

# Zoo Activity Packet



Gibbons  
Gibbons

Dear Educator,

Niabi Zoo, located in Coal Valley, Illinois, is part of the Rock Island County Forest Preserve. The ground covers 38 acres, with an additional 200 acres set aside for native flora and fauna preservation. Niabi, an Oswego Indian word means “young deer spared from the hunter’s arrow”. A fitting name, Niabi is home to a variety of animals.

Niabi Zoo takes pride in the quality animals and experience we provide for our communities! Our education department is committed to providing top quality educational programming. It is our goal to help spread the message about the importance of caring for our earth by leaving healthy ecosystems for our families and future generations.

Niabi Zoo is a great place to visit and we want to make your experience as educational as possible. The purpose of this material is to encourage students and teachers to explore the animal kingdom while learning about conservation efforts to protect our ecosystems.

Zoos provide an opportunity to learn about animals, but more importantly, to develop positive attitudes and curiosity about nature. Niabi Zoo hopes to create an adventure that encourages our visitors to leave this experience with a greater appreciation for all living things!

After completing this guide, we ask that you complete and return the attached evaluation form. We would love to hear your comments and appreciate any suggestions for improvement!

Sincerely,

Education Department  
Niabi Zoo



## Objectives and Learning Standards

Grades 1 and up

### Objectives:

1. Students will be able to identify the White handed gibbon.
2. Students will be able to list identifying characteristics of gibbons.
3. Students will be able to identify the habitat of the gibbons- rainforests.
4. Students will be able to list identifying characteristics of rainforests.

### IL State Learning Standards that could be applied with this material:

#### English Language Arts:

**1A, 1B, 1C; 2A; 3A, 3B, 3C; 4A, 4B; 5A, 5B, 5C**

*Goal 1 (Reading): 1A, 1B, 1C*

Vocabulary, animal stories, compare and contrast reading

*Goal 2 (Literature): 2A*

Fact or fiction

*Goal 3 (Writing): 3A, 3B, 3C*

Creative writing, animal fact cards, research paper, worksheets

*Goal 4 (Listening & Speaking): 4A, 4B*

Class discussion, student reports

*Goal 5 (Research): 5A, 5B, 5C*

Research, organize and report information

#### Science:

**12A, 12B**

*Goal 12 (Concepts & Principles): 12A, 12B*

Conservation efforts and status, ecosystems, habitats

#### Social Science:

**16E; 17A, 17C**

*Goal 16 (History): 16E*

Local zoo history, environmental history

*Goal 17 (Geography): 17A, 17C*

Culture & demographics, relationship between humans and animals



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## Vocabulary Sheet

*Arboreal:* Spends most of the time in the trees.

*Brachiation:* Hand over hand swinging motion.

*Carnivore:* A mammal with specially shaped teeth that feeds mainly on meat.

*Diurnal:* Active during the day, but inactive during the night.

*Ecosystem:* A collection of living things and their environment.

*Fruigivore:* An animal that has a diet consisting mainly of fruit.

*Habitat:* The natural home of a species.

*Herbivore:* An animal that eats only plant food.

*Mammal:* A warm-blooded animal with hair that feeds its young on milk.

*Nocturnal:* Active at night, but inactive during the day.

*Omnivore:* An animal that eats both plant and animals.

*Primate:* A mammal with flexible fingers and toes and forward-pointing eyes.

*Rainforest:* A dense and warm forests which receives a large amount of rainfall.

## White Handed Gibbon

Kingdom: Animalia  
 Phylum: Chordata  
 Class: Mammalia  
 Order: Primata  
 Family: Hylobatidae (tree dweller)  
 Genus: Hylobates  
 Species: Hylobates lar  
Features:



The White-handed gibbon, like the gorilla, chimpanzee and orangutan, is an ape, not a monkey. They share with the great apes (gorilla, orangutan and chimpanzees) several features: a large brain, a flat face with shortened jaws, a more or less upright posture, a broad chest and no tail.

Gibbons are very small and lightweight. They have a small, round head, very long arms (the arms are longer than the legs), and a short, slender body. Gibbons have lightweight bones. The long forearms assist it in suspensory behavior. Gibbons are **arboreal**; they spend most of their lives in trees.

Gibbons are covered with light-colored to very dark brown ( or black) dense hair on most of their body (except their face, fingers, palms, armpits, and bottoms of their feet). Their fur is extremely dense, providing protection from rain. One square centimeter of skin has over 2,000 individual hairs (13,125 per sq. in.) compared to 900 hairs per sq. cm. for Old World monkeys.

Some species of gibbons have a white face ring, a band of white completely surrounding their jet-black face. Snout is not protruding; nostrils are more widely spaced and more lateral than Old World Monkeys. Gibbons have small jaws with long canine teeth.

Gibbons have senses very similar to ours, including hearing, sight (including color vision), smell, taste, and touch.

