

WILD CATS OF SOUTHEAST ASIA: AN EDUCATOR'S GUIDE

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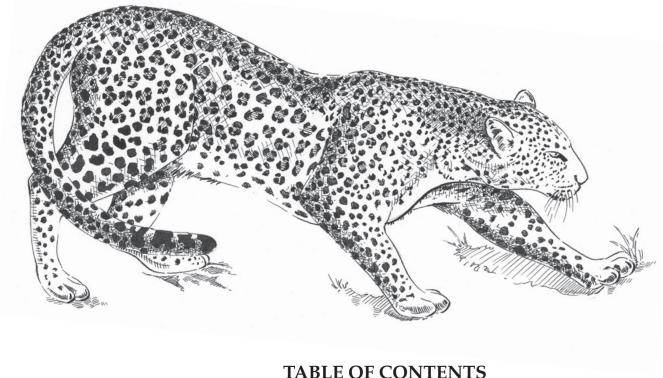
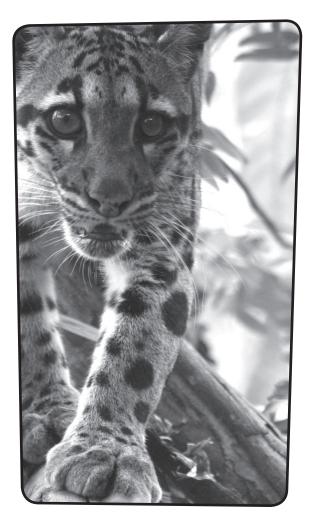


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For more information on conservation in Southeast Asia, please visit WildAid's website at www.wildaid. org or the Point Defiance Zoo & Aquarium's Clouded Leopard Project website at www.cloudedleopard.org.

The Wild Cats of Southeast Asia: An Educator's Guide introduces students to the natural history and conservation needs of some of the world's most amazing and beautiful creatures – the wild cats. This guide is designed to engage elementary students in learning about wild cats using skills in science, reading, social studies, mathematics, art, and physical education. Although the guide focuses on wild cats, it incorporates many concepts important for a general understanding of the region's wild animals and their habitats.

This guide is written for teachers and provides background information on wild cat habitat, biology, behavior, research, and conservation that will be useful in leading discussions and activities with students. The guide is designed to serve as a unit of study with activities presented in sequence with suggestions for appropriate grade levels (see chart below). The activities provide the students with opportunities to ask questions, make discoveries, and work as teams to explore issues relating to wild cats and their environments. The activities focus on science and social issues as well as the work of scientists in the field. Through the activities, students will consider the same questions facing wild cat scientists and conservationists. We hope that these activities will engage and challenge your students.

This guide was produced as a partnership between WildAid Thailand, The Clouded Leopard Project and the Point Defiance Zoo & Aquarium in Tacoma, Washington, USA. Through this guide, we hope to stimulate awareness of and support for conservation efforts to preserve the region's unique wildlife heritage.

Suggested Activity Sequence

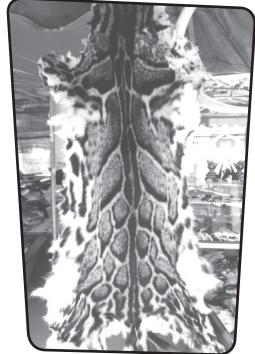
Grades 1-3

- 1. Everybody Needs a Home
- 2. Rainforest Mural
- 3. Forest Cat Creations
- 4. It's all Connected
- 5. Can Do!
- 6. Wild Cat Pledge

Grades 4-6

- 1. Rainforest Mural
- 2. Oh Deer!
- 3. It's all Connected
- 4. What's for Dinner?
- 5. On the Track of Wild Cats
- 6. Conservation Choices
- 7. Protection Poster
- 8. Conservation Role Play
- 9. Can Do!
- 10. Wild Cat Pledge





Wild cats have long been a source of fascination and inspiration to people. Unfortunately, however, the relationship between people and wild cats has not always been harmonious.

As a group, wild cats are among the most endangered wildlife species on the planet, suffering severe population declines during the last century. Increasing human populations are placing wild cats under severe pressure as their habitat is altered or destroyed and prey populations fall. Illegal hunting of wild cats for trophies, traditional medicines, and the pet market has also significantly reduced their numbers.

The wild cats of Southeast Asia are particularly vulnerable to these threats. Habitat loss in this region is taking place faster than anywhere else on earth and poaching activities are on the rise. In the face of such severe pressures, urgent action is needed to assure the future survival of the region's wild cats and other wildlife.

Currently, little information exists on the distribution and habits of Southeast Asia's ten wild cat species. However, scientists are now conducting studies throughout the region in an effort to gain a better understanding of these animals. Scientific study is extremely important for assessing the status of wild cats, developing conservation plans, and putting those plans into action. Many of these conservation plans will be implemented in protected areas, such as national parks and wildlife sanctuaries. These areas are vital for providing large tracts of wild cat habitat and a buffer from human-caused threats.

Successful conservation of Southeast Asia's wild cats, however, will depend not only on parks and sanctuaries, but also on the active involvement of people who live near wild cat habitat. Conservation efforts must address the needs of the communities who are directly involved in cat conservation issues such as poaching or habitat destruction.

Conservationists are hopeful that, through education efforts, scientific research, and the establishment of protected areas, wild cats and people will coexist long into the future.

CAT CLASSIFICATION

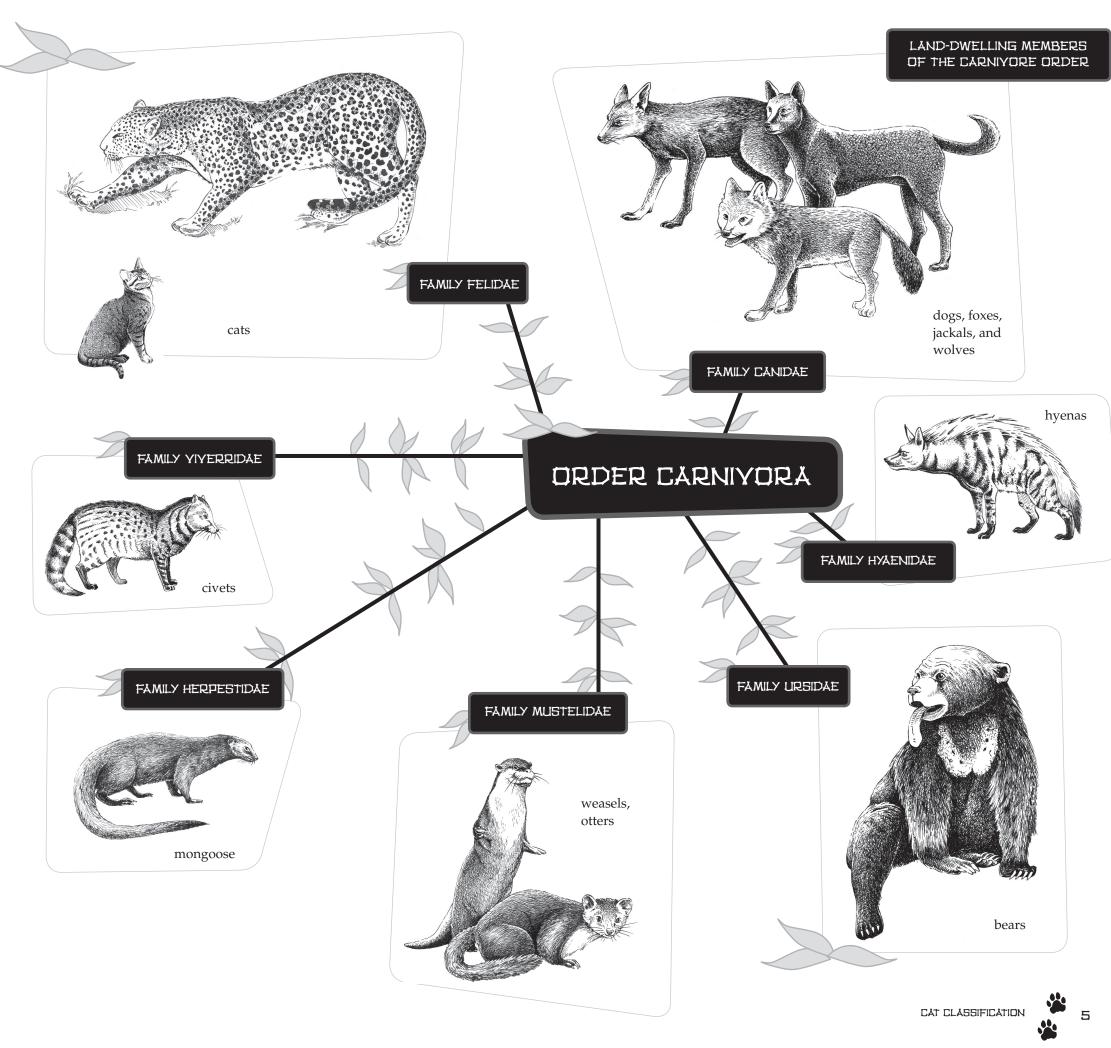
In order to understand the relationships between different types of animals, scientists have developed a classification system for grouping animals according to shared characteristics. These groupings are determined by the animals' physical similarities, such as features of the skull, teeth, and skeleton, and by the development of their young. Sometimes patterns of behavior, such as feeding and courtship, are also considered.

Increasingly, scientists are applying the analysis of the genetic makeup of the species to the task of classification. Laboratory analysis of an animal's DNA can help scientists determine what other species are its closest genetic cousins. This procedure has allowed biologists to classify animals with much more accuracy than they were able to in the past. In many cases, this information has resulted in changes in the existing classification system as previously unrecognized relationships between species have been revealed.

Within this classification system, all cats belong to the **Carnivora** order. This order includes other meat-eating animals such as wolves, weasels, otters, and bears. The Carnivora order is further divided into families of animals that share common characteristics. All cats, both wild and domestic, belong to the **Felidae** family.

Members of the cat family are further classified into 37 distinct species. Each species has a unique scientific name, in Latin, consisting of a genus and a species. The genus, or first part of the scientific name, is sometimes shared by several species, indicating that they are more closely related to each other than to other cats. Many species of wild cats can also be divided into smaller groupings called subspecies. Subspecies are usually determined by where the cat ranges and have subtle differences in appearance.

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WILD CATS IN DANGER

What are the Threats?

Wild cats in Southeast Asia face a variety of threats that are causing their numbers to decline. **Habitat** in the region is disappearing rapidly to make way for farmland and places for people to live and work. Cats are also the targets of hunters seeking their furs and body parts, such as bones, teeth, and claws, to use in traditional medicines. Although it is illegal to hunt wild cat species whose populations are known to be declining, there is often little enforcement of these laws. Some cat species with larger populations may still be legally hunted. Young wild cats are also captured for sale to private zoos or as pets. These animals are often unable to make the transition to life in captivity, dying from stress or lack of appropriate care.

Why Protect Wild Cats?

It is important to protect wild cats because they are considered **keystone** or "umbrella" species. Cats require large wild spaces to provide them with the food, water, shelter, and space they need. Therefore, if there are healthy populations of wild cats, there will also be healthy populations of the other wildlife in the ecosystems that they call home. By protecting wild cats, we can protect a large number of other species.

Conservation Status of Wild Cats

The international conservation status of wild cats is classified in two main ways:

IUCN: The World Conservation Union

IUCN is the world's largest conservation network. This organization examines the status of wildlife worldwide to determine each species' risk of extinction. The IUCN conservation status of each Southeast Asian wild cat species is listed in the table on page 7.



CITES: Convention on International Trade in Endangered Species

CITES is an international agreement between governments. Its goal is to ensure that international trade in specimens of wild animals does not threaten their survival. This agreement provides varying degrees of protection to more than 30,000 of the world's plant and animal species. Currently, 168 countries have adopted this conservation agreement. The CITES status of each Southeast Asian wild cat species is listed in the table below.

Species	IUCN Status	CITES Status
Tiger	Endangered	Appendix I
Leopard	Least Concern	Appendix I
Clouded Leopard	Vulnerable	Appendix I
Leopard Cat	Least Concern	Appendix II
Fishing Cat	Vulnerable	Appendix II
Flat-headed Cat	Vulnerable	Appendix I
Marbled Cat	Vulnerable	Appendix I
Jungle Cat	Least Concern	Appendix II
Golden Cat	Vulnerable	Appendix I
Borneo Bay Cat	Endangered	Appendix II

IUCN Status:

- **Endangered** means a population of less than 2,500 and declining.
- Vulnerable means a population of less than 10,000 and declining.
- Least Concern means a population of more than 50,000.

CITES Appendices:

- Appendix I includes species threatened with extinction.
 Trade in these species is permitted only in exceptional circumstances.
- **Appendix II** includes species not necessarily threatened with extinction, but in which trade must be controlled in order to prevent their decline.

SOUTHEAST ASIA WILD CAT HABITATS

When most people think of the places where wild cats and other animals live in Southeast Asia, they usually imagine humid, tropical rainforests. However, rainforests are just one of the many habitats that wild cats call home. Evergreen and deciduous forests, river basins, lakes, marshes, coastal wetlands, mangrove forests, and grasslands are all important habitats for providing wild cats with the prey and shelter they need to survive.

Some cats are very adaptable and can live in many different kinds of habitats, including areas near human settlement. Other cats are more specialized and restrict their ranges to certain types of habitats. Because the areas where they can live are limited, these species are usually more threatened by changes in their environment such as habitat destruction or pollution.

These are some of the primary wild cat habitats found in Southeast Asia:

EVERGREEN RAINFOREST – All 10 cat species

The evergreen rainforests of Southeast Asia contain the region's highest biodiversity, serving as home to more plant and animal species than any other land habitat. In Thailand, for example, there may be as many as 200 different species of trees growing in 100 square meters of rainforest. There are several types of rainforests, classified by differences in the amount and seasonality of rainfall they receive, the elevation where they occur, or the composition of the forest's plant species.

Despite their differences, rainforests generally have the same basic ecology. The plants of the forest form four distinct layers. The top layer is called the emergent layer and consists of widely spaced, very tall trees – up to 50 meters high – that tower over the underlying canopy.

Beneath the emergent layer lies the canopy, a dense, continuous layer of intertwined trees 25-35 meters tall. The canopy trees support a thick network of climbing vines and epiphytes such as ferns, mosses, and orchids. These epiphytes grow without soil, supported by the trees. They get their nutrients

from the atmosphere, rain, and forest debris that falls from above. Because the leaves, fruits, and flowers of rainforest plants are concentrated in the canopy, this layer of the forest supports the most animal life.

Beneath the canopy is the understory layer consisting of bamboo, shrubs, and small trees. Because the canopy blocks most of the sunlight from above, these plants must survive in dim, filtered light. When large trees fall in the forest, the canopy is opened up to these understory trees that will grow quickly to take advantage of the gap created.



Evergreen Rainforest Understory

The bottom layer of the rainforest is made up of ferns, herbs, and the seedlings of canopy and emergent trees. This layer is also the site of the huge trunks supporting the trees above. Many trees have fin-like **buttress roots** jutting from their trunks to support the rest of the tree towering above. Insects, invertebrates, and fungi are found in abundance on the decaying vegetation of the forest floor, turning the debris of the plants above into new soil as they feed.

DECIDUOUS FOREST- tiger, leopard, clouded leopard, marbled cat, jungle cat, leopard cat, fishing cat, golden cat

Deciduous forests grow in regions where lower rainfall amounts, longer dry seasons, and poorer soil prevent the development of evergreen forests. The canopy in some deciduous forests may reach 30 meters or more, but is much more open than that of the evergreen forest. Because the canopy allows substantial light to penetrate, the understory of the deciduous forest supports vigorously growing bamboo and other grasses and may become very thick and dense. The trees of the deciduous forest lose their leaves during the dry season but will quickly burst into flower and grow new shoots when the rains return.

FRESHWATER WETLANDS – tiger, leopard, clouded leopard, jungle cat, leopard cat, fishing cat, flat-headed cat, Borneo bay cat

The many wetlands of Southeast Asia include streams, rivers, lakes, seasonal ponds, and marshes. These wetlands provide an abundance

of food and cover for wild cat species. Both the flat-headed cat and the fishing cat prey almost exclusively on the fish, crustaceans, and invertebrates found in the region's streams and ponds. Other species take advantage of the cover provided by plants growing on the wetland's damp edges for stalking prev as it comes to drink.





Buttress Roots



SOUTHEAST ASIA WILD CAT HABITATS

SOUTHEAST ASIA WILD CAT HABITATS

SOUTHEAST ASIA WILD CAT HABITATS

MANGROVE FORESTS – tiger, leopard, clouded leopard, jungle cat, fishing cat

Mangrove forests occur where rivers empty into ocean waters in protected bays and inlets. The sediment deposited by the rivers provides a foothold for the mangrove's shallow roots that intertwine and spread as a dense mat on the mud's surface, giving them support against the tides. Some mangrove trees can grow 24-30 meters wide, supported by multiple stilt-like roots. Mangrove trees are specially adapted to survive in their salty, muddy environment. Special breathing roots grow upwards, out of the mud, to eliminate salt and absorb oxygen the plants need to grow.

Mangrove forests play an important role in protecting the coast from storms or tidal surges. In addition, by trapping river sediments and providing organic matter in the form of leaves, mangrove forests create a valuable marine nursery at the ocean's edge. Mangrove forests are rich wildlife habitats, nurturing many species of marine life including fish and crustaceans. These animals in turn are important sources of prey for the mangrove's rich collection of birds and mammals, including wild cats.

