

Kids' Discovery Clubs

Overall Objectives

These child-based, exploratory stations located in 6 areas of the Park provide activities for young Guests and their families at Disney's Animal Kingdom. The objectives are:

- to connect children (ages 3-8 years old) with the natural world through interactive, exploratory, micro-environments that encourage children to get involved
- to awaken their senses using different learning styles and ensure "family friendly" exhibits
- to embrace strong educational themes that deliver the conservation message: "Care for Wildlife and Wild Places"
- to provide activities for small Guests who are not tall enough to ride all the attractions
- to link each land of the Park with Rafiki's Planet Watch, our conservation center
- to increase Guest capacity in current low capacity areas

What should a child's micro-environment include?

A child's space, or micro-environment, fosters and promotes caring attitudes in young Guests. It integrates play and learning, and focuses on the process of discovery and exploration of the natural world. The design includes activity elements that are at their level, fun, interactive, robust, and discovery-based. Each activity is designed to incorporate the storyline in the individual lands where they are located.

ADA Guidelines offer Guests with disabilities an opportunity to take an active role in our Kids' Discovery Club activities.

Be sure to "Place the Guest first, not the disability"

Do not assume a Guest with disabilities cannot participate in certain activities. Direct them the same way you would direct other Guests.

Provide exceptional Guest service by using props, pictures, or other learning tools to preserve the Magical Guest experience.

Asia

Can you identify the animal by its call?



Level:
3-8 Years

Subject Area:
Naturalism, Animal
Tracking

Duration:
2-4 minutes

Setting:
On Pathway to
Expedition Everest

Skills:
Identification using the
sense of hearing

Summary

This activity develops children's sense of hearing and curiosity. By hearing the sounds animals make, young Guests discover the importance of these vocalizations to wildlife and scientists studying animals.

Objectives

- To identify 3 animals that come from Asia using recordings of the sounds the animals make
- To make connections between animals in their environment
- To understand that animals depend on their sense of hearing to learn about the wildlife in an area
- To leave children with the message "Care for Wildlife and Wild places"

Materials

- 3 Animal sounds
- 3 Animal pictures
- Props
- Containers

Making Connections

Children are fascinated by the world around them. By developing their sense of hearing they build an awareness of their surroundings and make discoveries about the natural world.

Background

The Rainforest

Tropical forests are home to the largest and smallest, the loudest and the quietest, as well as some of the most dangerous, most beautiful, most endearing, and strangest looking animals on earth. You've probably heard of some of them such as tigers, bats, and tarantulas. There are millions of fascinating animals in the tropical rainforests; many haven't been named or even identified yet.

In fact, about half of all the earth's animal species live in tropical rain forests. Scientists believe that there is such a great diversity of animals in the rainforest because rainforests are the oldest ecosystem on earth. Some rainforests in Southeast Asia have been around for at least 100 million years. During the Ice Ages, the last of which ended about 10,000 years ago, the frozen areas spread over much of the earth, causing a high rate of animal extinction. The giant freeze did not reach a number of refuges in tropical rain forests. Therefore, the rain forest plants and animals continued to evolve, developing into the most diverse and complex ecosystem on earth. Some rainforest species, like invertebrates, have populations that number in the millions.

Plants and animals depend on each other for survival. Many of the relationships in the rainforest are so close that one partner cannot survive without the other. This is called interdependence. For example, top predators, like tigers, use tall grasses to camouflage and help hide them while stalking prey such as elks deer. This chain of predators and prey is called a food chain. As a result of this interdependence, if one type of plant or animal becomes extinct, several others could be in danger of extinction as well. Rainforests are essential, not just to those who live in or near them, but to everyone on the whole planet. Tragically, rainforests are being cut down at a fast rate. They can never be replaced and their loss will affect everyone in the world. Rainforests even help control the world's climate. When the rainforests are cleared and burned, carbon dioxide is released into the atmosphere which may cause the weather to be much hotter. This process is called the greenhouse effect. People also use many materials that come from the rainforest. Many of our medicines, such as aspirin, heart disease treatment, and painkillers, come from plants that grow in rainforests.