Gibbons' hands are very much like ours; they have four long fingers plus a smaller opposable thumb. Their feet have five toes, including an opposable big toe. Gibbons can grasp and carry things with both their hands and their feet. When they swing through the trees (called brachiating), they use four fingers of their hands like a hook (but they do not use the thumb for this). Thumb is used for climbing tree trunks and thick branches and for manipulation of food and grooming. The upper sides of hand and feet are always white ('white-handed'),

contrast is less apparent in the buff specimens.

The average body mass for an adult male white-handed gibbon is around 14 pounds, and slightly smaller for the females.

The white handed gibbon has throat sac located beneath the chin to help enhance the calls. Male song is simple with quaver-hoots, female song is longer, rising to climax, about 18 seconds long.

### **Location:**

The white-handed gibbon is found in different parts of southeast Asia, the countries of Burma, China, Indonesia, Malaysia, North Sumatra, and Thailand. This species is found in old growth tropical rain forests, semideciduous monsoon forests and tropical evergreen forests. They prefer the covered closed canopy but during feeding may climb to highest emergent crowns of trees or descend to clumps of bamboo and low bushes, or to drink.

### **Diet:**

The lar gibbon is one of the pickiest eaters in the primate world. The white-handed gibbons are mainly frugivores, preferring fruits high in sugar such as figs. Gibbons are omnivores (eating plants and meat). They forage for food in the forests during the day, eating fruit, and they may visit 16 or more widely spaced food trees in a day's foraging. About 75% of their diet is fruit, but they also eat leaves, flowers, seeds, tree bark, and tender plant shoots. Sometimes they also eat insects, spiders, snails, bird eggs, and small birds. Zoo diet consists of primate chow, fruits, vegetables and browse.



Gibbons drink water, often by dipping a furry hand into the water or rubbing a hand on wet leaves, and then slurping up the water from their fur. Gibbons sometimes do this while dangling above the water from a thin tree branch.

They have several adaptations for feeding. One of them is brachiating locomotion, which involves swinging from branch to branch by their arms. This style of motion allows them to reach the edge of the tree canopy, where most of their food is found. Other adaptations include high cusps on their back teeth to help grind plant matter, and a gut adapted for a folivorous diet.

### **Social behavior:**

Gibbons are social animals that are active during the day (they are **diurnal**). Gibbons mate for life; the young, born singly, remain with the family group until they are five or six years old. Like other apes, gibbons groom one another (they clean the hair of a family member).

The males are not socially or physically dominant over females. They are vigorously territorial, spending up to ½ hour or more each morning calling and displaying. The function of calling seems to be both territorial and to reinforce the pair bond. The calling bout is usually initiated by the female. Male and female “duet” with different “songs.” The female song is a plaintive swooping call, rising to a crescendo – her great call; the male calls with a high-pitched “quaver song.”

The male usually takes the lead in attacking other gibbons encountered, although they rarely actual fight. Playful ‘biting’ matches, which can be painful to a human, seem to determine rank order of mature juveniles within the group. Even serious bites don’t seem to hurt them because of their dense fur.

Female gibbons carefully nurture their young. Eyes are open at birth and body and limbs are bare; very dependent on their mother for warmth. Many are white at birth and do not become black or final color until 2 – 4 years old. Babies can grasp their mother’s fur to cling to the mother’s belly soon after birth. Infants are hairless except for a cap of fur on the crown. They are weaned at about 1 year old. Young gibbons stay with their mother for about 6 years. The young then venture out (or are forced out) to start a new family group of their own.

### **Movement:**

Gibbons are extremely acrobatic and agile. They spend most of their life in the trees. They move by swinging gracefully from branches and vines; this is called **brachiating**. When they brachiate, they use four fingers of their hands like a hook (but not the thumb). They swing from branch to branch (horizontally or vertically), with legs flexed under body; using arms alternately and keeping hand bent in hook shape, and movements appear effortless. They are able to change direction even during fastest bounding by slightly touching a branch. While swinging, they are able to catch birds out of the air and eat them after landing.

They can also walk along small branches high up in the air, like tightrope walkers; they use outstretched arms to help keep their balance. Gibbons climb when moving slowly and feeding. Gibbons can also leap acrobatically across large gaps in the tree canopy from tree branch to tree branch; gibbons have been known to leap over 30 feet (9 m) in a single jump. The gibbon is the only anthropoid ape to walk on its hind limbs only, usually raising its arms for balance. Gibbons cannot swim and avoid the water. When on the ground (which is rare), gibbons walk bipedally (on two legs).

These are the most active of all gibbons. They move faster, more quietly, and farther each day than any other forest apes or monkeys. Brachiation comprises 90% of locomotor activity. Adaptations include precision of movement, incredible eye-hand coordination and dexterity. This remarkable agility makes a healthy adult gibbon virtually invulnerable to predation. They sleep sitting on their ischial callosities, hands resting upon flexed knees and head buried between knees and chest.

**Territories:**

Each family defends its territory by song and threat display. Gibbons are very territorial. A pair maintains and defends a territory through a series of calls and vocalizations. They also use an elaborate system of calls to keep track of family members within the territory.