GRASSLANDS – tiger, leopard, clouded leopard, golden cat, jungle cat, leopard cat

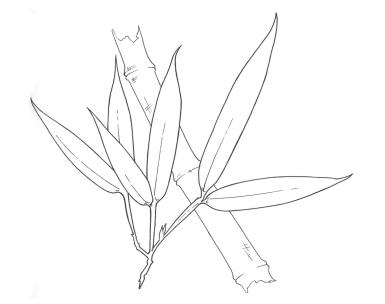
Grasslands are areas where the ground is covered by grass and shrubs instead of trees. In these places, woody plants are less than 2 meters tall. The plants

of the grassland grow seasonally with the rainfall. In the dry season, the grasses dry up.

Generally, grasslands in Southeast Asia are not large or widespread. In Thailand, for example, grasslands cover less than 10% of the land area. These grasslands are often found as areas within more forested habitats. Herbivores will often emerge from the surrounding forests to feed in the grasslands. Therefore, wild cats will frequently use grassland areas as hunting grounds.



Grasslands



CAT BIOLOGY & BEHAYIOR *

CAT SENSES

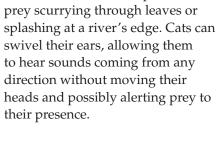
Cats locate their prey primarily by using their excellent eyesight. With their large, sensitive eyes, cats can see even in very dim light. The cat has



a special light-reflecting structure on its retina called the *tapetum lucidum* that increases the eye's sensitivity. This reflection produces a cat's characteristic "eyeshine" at night. A cat's eyes are particularly good at detecting movement, such as rustling grass or the activity of prey. The placement of the eyes at the front of its head provides the cat with an overlapping

field of view, known as binocular vision. **Binocular vision** is important for judging depth of field and distances, important skills for accurately pouncing upon prey.

Cats also have very sensitive hearing. Cats can hear sounds of much higher frequency than humans can, allowing them to hear the sounds of potential



Although cats have a better sense of smell than humans do, this sense is not considered important for hunting. Instead, cats mostly use

their sense of smell in social interactions. Cats will leave scent marks of urine and feces to mark their territories and to advertise their readiness to breed.

Although cats may vary considerably in the way they look, most of those differences are only skin deep. Beneath their spotted, striped, or solid coats, cats are all built very much the same. The design and behavior of a cat reflect its lifestyle as a meat-eating predator. Cats have bodies that are perfectly adapted for finding, catching, killing, and eating prev.

•



Cats are designed for slowly approaching prey, or **stalking**, while remaining hidden. A cat's coat pattern is very important for providing the **camouflage** necessary for a surprise attack. The color and pattern of a cat's coat reflects its hunting environment. Generally,

forest-hunting cats are patterned with spots or stripes that allow them to blend into the dappled shade of their surroundings. Cats that live in more open country often have plain-colored coats.

Cats are very patient hunters and often spend a great deal of time slowly approaching their prey, making only the smallest movements as they advance. This silent stalk is aided by a cat's **retractable claws**. Because a cat is able to draw its claws into its paws when not in use, its footsteps make no noise.

Once it is within striking distance, a cat will pounce at its prey with a burst of speed, catching it immediately or within a few bounds. Cats have powerful and graceful bodies that enable them to accelerate quickly and grab hold of their prey. They

walk on their toes in a posture known as **digitigrade**. This digitigrade posture serves to lengthen the cat's legs, adding to its speed. A cat's spine is extremely flexible with freely moving shoulder blades that allow it to stretch its legs way out, providing speed for the attack. This flexibility also helps a cat grip large prey tightly as it wrestles it to the ground.

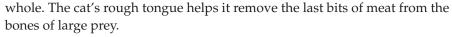


MAKING THE KILL

When capturing small prey, such as a rodent or bird, a cat will usually pin it to the ground with one or both paws before making a killing bite. Cats use their longest teeth, called **canines**, to kill their prey. A cat can direct its canine teeth

between the bones of the spine, killing the animal almost instantly. When killing larger prey, the cat usually first grabs it around the neck, chest, or back, digging in with its sharp claws. Next, the cat will bite its prey on the throat, holding tightly until the animal suffocates. The short jaw of a cat provides it with a very powerful bite, helping it keep its grip while the prey struggles.

After killing something small, a cat will usually eat it immediately, consuming the entire animal. If the prey is large, the cat may have to rest before the meal begins. A cat may also try to hide its prey, dragging it under cover to protect it from being stolen by other predators or scavengers. Cats eat their prey with specialized molar teeth called **carnassials**. These teeth have extremely sharp edges and function like scissors to cut through meat as the cat bites down. Cats do not chew their food; once pieces are bitten off they are swallowed



If the cat has captured a small animal, it may begin hunting again immediately. However, if a large animal is caught the cat may not need to hunt again for several days or more. If, for example, a tiger kills a large deer, it may not need to hunt again for a week.

THE SOCIAL LIVES OF CATS

When not actively seeking prey, cats spend much of their time resting – up to 20 hours each day. Time not spent resting or hunting is usually used for social activities. Like almost all cat species, the cats of Southeast Asia spend most of their lives alone. However, they devote considerable time to communicating with others of their own kind living in the same area. Although they may only rarely meet face to face, cats use urine, feces, and secretions from scent glands to broadcast information to one another about their territorial ownership and readiness for breeding.

Cats roam within an area known as a **home range**. The home range covers all the places a cat may go throughout the year. The size of a cat's home range will vary depending on the

cat's species, its sex, and the quality of the habitat. Within this home range, a cat will maintain a smaller area known as a **territory** and defend it against other cats of the same species to reduce competition for prey or mates. Cats will mark the





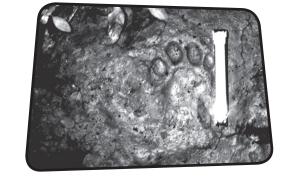


CAT BIOLOGY & BEHAYIOR

STUDYING WILD CATS &

boundaries of their territories by spraying rocks and trees with urine or rubbing them with scent glands on their cheeks. Typically, male cats hold larger territories than females. A male's territory will encompass that of several females. By keeping other males out of his territory, the male will protect his right to breed with the females.

Sometimes conflicts between cats arise when one challenges the established territory of another. These interactions can quickly escalate to extremely aggressive encounters where the cats may become seriously injured. To avoid fighting and risking injury, cats use many facial expressions, body postures, and sounds to communicate in interactions with one another. An aggressive cat will flatten its ears, swish its tail, and growl or snarl at its opponent. If the cat appears strong and committed to a fight, its challenger may back down and adopt a submissive posture of putting its ears to the side, rolling over, hissing, and eventually retreating.



Gaining this type of information, however, is extremely challenging. Wild cats are notoriously difficult to observe and study in their natural habitats. They are shy and secretive and often live in environments where conducting field research may be physically demanding. As a result, the habits of many wild cat species, particularly those of Southeast Asia, are still virtually unknown to scientists.

programs to protect wild cats, scientists need to have an understanding of their natural history. Learning about the prey a cat hunts, how much space it needs, and the type of habitat it requires is critical for making decisions when developing conservation strategies. Scientists also need to know how large cat populations are within a given area to determine

whether or

not they need

conservation efforts.

In order to establish

CAT REPRODUCTION

The primary time that cats interact is during courtship, breeding, and the rearing of young. A male cat will determine when a female is ready to breed by monitoring her scent marks and vocalizations. The male will begin courting the female by approaching her and scent marking nearby. If the female is receptive, the pair will breed. After breeding, the male and female go their separate ways.

The gestation period of cats vary depending on their size, averaging about 3 months. This short period of pregnancy results in cubs that are born very small and helpless. The mother cat will give birth to 1-4 cubs in a sheltered den where she can safely leave them while she hunts. She will return to them several times a day to nurse. As the cubs grow, they venture from the den to wrestle and chase one another, developing the skills they will use as hunters later in life.



After a few months, the mother cat will bring prey back to the den for the cubs to eat. Sometimes she'll bring live prey for the cubs to practice killing. Eventually, the cubs will accompany their mother on hunting trips where they will practice their own hunting skills. Most young cats will set out to establish their own home ranges by the time they are a year old when their mothers will have a new litter. Tiger cubs, however, will remain with their mother for nearly two years.

LOOKING FOR CAT SIGNS

Because wild cats are so difficult to find, researchers have developed several methods for studying them that do not rely on direct observation. One way is by looking for signs of cats such as footprints, feces, and scratch marks on trees. One of the oldest techniques for studying cats is the analysis of their footprints, called **pugmarks**. Skilled naturalists can distinguish between pugmarks of individual animals based on the track's appearance and measurements. This technique, however, is very prone to error and is therefore not considered reliable for making accurate estimates of the size of the species' population. It is also difficult to distinguish between the tracks of different cat species of similar size. Despite its drawbacks, tracking is a useful tool for determining whether or not a cat species is found in a certain area and whether it is rare or common.

Other cat signs may tell similar stories. Some cats, especially tigers, leave scratch marks on trees as a signpost of their territory. Cats also deposit feces, called **scat**, along trails, often creating **scrapes** with their back feet that serve as territorial markers. All of these signs can alert researchers to the presence of cats in the area.

Researchers can also analyze scat for the bones, fur, and teeth of prey to determine what the cat has eaten.



STUDYING WILD CATS







CAMERA TRAPPING

A more reliable method for obtaining rough estimates of the number of cats in a particular area is the use of camera traps. These cameras "trap" animals by taking photos of them as they move through their habitat. Researchers set up cameras along established animal trails and connect them to a triggering device that projects a beam of invisible infrared light across the trail. When an animal walks by and interrupts the beam of light,

the camera is triggered to take a photo. When the researchers develop the film, they can count the numbers of different animals – both cats and their prey – that have passed by. Because every cat has a uniquely marked coat, the researchers can distinguish individual animals and make a rough estimate of the number of cats in the area.







RADIO TELEMETRY

Although examining animal signs and evaluating camera trap photos can provide useful information about the presence and number of cats in an area, the most reliable method for learning



the details of a cat's daily life is through the use of radio telemetry. In radio telemetry, cats are captured and fitted with collars that produce signals that scientists follow once the cats are released. By tracking a radio collared cat, a scientist can determine when the animal is active, how

far it travels, and the size of its home range. This type of information about the range and movement of cats is extremely important for determining what places should be included in protected cat habitat.





STUDYING CATS IN THE LABORATORY

While most wild cat research takes place in the field, studies are also increasingly being undertaken in laboratories, far from wild cat habitat. Some researchers working in labs focus on medical issues, such as the diseases affecting wild cats. Others use computer models to make predictions about the future of certain cat populations.

One quickly growing field of research is the study of genetics. New technology now allows scientists to study the DNA from blood, hair, and tissue samples taken from cats captured in the wild. These genetic studies help scientists determine if certain populations of a cat species are unique and warrant special protection.



WILD CAT PROFILE

Indochinese tiger Panthera tigris corbetti

Sumatran tiger

Panthera tigris sumatrae

Stripe patterns and coat colors vary between individual tigers as well as tiger subspecies. In general, the Sumatran and Indochinese tigers have the darkest coat colors as well as the most closely spaced stripes. These two subspecies also have the shortest coat length, a reflection of their tropical habitat.







WHERE IN THE WORLD?

There are a total of five subspecies of tigers living in Asia. Two of these, the Indochinese tiger and the Sumatran tiger are found in Southeast Asia. These tigers are found primarily in tropical evergreen and deciduous forests.

Indochinese tiger

Sumatran tiger



Indochinese tiger male Indochinese tiger female

150 – 195 kilograms 100 – 130 kilograms

Length 2.5 - 2.8 meters

2.3 - 2.5 meters

Sumatran tiger male 114 – 125 kilograms 2.2 - 2.5 meters Sumatran tiger female 91 – 102 kilograms 2.1 - 2.3 meters

Weight



BEHAVIOR

Tigers are the dominant predator in Southeast Asian forests. They are usually most active during the night, near dawn, and near dusk, but can be active any time of day. Tigers hunt by stalking and ambushing prey on the ground. If a surprise attack is not successful they will rarely chase their prey very far. Tigers are excellent swimmers and will often rest in water during the heat of the day. They are also known to pursue prey into the water.



Tigers live 10 to 12 years in the wild.

LIFE SPAN



THREATS

Tigers face habitat loss through deforestation of wide areas of Southeast Asia. They are also hunted for the trade PRINCIPAL in fur, pelts, and bones. Tigers were also heavily persecuted throughout the twentieth century as livestock predators.



Tigers will kill and eat any animal that they can catch. Small prey items include frogs, rodents, porcupines, monkeys, and barking deer. However, tigers survive primarily by hunting large hoofed animals such as chital, sambar, water buffalo, and gaur. When it makes a large kill, a tiger will consume 18 to 30 kg of meat per night. It will guard its kill and continue to feed from it over the course of several days.



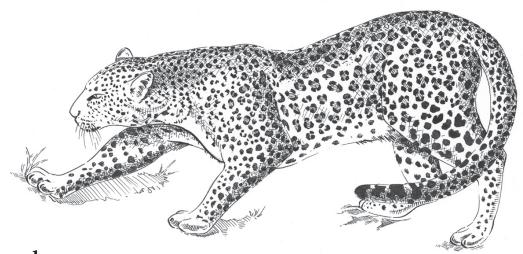
STATUS & CONSERVATION

CITES Appendix I. Tigers are protected throughout their range, although poaching continues. Tigers are now found living almost exclusively in protected areas. The wild Sumatran tiger population is estimated at 400 animals. The wild Indochinese tiger population is estimated at 1,200-1,800.



Visit www.5tigers.org for information on tiger natural history, conservation efforts, and to find out ways to help.

WILD CAT PROFILE



Leopard Panthera pardus

Leopards are powerfully built cats that also have amazing agility and grace. The background color of a leopard's coat is highly variable, from golden brown to reddish to dark gray. Generally, leopards living in tropical forests have the darkest coat color. Leopards have spots forming circular patterns called rosettes that cover the back, flanks, legs, and tail. The leopard's underbelly is white. A leopard's spot pattern is highly individual and can be used to identify specific animals. Leopards can also be black, or melanistic. These leopards also have spots, but they are faint and difficult to see through the black fur.





WHERE IN THE WORLD?

The leopard ranges widely through Southeast Asia in the countries of Myanmar, Vietnam, Laos, Cambodia, Thailand, Malaysia, and Java. They are also found throughout central Asia, the Middle East, and Africa. Leopards can be found in most of the habitats of this region including tropical evergreen and deciduous forests, shrub lands, and near human settlements.



Weight: 25 - 70 kilograms Length: 1.5 - 2 meters

SIZE



BEHAVIOR

Leopards are extremely secretive cats and can often make their homes very near to human settlement without being discovered. As a result, they can live in places where many other wild cats cannot. Leopards are excellent climbers and will often rest and store food in trees. Leopards are mostly nocturnal but will sometimes be active during the day, especially if there are no tigers in the area that need to be avoided. Leopards hunt by making a slow, careful stalk before ambushing prey, using their superb camouflage to remain hidden.



Leopards will kill and eat any animal that they can catch, usually small to medium-sized mammals. Because of its great strength, a leopard is able to kill an animal two to three times its own weight. If large prey has been eliminated from an area, however, they can also survive on small animals exclusively. Leopards have been recorded killing a wide variety of animals including rodents, rabbits, deer, pigs, porcupines, civets, and monkeys. Leopards are also well-known for killing domestic animals, especially dogs.



Leopards live 10 to 12 years in the wild.

LIFE SPAN



PRINCIPAL THREATS

Although leopards face habitat loss through deforestation of wide areas of Southeast Asia, they have proven adaptable to living near humans. They also often increase in numbers in regions where tigers have been exterminated. In some areas, leopards are in competition with humans for wild prey. This situation has forced leopards to rely on domestic livestock for food and, in turn, are killed by people. As they come into increasing contact with people, leopard attacks are also on the rise. Leopards are also hunted for the trade in fur, pelts, and bones.



CITES Appendix I. Leopards are protected throughout most of their range in Southeast Asia, although poaching continues.

STATUS & CONSERVATION





* WILD CAT PROFILE



Weight: 11 – 20 kilograms Length: 1.5 - 2 meters

SIZE



BEHAVIOR

The clouded leopard's short legs, large paws, and long tail are adaptations for a tree-climbing lifestyle. They are able to run down tree trunks headfirst, climb by hanging underneath horizontal branches and even hang upside down from branches by their hind feet. Research suggests that clouded leopards travel and hunt mostly on the ground, but use trees for resting. Clouded leopards may be active any time of the day or night, but research suggests they are most active around dawn and dusk.



Clouded leopards can live up to 17 years.





Clouded leopards face habitat loss through deforestation of wide areas of Southeast Asia. They are also hunted for the trade in fur, PRINCIPAL pelts, and bones. There is also THREATS trade in clouded leopards for the exotic pet market.



The clouded leopard's diet consists of birds, primates, and small mammals as well as larger prey such as porcupines, deer, and wild boar.



CONSERVATION

CITES Appendix I. Hunting is prohibited in parts of its range. Because little is known about this species in the wild, there are no reliable population estimates.







Visit www.cloudedleopard.org for more information on clouded leopard natural history, conservation efforts, or to find out ways to help.





WHERE IN THE WORLD?

The clouded leopard ranges from northeastern India, Nepal, and China through Myanmar, Laos, Vietnam, Cambodia, Thailand, Malaysia, Sumatra, and Borneo. Clouded leopards are found primarily in moist tropical forests, but can also be found in grassland and scrub areas. They have been recorded in the Himalayan foothills up to 1,500 meters in elevation.

Clouded leopard

The clouded leopard is named for

its distinctive cloud-like markings

of large irregular spots. These

are on a coat of tawny brown to

is marked with thick black bars.

silvery grey. The back of the neck

The tail is as long as the body and

is thick and plush with black rings.