By encouraging careful use of the rainforest, we can protect these complex ecosystems for our future. Many products, such as medicines, shade-grown coffee, vanilla, and cocoa can be taken from the rain forest without destroying the land. You can make a difference by purchasing sustainable forestry products to help save wildlife and wild places.

The use of sounds for animals and scientists

You don't always have to actually see an animal to know it's there. Scientists use many different methods to track animals in the wild. For example, they look for visual signs such as footprints, dung droppings, browsed plant material, nesting sites, etc. Scientists may track animals for a number of different reasons. They may want to find out where the animals live, how many of a particular animal live in a certain area, the distance traveled by the animals, or they may be tracking an individual animal.

Tracking is very important when you are studying endangered animals. It's important to know as much about the animals you are studying as possible. Gathering as much information as you can about habitats, food supplies, and environmental conditions makes it possible for scientists to help species and ensure their survival.

Procedure

Warm up

Ask kids to listen to the sounds of the forest. Use your senses, much like some animals do, to find out more about the world around you.

The Activity

Step 1: Tell the children that most of the time we explore nature with our sense of sight, but today we are going to explore with our sense of hearing

Step 2: Have them listen to the sounds

Step 3: Have them guess what animal made that sound

Step 4: Use props to utilize their sense of touch and sight to help identify each sound. Briefly talk about each sound. For example, animals depend on their hearing to learn about the wildlife in an area. Siamangs use vocalizations to communicate with other members of their family or to warn others of a predator in the area.

Extensions

Be sure to leave Guests with the message to care for wildlife and wild places. Remind children that both plants and animals are being affected by habitat destruction. Direct them to Conservation Station where they can learn about endangered animals and what they can do to help protect them. One thing they can do to help is to create habitats in their own backyard to protect native wildlife. At Rafiki's Planet Watch they can learn more about creating backyard habitats.



Sample Conversations

Tiger Conversations

- Tigers depend on forest habitat

“Can you see the tiger?” They use their stripes to blend in with the trees. Tigers rely on the forest cover to hide them while hunting. You can help protect wildlife and their habitats around the world by contributing to conservation organizations such as the Disney Worldwide Conservation Fund.”

- Tigers are the largest cats

“Tigers are big! They are the largest cats in the world. Some exceptionally large tigers may weigh as much as 500 pounds. For a long time, people hunted tigers as trophy prizes and for their brilliant striped coat. Today, tigers are protected. You can help protect wildlife by being sure to only purchase products that are wildlife-friendly.”

- Tigers are protected.

“Not so long ago, people would hunt tigers and all the animals around Anandapur. After many years of hunting, very few tigers and deer were left, but today we protect all the wildlife here. We believe in caring for all living things. Learn more about wildlife so that you can help protect it.” (Use this conversation even when tigers are not visible.)

Siamang Conversations

- Siamangs live in the rainforests of Asia.

“Look up! Can you see the siamangs above us? Siamangs spend most of their time in the high canopy of Asia’s tropical rainforests. Though the forest has many different levels, siamangs prefer the treetops. It’s in the canopy that they find their favorite foods and feeding sites. Without their forest habitats, the siamangs and many other animals in the forest could not survive. You can help save the forest by recycling at home. Remember, every little bit makes a big difference.”

- Siamangs use vocalizations to communicate.

“Did you hear that noise? That was the call of the siamangs. Siamangs vocalize to “talk” long distance with neighboring siamang families. It is usually a duet between the male and female. These early morning calls let other siamang groups know the perimeters of individual territories. When an intruder is present, songs combine with acrobatic displays to scare off strangers. Another theory is that calling helps maintain strong family bonds. By observing these natural behaviors we are learning more and more everyday about these wonderful animals. The more we know, the better equipped we are to protect them. You can also help by learning about wildlife and wild places and telling others how important they are.”