**Communication:**

The white-handed gibbon is distinguished by its musical howl. They are quiet during the day but commonly howl at sunrise and sunset. They are very vocal, making loud "whoop" sounds. Their loud resonant songs can be heard up to ½ mile away. Songs by far excel those of all other species because of a sound-amplifying throat sac.

Duetting is the singing between the male and female, and is dominated by the female. This helps to maintain the pair bond between the pair and to maintain the territory. Each morning upon awakening a family group of gibbons loudly announces its presence in the forest, using a territorial hooting call and menacing gestures. This call warns other gibbons to stay out of their territory (and especially away from the local fruit trees). This noisy display takes ½ hour or more every morning and is usually started by the adult female. The male and female have different calls.

In friendly greetings, corners of mouth are drawn back, revealing teeth, and tongue is sometimes protruding. In anger, mouth is opened and closed repeatedly, smacking lips and snapping teeth together. Snarling is interpreted as an intention of biting.

There are 9 species with 9 different territorial songs. The gibbons seem to be born knowing the songs because they are always the same, and not learned.

**Habits:**

Gibbons do social grooming, when one individual grooms another, to reinforce the bonds between individuals.

They do not construct sleeping nests but show preference for specific 'sleeping trees' where no other family group is tolerated. They sleep sitting erect in trees, huddled together in twos and threes, with knees bent up to chin, hands folded on knees and face buried between the knees and chest. They sleep sitting upright, resting on tough pads located on their rear ends (these pads are called ischial callosities).

## Conservation Status

**Status:** *Near threatened*

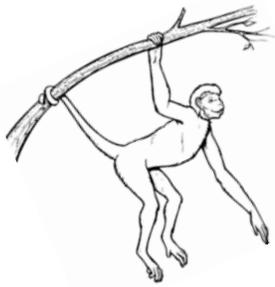
This species is threatened for a several reasons. These gibbons are hunted for meat in some areas. Live capture for the pet trade also poses a serious problem. In many Asian countries, it is “fashionable” to own your own primate, and this has led to the death of many gibbons either at the time of capture or during transport. The final, and greatest, threat to the gibbon is deforestation. Rainforests are disappearing at an alarming rate due to logging and agricultural, leaving forest species with an ever smaller region in which to live. Some efforts are being made to save these primates, such as national parks and reserves, but they are not very effective. Laws protect them from live capture, but they are rarely enforced.

Gibbon populations are decreasing; they are threatened with extinction. There are estimated to be about 79,000 lar gibbons (the white-handed or common gibbon). Lar gibbons retain only 10% of their original habitat in protected reserves. In 1987, the IUCN estimated that there were 79,000 lar gibbons but to protect the more endangered species, all are listed as endangered by the USDI (1980) and are on appendix 1 of the CITES, prohibiting commercial trade in gibbons. They are endangered and participate in the Species Survival Plan.

Life span is 30 to 40 years.



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## Monkey vs. Ape

### Monkey

#### *Habitat-*

Nearly all live in tropical or subtropical climates, and are primarily arboreal.

#### *Physical-*

Monkeys have tails (most which are prehensile or semi prehensile)

Flattened chest

Hairy nose

Large brain

Deep lower jaw

#### *Swinging-*

Monkeys cannot swing arm over arm (brachiation), with the exception of the spider monkey. Monkeys move about in trees by running along the branches on all fours. Excellent climbers.

#### *Reproduction-*

Gestation period ranges from 4-8 months depending on species.

Normally give birth to a single baby. Young nurses for a period of a few weeks to 2 years.

#### *Other-*

2 categories of monkeys:

Old World monkeys and New World monkeys

### Apes

Apes are more intelligent than monkeys- the most important difference between monkeys and apes.

#### *Habitat-*

All apes are forest dwellers, and spend at least some of their time in trees.

#### *Physical-*

No tails

Larger and more developed brain

Highly developed eyes

Larger bodied than monkeys

Broad, flat chests

Arms capable of reaching up and backward from the shoulder

Arms are longer than the legs

*Swinging-*

Except for adult gorillas, they can run along branches on all fours; they are also able to move about by brachiation, or arm-over-arm swinging. Apes spend more time upright than on all fours.

*Reproduction-*

Apes have fewer young than monkeys, they also nurture the young longer than monkeys.

*Other-*

Closest relatives to humans

2 classifications of apes:

Great Apes... family Pongidae

Includes gorillas, orangutans, chimpanzee and bonobos

Lesser Apes... family Hylobatidae

Includes gibbons and siamung

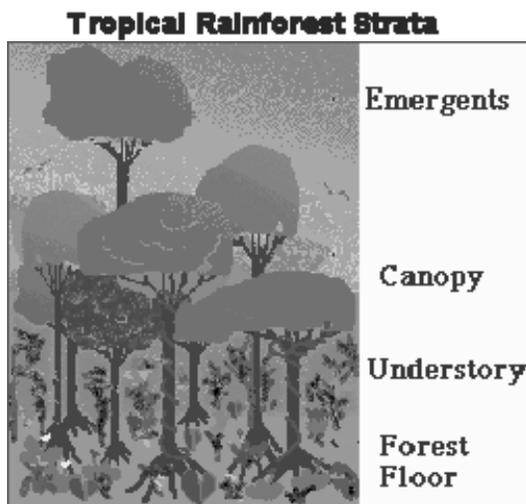
## What Is A Rainforest?