The clouded leopard has short legs and is fairly stocky. This cat has canine teeth that are the longest in proportion to body size of any cat

spots are edged in black and

Neofelis nebulosa

in the world.



CLOUDED LEOPARD

WILD CAT PROFILE





Leopard cats vary considerably in coat color. Those in the tropics tend to be yellowish-brown while those with more northern ranges are more grayish in color. The leopard cat's markings are also variable. They usually have rows of elongated spots along the back with smaller spots on the flanks, chest, and legs. Black lines extend up the forehead and along the cheeks. Its tail is spotted with a black tip.







WHERE IN THE WORLD?

The leopard cat ranges through most of Southeast Asia from India, Nepal, and China through Myanmar, Laos, Vietnam, Cambodia, Thailand, Malaysia, Sumatra, Borneo, and the Philippines. Leopard cats also range into other parts of Asia including Russia, Japan, and North Korea. They are found in a wide variety of habitats including tropical rainforest, temperate forests, grasslands, and farmlands. They can be found ranging up to 2,400 meters along river valleys in the Himalayas, but they avoid areas with deep snow. They are also commonly found in altered habitats such as rubber plantations, farmland, and near villages.



Weight: 2 - 5 kilograms



Length: 0.8 - 1 meters



BEHAVIOR

Studies of leopard cats show that they are just as active during the day as at night. They are excellent climbers and spend time hunting and resting in trees. They can also swim well and are found on many small islands in their range.



The leopard cat lives 8 - 15 years.





PRINCIPAL

The leopard cat seems fairly adaptable to deforestation and other changes to habitat and can live near human settlements. In many parts THREATS of its range the leopard cat is heavily hunted for its fur. In China, from the 1950s to the 1980s, between 150,000 - 400,000 leopard cats were killed for the fur trade annually. Most coats made from leopard cat skins are sold in China and Japan.



Leopard cats prey on a variety of small animals including rodents and other small mammals, birds, reptiles, amphibians, and insects. They will also kill domestic poultry.



STATUS & CONSERVATION

CITES Appendix II. One subspecies (Prionailurus bengalensis bengalensis) found in Bangladesh, India, and Thailand is thought to be less common and is classified on CITES as Appendix I.

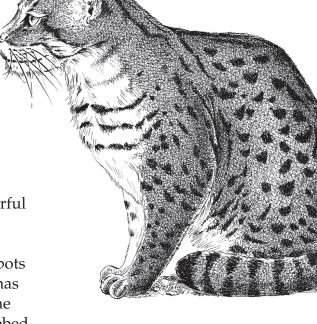


* WILD CAT PROFILE





The fishing cat has a stocky, powerful build and long face that causes it to resemble a civet. Its short fur is grayish brown with small black spots and a white underbelly. The face has dark black stripes extending up the forehead. Its feet are partially webbed and its claws remain partially exposed when retracted. The short tail has black rings and a black tip.







WHERE IN THE WORLD?

The fishing cat ranges from northeastern India, Pakistan, Nepal, and Bangladesh, through Myanmar, Laos, Cambodia, Vietnam, Thailand, Malaysia, Sumatra, Java, and Sri Lanka. Fishing cats are strongly associated with wetlands, living in marshes, near lakes, in mangrove forests, and along rivers and streams in forests.



Weight: 7 - 12 kilograms Length: 1 - 1.2 meters

SIZE



BEHAVIOR

Fishing cats are excellent swimmers and will even dive under water to pursue prey or escape predators. They also hunt on land and have at times been seen hunting far from a water source. Little else is known about the behavior of fishing cats in the wild.



The fishing cat can live 12 – 16 years.

LIFE SPAN



PRINCIPAL THREATS

The fishing cat is most threatened by the conversion of wetland habitats into agricultural areas. It has already disappeared from large areas of Bangladesh, India, and Pakistan because of habitat loss. Pollution of waterways may also pose a significant problem. In addition, fishing cats are hunted for the fur trade and killed because they prey on livestock.



The fishing cat preys mostly upon aquatic animals such as fish, frogs, snails, and shrimp. They will also hunt birds, reptiles, rodents, and other small mammals. Fishing cats are known for their strength and have been recorded killing larger prey such as deer fawns.



STATUS & CONSERVATION

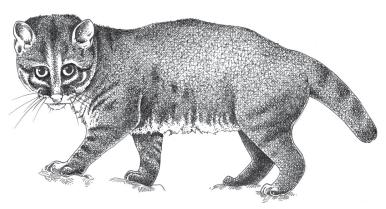
CITES Appendix II. Hunting is prohibited in most of its range. Because little is known about this species in the wild, there are no reliable population estimates.





WILD CAT PROFILE





Flat-headed cat *Prionailurus planiceps*

The flat-headed cat looks markedly different from most cats. It has very short legs, a short tail, and a long head with small ears that causes it to more resemble an otter or civet. The flat-headed cat has thick, soft, reddish-brown fur with a white underbelly. The face is lighter in color than the body with white streaks and a white chin. The tail measures only about a quarter of the cat's body length.

The flat-headed cat has several unique adaptations for its life of hunting and eating fish. The premolar teeth of this cat are much larger and sharper than those of other cats, helping it to better grip its slippery prey. The flat-headed cat's toes are webbed and its claws remain partially exposed when retracted.





WHERE IN THE WORLD?

The flat-headed cat ranges from southern Thailand through Malaysia, Sumatra, and Borneo. Flatheaded cats are usually associated with water and have been found living in marshes, near lakes, and along rivers in the forest.



Weight: 1.5 - 2.5 kilograms Length: .5 - .8 meters

SIZE



BEHAVIOR

Flat-headed cats are rarely encountered in the wild and little is known of their behavior. Cats observed in zoos have shown a strong attraction for water, often playing in and hunting from pools. They will use their webbed paws to grope for food in water. They will also dunk their entire heads under water to bite prey. Once prey is captured, a flat-headed cat will often carry it several feet away before eating it. This is thought to be an adaptation for ensuring that captured prey doesn't escape into the water.



The flat-headed cat can live up to 14 years.

LIFE SPAN



PRINCIPAL THREATS

Because of its strong relationship to water-related habitats, the flat-headed cat is threatened by the conversion of wetland habitats into agricultural areas. Pollution of waterways may also pose a significant problem.



The flat-headed cat preys mostly upon aquatic animals such as fish, frogs, and shrimp. They will also hunt rodents such as rats and mice.

DIET



STATUS & CONSERVATION

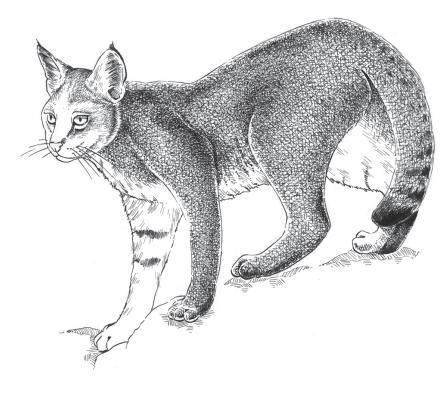
CITES Appendix I. Hunting is prohibited in most of its range. Because little is known about this species in the wild, there are no reliable population estimates.



WILD CAT PROFILE



The jungle cat has long legs and a slender build. It has an unspotted coat that varies in color from reddish-brown to grayish with a white belly. The fur has black guard hairs on the back that give the cat a speckled appearance. It has light black stripes on its legs, and short black hair tufts on its ears. The tail is fairly short, extending about halfway down its legs, ending in a black tip.







WHERE IN THE WORLD?

The jungle cat has a wide range through the Middle East, Central Asia, and Southeast Asia. In Southeast Asia it ranges through India, Bangladesh, Myanmar, Laos, Vietnam, Cambodia, and Thailand. Despite its name, jungle cats are usually not found in densely forested areas. Instead, they are usually found near a water source such as marshes and rivers. They also inhabit shrubby areas and grasslands. They have also adapted well to farming areas, plantations and living near villages.



Weight: 5 - 10 kilograms Length: .7 - 12 meter

Although it prefers to live near water, the jungle cat is thought to be a



BEHAVIOR

very adaptable species, able to use a variety of habitats. Jungle cats can be active any time of the day or night and have been frequently observed hunting in the morning and afternoon. When not hunting, they usually rest in thickets of shrubs or grass. They have also been observed lying in the open to sunbathe.



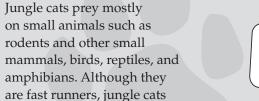
The jungle cat lives up to 14 years.





PRINCIPAL THREATS

The jungle cat is thought to be fairly adaptable to deforestation and other changes to habitat and can live near human settlements. It also does well in areas under cultivation for farmland. As a result, it is one of the most common wild cats in many parts of Asia. However, destruction of natural wetlands is considered a threat to the species.



usually hunt by stalking and

pouncing on prey. They are

into the air to capture birds

the grass to catch rodents.

poultry.

They will also kill domestic

and will also spring through

also able to make vertical leaps

CONSERVATION

CITES Appendix II. The jungle cat is fairly common over most of its range. In many areas it can be legally hunted outside of protected areas and is a target for the fur industry.



STATUS &

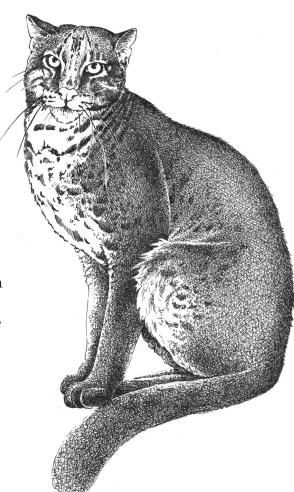


JUNGLE CAT

* WILD CAT PROFILE

Asiatic golden cat
Catopuma temminckii

The Asiatic golden cat can be seen in a wide variety of colors. The most common coloration is reddish or golden-brown, but it can also be bright red, grey, black, or brown. The coat is usually a solid color, but a variation found in China is spotted. The face is marked with white lines running across the cheeks and up the forehead. The tail is approximately half of the cat's body length.







WHERE IN THE WORLD?

The Asiatic golden cat ranges from China and northeastern India through Myanmar, Vietnam, Laos, Cambodia, Thailand, Malaysia, and Sumatra. Golden cats are usually found in tropical and sub-tropical evergreen and dry forests. There are occasional reports of these cats also ranging in open habitats such as shrubs or grasslands or in rocky areas up to 2500 meters in elevation.



Weight: 8.5 -15 kilograms Length: 1.1 - 1.6 meter

SIZE



BEHAVIOR

Little is known of the highly secretive golden cat's behavior in the wild. It is thought to be mainly active at night. It is thought to travel and hunt mostly on the ground, although it is also able to climb trees.



The golden cat can live 15 - 20 years.

LIFE SPAN



The golden cat is threatened primarily by loss of habitat through deforestation. It is also hunted for its skin and PRINCIPAL bones and sometimes killed for THREATS preying upon livestock.



The golden cat preys upon birds, reptiles, rodents, and other small mammals. There are also reports of golden cats killing small to medium-sized hoofed animals such as muntjac, deer, wild pigs, and wild goats. They will also kill domestic animals such as poultry, sheep, goats, and water buffalo calves.



STATUS & CONSERVATION

CITES Appendix I. Hunting is prohibited in most of its range. Because little is known about this species in the wild, there are no reliable population estimates.

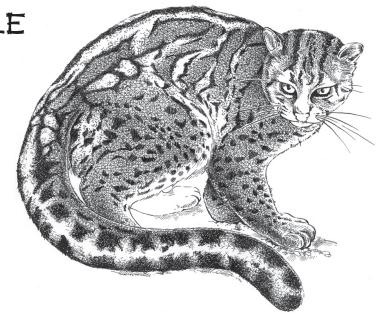




WILD CAT PROFILE

Marbled cat Pardofelis marmorata

The marbled cat has a coat very similar in pattern to the clouded leopard, although it is a bit darker in color. Its coat is thick and wooly and varies in color from dark gray-brown to reddish- or yellowish-gray. It has blotchy spots edged in black on its back and sides with smaller black spots on its legs. The marbled cat is well adapted for tree climbing, having large paws and a very long tail - often longer than its body.



SIZE



Weight: 2 - 4 kilograms Length: 0.8 - 1.1 meters

BEHAVIOR



Little is known about the behavior of marbled cats in the wild. They are thought to be nocturnal and to spend a significant amount of time in trees.

DIET



The marbled cat is thought to prey on birds, reptiles, rodents, and other small mammals.

LIFESPAN



The marbled cat can live up to 12 years.

PRINCIPAL **THREATS**



Although there is little information on this species in the wild, habitat loss through deforestation is thought to be the most serious threat. Some instances of hunting have been recorded, but marbled cat pelts are rarely seen in wildlife markets.

STATUS & CONSERVATION



CITES Appendix I. Hunting is prohibited in parts of its range. Because little is known about this species in the wild, there are no reliable population estimates.

WHERE IN THE WORLD?



The marbled cat ranges from northeastern

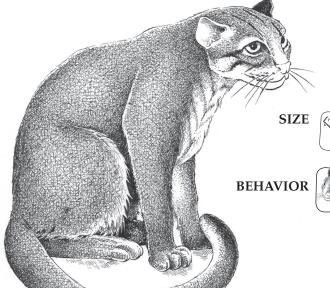
WILD CAT PROFILE *



Borneo bay cat

Catopuma badia

The Borneo bay cat is similar in size to a domestic cat, although its tail is longer. This cat is found in two color phases: reddish (the most common) and dark grey.



Weight: estimated 3 – 4 kg (no records exist) Length: 1 meter

This species is still considered a mystery to science and is the least understood cat in the world. By 1928 only eight skins had been seen by scientists and a whole specimen had never been found. In 1992, a live adult female bay cat was captured and brought to a museum. This cat provided the genetic material that led to its classification as a distinct species, closely related to the Asiatic golden cat. A few other live animals have been trapped since, but died shortly after capture.





Unknown





Unknown





The Borneo bay cat is thought to have always been rare and even unknown to local villagers. Because of its rarity, there is a high value placed on animals captured which may lead to increased pressure on this cat.





CITES Appendix II. This status allows live animals to be shipped from Borneo if captured.

WHERE IN THE WORLD?



The Borneo bay cat is found only on the island of Borneo in forested areas.

BORNEO BAY CAT





India and Nepal through Myanmar, Laos, Vietnam, Cambodia, Thailand, Malaysia, Sumatra, and Borneo. Marbled cats are found primarily in moist tropical forests, but have occasionally been observed in open or shrubby areas.



SECTION 2: ACTIVITIES





EYERYBODY NEEDS & HOME

GRADES:

1 - 3

SUBJECT FOCUS

Science, Language Arts, Art

SKILLS

Analysis, comparing similarities and differences, discussion, drawing, generalization

DURATION

30 minutes or longer

SETTING

Indoors or outdoors

MATERIALS/SUPPLIES

- Drawing paper
- Crayons or markers

Objectives Students will:

- Generalize that people and other animals share a basic need to have a home.
- Identify the four basic needs of all animals and people.

Method

Students draw pictures of homes and compare their needs with those of other animals.

Background

Humans and other animals – including pets, farm animals and wildlife – have some of the same basic needs. Every animal needs a home. But that home is not just a "house" like those in which people live. Home, for many animals, is a much bigger place – and it's outdoors. The scientific term for an animal's home is "habitat." An animal's habitat includes the food, water, shelter, and space that it needs to survive.

Homes are not just houses. A house may be considered shelter. People build houses, apartments, houseboats, and other kinds of shelter in which to live. Animals don't need a home that looks like a house – but they do need some kind of shelter. The shelter might be underground, in a bush, in the bark of a tree, or in some rocks.

Animals need a place in which to find food and water. They also need enough space in which to live and find the food, water, and shelter they need. Everybody needs a home! And "home" is bigger than a "house." Home is more like a "neighborhood" that has everything in it that is needed for survival.

Procedure

- 1. Ask the students to draw a picture of where they live or to draw a picture of the place where a person they know lives. Ask the students to include pictures in their drawing of the things they need to live where they do; for example, a place to cook and keep food, a place to sleep, a neighborhood.
- 2. Once the drawings are finished, have a discussion with the students about what they drew. Ask the students to point out the things they need to live that they included in their drawings.
- 3. Make a "gallery of homes" out of the drawings. Point out to the students that everyone has a home.
- 4. Ask the students to close their eyes and imagine: a bird's home, an ant's home, a tiger's home, the King's home, their home. OPTIONAL: Show the students pictures of different places that animals live.
- 5. Discuss the differences and similarities among the different homes with the students. Talk about the things every animal needs in its home: food, water, shelter and space in which to live, arranged in a way that the animal can survive. Summarize the discussion by emphasizing that although the homes are different, every animal people, pets, farm animals, and wildlife needs a home. Talk about the idea that a home is actually bigger than a house. In some ways, it is more like a neighborhood. For animals, we can call that neighborhood where all the survival needs are met a "habitat." People go outside their homes to get food at a store, for example. Birds, ants, tigers, and other animals have to go out of their "houses" (places of shelter) to get the things they need to live.

Extensions

- Draw animal homes. Compare them to places where people live.
- Go outside and look for animal homes. Be sure not to bother the animals or the homes in the process!



Evaluation

- 1. Students should be able to name three reasons why people need homes and three reasons why animals need homes.
- 2. Ask students to draw a picture of a suitable habitat for an animal. Have them write a paragraph to describe how the habitat meets the animal's needs for survival.

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* RAINFOREST MURAL

GRADES:

1 - 3, 4 - 6

SUBJECT FOCUS

Science, Art

SKILLS

Research, drawing, discussion, comparing similarities and differences

DURATION

60 minutes or longer

SETTING

Indoors - large room or hallway

MATERIALS/SUPPLIES

- Large sheets of paper for mural background
- Drawing paper
- Crayons or markers
- Scissors
- Other craft material for decorating the mural

Objectives Students will:

- Name and describe the four layers of the rainforest.
- Accurately place appropriate animals in these layers on a rainforest mural.