Frog conversations

- Frogs as environmental indicators

“Can you guess what animal made that sound? That’s right, its a frog! Can you guess how frogs help the environment? They can tell us how healthy the ecosystem is. They don’t talk, but because frogs are so sensitive to changes in the environment, scientists can study them to measure the health of an area. What do you think it means if you go to a pond that used to have a lot of different frogs, but now there are none? Exactly, it means there is something wrong with the area. You can help frogs by cleaning up trash around ponds and streams near your home.”

- Frogs as pest control

“Did you hear that frog? Can you guess what frogs like to eat? That’s right, beetles and other small invertebrates are common food for most types of frogs. They eat the bugs like flies and mosquitoes that can sometimes cause problems for people. Frog species throughout the world are declining so it is important to spread the word about how helpful and interesting these animals are.”

- Frog vocalizations

“Did you hear that sound? What animal is that? Right, a frog! Why do you think frogs make noise like that? Since a lot of frogs like to come out at night, it is a way for them to communicate in the dark. Usually it is the males making the sound to attract females. They have to be careful though because by making all that racket they are also telling predators where they are. You can help them by making a home for them in your backyard. It can be as easy as putting out a hollow log for them to hide in.”

- Vocalizations teach scientists

“Sometimes it is hard for scientists to see animals in the wild. Have you ever heard a bird singing but couldn’t find where the sound was coming from? Scientists can use the sounds animals make to learn different things about them, like how many are in the area and what type of interactions they have with each other. When you go home, try listening to the forest and see how many different types of animals you can hear. You can even use a field guide to identify them.”

Background Information:

Siamang

Scientific Name: *Hylobates syndactylus*

Range: Malay Peninsula, Sumatra

Description: Like all “lesser apes”, Siamangs and other gibbon species do not have a tail (unlike monkeys, which do have tails). They have an upright body with a broad chest, they tend to hang below branches rather than balance on top of them, and they rely more on vision than on smell.

Both the male and female Siamangs have black fur with either a gray or pink throat sac. They have long anterior limbs and a deeply detached grasping thumb and toe. Both males and females have large canine teeth, which are used primarily for defense. These animals often develop calluses on their hind quarters which are thought to aid with comfort when sitting. A throat sac is also present to amplify sound.

Fingers are long and slightly hooked, and are used to grip objects with impressive force. The thumb is opposable, but shorter than other primates; as a result they do not have thumb to index capability. Their feet have an opposable big toe capable of holding and carrying objects. Siamangs, along with all other gibbons can rotate their arms 360 degrees. This helps them swing hand over hand through the trees. This method of movement is called “brachiation”. Gibbons are the only true brachiators of the primates. To swing quickly, gibbons will pull their legs close to their trunk and let their body swing through like a pendulum, then let go with one hand before the other hand has found a grip allowing their body to project freely through space. Spaces between trees are negotiated this way. Observers have documented distance of flights between 25 to 30 feet. Gibbons are also incredible acrobats. They can change quickly from a two handed swing to a two-legged run, jump, spin around the tree trunk it grasps, swing in another direction, fly far through the air and land on a higher branch, then sit quietly, huddled up, as though having never been in motion.

Size: Siamangs are the largest of all the gibbon species. The males are larger than the females. They are usually about 3 feet in length and weigh approximately 20-25 pounds. Their arm span is longer than the height of their bodies. This allows for greater mobility and for reaching the most nourishing parts of the trees.

Behavior: Gibbons spend between 3 to 4 hours of the day feeding. The siamang social structure is monogamous - 1 male and 1 female with offspring in a family group. Siamangs have a greater cohesion of social interactions than most other gibbon species. One of the most important social interactions between adults is grooming. For juveniles, the most important interaction is play.