Rainforests are very dense, warm, wet forests. They are havens for millions of plants and animals.

Rainforests are extremely important in the ecology of the Earth. The plants of the rainforest generate much of the Earth's oxygen. These plants are also very important to people in other ways; many are used in new drugs that fight disease and illness.

### Levels of a Rainforest-

Different animals and plants live in different parts of the rainforest. Scientists divide the rainforest into strata (zones) based on the living environment. Starting at the top, the strata are:



- **EMERGENTS:** Giant trees that are much higher than the average canopy height. It houses many birds and insects.
- **CANOPY:** The upper parts of the trees. This leafy environment is full of life in a tropical rainforest and includes: insects, birds, reptiles, mammals, and more.
- **UNDERSTORY:** A dark, cool environment under the leaves but over the ground.
- **FOREST FLOOR:** Teeming with animal life, especially insects. The largest animals in the rainforest generally live here.

### Where Are Rainforests?

Tropical rainforests are found in a belt around the equator of the Earth. There are tropical rainforests across South America, Central America, Africa, Southeast Asia and Australia (and nearby islands).

Tropical rainforests are located in a band around the equator (Zero degrees latitude), mostly in the area between the Tropic of Cancer (23.5° N latitude) and the Tropic of Capricorn (23.5° S latitude). This 3,000 mile (4800 km) wide band is called the "tropics."

The equator is an imaginary circle around the earth, halfway between the north and south poles. Temperatures at the equator are high. These high temperatures

cause accelerated evaporation of water, which results in frequent rain in forested areas in the tropics.

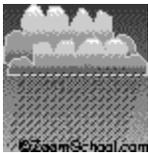
There are rainforests in South and Central America, Africa, Oceania (the islands around Australia), and Asia. Tropical rainforests cover only about 7% of the Earth's surface.

### **The Importance of Rainforests!**

Tropical rainforests cover about 7% of the Earth's surface and are VERY important to the Earth's ecosystem. The rainforests recycle and clean water. Tropical rainforest trees and plants also remove carbon dioxide from the atmosphere and store it in their roots, stems, leaves, and branches. Rainforests affect the greenhouse effect, which traps heat inside the Earth's atmosphere.

Some of the foods that were originally from rainforests around the world include cashew nuts, Brazil nuts, Macadamia nuts, bananas, plantains, pineapple, cucumber, cocoa (chocolate), coffee, tea, avocados, papaya, guava, mango, cassava (a starchy root), tapioca, yams, sweet potato, okra, cinnamon, vanilla, nutmeg, mace, ginger, cayenne pepper, cloves, oranges, grapefruit, lemons, limes, passion fruit, peanuts, rice, sugar cane, and coconuts (mostly from coastal areas).

### **Rainforests Conservation- see insert**



#### **Rainfall... visual on wall**

It is almost always raining in a rainforest. Rainforests get over 80

inches (2 m) of rain each year. This is about 1 1/2 inches (3.8 cm) of rain each week.

The rain is more evenly distributed throughout the year in a tropical rainforest (even though there is little seasonality). In a temperate rainforest, there are wet and dry seasons. During the "dry" season, coastal fog supplies abundant moisture to the forest.