Method

Students create a classroom rainforest mural by drawing plants and animals.

Background

A rainforest is a **habitat** of tall, dense, evergreen trees growing in an area where there is much rainfall. There are tropical, sub-tropical and temperate rainforests. The types of trees may vary between the three, but all have heavy rainfall and lush, dense growths of plants and trees. Rainforests are distinguished from other forests by the high level of diversity of species of plants and animals, and by the existence of special plant structures such as lianas, **epiphytes**, strangler figs and **buttress roots**.

Tropical rainforests are generally found near the equator, with annual rainfall between four and ten meters per year. The largest remaining sections of tropical rainforest can be found in Central and South America, Central Africa, Southeast Asia and Northeast Australia. These forests are very warm, wet and humid.

Rainforests are among the most biologically diverse **ecosystems** on the planet. This high **biodiversity** means more different kinds of plants and animals are found in rainforest regions than in any other land habitat worldwide. More than half of all the known species of animals and plants on earth are found in the tropical rainforests of our world, and millions of species haven't been discovered yet.

The rainforest is comprised of four distinct layers: the **emergent layer** with trees towering above the rest of the forest, the **canopy** that forms the dense layer of tall, intertwined trees, the **understory** of bamboo, shrubs, and small trees, and the forest floor of ferns, seedlings, and decaying plants.

Most animals in the rainforest utilize distinct layers of the rainforest. They spend their time in the layers of the forest where they find the food, water, shelter and space they need to survive. Some, such as tapirs, tigers, porcupines, and millipedes remain on the forest floor, feeding on understory plants, animals or decaying matter. Most, however, live high in the canopy. This is where you can find animals such as hornbills, gibbons, and fruit bats. (Please see Southeast Asia Wild Cat Habitats on pages 8-10 for more information.)

Procedure

- 1. Talk with students about what makes a rainforest a rainforest. Discuss the arrangement of rainforest plants with the students, introducing the vocabulary words for the forest's different layers.
- 2. Explain to the students that they will be creating their own rainforest mural in the classroom, complete with the plants and animals found in the Southeast Asian rainforest.
- 3. Measure out a large sheet or sheets of paper to cover a wall in the classroom or hallway where the mural will be hung. Lay out the paper on the floor and assign students in groups to different sections of the mural. Have students draw the rainforest plants on the paper or create them from construction paper that they glue to the mural. Be sure that all layers of the forest are represented in these plants. (You may want to use the cards from the It's All Connected activity on page 50 for ideas.)
- 4. Brainstorm with the class some of the animals that live in the rainforests of Southeast Asia, and write the list on the board. Encourage the students to think about animals from all of the major groups (mammals, birds, reptiles, insects, etc.) If you have time, the students could be encouraged to select animals appropriate to the Southeast Asian rainforest on their own by researching animals in books, magazines, or online. Encourage students to select several species of wild cats and their prey to include in the mural. Have students place their animals in the appropriate position on the mural based on what they learned about the animal in their research, and where that animal would find the four basic things it needs to live.

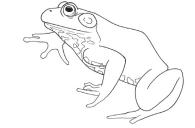
Extension

 Have the students research a rainforest from another continent, such as Africa or South America. Discuss as a group some of the similarities and differences between these rainforests and those of Southeast Asia.



Evaluation

- 1. Observe that students select appropriate animals and accurately place them in the rainforest levels on the mural.
- 2. Ask the students why they placed the animal in the level that it did. Have them show you where the food, water, shelter and space for that animal is within that particular level.



ACTIVITY : RAINFOREST MURAL



OH DEER!



GRADES:

4 - 6

Group size: 15 and larger recommended SUBJECT FOCUS

Science, Mathematics, Physical Education

SKILLS

Comparing similarities and differences, description, generalization, graphing, discussion, observation

DURATION

30 - 45 minutes

SETTING

Indoors or outdoors, large area for running around

MATERIALS/SUPPLIES

- Space either indoors or outdoors – large enough for students to run, e.g. playing field
- Chalkboard
- Writing materials
- Paper

Objectives Students will:

- Identify and describe food, water, and shelter as three essential components of habitat.
- Describe the importance of good habitat for animals.
- Define "limiting factors" and give examples.
- Recognize that some fluctuations in wildlife populations are natural as ecological systems undergo constant change.

Method

Students become "deer" and components of habitat in a highly involving physical activity.

Background

Wildlife populations are not static. They continuously flucuate in response to a variety of factors. These factors, called **limiting factors**, affect the ability of wildlife to successfully reproduce and to maintain their populations over time. Disease, predator/prey relationships, varying impacts of weather conditions from season to season, accidents, environmental pollution and habitat destruction and degradation are among these limiting factors.

The most fundamental of life's necessities for any animal are food, water, shelter and space in a suitable arrangement. Without these essential components, animals cannot survive.

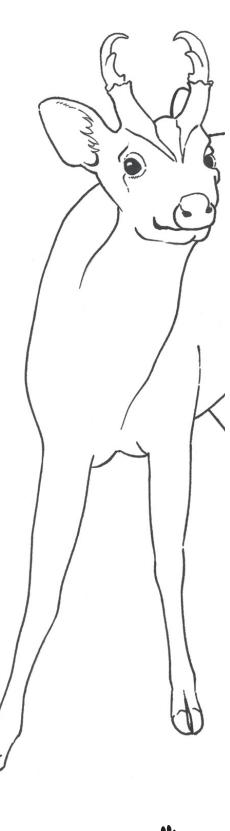
This activity is designed for students to learn that:

- good **habitat** is the key to wildlife survival;
- a population will continue to increase in size until some limiting factors are imposed;
- limiting factors contribute to fluctuations in wildlife populations; and
- nature is never in "balance," but is constantly changing.

This activity is intended to be a simple but powerful way for students to grasp some basic concepts: that everything in natural systems is interrelated; that populations of organisms are continuously affected by elements of their environment; and that populations of animals do not stay at the same static number year after year in their environment, but rather are continually changing in a process of maintaining dynamic equilibria in natural systems. The major purpose of this activity is for students to understand the importance of suitable habitat as well as factors that may affect wildlife populations in constantly changing **ecosystems**.

Procedure

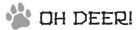
- 1. Begin by telling students that they are about to participate in an activity that emphasizes the most essential things that animals need in order to survive. Review the essential components of habitat with the students: food, water, shelter, and space in a suitable arrangement. This activity emphasizes three of those habitat components food, water, and shelter but the students should not forget the importance of the animals having sufficient space in which to live, and that all the components have to be in a suitable arrangement or the animals will die.
- 2. Ask your students to count off in fours. Have all the ones go to one area; all twos, threes, and fours go together to another area. Mark two parallel lines on the ground or floor ten to twenty meters apart. Have the ones line up behind one line; the rest of the students line up behind the other line.
- 3. The ones become "deer." All deer need good habitat in order to survive. Ask the students what the essential components of habitat are again: food, water, shelter, and space in a suitable arrangement. For the purposes of this activity, we will assume that the deer have enough space in which to live. We are emphasizing food, water and shelter. The deer (the ones) need to find food, water, and shelter in order to survive. When a deer is looking for food, it should clamp its hands over its stomach. When it is looking for water, it puts its hands over its mouth. When it is looking for shelter, it holds its hands together over its head. A deer can choose to look for any one of its needs during each round; the deer cannot, however, change what it is looking for; e.g. when it sees what is available, during that round. It can change what it is looking for in the next round, if it survives.
- 4. The twos, threes, and fours are food, water, and shelter components of habitat. Each student gets to choose at the beginning of each round which component he or she will be during that round. The students depict which component they are in the same way the deer show what they are looking for; that is, hands on stomach for food, etc.
- 5. The activity starts with all players lined up on their respective lines (deer on one side; habitat components on the other side) and with their backs to the students at the other line.
- 6. The teacher begins the first round by asking all of the students to make their signs each deer deciding what it is looking for, each habitat component deciding what it is. Give the students a few moments to get their hands in place over stomachs, mouths, or over their heads. (As you look at the two lines of students, you will normally see a lot of variety with some students water, some food, some shelter. As the activity proceeds, sometimes the students confer with each other and all make the same sign. That's okay, although don't encourage it. For example, all the students in habitat might decide to be shelter. That could represent a drought year with no available food or water.)
- 7. When you see that the students are ready, count: "one...two...three." At the count of three, each deer and each habitat component turn to face the opposite group, continuing to hold their signs clearly.



ACTIVITY : OH DEER!

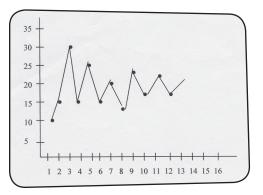


OH DEER! : ACTIVITY



- 8. When deer see the habitat component they need, they are to run to it. Each deer must hold the sign of what it is looking for until getting to the habitat component person with the same sign. Each deer that reaches its necessary habitat component takes the "food," "water," or "shelter" back to the deer side of the line. This is to represent the deer's successfully meeting its needs, and successfully reproducing as a result. Any deer that fails to find its food, water, or shelter dies and becomes part of the habitat. That is, in the next round, the deer that died is a habitat component and so is available as food, water, or shelter to the deer who are still alive. NOTE: When more than one deer reaches a habitat component, the student who gets there first survives. Habitat components stay in place on their line until a deer needs them. If no deer needs a particular habitat component during a round, the habitat component just stays where it is in the habitat. The habitat person can, however, change which component it is from round to round.
- 9. You as the teacher keep track of how many deer there are at the beginning of the activity, and at the end of each round you record the number of deer also. Continue the activity for approximately 15 rounds. Keep the pace brisk and the students will thoroughly enjoy it.
- 10. At the end of the 15 rounds, gather the students together to discuss the activity. Encourage them to talk about what they experienced and saw. For example, they saw a small herd of deer begin by finding more than enough of its habitat needs. The population of deer expanded over two to three rounds of the activity until the habitat was depleted and there was not sufficient food, water, and shelter for all the members of the herd. At that point, deer starved or died of thirst or lack of shelter, and they returned as part of the habitat. Such things happen in nature also. NOTE: In real life, large mammal populations might also experience higher infant mortality and lower reproductive rates.
- 11. Using a chalkboard, post the data recorded during the activity. The number of deer at the beginning of the activity and at the end of each round represent the number of deer in a series of years. That is, the beginning of the activity is year one; each round is an additional year. Deer can be posted by fives for convenience.

 For example:



- The students will see this visual reminder of what they experienced during the activity: the deer population fluctuated over a period of years. This is a natural process as long as the factors which limit the population do not become excessive, to the point where the animals cannot successfully reproduce. The wildlife populations will tend to peak, decline, and rebuild, peak, decline, and rebuild as long as there is good habitat and sufficient numbers of animals to successfully reproduce.
- 12. In discussion, ask the students to summarize some of the things they have learned from this activity. What do animals need to survive? What are some of the "limiting factors" that affect their survival? Are wildlife populations static, or do they tend to fluctuate as part of an overall "balance of nature?" Is nature ever really in "balance" or are ecological systems involved in a process of constant change?

Variation

- 1. After the students have played several rounds of "Oh Deer!," introduce a predator such as a tiger or clouded leopard into the simulation. The predator starts in a designated "predator den" area off to the side. The predator has to skip or hop. This reduces the possibility of violent collisions between deer and predators. The predators can only tag deer when they are going towards the habitat and are between the habitat and deer lines. Once a deer is tagged, the predator escorts the deer back to the predator den. That simulates the time it takes to eat. The "eaten" deer is now a predator. Predators that fail to tag someone die and become habitat. That is, in the next round, the predators that died join the habitat line. They will become available to surviving deer as either food, water, or shelter. During each round, the teacher should keep track of the number of predators as well as the number of deer. Incorporate these data into the graphs.
- 2. Instead of drawing the line graph for students as described in Procedure 11, have the student create their own graphs. Provide them with the years and number of deer. Depending upon the age group, they can make picture, line, or bar graphs.



Evaluation:

- 1. Ask students to name three essential components of habitat.
- 2. Have students define "limiting factors" and give three examples.
- 3. Draw the graph below on the chalkboard. Ask the students what factors may have caused the following population changes
- a) between years 1 and 2?
- b) between years 3 and 4?
- c) between years 5 and 6?
- d) between years 7 and 8?



OH DEER! : ACTIVITY



FOREST CAT CREATIONS



GRADES:

1 - 3

SUBJECT FOCUS

Science, Language Arts, Art

SKILLS

Comparing similarities and differences, discussion, comprehension

DURATION

45-50 minutes, or 2 sessions of 20-25 minutes each.

SETTING

Indoors

MATERIALS/SUPPLIES

- Drawing paper
- Crayons or markers
- Washable paints and paintbrushes
- Scissors
- Glue

Objectives

Students will:

- Create a forest habitat where wild cats would live.
- Create a wild cat and place it in the forest habitat.

Method

Students will listen to a story about a Southeast Asian forest and then draw or paint a forest habitat, including representatives of the food, water, shelter and space needed by the wild cats that live there. They will then learn about wild cat adaptations to create their own cat to be placed within the forest **habitat**.

Background

Southeast Asian forests are home to ten different species of wild cat. Each of these cats relies on the forest to provide them the food, water, shelter and space they need to live. Each type of cat has its own unique lifestyle and **adaptations** to help it survive within the forest **ecosystem**. (See Wild Cat Profiles, beginning on page 18 for information on each cat species).

Procedure, Part I.

- 1. Tell the students that you are going to read them a short story. Ask the students to close their eyes and imagine that they are in the forest as you read (See attached story, *A Day in the Forest on page 48*).
- 2. When you have finished reading the story, ask the students to recall what they remember about what it was like to "be" in the forest. What did they see, hear, and smell? Make a list of the answers at the front of the room.
- 3. Ask the students to create their own forest using a piece of construction paper and paints or crayons. They should try to include as many of the elements of the forest as they can.

Procedure, Part II.

- 1. Write the names of the following cats up at the front of the room: tiger, clouded leopard, and fishing cat. Tell the students that you are going to read them three short stories, one about each of three cats that can be found in Southeast Asian forests. Ask them to listen closely to the stories so that they will be able to guess which cat each story is about (See attached stories, *Cat Tales on page 49*).
- 2. After you have read each story, ask the students to guess which cat the story is about. Discuss the meaning of the word adaptations, and ask the students to help you make a list of the special adaptations that were mentioned in the story. Write your list on the board under the name of each cat.

- 3. When you have finished reading the stories and making the three lists of adaptations, discuss the ways that the three types of cats are the same, and how they are different, focusing on their special adaptations. You may choose to use the following questions to get the discussion going:
 - What does each cat like to eat?
 - How do they catch their prey (what behaviors do they use, and what body parts do they use)?
 - What parts of the forest do they use (forest floor, water, trees)?
 - What does their fur look like? What color are they, and do they have spots or stripes?
 - Is their tail long or short? Why do they have a long or short tail?
- 4. Ask the students to choose one of the three wild cats to create to place into the forest habitat they created in the previous activity.
- 5. To create their cat, students should choose a color of paint they would like to use for their cat's body. Using the paintbrush, they will paint their palm and then press their hand against a piece of white drawing paper. This handprint will be the cat's body, tail and legs. Wash up!
- 6. Using the same piece of paper, students should use the same paint and brush to paint a circle for the cat's head.
- 7. After the paint has dried, the students can cut out their cat body and head. Triangles can be cut out of the scraps for the cat's ears.
- 8. Ask each student to turn their handprint upside down so that the fingers are pointing towards them. The fingers are the cat's legs and the thumb, its tail. The head and ears can be glued on the opposite side of the tail.
- 9. Now it's time for the students to put the finishing touches on their cats, using paints and crayons. Does the cat they chose have spots or stripes? Does it have big, hooked claws or a pink nose? Whiskers, ear tufts, and any other special adaptations can be added at this time, too.
- 10. Once their cat is complete, ask the students to find a home for their cat in the forest drawing they created. Encourage them to place their cat in a part of the forest habitat that the type of cat they created would really use (fishing cat by the water or clouded leopard on a branch).
- 11. Ask the students to share their finished creation with the class, explaining which cat they chose, its special adaptations and place in the forest.

Extension

• If time permits, the students can add other animals, such as animals their cat would prey upon and/or animals that would prey upon their type of cat.



Evaluation

- 1. Observe that the basic needs of animals are represented in the students' forest creations.
- 2. Observe that the basic adaptations of the chosen cat species are included in the students' cat creations.
- 3. Observe that the student is sharing accurate information about his/her cat species during the class presentation.