Adults will sing, either to advertise the establishment of a territory, to warn off other family groups, or to attract a mate. Siamangs have an inflated throat sac that amplifies the sound that can be heard up to two miles away. If a siamang is calling, the other gibbons will stop calling because the siamangs are too loud. Elaborate singing can take place every day or once every five days depending on territorial conditions. The singing behavior follows a strict format. The song will start with an introductory sequence while the singers “warm-up,” followed by a duet of the male and female calling together with the female engaging in a “great call”. Siamangs are particularly good at singing duets. A “great call” sounds like a series of alternating booms and barks that starts slowly and

quietly, but then accelerates into a blood-curdling scream at the climax of the call. After the female's "great call" the male will sing a coda at the end. Pairs can be identified by their particular song. If one of the adult partners dies, the mate will mourn for the deceased, but will in time "remarry."

Reproduction: Gibbons usually produce offspring only once every 2-3 years. A family group usually will consist of 2 juveniles, but sometimes as many as four. Females have a cycle similar to humans, so they can only conceive a couple of days out of every 30 days or so, but a female does not have to be in estrus to mate. Copulation usually occurs dorso-ventral with the female crouched on a branch and the male suspended behind her. Occasionally copulation occurs while the gibbons are facing each other.

The female gestates for 7-8 months before giving birth to one live young. For the first 0 to 3 months the mother pulls her knees up to form a sort of lap to support the infant while hanging or swinging from branches. The newborn hangs on to the mother's belly constantly, even through the most daring acrobatics; fingers do not just grip bunches of hair, they are literally braided into the fur. At 3-4 months the offspring will detach itself more and more from the mother and at 4 to 5 months babies begin to swing hand-over-hand. At 6 months they may start moving on 2 legs and at 7 months they will begin to play with siblings and with the father. Their playing consists of gymnastics, chasing, and wrestling. Eventually contact with the mother gradually diminishes to cuddling at rest periods and at night. Weaning is begun at about a year and a half. Male siamangs play a larger role in raising their young than do other gibbon males. The male will participate in the caring for the juvenile somewhere between 8 months and 1 year and will continue to participate in the raising of the juvenile until it achieves independence at around 3 years of age.

Lifespan: Approximately 35 years.

Diet: The siamang diet is similar to that of other gibbons consisting of pulpy fruits, young leaves, flowers, and insects. However, the siamangs will consume more leaves in their diet than most other gibbons. Leaves consist of 50 percent of a siamangs diet, whereas the diet of other gibbons consist of only 30 percent leaves. Gibbons are not very possessive about food within groups. If one gibbon finds something especially good he will pass the piece around to the other family members, often not getting any himself. When drinking, a gibbon dips the back of its hand into the water, raises his hand above his head and licks off the drops.

Habitat: Siamang territories overlap other gibbon areas with little conflict, unlike other gibbons whose territories do not overlap. Like other gibbons they prefer the forested region of their range. Their territory is determined by food supply. Fruit should be available year round.

Conservation Message: The forest people of southeast Asia have a high respect for gibbons because of their resemblance to man and usually do not hunt them. Foreign influences, however, have led to increased hunting by outsiders. Continual habitat destruction also threatens the stability of this species. Forests are cleared for firewood, paper, lumber, and agriculture. Human encroachment, building of new roads, and slash and burn clear-cutting of areas for agriculture result in the fragmentation of habitat. This creates small islands of gibbon populations which in turn creates the potential of inbreeding among isolated groups. Gibbons are not adapted for crossing open country.

Current reforestation efforts have not proven adequate because the gibbons disappear from an area once it has been cut down never to return. Also, the trees that have been planted are to yield valuable timber for humans, but do not provide the type of habitat and food sources needed to support gibbons. Oil operations in tropical rainforests have a severe environmental impact, including water and air pollution, soil erosion, sedimentation, and disturbance of wildlife and habitats. Making roads and pipelines induces colonization and extensive deforestation. The Vietnam War devastated many of the areas in the South Pacific inhabited by gibbons. Military debris, destruction of forests, and the effects of herbicide chemicals such as Agent Orange are just a few of the lingering effects still plaguing the area.