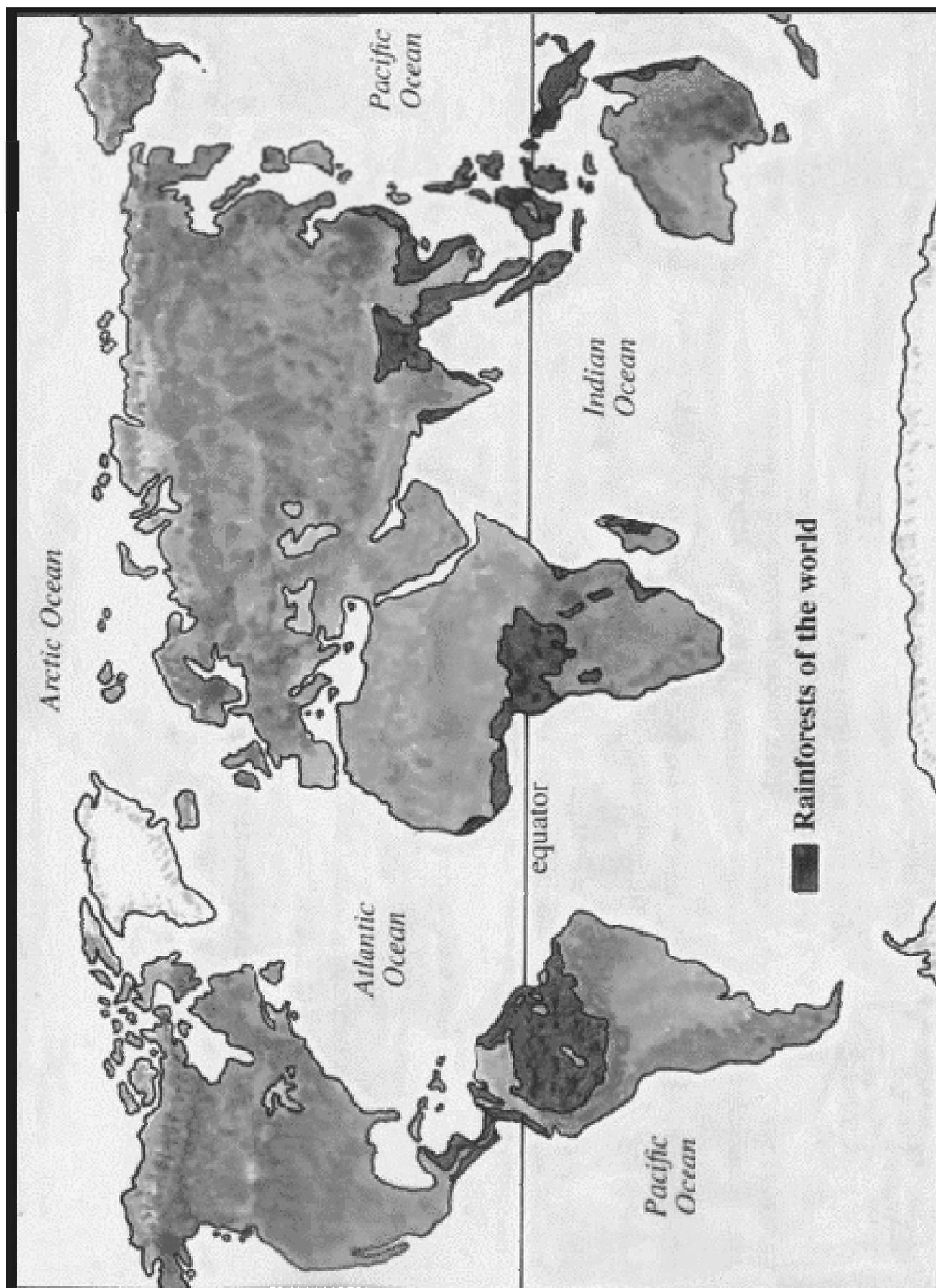
#### **Temperature**

The temperature in a rainforest never freezes and never gets very hot. The range of temperature in a tropical rainforest is usually between 75° F and 80° F (24-27° C). Temperate rainforests rarely freeze or get over 80° F (27° C).

### **The Soil in a Rainforest**

The soil of a tropical rainforest is only about 3-4 inches (7.8-10 cm) thick and is ancient. Thick clay lies underneath the soil. Once damaged, the soil of a tropical rainforest takes many years to recover.

Temperate rainforests have soil that is richer in nutrients, relatively young and less prone to damage.



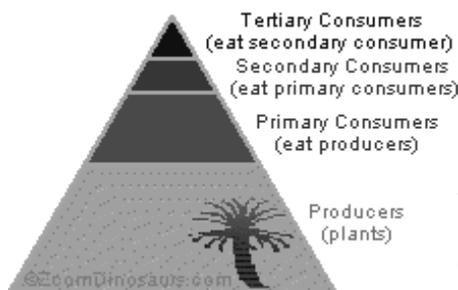
## Rainforest Animals

Rainforests are tremendously rich in animal life. Rainforests are populated with insects (like butterflies and beetles), arachnids (like spiders and ticks), worms, reptiles (like snakes and lizards), amphibians (like frogs and toads), birds (like parrots and toucans) and mammals (like sloths and jaguars).

Different animals live in different strata (or zones) of the rainforest. For example, birds live in the canopy (upper leaves of the trees) and in the emergents (the tops of the tallest trees). Large animals (like jaguars) generally live on the forest floor, but others (like howler monkeys and sloths) are arboreal (living in trees). Insects are found almost everywhere.

Many species of rainforest animals are endangered and many other have gone extinct as the number of acres of rainforests on Earth decreases.

### The Food Web



As in any food web, there are more plant-eaters than meat-eaters (and many more plants than plant-eaters). There are also more small animals than large animals. Insects are the most numerous animals in rainforests.

Although there is intense competition between animals, there is also an interdependence. When one species goes extinct, it can affect an entire chain of other species and have unpredictable consequences.

### Protection from Predators

Animals are always in danger of being eaten and have developed many methods of protecting themselves from hungry animals. *Use animals in Ed Center to explain... let students walk around to different exhibits.*

- **Hiding:** Some animals simply hide from predators, concealing themselves in burrows, under rocks or leaves, in tree hollows, or in other niches where they are hard to find.
- **Camouflage:** (White's Tree Frogs, Bengal Tigers) Camouflage is another way of hiding in which the animal blends into its environment. Many animals, like the "walking stick" insect and the Indian Leaf Butterfly (Kallima inachus) are camouflaged so well that they are virtually invisible when they are standing still. Sloths are covered with a greenish layer of algae which camouflages their fur in their arboreal environment. Sloths also move very slowly, making them even harder to spot.