ACTIVITY : FOREST CAT CREATIONS : ACTIVITY

A DAY IN THE FOREST

CAT TALES

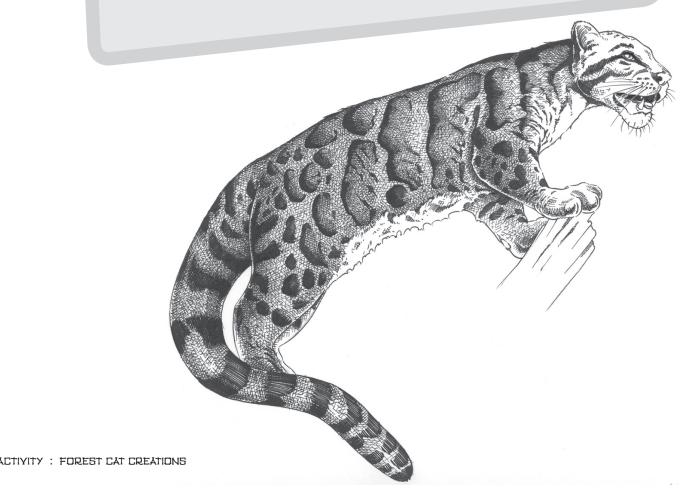
You are standing in the forest. All around you, trees stretch way up to the sky. Their branches hide the sun. Long creeping vines drape over the branches. The air is hot and thick. Ferns and other growing things poke out from every hole and crack in the trunks of the trees. You can hear the rustling of the leaves. Long bamboo stalks shoot up towards the sun. They make a "clock-clock" sound as they bump into each other in the breeze. The ground is damp and squishy from the afternoon rain. Your feet press into the mud and clumps of fallen leaves. You see that forest animals have been here, too. There are tracks in the mud next to your feet. As you hop over a fallen log, you begin to hear the sound of water up ahead. You enter the shadow of a bamboo grove. A flock of birds flies to a nearby tree, squawking all the way. The whole forest wakes up! You can hear a group of gibbons singing in the distance. Following the sound of the water, you find a waterfall. It rushes down the side of a cliff into a clear pool. You decide to take a swim to cool off. You have a delicious snack of some fruit that has fallen from a tree. A stream winds away from the pool into the shadows of the forest. You see many animal tracks along the banks of the pool. There are claw marks in the bark of a nearby tree. As you listen to the loud buzzing of the cicadas, you imagine all the unseen forest animals hiding and watching you from the shadows.

It is almost night in the forest. In the shadows of the trees, a cat makes its move. Its spots, which look like small clouds, help it to disappear into the leaves. It uses its huge paws and long tail to balance as it moves along a sturdy branch high in the air. Suddenly, the cat runs down the tree trunk headfirst, using its short legs and sharp claws to grip. On the forest floor, it crouches near the roots of a tree and yawns, showing huge canine teeth. It is time to find a meal! Maybe tonight it will be a monkey or a bird. As night falls, the cat disappears completely into the mist. (Clouded Leopard)



The moonlight sparkles in a forest pool. It is almost dawn in the forest. Something stirs in the shadows. A large cat is waiting patiently in the brush near the water. The stripes on its fur make it almost invisible as it waits. It hopes to surprise a deer or a water buffalo that might come to the waterhole for a drink. It is powerful, one of the largest cats in the world. If it makes a big kill tonight, it won't need to eat for a few days. Instead of hunting tomorrow, it could take a swim in the pool. A twig snaps, and out of the trees steps an unsuspecting deer. Maybe this cat will be lucky tonight. (Tiger)

Near a forest stream a small cat crouches on a rock. It is hungry for a meal of frogs or fish. It sits patiently, waiting for its prey to swim by. Its gray fur and black spots help it blend into the streambed. It holds its paw up in the air, ready to strike with long, curved claws. The cat's short tail swishes back and forth. Suddenly, its paw jets into the water with a splash. The skin between its toes helps it scoop up a fish. Success! But this cat had better find a safe place to eat its meal. There are larger cats nearby. (Fishing Cat)



IT'S ALL CONNECTED: A FOOD WEB ACTIVITY

GRADES:

1 - 3, 4 - 6

SUBJECT FOCUS

Science

SKILLS

Analysis, Classification

DURATION

30 minutes or longer

SETTING

Outdoor or indoors in a large room

MATERIALS/SUPPLIES

- Plant and animal identification cards
- Ball of yarn or string
- Hole punch
- Scissors
- Crayons or markers

Objectives

All Students will:

- Understand how plants and animals relate to one another within a food web.
- Explain how changes in one part of the food web may affect animals in other parts.

Students 4-6 will:

- Understand the parts of an ecosystem.
- Define a keystone species and its role in an ecosystem.

Method

By representing plants and animals, students will simulate the relationships that occur in a Southeast Asian forest ecosystem

Background

Ecosystems (short for ecological systems) are dynamic groups of living organisms (plants, animals, fungi and microorganisms) all interacting with each other and with the non-living elements of the environment in which they live (air, water, energy, climate, soil, etc.). They are "open" systems through which energy and nutrients are constantly moving in and out. Any changes that occur within an ecosystem (for example: the number of living organisms, temperature, nutrients, etc.) will result in changes to the nature of the system. For example, slash and burn logging of a forest changes the structure of the forest ecosystem. When the trees and under story plants are removed, the nutrients that were stored within them are lost into the soil or air, or are washed away by the rain. Animals that relied on the trees and plants to find food, water, shelter and space will have to find new habitat elsewhere. After a time of recovery, the ecosystem will become something entirely different; perhaps a scrub forest or grassland.

Within an ecosystem, different organisms and environmental elements play different roles. Plants, which are **producers**, use light energy from the sun to turn water and carbon dioxide into stored energy (through **photosynthesis**). Animals, which are **consumers**, eat the plants, or eat other animals that eat the plants, to get their energy. Other organisms, such as bacteria and fungi, act as **decomposers**, feeding on and breaking down dead organisms and waste products into nutrients that can be reused. These nutrients are then available to the **producers**, and the cycle is repeated.

In some ecosystems, there are specific organisms which help to support the entire system in a particularly powerful way. In these ecosystems, if this particular organism was removed, the other organisms in the ecosystem would be dramatically affected. This type of organism is referred to as a **keystone species**. For example, certain predators within an ecosystem are considered keystone species because they control the number of prey species within the system. If an entire species of predatory animal is removed, the prey species that they would normally hunt would become over-populated, using up too many resources within the ecosystem.

Procedure

- 1. Photocopy the plant and animal cards (on the following pages) and distribute one to each student. (Cards should have holes punched at the top.) If it is not possible to photocopy the cards for each use, laminate the cards so they can be re-used.
- 2. Have students color the plant or animal represented on their card. Ask the students to read their card to themselves to learn what their animal eats or what animal eats it.
- 3. Give each student a piece of yarn to hang the card around his/her neck.
- 4. Have the students make a large circle.
- 5. Holding the ball of yarn, explain to the students that you are the sun and, through your energy, give life to all things. Find a student with a plant card and pass the ball along while you hold onto the end of the yarn. Explain that the plant uses the energy from the sun to grow.
- 6. Have students take turns identifying relationships between plants and animals, each time passing the ball of yarn between them. The relationship can be in either direction; that is, a student can pass the yarn to another student if they either eat or are eaten by the animal or plant on the other card. Use this time to introduce or reinforce the concepts of **producer**, **consumer** and **decomposer**.
- 7. Continue forming connections between students. Students can be in many different connections. Cut the yarn and start over if you come to a "dead" end. When all the students are connected by the "web" of yarn, discuss the nature and complexity of the food web they have formed.
- 8. Ask the students what might happen to the food web if a species were removed. Have one student pull on the strings he or she holds. Explain that anyone directly connected to that species should feel the tug. Next, those students feeling the pull should pull on their strings. Encourage the students to describe the result in terms of how the plants and animals in the web are connected.
- 9. With older students, see if they can identify specific plants or animals within the food web that seem to have a greater effect on the web than others. Use this opportunity to discuss the role of **keystone species** within an ecosystem.



50

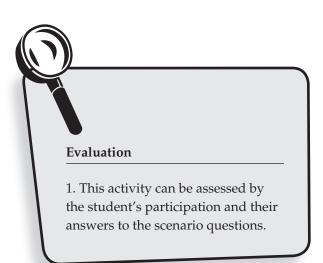
ACTIVITY: IT'S ALL CONNECTED: A FOOD WEB ACTIVITY

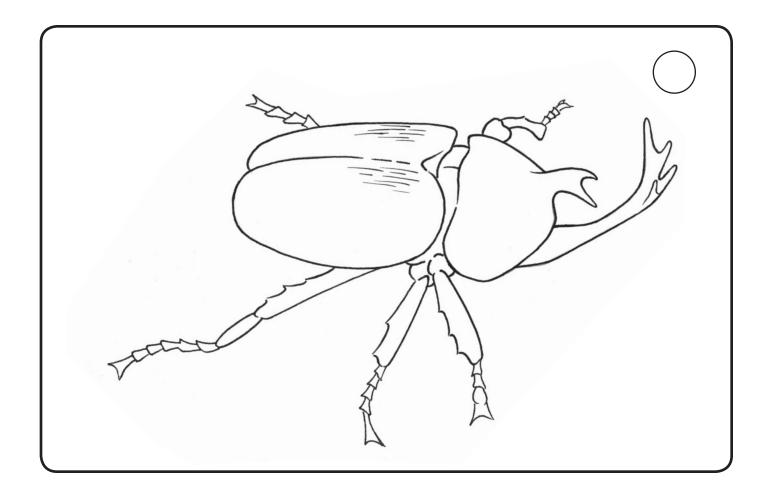
IT'S ALL CONNECTED: A FOOD WEB ACTIVITY

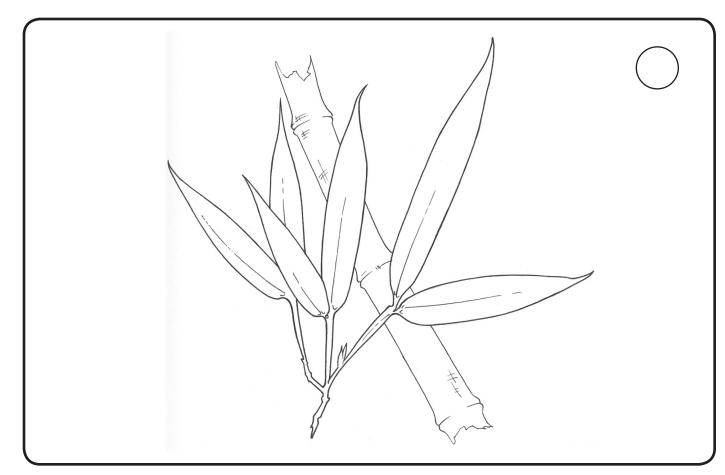
- 10. Next, describe some scenarios and ask the students to predict what might happen. If the scenario describes a species dying out, have the student representing that species let go of his or her string to see what happens.
 - People in the area have been killing **predators** because they fear the predators will attack their livestock. What might happen if all the predators were removed? How would that affect the entire food web?
 - Water pollution is becoming a serious problem in the lakes and rivers in the area. How might pollution affect the food web?
 - Pesticides from farming have killed the insects in the area. What impact would the disappearance of insects have on the food web?
 - Many of the trees in the forest have been cut down for their wood. How would the disappearance of trees affect the food web?
- 11. Ask the students if this food web they created is exactly like real food webs in the wild? How is it different? Is a real food web more simple or complex?

Extension

- Ask the students to design a food web that includes them. They should consider what foods they eat, where their food came from, and what that food eats or needs to survive.
- Older students could be asked to research and describe or draw an ecosystem, including representations of the various parts of the ecosystem, both living and non-living. A keystone species should be included in the ecosystem.







I am an atlas beetle.

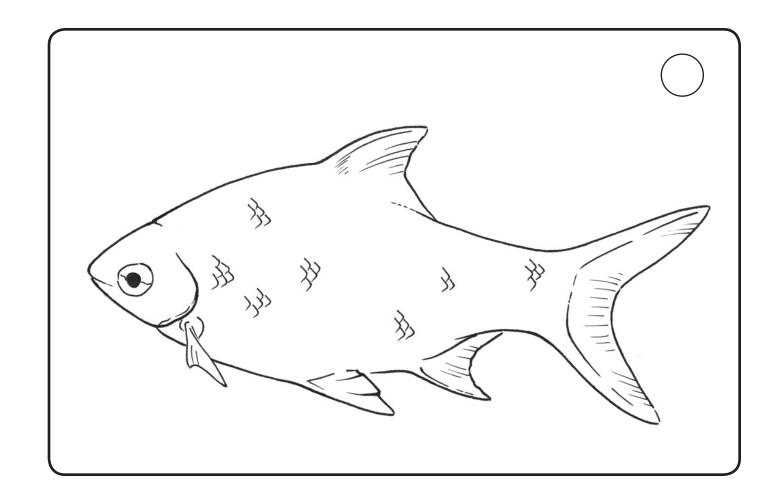
I live on the forest floor.

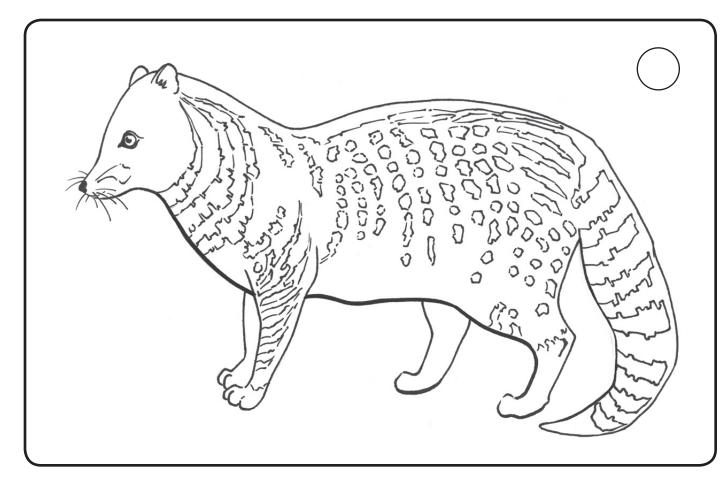
I eat rotting plants.

I am bamboo.

I grow in the forest.

I am eaten by elephants and deer.





I am a tinfoil barb.

I live in streams.

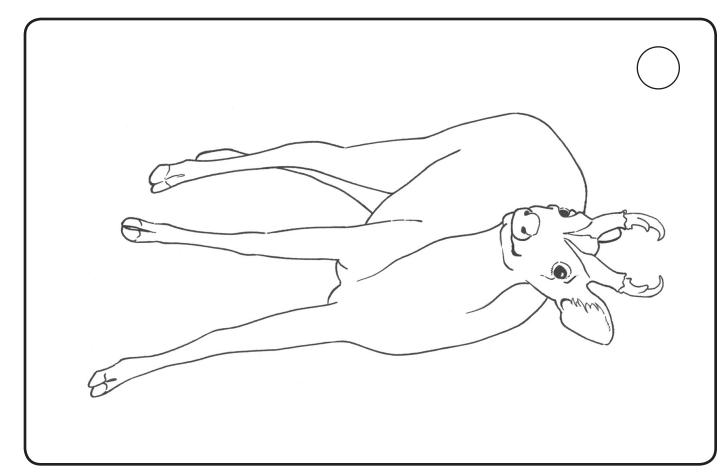
I eat fruit, plants and bugs.

I am a civet.

I live on on the forest floor.

I eat small animals.





I am a clouded leopard.

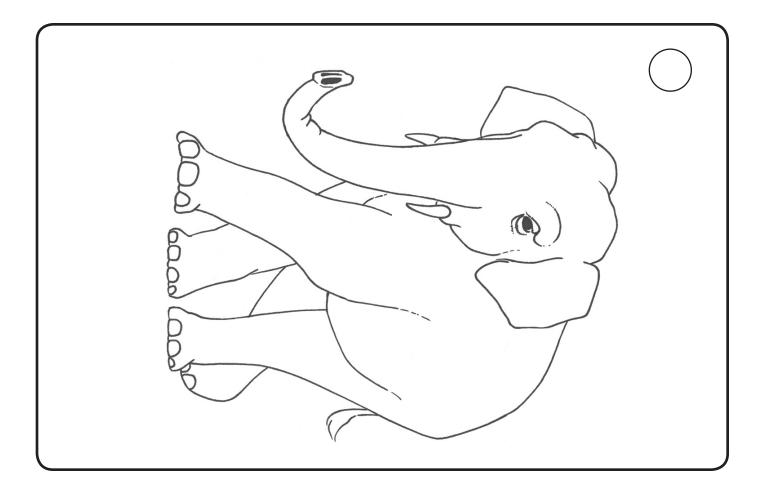
I live in the trees.

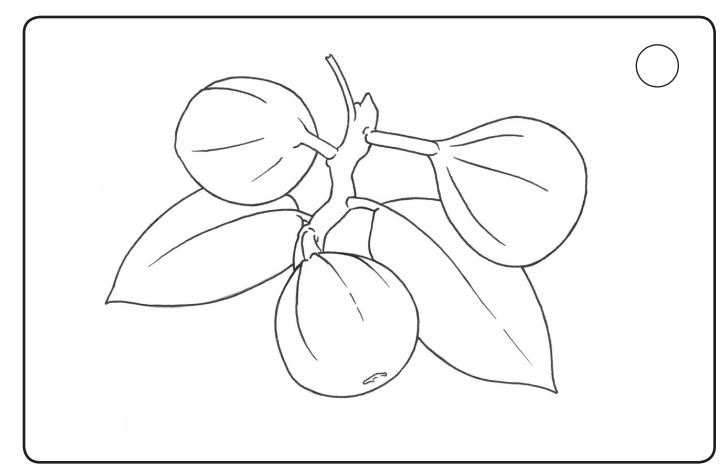
I eat birds and small mammals.

I am a barking deer.

I live on the forest floor.

I eat grass, fruit and other plants.





I am an elephant.

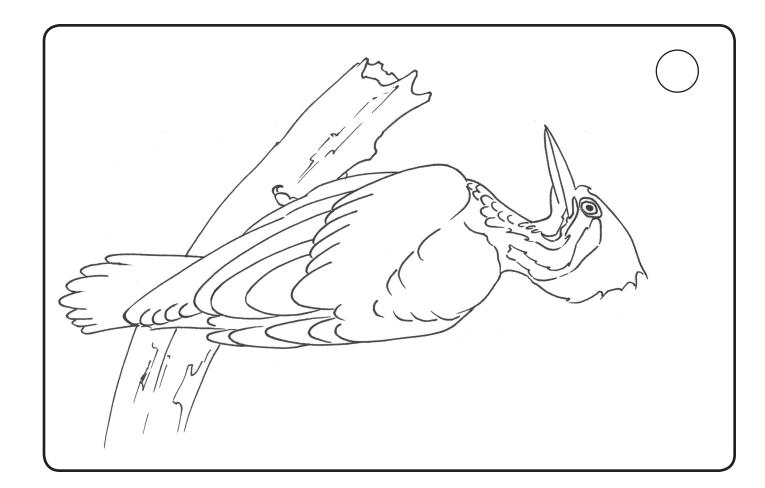
I live on the forest floor.