Gibbons are often harvested for the pet trade, which is illegal under CITES Appendix I. Often the mother and father are killed in order to capture the young gibbon. Nine out of ten animals die during illegal smuggling. The removal of one adult female per year from a population of less than a 100 will double the risk of extinction.

As of April 1995, there were approximately 150 siamangs in North American zoological facilities. Because of this high number, siamangs have a lower conservation priority according to the Association of Zoos and Aquariums. Their captive population will be allowed to decline to as low as 80 breeding individuals. These individuals will be managed for education and study with limited breeding.

Asian Tiger

Scientific Name: *Panthera tigris*

Range: India, Manchuria, China, Indonesia and Siberia

Description: Famous for their orange and black striped fur, the tiger is the largest of all the wild cats. Their physique is designed for the capture and killing of prey. The hind limbs are longer than the forelimbs for better jumping. Their forelimbs and shoulders have more muscle structure than their hind limbs. They use long, sharp retractable claws to catch and hold their prey and long flattened canines to deliver the killing bite. Their skull is foreshortened to create more shearing leverage when they bite. There is also a white spot on the back of a tiger's ears, but the reason for this is unknown. One possibility is that the spots are used as a signal for cubs. The tiger has large eyes in relation to their body size. This is an essential tool in hunting. The eyes are set to give binocular vision, which provides depth perception for leaping. During the day the tiger can see about as well as humans. At night their vision is six times more powerful than humans. Like their eyesight, a tiger's hearing is very sensitive because detecting the location of sounds is crucial for hunting. Their ears turn independently of each other and in an arc up to 180 degrees. This allows the tiger to pick up sounds from different directions. A tiger's whiskers are used as a set of "feelers" to help the tiger find its way in the dark or through heavily wooded areas. They are also used to help tigers target the area of the killing bite. Tigers regularly shed their whiskers and grow new ones. Tigers have long canine teeth which enable them to kill prey by crushing the neck vertebrae or by grabbing the throat of its prey and holding on until the animal suffocates. They also have scissor-like teeth, which enable the tiger to slit the hide, slice through flesh, and process the carcass. In comparison to the teeth of a human, tigers' teeth are sharp and narrow to cut meat; human's teeth are flat, wide, pliers-like to grind food. Tigers are born with baby teeth which they lose and grow adult

teeth. If a tiger loses an adult tooth, it does not grow another.

Size: There are eight subspecies of Tiger, some larger than others. Of the eight subspecies only five still exist: Bengal, Siberian, Indo-Chinese, South China, and Sumatran. Three of the sub-species are believed extinct: Javan, Bali, and Caspian. Size is relative to the geographic location - the farther north the tiger range, the larger the tiger.

Behavior: Male and female tigers maintain their own territory, called home ranges, and rarely cross over into a neighbor's territory. Their territory ranges in size from about 10-30 square miles, with the exception of the Siberian tiger's range which may be as large as 120 square miles. They use visual signals, such as scratches on a tree or on the ground, as well as chemical signals, such as spraying a tree with urine and scent gland secretions. Tigers will display the behavior known as flehmen when examining the scent markings of another tiger. Flehmen is a wrinkling of the nose and pulling back the corners of the mouth while the tigers detect scent clues left by other tigers.

Despite being territorial, tigers tend to have a high degree of social tolerance. They use non-vocal communication, such as body postures and rubbing, as well as non-vocal communication when encountering one another. For example, when tigers greet each other peacefully, they will rub faces, shoulders, and sides. Cubs also do this when their mother returns from hunting. Prousting, a type of sound tigers make, is another way that tigers greet each other. Tail movement and positioning of the ears can indicate friendliness or agitation. The tail is also used for balance.