- **Scaring predators:** Some animals try to convince predators that they are bigger and more fierce than they really are. For example, the larva of the lobster moth (*Stauropus fagi*), whose larva looks like a scorpion, but is in fact completely defenseless. Many butterflies have large "eye" designs on their wings. This makes them look like the head of a very large animal instead of a harmless butterfly, and scares many predators away.
- **Warning colors:** (Poison Dart Frogs) Poisonous animals openly advertise their defense methods, usually with bright colors and flashy patterns. When a predator eats one member of the group, it will get sick. This memory will stay with the predator, who will avoid that type of animal in the future. This method sacrifices a few individuals in order to protect the entire group. Examples of poisonous animals include the Monarch butterfly. Other animals (poisonous or not) have come to mimic poisonous butterflies, obtaining the benefits of their poisonous "twins." This is called mimicry.

## **Animals at Niabi Zoo that come from the Rainforest:**



**Madagascar Hissing Cockroaches, Madagascar**  
**Eclectus parrots, Southeast Asia**  
**Blue-fronted Amazon Parrot, South America**  
**Sulfur-Crested Cockatoo, Australia**  
**Ball Python, Africa**  
**Inland Bearded Dragon, Australia**  
**Madagascar Day Gecko, Madagascar**  
**Poison Dart Frogs, Central & South America**  
**White Handed Gibbons, Southeast Asia**  
**Binturong, Southeast Asia**  
**African Gray Parrot, Africa**  
**Scarlet Macaw, Central & South America**  
**Blue & Gold Macaw, Central & South America**  
**Green Winged Macaw, Central & South America**  
**Green Iguana, Central & South America**  
**Jaguar, Central & South America**  
**Two toed sloth, Central & South America**  
**Bengal Tiger, Southeast Asia**  
**Kinkajou, Central & South America**  
**Water Monitor, Southeast Asia**  
**Burmese Python, Southeast Asia**  
**White's Tree Frogs, Australia**  
**Turacos, Africa**  
**Rosella, Australia**  
**African Lion, Africa**  
**Leopard, Africa & Southeast Asia**  
**Asian Elephant, Southeast Asia**  
**Black & White Colobus, Africa**  
**Pygmy marmoset, South America**  
**Cotton Top Tamarin, South America**  
**Black Handed Spider Monkey, South America**  
**Ring Tailed Lemurs, Madagascar**  
**Ruffed Lemur, Madagascar**  
**Collard Peccary, Central & South America**



**Other Rain Forests animals (not on exhibit at Niabi Zoo):**

Swallow tailed kite	Fruit Bat
Yellow- Chevroned parakeet	Red Faced Uakari
Harpy Eagle	Ruby Topaz Hummingbird
White Collard Swift	Guan
Black-Throated Trogan	Ocelot
Tanager	Spectacled Owl
Yellow Conure	Three-toed sloth
Red-Ruffed Fruit Crow	Douroucouli
King Vulture	Rufous Jacamar
Oropendola	Ithomiid Butterfly
Squirrel Monkey	Tamandua
Three Wattle Bellbird	Leaf-Cutter Ant
Capuchin Monkey	Brocket Deer
Morpho Butterfly	Ring-Tailed Coati
Toucan	Tayra
Green Aracari	Trumpeter Bird
Howler Monkey	Giant Anteater
Woodpecker	Boa Constrictor
Quetzal	Armadillo
Emerald Tree Boa	Tapir
Rhonoceros Beetle	Red Eyed Tree Frog
Mouse Opossum	Agouti
Bromeliad	Paca
Green-Cheeked Hummingbird	Acuchi
Tree Porcupine	Basilisk Lizard
Motmot	Golden Beetle

## Rainforest Conservation

### What is being done to save the rainforests?

**Although we may live many thousands of miles away from tropical rainforests the way we live still has an effect on them. People from all countries of the world can help. There are many ways to save rainforests and prevent them disappearing forever.**

- **EDUCATION**

People who live in countries with rainforests need to understand their importance. People in other countries also need to understand how their lifestyles affect the rainforests.

- **NATURE SWAPS**

The world's tropical rainforests are found mostly in poor countries that have big debts. These countries have built large dams and roads, encouraged by foreign governments lending them the money.

These poor, developing countries can't afford to pay back the debts without selling timber and minerals from their tropical rainforests.

Now some conservation organizations are buying the debts in exchange for rainforest conservation. These are called 'debt for nature swaps'.

- **THE REAL PLAN**

In January 1995 the government in Brazil came up with new ideas to help conserve the rainforests. They set up a plan called the Real Plan. The plan promised more care for the environment and threw out ideas about building dams across the Amazon to provide electricity to Brazil's cities. The Real Plan aimed to divide the forest into sections for different uses. Mining and logging companies were ordered to plant trees on land that they had cleared. Sawmills and factories not obeying the new environmental laws were closed down.