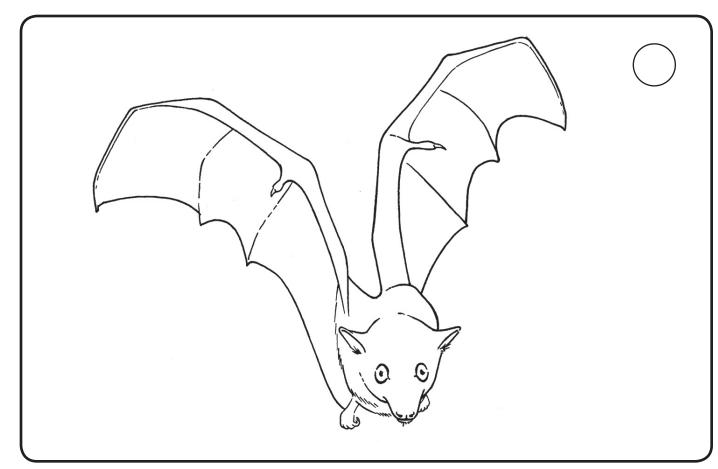
I eat grass, leaves and other plants.

I am a fig tree

I grow in the rainforest.

My fruits are eaten by monkeys, bats, birds and elephants.





I am a flameback woodpecker.

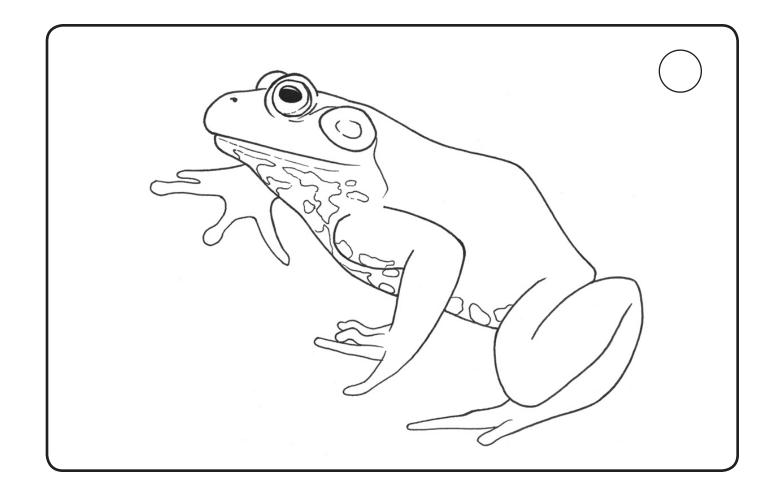
I live in the trees.

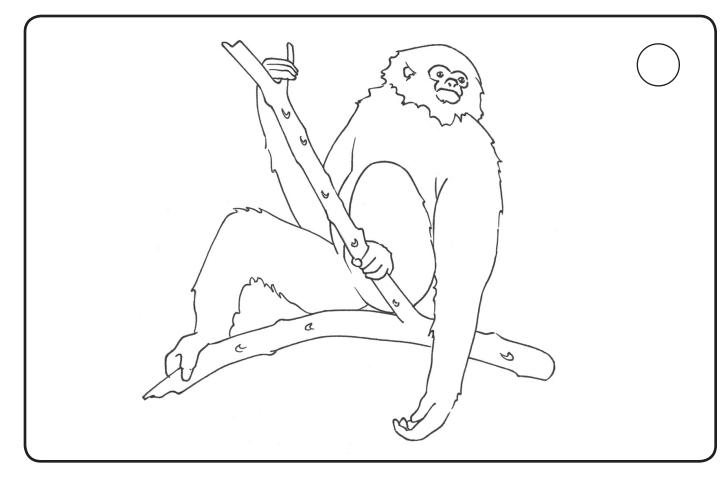
I eat insects.

I am a flying fox.

I live in the trees.

I eat fruit.





I am a frog.

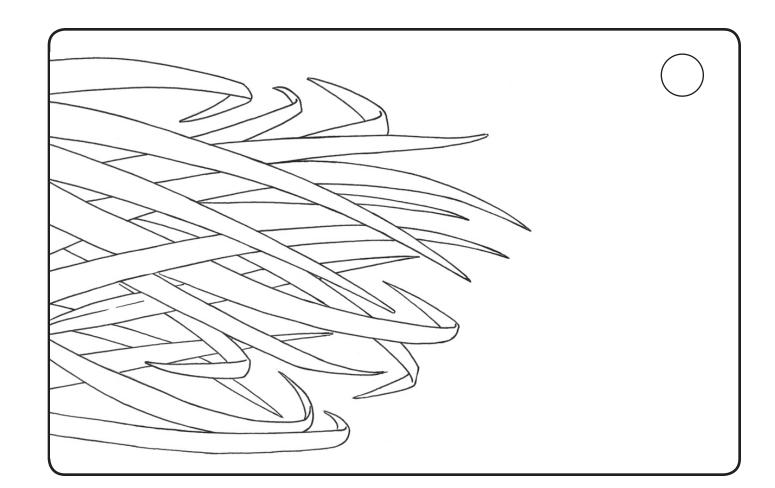
I live on the forest floor and in streams.

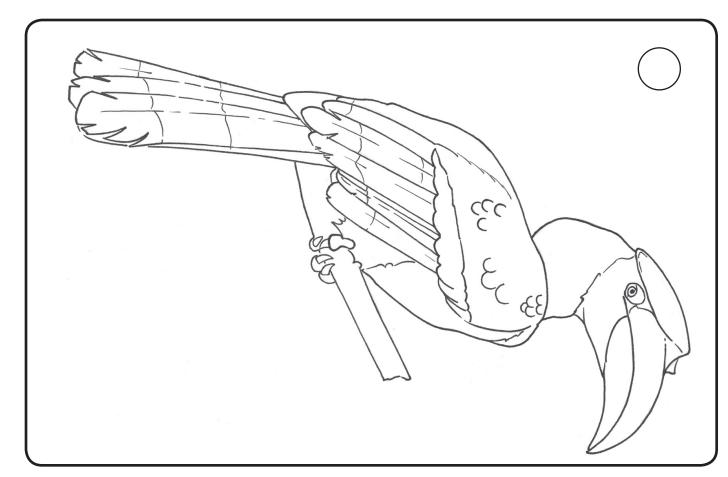
I eat insects.

I am a gibbon.

I live in the trees.

I eat fruit, leaves and insects.





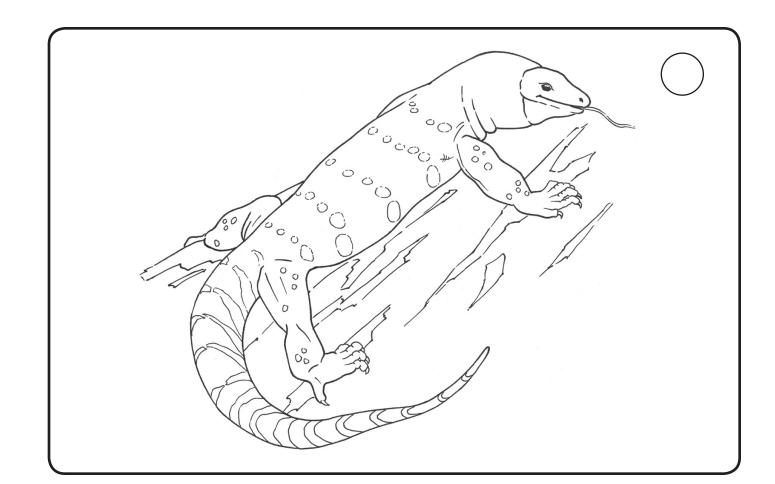
I am grass.

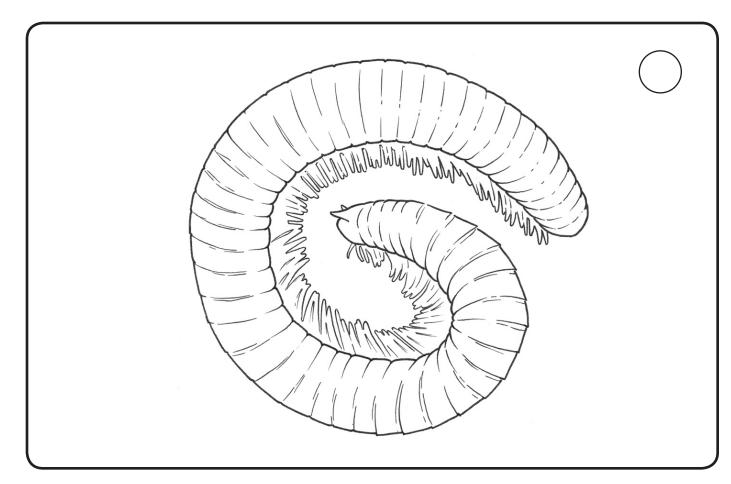
I am eaten by many different plant eaters.

I am a great hornbill.

I live in the trees.

I eat fruit and small animals.





I am a monitor lizard.

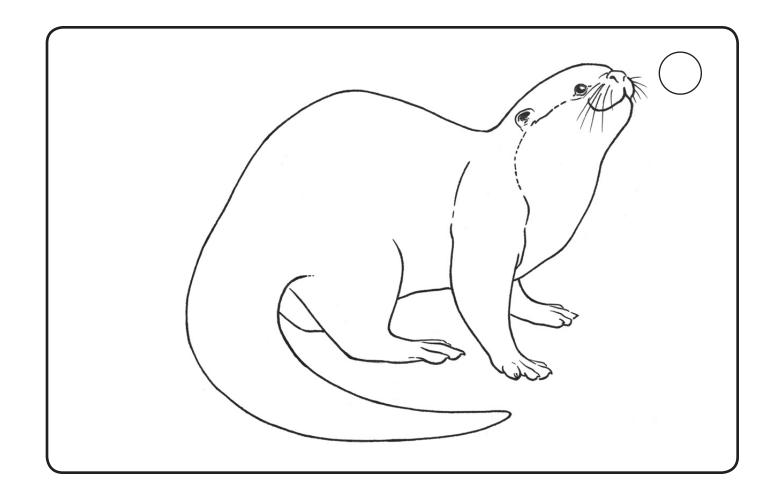
I live on the forest floor and swim in streams.

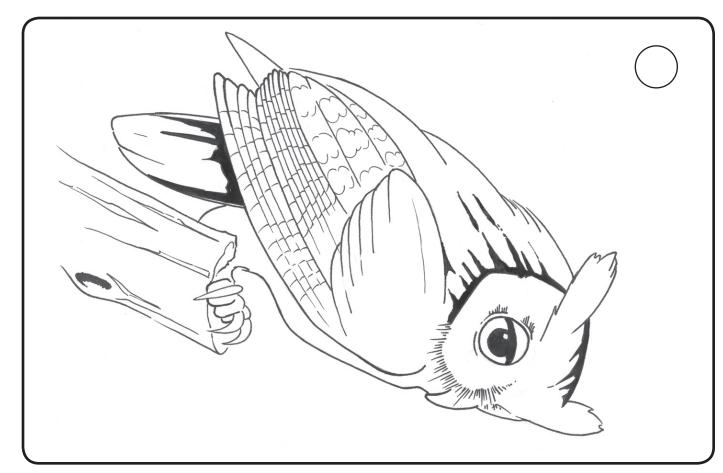
I eat small animals.

I am a millipede.

I live on the forest floor.

I eat rotting plants.





I am an otter.

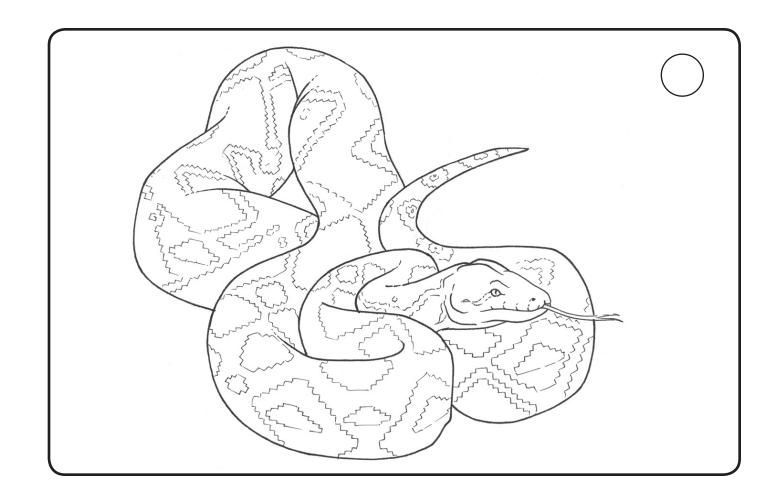
I live in streams.

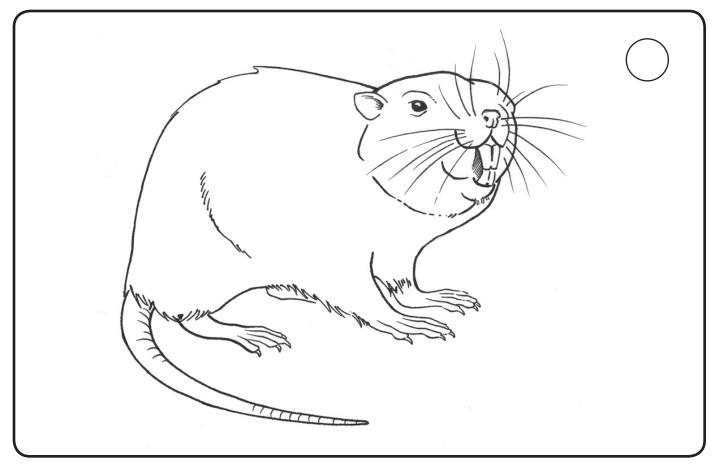
I eat fish and frogs.

I am an owl.

I live in the trees.

I eat insects and small animals.





I am a reticulated python.

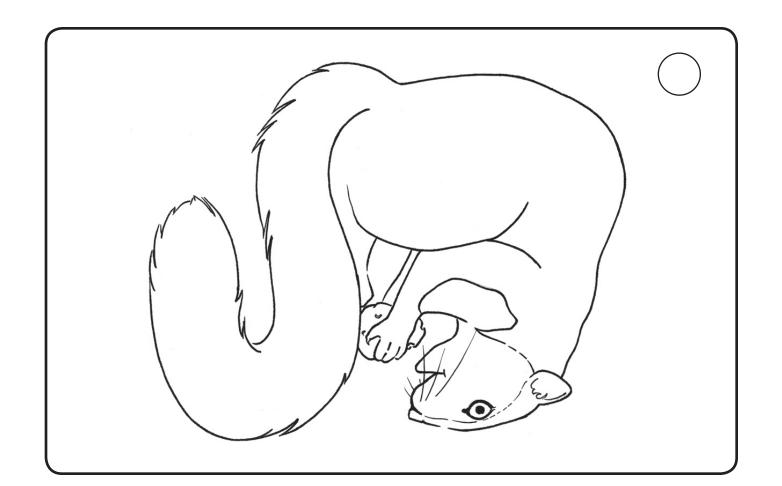
I live on the forest floor.

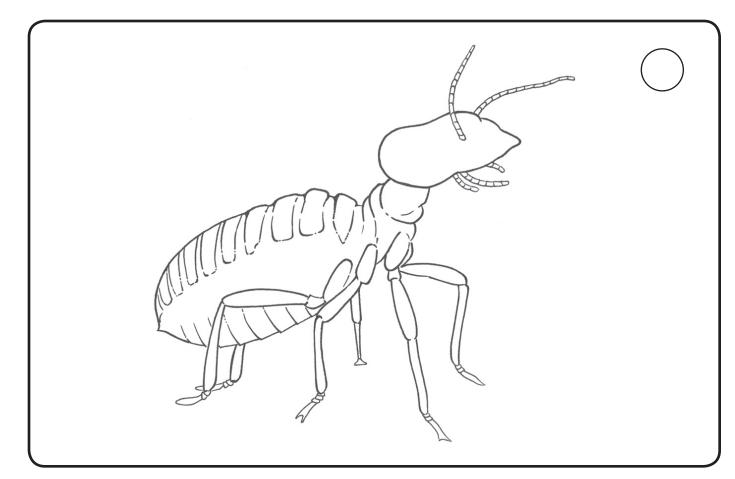
I eat birds and mammals.

I am a bamboo rat.

I live on the forest floor.

I eat fruit, grass and other plants.





Photocopy cards for multiple group uses.



I am a giant squirrel.

I live in the trees.

I eat fruits and other plants.

I am a termite.

I live on the forest floor.

I eat rotting plants.



WHAT'S FOR DINNER?

GRADES:

4 - 6

SUBJECT FOCUS

Science, Mathematics

SKILLS

Computation, interpretation, discussion

DURATION

30 minutes

SETTING

Indoors

- Paper
- Pen or pencil

Objectives

Students will:

- Calculate the percentages of certain prey items in wild cat diets.
- Make conclusions about the relationship between wild cats and their prey.

Method

By analyzing data collected by wildlife researchers, students will examine the relationship between wild cats and their prey.

Background

Because wild cats are so secretive, scientists have difficulty observing them directly. One way that scientists can learn about the habits of wild cats is by studying their droppings, called scat. Scat contains bones, hair and other clues to a wild cat's diet.