Tigers are solitary ambush hunters that use their stripes to help conceal them while they stalk their prey. Unlike cheetahs, which run down and chase prey, the tiger will use tall grasses to quietly approach its prey. When they are within 30-60 feet, the tiger will get into position to launch a final charge. Tigers can be extremely swift for short distances, running 30 to 35 mph and can leap up to 30 feet horizontally. If they are unable to catch prey quickly, tigers will tire and give up. They have successful hunts only about once out of every 15 to 20 attempts. An entire week may go by before a tiger completes a successful hunt.

The prey is often dragged to a water source because tigers will often drink water while eating it. Sometimes they will run the prey into the water to make them easier to catch. Tigers seem to enjoy water and can swim well. They use rivers and lakes to seek relief from the heat and to catch fish. Tigers rarely become man-eaters.

Reproduction: A female reaches maturity at about 3 years, males at about 4 years. In temperate climates the female comes into estrus only seasonally. In tropical climates, the female may come into estrus throughout the year. The female signals her readiness to a male with scent markings and locating calls. The brief act of copulation occurs intermittently for a five day period. Tigers are induced ovulators. Ovulation must be stimulated through copulation. The female will gestate for a period of about 110 days (varies slightly by species) before she gives birth to 3-4 cubs. Each cub weighs 2-3 pounds.

Lifespan: Approximately 15 years in the wild and 20 years in captivity.

Diet: Tigers usually hunt for larger hoofed mammals. Typical prey ranges from various deer species (sambar and chital) to wild pigs. Occasionally they will target much larger prey such as rhinos, water buffalo, and elephant calves. They have also been known to catch fish (enrichment here at DAK). A male tiger in the wild requires nearly 3 tons of food per year. In captivity a tiger's diet consists of prepared meat with bones and hide to help keep their teeth clean.

Habitat: Asian tigers can be found in tropical rain forests, mangrove swamps, snow-covered coniferous and deciduous, and drier forest types.

Conservation Information: All tigers are endangered. The Balinese tiger is believed extinct, with the last recorded sighting in 1937. It is suspected that the Javan tiger and Caspian tiger are extinct as well. The last recorded sighting of a Javan tiger occurred in 1972. As for the 5 surviving sub species: Siberian Tiger (northernmost tiger) estimated numbers: less than 200 in wild and about 500 in captivity; Bengal Tiger estimated numbers: 3000-5000 in wild and a little over 300 in zoos (mostly in India); Indochinese Tiger estimated numbers: 1000-2000 in the wild and about 60 in zoos; Sumatran Tiger estimated numbers: 400-500 in the wild and a little over 200 in zoos; South China Tiger estimated numbers: the last reported sighting of a wild tiger was 10 years ago. China officials believe between 20-30 are still left in the wild based on the 21 reserves within the presumed range of the tiger. There are between 40-50 in zoos.

As happens throughout the world, animals and people compete for space. Villages grow larger forcing villagers to live dangerously close to parks and reserves that are havens for tigers and other endangered species. Villagers may extend their fields into park borders and they may allow livestock to graze on park lands. Goats and other livestock eat the grass and nearly all vegetation that the tigers depend on for camouflage to stalk the prey they depend on for food. Tigers then resort to killing livestock for food, and villagers in turn shoot, kill, and poach tigers to protect their livestock.

Disney Worldwide Conservation Fund: Hornocker Wildlife Institute. Ecology and Conservation of the Siberian Tiger. Project Site: Russia

Frogs

Class: Amphibia

Range: Frogs are found in almost all areas of the world and nearly every environment except for extreme polar areas. The wood frog is even found north of the Arctic circle, surviving for weeks with up to 65% of its body frozen.

Description: Frogs do not have tails or necks. This combined with their short bodies, bulging eyes, and powerful legs gives them a very distinctive appearance. There is evidence that frogs have been around since before the dinosaurs and that they are actually an historic representation of the first animals to creep out of the ocean onto land.