- **INTERNATIONAL AGREEMENTS**

- \* The World Conservation Union (IUCN) is an organization with people from many countries who work to produce plans to protect the environment.

- \* The Convention on International Trade in Endangered Species (CITES) decides which endangered plants and animals need to be protected by international law.

- \* Earth Summit. This is when governments from around the world get together to decide what needs to be done to protect the planet. The first Earth Summit was held in Rio de Janeiro, in Brazil, in 1992.

The main points agreed at this meeting were:

- \* Conserving biodiversity

- \* Protecting forests



\* Agenda 21 (encouraging communities to work together for a sustainable future).

- **TREES BY LAW**

Some tropical trees have become so reduced in the wild by logging that they are protected by an international agreement called CITES (Convention on International Trade in Endangered Species). Through this, trade in Brazilian rosewood timber is banned. Exports of African timber known as Afronesia is only allowed with permits. CITES also bans or controls trade in a long list of products from animal species including Asian rhino, tigers, parrots and apes.

- **ECOTOURISM**

Ecotourism is a sustainable use for the rainforests. Visitors are allowed to visit tropical rainforest areas and stay in environmentally friendly accommodation. It provides income to support conservation and visitors are taught through lectures, tours, visits and field excursions about the forests.

Ecotourism is already being carried out in tropical rainforest areas such as Belize, Costa Rica, Brazil and Australia.

This however does not provide all the answers to help save the rainforests. It is suggested that the presence of visitors in the forest has changed the way the animals behave and has put the environment under pressure from the activities of the visitors.

- **FOREST RESERVES AND SUSTAINABLE USE**

Forest reserves can be managed in a sustainable way. This may include:

- \* Carefully selecting trees for logging, allowing natural regrowth.
- \* Planned logging and replanting of small areas.
- \* Preventing illegal logging and poaching.

In 1989 a forest reserve was created in Brazil, covering 500,000 hectares (1.25 million acres). In this reserve forest dwellers are allowed to collect nuts and rubber and to decide amongst themselves on the best way to look after the forest.

- **NATIONAL PARKS**

National parks cover an estimated 5% of tropical rainforest areas.

They were created to protect the animals, wildlife and people.

Korup National Park in Cameroon protects an area of rainforest which has never been logged. It is a primary forest.

In this area local people live in the forest by hunting and fishing and now they help to run the national park. A Small amounts of tourism is allowed only on the edges of the national park.

- **BUYING AREAS OF RAINFOREST**

Conservation organizations in richer countries have supporters who give money to buy areas of rainforest to conserve them.

## **Pre Field Trip Activities:**

*Behind each activity you will find state goals that can be applied to each activity.*

Discuss the term Endangered with the students. Teach them the other levels of conservation status... Extinct, Endangered, Threatened, Least Concern. Go through the list of Niabi Zoo animals and determine which animals are endangered. (1A; 4A; 12A, 12B; 17A, 17C)

Have students complete Part 1 of the "What I Know" worksheet. (3A, 3B, 3C)

Call on students to become investigators before visiting Niabi Zoo. Have them complete the "Animal Investigator" worksheet. (3A, 3B, 3C; 5A, 5B, 5C)

Using the White Handed Gibbon, have students create a food chain that shows where the gibbon fits in. Students will have to research the diets of various animals to make sure their food chain is accurate! Have students make a food chain... see attached worksheet. (1C; 3A, 3B, 3C; 5A, 5B, 5C; 12A, 12B)

Have students develop 3 research questions based on wild animals. Collect and redistribute questions. Using research methods have students answer the questions. Ask several students to report their information to class! (1C; 3A, 3B, 3C; 4A, 4B; 5A, 5B, 5C; 12A, 12B)

Discuss animals on different continents of the world. Use maps when discussing geography, along with climate and natural habitats found on those places in the world. How have animals adapted to the environment in which they live? (3A, 3B, 3C; 4A, 4B; 5A, 5B, 5C; 16E; 17A, 17B)

## **While at Niabi Zoo:**

Have students complete the Primate Observation Sheet.

## What I Know About Gibbons

Name: \_\_\_\_\_

Part 1: Complete before visiting Niabi Zoo.

I think I know that gibbons \_\_\_\_\_

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Part 2: Complete after visiting Niabi Zoo.

I know that gibbons \_\_\_\_\_

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# Animal Investigator

Name: \_\_\_\_\_

Animal I am investigating:  
\_\_\_\_\_

Use 3 sources to find information:

Source # 1: \_\_\_\_\_

Source # 2: \_\_\_\_\_

Source # 3: \_\_\_\_\_

Write 3 things you learned from these sources...

1. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Food Chain

Plants make food for all living things and use the sun's energy to grow. When animals eat plants, they get energy. You also get energy from eating food. Your food may be plants or animals.

A food chain shows how energy is passed from one living thing to another. All food chains start with plants. You can make your own food chain.

