with the small patches of sun that reach the rain-forest floor. These patches, mixed in with the shade, produce an effect that highly resembles a jaguar's coat. Another animal with spotted fur is the snow leopard. The snow leopard, with a white coat and black spots, lives in wooded areas as well, using its coat to hide amid the trees and snow.

Scales



One final type of body covering is scales. Scales serve a purpose different than that of fur and feathers. Scales are mainly a protectant from the environment for most animals. For instance, anacondas and other snakes at the Milwaukee County Zoo have scales to protect their bodies from the variety of terrain they encounter. In the case of the anaconda, its habitat is largely made up of water. In the case of other snakes, the climate may be dry and the land sandy and rocky; so they cannot afford to lose water from their body. Scales help protect the body of the animal in an instance where skin, fur, or feathers would become damaged or destroyed.