Frogs are amphibians, which means two-lived. With only a few exceptions, amphibians begin their life cycle in water and then metamorph to live on land. They possess porous skin that functions in almost the same way as our lungs. The skin allows gases to pass through so they actually breath through their skin! To keep this skin functioning properly, they have mucus glands

to keep them from drying out. These glands are the “warts” that characterize some species. All amphibians are also cold-blooded, which means their body temperature changes with the changing outside temperature. To survive the winter, frogs can burrow underground or into the mud at the bottom of a pool to wait out the winter.

There are over 4,900 species of frogs that have been identified by science, but they estimate there may be over 1,000 more yet to be discovered. Taxinomically, toads and frogs do not differ, we use the word toad to describe frogs with dryer skin and shorter hind legs.

Frogs are amazingly adapted to their specific environments. A frog's long legs can allow it to jump more than 20 times their body length. Frogs come in an incredible range of colors. Most of the time, these bright colors are to warn predators away from their toxic skin. Of course, some others just have the bright colors so predators will think they are toxic. The Costa Rican flying tree frog has webbing between its toes to allow it to glide from one branch to another.

Frogs' bulging eyes on top of the head allow them to see in front of, to the sides of, and partially behind them. They have excellent night vision and are sensitive to motion, but that's not all they are good for! When a frog swallows food, it pulls its eyes down into the roof of its mouth to help push the food down its throat.

Frogs were the first land animals with vocal cords. Many males also have a vocal sac. These are pouches of skin that can be filled with air that can resonate sounds loud enough that they can be heard for miles. Ironically most frogs have excellent hearing and must produce special vibrations in its body to partly block the sound of its call. A frog's eardrum is on the outside of its body just behind the eye. The size and the distance between the eardrums determine which sounds a frog hears best. They cannot hear the highest or lowest sounds that we can hear.

Size: Ranges from ~3/8 of an inch (Cuban Tree Toad, Brazilian Gold Frog) to ~14 inches and up to 7 pounds (Goliath Frog)

Behavior: Many male frogs attract mates using a loud vocal call. Scientists actually use the unique calls to tell some species apart since they look so similar. Only the males call, females in turn choose their mate based on a call's quality.

Lifespan: Ranging form 2 - 40 years, with most living between 4 and 15 years.

Diet: Insects, small mammals, lizards

Reproduction: Methods of reproduction vary greatly in frogs with about 40 different types. However, by far the most common is for frogs to begin their lives as eggs laid in water which hatch into swimming tadpoles, and finally metamorphose into adults. The key for all the methods is to provide a moist, safe environment for the next generation. Like fish, most frog eggs are fertilized outside the body. The male will hold the female around the waist in a mating hug called amplexus; he then fertilizes the eggs as she lays them. The number of eggs laid varies depending on the species, but they often number in the tens of thousands. Most frogs simply leave the fertilized eggs to hatch and develop on their own into tadpoles and then froglets. In the tadpole stage, they exist to eat and grow. This stage can last anywhere from a few days to a couple of years depending on species and weather. Some land-based frogs have adapted to skip the tadpole stage, so fully formed froglets hatch from the eggs, making it is unnecessary for them to find water.

As you might expect these eggs, tadpoles, and young froglets provide food for predators from

fish to other frogs. In fact, in one species the male attracts a female to his pool where she lays her eggs and leaves him to fertilize and care for them. After the eggs hatch, the male will attract another female to come lay eggs in his pool and instead of fertilizing them, he feeds the new eggs to his tadpoles. Many frog species have developed unique strategies to give their offspring a head start on life. One common technique is a foamy mass of fluid produced during mating that protects the eggs until hatching. Another example being that one female will actually swallow her fertilized eggs and several weeks later they hop from her mouth. Among Darwin frogs, it is the male who swallows the tadpoles who develop in his vocal sac until reaching the froglet stage. Even stranger is the Surinam toad that carries her young embedded in the skin of her back where the developing juvenile frogs are visible inside their pockets for several days before struggling free of the skin covering.