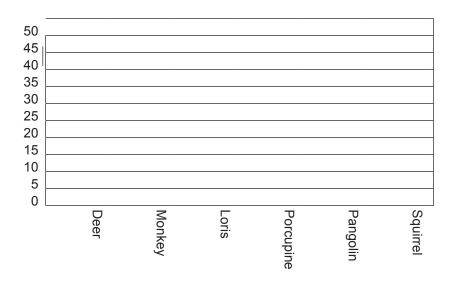
One challenge in studying scat is determining what species of cat left the droppings. Sometimes scientists can answer this question by looking at the size and shape of the scat or looking for other evidence such as nearby paw prints. If a cat has been caught in a live trap for study it will often leave a scat in the trap. The newest techniques even allow scientists to analyze the cat's DNA from the scat to get a positive identification. Even using these techniques, scientists cannot always be sure they have a proper identification.

Procedure

- 1. Explain to the class that they will be playing the role of a wildlife researcher and analyzing data gathered by a scientist working in Phu Khieo Wildlife Sanctuary in Thailand. Discuss with the class the technique scientists use to learn about a cat's diet by studying its scat. Brainstorm the ways a scientist can be certain a scat sample has come from a particular species of cat.
- 2. Copy the following chart onto the blackboard. Tell the students that scientists collected 23 scat samples from cats they identified as clouded leopards, golden cats, or other "medium-sized cats." Tell the students to fill in the chart by calculating the percentage of the cats' diet made up of each type of prey animal. Perform the first calculation as an example.

Prey animal	# of samples containing prey	% of samples containing prey
Deer	4	4 ÷ 23 X 100 = 17.4%
Monkey	1	
Slow loris	2	
Porcupine	3	
Pangolin	1	
Squirrel	3	
Rat	9	

3. Once the students have completed their calculations, have them create a bar graph of these percentages. Have students copy this graph template from the chalkboard.



- 4. Discuss the following questions with the students:
 - What prey item was eaten most often by the cats? What percentage of the cats' diet is this prey? Why do you think this prey was favored?
 - How accurate of a picture is this of the cats' diet? What would make it more accurate? (Larger sample size, positively identifying cat species)
 - If these medium-sized cats disappeared from Phu Khieo Wildlife Sanctuary, what might happen to the population of prey animals? How might this effect the forest ecosystem?
 - What might happen to these wild cats if many of the deer in the Sanctuary were taken by poachers?

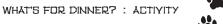




Evaluation

- 1. Observe that students complete the calculations and the bar graph correctly.
- 2. During discussion, the students should be observed for participation and their answers to the scenario questions.





ON THE TRACK OF WILD CATS

Objectives Students will:

- Chart data about clouded leopard home ranges.
- Analyze the data for patterns of clouded leopard behavior.

Method

Students use data collected by scientists to graph the home ranges of four

Background

hunt and find water and shelter. This area is called a home range. A home range is the space where a wild cat will roam over the course of its adult life. The size of a cat's home range may vary greatly depending on many males will have home ranges completely separate from those of other males of the same species. In contrast, the ranges of females may overlap. The home ranges of male cats will often overlap with the range of one or more females. Although these ranges overlap, males and females will avoid one another until the female is ready to breed.

The availability of food will play an important role in the size of a cat's home range. If food is scarce in a certain area, a cat living there may need a large home range to find enough food to eat. A cat living where food is plentiful may have a much smaller home range. (See page 13, "The Social

Scientists are very interested in studying the home ranges of wild cats. This information is important for estimating the population numbers of wild cats within a certain area. It can also help scientists determine how much space will need to be protected to provide homes for enough wild cats to keep their populations healthy.

Determining the home range of an elusive wild cat such as the clouded leopard is very difficult. Because it is not possible to observe these cats directly, scientists instead rely on radio telemetry. In radio telemetry, cats are captured and fitted with collars that produce signals that scientists follow once the cats are released. Tracking cats, even with telemetry, can be extremely difficult. Mountains may interfere with the signals and following signals through thick forest is challenging. Scientists follow signals on foot, with motorbikes or trucks, or sometimes with airplanes and helicopters.

clouded leopards and interpret the results.

As a wild cat becomes an adult, it needs to find a place to live where it can factors. Typically, male cats have larger home ranges than females. Usually

Lives of Cats" for more information.)

Procedure

- 1. Explain to the students that they are going to chart actual data that were collected by a scientist studying clouded leopards in Thailand's Phu Khieo Wildlife Sanctuary. After plotting the data, they will analyze it to make some conclusions about the behavior of clouded leopards living in the Sanctuary.
- 2. Have the students create a plot on graph paper oriented horizontally. (Students may use plain paper if graph paper is unavailable.) The x axis should be numbered from 1-10 (left to right) with each number evenly spaced. The y axis should be lettered A-H (bottom to top) with each letter evenly spaced (see example).
- Write the following on the board. Ask the students to plot the data points for the locations of each clouded leopard, using the appropriate color and symbol for each animal.

Clouded Leopard 1 – Black X	Clouded Leopard 2 - Red •		
B4	F9		
G4	F6		
C6	E9		
C5	D7		
F7	D10		
D8	F10		
D2	Н8		
Clouded Leopard 3 – Blue O	Clouded Leopard 4 – Green		
D5	B2		
01	D.4		

ded Leopard 5 – blue O	Ciouded Leopard 4 – Green
D5	B2
G6	D4
F8	C2
C3	C1
E3	D3
F4	E1
E5	В3

ON THE TRACK OF WILD CATS: ACTIVITY ACTIVITY: ON THE TRACK OF WILD CATS

GRADES:

SUBJECT FOCUS

Graphing, analysis, comparing

similarities and differences,

discussion, generalization

MATERIALS/SUPPLIES

Science, Math

DURATION

45 minutes

SETTING

• Graph paper

• Colored pencils

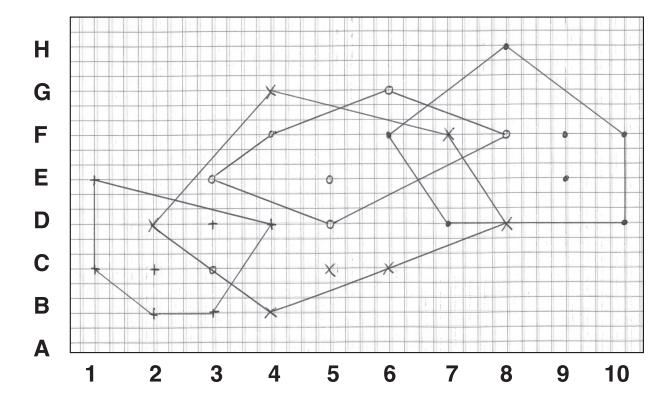
Indoors

SKILLS

4 - 6

ON THE TRACK OF WILD CATS

4. Once the students have plotted all the data points, have them connect the outer points from each cat with the pencil of the appropriate color to map the boundaries of the cats' home ranges. See graph below.

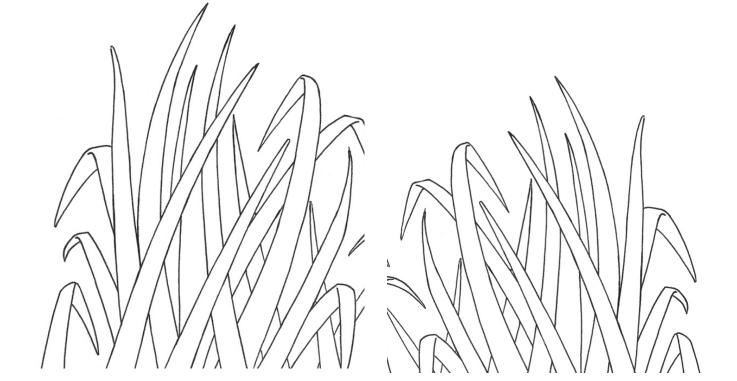


- 5. Ask the students the following questions to generate discussion about the behavior of these clouded leopards.
 - Which territory is the largest? What does this tell you about the gender of the clouded leopard living there?
 - Explain the overlapping territories. What do you think this tells you about the gender of the clouded leopards living there? (Clouded Leopards 1 and 4 are males; Clouded Leopards 2 and 3 are females.)
 - Why might the findings from these data be surprising to scientists? (Males don't usually tolerate other males in their ranges.) Can you think of any explanations for these males having overlapping ranges?
 - Do you notice a pattern in the way all of the home ranges are oriented? What might be the explanation for this? (They are aligned along a common line, in this case a river.)
 - Why are there so many data points clustered around a single location for Clouded Leopard 2? Why do you think this cat was at this location so frequently? (Has young there, feeding on a kill, presence of a waterhole.) How could a scientist be certain what was going on here? (Visual observation of a den or young, observation of a kill.)
 - The area charted represents about 100 square kilometers and supports four clouded leopards. What does this tell you about considerations for planning other protected areas for clouded leopards?



Evaluation

- 1. Observe that students plot the data points and complete the boundary lines correctly.
- 2. During discussion, the students should be observed for participation and their answers to the questions.



CONSERYATION CHOICES



GRADES:

4 - 6

SUBJECT FOCUS

Science, Language Arts, Social Studies

SKILLS

Analysis, discussion, small group work

DURATION

45 minutes

SETTING

Indoors

MATERIALS/SUPPLIES

• Writing materials

Objectives Students will:

• Work in groups to identify priorities for conserving endangered species.

Method

Students will play the role of wildlife conservationists and determine how to use a fixed amount of money to protect endangered species.

Background

People working in conservation must often make choices about the best way to spend the limited money available for protecting endangered animals and habitats. Often, the only money available is for large, well-known, or "cute and cuddly" animals that gain the attention of donors. Should conservationists focus on protecting these creatures at the expense of less well-known animals? Often, those overlooked animals may be more endangered and need more conservation help than their more famous counterparts. However, by protecting the well-known umbrella species and their habitats, a conservationist may be protecting all the other creatures that share its space.

This activity will allow students play the role of conservationists who often have to make decisions about how to spend limited conservation dollars.

Procedure

- Review with the students the definition of an **endangered** species. Ask the students to share some of the reasons why animals may become endangered.
- 2. Have the students break into small groups of 2-4 people. Tell them that each group will be a team in charge of saving ten endangered species. To save these species, they have a total of 40,000 baht. Give each team a copy of the worksheet with the ten species (on page 85) or write it on the board for them to copy themselves.
- 3. Tell the students that they must look over the list and decide which animal or animals they would like to give conservation money to, and divide their money among no more than three animals on the list. (Money does not need to be divided evenly.) Students must work only with the information given. Give the students no more information, even if they ask questions.
- 4. Have students put their names on the top of their group sheet. After they have completed their sheets, collect them and tally them in front of the class. As you tally the numbers, briefly ask each group why they picked the species they did.

- 5. As the tally is completed, it will often be clear that most groups picked the same species for funding. Many species will have received no money at all. Ask the students why this happened. (People usually chose to donate money to help animals that they know about.) Ask if they think students in other classes would make the same choices. Ask them which animals on the list are most endangered. Give the students time to discuss this. Guide the discussion, and they will eventually determine that the animals that no one knows about or that receive no support are the most endangered. (See below for more information.) Explain that many of these animals don't receive much conservation money in real life either.
- 6. Explain to the students the concept of an **umbrella species**. Ask them if providing money for an umbrella species, such as a tiger or an elephant would be a good idea? Why?
- 7. Take a few minutes to talk about the good work that conservation has done to protect endangered species. Visit the Clouded Leopard Project website at www.cloudedleopard.org to learn more about how people are protecting endangered cats in Thailand.



Evaluation

1. Observe that all students participate during small group and class discussions.

ENDANGERED SPECIES INFORMATION

Pileated gibbon - Hylobates pileatus

This gibbon has long white hairs growing out from the side of the head. Gibbon populations have declined due to habitat loss, hunting and the pet market. It is estimated that before mass deforestation there were 2-3 million; they now number less than 10,000.

Siamese fireback pheasant - Lophura diardi

This pheasant inhabits the dense bamboo and evergreen forests of Southeast Asia. It faces serious habitat destruction and its vivid coloring makes it particularly vulnerable to live trapping for sale in the illegal pet trade.

Kitti's hog nosed bat - Craseonycteris thonglongyai

This is the world's smallest mammal, about the size of a bumblebee, with a pig-like nose, no tail, relatively large ears and small eyes. It is only found in small, remote caves in Thailand. Highly threatened by deforestation of its feeding habitats, this bat is one of the top twelve most endangered animals in the world.

Indochinese tiger - Panthera tigris corbetti

This tiger subspecies from Thailand is smaller than other forms with darker coloration and more numerous stripes. Poaching for skins and bones, together with the loss of natural prey species and habitat destruction have greatly reduced tiger populations to a few isolated areas.

CONSERVATION CHOICES! : ACTIVITY ACTIVITY: CONSERVATION CHOICES

CONSERYATION CHOICES

Asiatic water buffalo - Bubalus bubalis

Wild water buffalo prefer to live in open forests and grasslands near water. They are threatened by habitat loss, poaching for their horns, and disease spread by domestic water buffalos. The water buffalo is highly endangered with probably only 40 - 50 remaining in Thailand.

Malayan tapir - Tapirus indicus

Tapirs live in dense forests and swamps and when threatened flee to the water for safety. Destruction of their forest habitat and hunting have brought the species to near extinction.

Asian spiny turtle – Heosemys spinosa

The spiny turtle is hunted and killed for food in large numbers throughout its Southeast Asian range, and is also heavily exploited for the pet trade. Not a lot is known about these turtles, as scientists are still in the very early stages of studying them. Much more remains to be learned about this turtle to protect it from extinction.

Sumatran rhino - Dicerorhinus sumatrensis

The Sumatran rhino, like other rhinos, has long been targeted by poachers for its horn. Habitat destruction due to logging and agricultural has also caused rhino numbers to decline. The last seen Sumatran rhino in Thailand was in Surathani province in the 1990s.

Asian elephant - Elephas maximus

Wild elephant habitat is under severe threat from human encroachment. Much of the former elephant habitat has been taken over for rice cultivation. It is estimated that there are less than 2,000 wild elephants left in Thailand, most of these living in protected areas such as Khao Yai National Park and in forest areas along the Myanmar border.

Mekong giant catfish – *Pangasianodon gigas*

Once found in large numbers in Cambodia and Thailand, the giant catfish can weigh as much as 300 kilograms and measure up to 3 meters in length. They are one of the largest freshwater fish in the world. The giant catfish is threatened by over fishing and dynamite blasting of their spawning ground. The giant catfish is in danger of disappearing from Thailand completely – none have been seen since 2001.

CONSERVATION CHOICES WORKSHEET

Your group has been given 40,000 baht for protecting endangered animals. As a group you must choose which species deserve the money most. Donate to 1, 2, but no more than 3 species. The money does not have to be divided evenly.

Species	Would you like to contribute?	How much?
Pileated gibbon		
Siamese fireback pheasant		
Kitti's hog-nosed bat		
Indochinese tiger		
Wild water buffalo		
Malayan tapir		
Asian spiny turtle		
Sumatran rhino		
Asian elephant		
Giant catfish		

ACTIVITY: CONSERVATION CHOICES



GRADES:

SKILLS

writing

DURATION

SETTING

Indoors

SUBJECT FOCUS

Social Studies, Language Arts,

Research, description, drawing,

Two 30 to 45 minute periods

MATERIALS/SUPPLIES

• Large sheets of paper or

poster board

• Drawing and writing materials

4 - 6

PROTECTION POSTER

Objectives Students will:

• Identify and describe a problem facing Southeast Asian wild cats.

- Develop a message for a local campaign to solve this problem.
- Create a poster using art and a message to promote a solution to this problem.

Method

Students select a conservation issue facing a wild cat and create a poster to promote a solution to the problem.

Background

Wild cats face a variety of problems that threaten their survival (See Wild Cats in Danger on page 6-7). This activity will provide students with an opportunity to explore one of these conservation challenges and develop a message for convincing an audience to protect wild cats.

Procedure

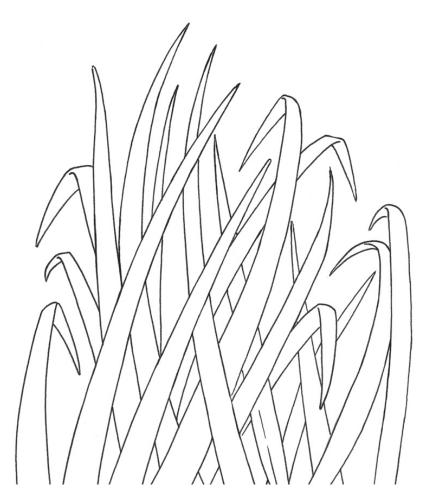
- 1. Brainstorm with the students some of the challenges that they think wild cats might be facing in Southeast Asia. Make a list of these challenges on the board. Use the background information in the guide to help lead the discussion.
- 2. Lead a discussion with the class about reasons that these challenges might exist for the cats in the first place. Have the students discuss some of the possible solutions to these challenges (creating protected areas, increasing law enforcement, promoting tourism). Be sure that the students consider how their solutions might affect the people involved in the problem (displacing villages, loss of income, sending people to jail). Have the students consider how successful this solution might be in light of the consequences to people.
- 3. Explain to the students that they will each be developing a poster campaign to promote the conservation of wild cats in the area. The students will develop both a message and complementary artwork for the poster. The students should consider the following points while developing their message and art:
 - To whom do I want to communicate my message? Is the poster designed to reach just the people involved with the challenge or a wider group of people?
 - What is my message? It needs to be specific and relate to the challenge and the group of people with whom I'm communicating.
 - Is my message positive or negative? Often the best approach is a positive one. For example, for some people a poster saying "Protect wild cats because they are an important part of nature" may be more effective than saying "If you kill wild cats you will go to jail." For other people the opposite might be true.