Habitat: Frogs live almost everywhere, from tropical forests to frozen tundras to scorching deserts. Almost all rely on water for reproduction and many spend the majority of their lives in or around a constant source of moisture. Like everything else, frogs have evolved to have an amazing number of different strategies to survive in different conditions. Most frogs are freshwater creatures, but some such as the Florida leopard frog are able to live in brackish or nearly completely salt water. The Australian water-holding frog can wait in the desert for up to seven years for rain by burrowing underground and surrounding itself in a transparent cocoon made of its own shed skin. On the opposite extreme, the North American wood frog ranges well into the Alaskan tundra, inside the Arctic Circle. During the winter, most frogs body temperature will fall, the metabolism drops, and the heart may even stop beating. Most frogs dig into the mud to escape the killing frost., but some like the wood frog practice controlled freezing. They produce excess glucose in the blood to act as a kind of antifreeze that concentrates in its vital organs, protecting them from damage while the rest of the body (about 65%) freezes solid.

Frogs and Humans: Frogs help us in more ways than one. Probably their most important role is their role as nature's bug zappers! Frogs eat untold billions of insects each year, not to mention the insect larva eaten by tadpoles and froglets. On the other end of the food chain, frogs provide a critical food source for birds, fish, snakes, and other wildlife... including us. Since the dawn of humanity frogs have been on the menu and are still an important food source for some developing countries. In America we import 1.25 million pounds of frog legs each year. Wild frog populations cannot keep up with the world wide demand for this delicacy.

However, far outweighing their importance as a food source, is their role as environmental indicators. When pollution or other environmental changes affect a habitat, frogs are often the first casualties. These delicate creatures provide an early warning for endangered ecosystems. If we simply pay attention, frogs can tell us all the information we need about the effects of pollution to our environments. Frogs with extra or missing legs, eyes, and toes have been found in 44 states since 1996. Possible causes include parasites, pollution, and ultraviolet radiation. This gives us an idea of what these causes can eventually do to other animals in an area, and even humans.

Finally, the scientific benefits frogs provide to us is reason enough to be concerned about their survival. Many frogs produce skin toxins to protect against predators. Humans are remarkably similar to these ancestral predators, and as a result, frog toxins are remarkably potent in the human body. Many are being studied for use as medicines. One example is the phantasmal poison frog from Ecuador and Peru that secretes a powerful painkiller which is 200 times more potent than morphine and is non-addictive. Some ailments that frog toxins are being used to treat are: heart ailments, bacterial and viral infection, skin and colon cancers, depression, strokes, Alzheimer's disease, and chronic pain. With all these benefits, frog could prove very important to human

survival.

Conservation Information: As mentioned earlier, frogs are very sensitive creatures, and human activity is causing their numbers to decline around the world. There are even a few species that have vanished completely. Scientists are searching for the answers. Some of the major causes they have found are: habitat destruction, introduced species, chemical pollution, climate changes, over collection, and epidemic diseases. New housing construction throughout the northeast provides home for people, but sometimes at the expense of local frog populations. Reports of species decline have led to smarter land use practices that meet the needs of both amphibians and humans. The pet trade is also an important issue. Brightly colored frogs are popular pets. Many frogs are bred in captivity for this purpose, but over collection of wild frogs is still a major problem, especially isolated populations. As if this all wasn't enough, they are also faced with new diseases. A recently discovered fungal disease is spreading throughout many regions of the world, killing virtually all amphibians in its path. In an attempt to counter act these threats, the Global Amphibian Assessment and Amphibian Ark programs are trying to measure extinction threats for all frog species around the world and implement conservation action plans including rescue, protection, and breeding before we lose any more species.