• Does my artwork strengthen my message? The art and words on the poster should work together to deliver a strong message.

- What is a realistic goal for the campaign? What does the student hope to achieve?
- 4. Provide the students time to research a conservation challenge, plan a message, and create their posters.
- 5. Once the posters are created, have each student present their poster to the class and explain why they chose the message they did, who the message was for, and what they think the result of their campaign might be.
- 6. Display the students' posters in the school.

Extension

 If desired, the students may take this campaign into their community. They could display the posters for people throughout the community to see or display them in a place where they will reach their target audience.





Evaluation

1. Determine whether or not the students' messages were appropriate for their targeted audience and if the art and message were complementary.



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CONSERYATION ROLE PLAY

GRADES:

4 - 6

SUBJECT FOCUS

Social Studies, Science

SKILLS

Analysis, small group work, discussion, persuasion

DURATION

45-60 minutes

SETTING

Indoors

MATERIALS/SUPPLIES

• Writing materials

Objective Students will:

- Role play to develop perspectives for other people's points of view on conservation issues.
- Participate in group discussion to develop and present a persuasive argument.

Method

Students assume the roles of various community members who have a stake in the outcome of a governmental decision to move people who currently live in a wildlife reserve.

Background

Throughout Southeast Asia, people live in very close proximity to wildlife reserves. In some cases, people even live within the boundaries of the reserves. When people live in or near reserves, they often have an impact on wildlife. People may damage or destroy protected habitat in order to create their homes and farms. They may collect firewood in surrounding forests and hunt wildlife for food. Sometimes people illegally kill, or poach, wild animals for profit. Wild cats are often targets for **poachers** because their skins and body parts can be sold for a great deal of money. In some cases, poachers also harm wild cats by hunting their prey. When too many prey animals, such as deer, are killed, wild cats may no longer be able to survive in the reserve.

Wildlife may also have an impact on people living in or near reserves. For example, wild animals may eat or damage crops or kill livestock. On rare occasions, people may even be killed by wild animals.

In order for reserves to be successful for conserving wildlife, conservationists must be sensitive to the needs of the people who live nearby. Any plans to save wildlife must balance the needs of both people and animals. If a conservation plan negatively impacts people, it is unlikely to be successful. As more and more people live within or near wildlife reserves, it is even more important to have those local people on the side of conservation.

This activity will model a conflict resolution problem, allowing students to role play people with various points of view about wildlife conservation. The activity will help students understand that conservation is a complex issue, with many people having a strong stake in the outcome of conservation decisions.

Procedure

1. Share the following information with your students:

You are members of a community living in and around a forest reserve. Currently, 5,000 people live in the region, with about 2,500 people living within the reserve's core area. Although no agriculture is allowed within the reserve, the people living there have a substantial impact on the habitat. They often hunt for food within the reserve and they collect firewood and cut down trees to clear space for their homes.

The government has proposed moving all the people out of the core area of the reserve. Each family that is moved will receive a house and some land. These families will have access to electricity, clean drinking water, schools, and health care. Once people are moved out of the reserve, it will be much easier for reserve managers to control the poaching and illegal logging that sometimes takes place in the reserve.

- 2. Divide the students into six groups:
 - Conservationists
 - Park Rangers
 - Poachers
 - Tour Operators
 - Villagers
 - Government Officials. The group of Government Officials must be made up of an odd number, ideally three or five.

Explain to the students that each group will be playing the role of a group of people who have a stake in the proposal to move people out of the reserve. Tell the students that it is important for them to take on their new roles as completely as possible, even if their own personal opinions might be different. They must try to imagine the interests and experiences of their assigned groups and how that would impact their feelings towards the proposal.

- 3. Give each group the appropriate information to help them consider their position on the proposal (see following pages). Give each group only the information appropriate to the group.
- 4. Allow the groups ten to fifteen minutes to consider the information and discuss how they feel about the proposal. The exception to this is the group of Governmental Officials, who should disperse among the other groups and listen to but not participate in their discussion. Encourage debate within each group and remind the students that they need to debate the proposal only within their assigned role.

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CONSERVATION ROLE PLAY: ACTIVITY

ACTIVITY : CONSERVATION ROLE PLAY

CONSERVATION ROLE PLAY

Emphasize to the students that discussing a complicated issue such as this one can be difficult. There are many sides to every issue and often the feelings for one position or another are strong. In presenting this activity to students, stress the importance of not placing judgment and listening to perspectives other than one's own. Understanding all sides can provide a bigger picture of the issue. Remember, it is not the intent of this activity to impose right or wrong answers for the students. At the end of the debate, the group must vote on the proposal and select a spokesperson to present their viewpoint.

- 5. When all groups have selected a spokesperson, have them take turns presenting their opinion on the proposal to the Government Officials who will make the final decision on whether or not the proposal is approved. They should be as persuasive as possible in order to convince the officials to vote in their favor. During the presentations, the Government Officials should be encouraged to question the presenters.
- 6. When all the groups have made their presentations, give the Government Officials five minutes for discussion and making their decision. Ask the group to choose a spokesperson to announce their decision on whether the proposal will pass. Tell them they are free to amend the proposal based on their feelings. After their announcement discuss the following questions with the students:
 - Could this activity happen in real life?
 - What does this activity have to do with wild cat conservation?
 - How similar are these issues to the issues where you live?
 - Would the same groups be interested in conservation decisions where you live?

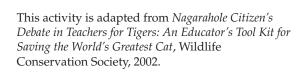


Evaluation

1. During discussion, the students should be observed for participation and their ability to consider the issue based on their assigned roles.

GOVERNMENT OFFICIALS

As government officials, you will decide whether the proposal passes or fails. A representative from each group will make a presentation telling you how the group feels about the proposal. You will need to listen carefully and ask the speakers any questions you may have. You have a lot to consider. You should think about the needs of the people you are responsible to. What is in their best interests? What about your responsibilities to the nation as a whole? Do you have a responsibility to your nation's wildlife? Would the proposal be of benefit to your country? Why or why not? Would the proposal hurt or help people make a living? Are you an elected official? If so, who elected you and what are your responsibilities to these people? Do you need to be reelected in the future? These are all issues to consider as you think about the proposal.







CONSERVATIONISTS

Your group is made up of conservation biologists and citizens who support conservation. Your primary concern is the protection of wildlife and natural habitats. You feel that protecting wildlife reserves is extremely important. However, you also know that even if the villagers are moved out of the reserve, they will continue to live around its borders. Therefore, it is important to consider the people's feelings and well being so they will not have negative feelings towards the reserve and its wildlife. Your work is driven by your belief that your country's wildlife is an important part of its cultural heritage. You want future generations to be able to see the tigers, elephants, and other animals that have been so important to the nation's cultural history. You want to make sure that wildlife protection laws are enforced.





PARK RANGERS

Your professional responsibility is to take care of the reserve and its wildlife. You patrol the park to watch for poachers and illegal loggers and remove snares set to catch animals. You also conduct research to learn more about the reserve's wildlife. But while you care about the survival of wildlife and natural habitats, you receive little money for conservation in the reserve. This lack of funds makes it very difficult for you to enforce the laws protecting wildlife. You do not have enough staff or enough resources to do your job effectively. Many of you were born in the reserve, and some of you still live there. Some of you have family members among the people who would be moved out of the reserve if the proposal passes, and your main concern is for their well-being.





VILLAGERS

Your ancestors have lived on the land in the reserve for generations. You feel that you should have the right to remain if you choose. You and your ancestors have lived harmoniously on the land and with its animals. You feel you are being punished for the fact that the rest of the nation has wiped out its wildlife. Because there is no farming or livestock allowed within the park, most of you are forced to work outside the park on farms and plantations. A few of you work within the park as reserve guards. Some of you make money collecting forest products. You are very poor and would love to have access to electricity, schools, and health care. But if you are forced to move out of the reserve, you are not sure what to expect. You don't know if the government will keep its promises.





POACHERS

The members of your group make your living from illegal activities in the reserve. Some of you cut down trees to sell outside the reserve as fuel or incense. Some of you set up snares on game trails in order to catch animals you can sell for food. Occasionally you catch a tiger or clouded leopard in one of your snares. When you do, you can sell it to middlemen from outside the reserve and make as much money as you would earn in a couple of years otherwise. On the black market a tiger's bones can be sold for thousands of dollars to users of traditional Asian medicines. All of these activities are illegal and you know you could get into a lot of trouble if you're caught. But you have few other ways of making money.

CONSERVATION ROLE PLAY: ACTIVITY





TOUR OPERATORS

Your group leads tours for foreign visitors to your country. Visitors come to see the country's cultural sites and wildlife. You currently bring groups into the reserve, but often have difficulty spotting wildlife because it is easily frightened by people. You would like to find ways that the reserve can become a better destination for wildlife viewing by tourists. You are also interested in hiring as guides the villagers who know the trails and wildlife of the reserve so well. Your long-term plan includes building a lodge near the reserve where visitors on wildlife-watching trips can stay. You'd also like to create hides in the reserve where tourists can watch animals such as elephants and tapirs as they visit saltlicks or mud wallows.

ACTIVITY : CONSERVATION ROLE PLAY









GRADES:

1 - 3, 4 - 6

SUBJECT FOCUS

Social Studies, Language Arts, Science

SKILLS

Analysis, description, discussion, public speaking, problem-solving, small group work, writing

DURATION

A minimum of three 45 minute periods

SETTING

Indoors and outdoors

MATERIALS/SUPPLIES

- Paper
- Pen or pencil

Objectives Students will:

- Identify a problem involving wildlife on their own school grounds.
- Suggest and evaluate alternative means by which to either solve the problem or at least improve the situation.
- Successfully undertake the project.
- Analyze and describe the process by which they successfully solved the problem or improved the situation.

Method

Students select a school environmental project; conduct research; make plans; and follow procedures to accomplish the project.

Background

Each of us can make constructive contributions to improving the environment in which we live. Sometimes our actions can improve the environment for people, sometimes for wildlife, and sometimes for both. Sometimes our effectiveness can be improved if we work with other people – sharing ideas, information and skills.

A working knowledge of the following terms will be useful to students in this activity:

Problem: A difficult situation to be improved, or an opportunity to make things better. Problems can't always be "solved," but situations can usually be improved.

Compromise: A way to settle a problem in which both "sides" usually give a little.

Given that it is important for young people to learn that they "can do" for people, wildlife, and the environment – use your judgment in the course of this activity to assist students in selecting a project that is realistic, constructive, and possible. If not, the students may experience an activity that contributes to their thinking that they "can't do."

Procedure

- 1. Ask the students to think of some ways in which they could improve areas of the school grounds as a home for wildlife. They might generate a list of activities on their school grounds that have a negative impact on wildlife. The list might include litter that poses a hazard for some kinds of wildlife; a proposed pesticide spraying that will not only kill the "pest" but perhaps affect other plants and animals; removal of a tree that presently helps contribute to cleaning the air, produces oxygen, and serves as a food and shelter source for varying kinds of wildlife, etc.
- 2. Look at the list of possible problems and suggestions for ways to improve wildlife habitat at school ask the students to select one they think they could realistically handle and do something

- constructive about. If there is difficulty in deciding which one, and reasonable support has been offered for each, the students might vote to decide. Students could also make speeches in support of the project they want to tackle in hopes of swaying the class vote.
- 3. Once the project has been selected, ask the students to work alone or in small groups to begin to generate ideas for possible solutions to the problem and ways to implement the project. Each individual or small group could come up with a plan, including a written description and illustrations or sketches of how it will work, and how it can be accomplished.
- 4. Ask the groups to present their plans to the rest of the students. Students may ask questions for clarification. Once all the plans have been presented, ask the students to select the plan that seems most: a) constructive; b) realistic; c) helpful to wildlife; and d) likely to make a lasting contribution.
- 5. Also ask the students to select one or more alternative plans, in case their first choice is not acceptable to authorities at the school.
- 6. Once a plan has been selected, ask the students to select a delegation to present their proposal to the school principal or whomever the appropriate authority would be. Remember janitors, groundskeepers, etc anyone who would be physically and /or officially involved. A practice session before the students would be helpful. At the practice session, the student delegation would make their presentation as they plan to make to the principal, janitor, etc. and respond to any questions that might be raised.
- 7. The students should make an appointment to present their proposal, make the presentation, and report back to their classmates. If their plan is accepted, they should make sure they know who to contact next in order to successfully complete their project. Making sure they have all necessary permissions secured, the students should proceed to successfully accomplish their project. If their plan, including alternatives, is not accepted, have the students identify the reasons why. Have them find out exactly what people objected to in their original plan. The students can then respond to those objections with alternative proposals. Creating an alternative plan may require further research, careful interviews and time.
- 8. Once accomplished, ask the students to analyze their results. Did things work out like they wanted them to? Were there any surprises? Any unforeseen problems? How might they have been any more effective?



Evaluation

- 1. Observe that students have selected an appropriate and realistic project.
- 2. Observe that all students participate in the development and implementation of the project plan.

CAN DO! : ACTIVITY





WILD CAT PLEDGE

GRADES:

K - 6

SUBJECT FOCUS

Social Studies, Language Arts

SKILLS

Discussion, public speaking, writing

DURATION

15 minutes

SETTING

Indoors or outdoors

MATERIALS/SUPPLIES

• Writing materials

Objectives

Students will:

- Identify two actions that they want to take that will help wild cats or wild cat habitat.
- Fill out and sign their Wild Cat Pledge card.
- Present their pledge to the class.
- Take their pledge home to share with their family.

Method

Students use what they have learned about wild cats and the challenges facing their survival to determine two specific action steps that they can take to help wild cats or wild cat habitat.

Background

Every person, no matter how old they are, what they do, or where they live, can make a difference in helping protect wild cats and their habitats. One way to empower individuals to take their own personal action steps toward a solution to an environmental challenge is by encouraging them to identify specific actions that they can take in their own lives. Further, encouraging someone to write these actions down as a pledge and then communicate that pledge to peers and family members can reinforce the actions steps to further empower a student to follow through with the desired actions.

Procedure

- 1. Ask students to discuss some of the things they have discovered about wild cats and their habitats. Ask them to recall some of the special adaptations the cats have, some of their habitat needs (where do the different species find their food, water, shelter and space in their habitat), and some of the challenges facing their survival.
- 2. Ask students to make a list of actions on a piece of paper that they feel people in their community should take to help wild cats and wild cat habitat, and have them share a few ideas with the class, or write them on a chalk board or piece of paper on the wall.
- 3. Then ask students to choose two items from the list as personal action steps that they would like to make on behalf of wild cats.
- 4. Pass out photocopies of the Pledge Cards. (If you are unable to photopy the pledge, write it on the chalkboard for students to copy.) Have the students complete and sign the Pledge Cards. You may choose to be their witness, or you may have a fellow student be the witness.
- 5. Ask the students to make their pledge to the class.
- 6. You may want to display all of the pledges in the classroom, or send them home with the students to share with their parents.

WILD CAT PLEDGE CARD



I,		pledg	ge to take c	are of wild
cats by taking the following				
1				
2				
Signed, this day	of the mon	th of	ir	n the
year				
Your Name				
Witness				

GLOSSARY



Adaptations – Special body parts or behaviors that help an animal survive

Binocular vision – The overlapping field of vision from both eyes that provides depth perception and the ability to accurately judge distances.

Biodiversity – A term that describes the variety of life: the different plants, animals and microorganisms, their genes and the ecosystems of which they are a part.

Buttress roots – Roots that grow outward from a tree's trunk to provide support in shallow or damp soil.

Camouflage – An animal's ability to blend into its environment through markings on its fur or skin.

Canines – A cat's large, fang-like teeth used for grabbing and holding prey.

Canopy – The uppermost layer of continuous trees in the rainforest.

Carnassials – The sharp-edged molar teeth of a cat that are used for shearing meat.

Carnivora – The scientific name for the order of mammals designed for eating meat.

Carnivore – A meat-eating animal.

Consumer – An animal that gets its energy by eating plants and/or other animals.

Decomposer – An animal that feeds upon dead plant and animal matter, breaking the remains down into soil.

Digitigrade – The posture in which a cat stands on its toes.

Ecosystem – Dynamic groups of living organisms all interacting with each other and with the non-living elements of the environment in which they live.

Emergent layer – The trees that grow above the canopy of the rainforest.

Endangered species – A species that is threatened with extinction in all or part of its range.

Epiphyte – A plant that lives on another plant for support without harming the host plant.

Felidae – The scientific name for the cat family.

Habitat – The natural environment where an animal is found.

Herbivore – An animal that eats plants.

Home range – The area in which a cat roams throughout the course of its activities.

Keystone species – A species that has an especially great influence on its ecosystem.

Limiting factor – Any environmental factor that prevents an organism from living in a specific habitat or restricts its population size.

Photosynthesis – The process in which plants absorb light energy to convert carbon dioxide and water into carbohydrates.

Poacher – A person who hunts or catches animals illegally.

Predator – An animal that hunts and kills other animals.

Prey – An animal killed and eaten by a predator.

Producer – An organism, such as a plant, that is capable of making its own food using energy from the sun through the process of photosynthesis.

Pugmarks – Animal footprints.

Retractable Claws – Claws that can be brought into sheaths in a cat's paw when not in use.

Scat - Cat feces.

Scrape – A territorial marking a wild cat makes by scratching its back feet on the ground while depositing urine or feces.

Stalking – The action of a cat sneaking up on its prey.

Tapetum lucidum – The layer of light-reflecting cells on a cat's retina.

Territory – The part of a cat's home range that it will defend against other members of its species.

Umbrella species – a species that requires large areas to maintain stable populations, which when protected, will share this protection with other species using the same habitat

Understory – The plants growing beneath the rainforest canopy.