You will need:

- 8 ½ in. by 11 in. sheets of paper or construction paper
- Crayons or markers
- Pencils
- Tape
- Pictures of plants and animals

1. Cut a few pieces of paper in half the long way.
2. Find a picture of a plant or draw one. Tape it to one of these strips of paper.
3. Loop the ends of the strip of paper together and add tape to make a closed circle. You now have the first link in your food chain.
4. Find or draw a picture of something that can eat your plant. Tape it to another strip of paper. Put one end of the strip through the first link and tape the ends to make another closed circle. Now your food chain has two links.
5. Find or draw a picture of something that eats the animal that is eating your plant. Make a third loop. Follow the directions in Step 4.
6. Keep going.

Here are some food chain ideas for you to start with:

Grass—prairie dog—rattlesnake

Acorn—gray squirrel—red-tailed hawk

Flower—beetle—skunk—great horned owl

Mayfly—sunfish—wood stork—alligator



## **Rainforests Possible Activities:**

### **Science**

- Get the children to construct food chain mobiles in which the outer frame is an animal - the top predator - with a hole inside, in which a prey animal is revealed. Inside the prey animal is an insect and inside the insect is...
- Devise a series of decision trees, linking these to sorting and classification skills. Get the children to devise their own decision trees, bringing these to publication standard with !Paint and then inserting them into desktop publishing programs. You might even publish them to the web.
- Use the website as a background to investigate life processes such as breathing, excretion, locomotion, reproduction, sensitivity, nourishment and growth. Get the children to paint - or electronically publish - a background in which hide or show frames are used to illustrate the various life processes.
- Adaptation to environment. Devise either pages or activities which will support writing or investigation activities for the children to explore or construct, linking this to two different types of habitat, e.g. either under the water in a rainforest river such as the Amazon or in a different location such as creatures living in the emergent layer of the rainforest.
- Put together pages which explore uses of naturally occurring materials within the rainforest, preferably ones which the children can see/touch/explore and link to reversible or irreversible changes. This might be as simple as making a latex mould by painting the rubber on in layers and then casting a plaster ornament from the finished mould

### **Music**

- Use background music inspired by the rainforest as stimulus and discussion material for the children. Their next step is to compose and perform some rainforest music using a variety of instruments and sources of sound, using symbols to depict where and when a particular sound or instrument is needed. (You might like to load some downloadable .wav files onto the website so that these can be accessed by teachers.) High ability children can experiment with composition on either !Notate or Music Ace.

- Get the children to devise and perform a dance to accompany their music. In this way they can then share their compositions at a sharing assembly, tape recording and videoing their performance - both musical and dance - for analysis and discussion later. What revisions would they suggest?

### **Art**

- Let the children use their sketchbooks to record images of life within a rainforest. Use these images to construct a collage of a rainforest, where creatures or plants are hidden within the foliage or background.
- Look at native artifacts from cultures living in rainforest conditions. Can the children use pottery, sketches or other mediums to explore these examples? How would they illustrate artifacts that had special or religious significance to themselves?

### **Geography**

- Use the website as an investigation starter into where areas of rainforest are found. Can the children match these areas on globes or maps? How are they changing? What is the effect of human activity upon the rainforest environments in different parts of the world? How are conservation projects attempting to conserve the natural environment? What are the difficulties faced?

### **Technology**

- Design and build a set and the puppets necessary to produce and perform a creation myth before an audience, e.g. at a sharing assembly. Link this to English and writing.
- Design and make a rainforest bookmark using plastic canvas. This would start with the intended picture and then move onto transferring this to graph paper. The next stage would involve cutting and making the bookmark itself.

### **Math**

- Use information on endangered species to construct a database using either Excel or Information Workshop (which is differentiated according to age, ability and complexity). Generate graphs on the fields within the file setup and save them in bitmap format. Insert these graphs into either Word or Microsoft Publisher, getting the children to interpret exactly what they reveal. Discuss the issue of bias and see whether the children can independently realize the limitations of a small sample. Use this as a teaching point.
- Investigations: Numbers of statistics, often destructive ones, are quoted in connection with rainforests, e.g. how many acres are cut down in a day,

how many species are disappearing etc. Get the children to investigate these issues mathematically, e.g. how many acres are destroyed in an hour, a week, a month etc. Given that the rainforest is approximately so big, how much rainforest will remain in a year's time; two years' time; ten years' time, if unchecked, etc.

## **English**

- Use the website as background material to generate a series of scaffolding structures for either KS1 infants or KS2 children with special needs. (Scaffolding structures are a series of true or false statements which the children first verify, then use in modeling a series of correct sentences.)
- Look at Aesop's fables and creation myths generated by rainforest cultures. Try to generate a creation myth of their own, linking it to research on creatures found in the website. Get the children to put together and perform their own script. This may be linked to technology or dance (PE), where the children devise a series of masks or costumes to go with their tale.
- Use the website to generate research into conservation issues, backing this up with emails to different groups in order to support or enrich their viewpoint. The children could investigate scientific or geographic issues, making a presentation, backed up with ICT materials downloaded from the website, to an audience of the teacher's choice, i.e. parents, other classes etc. This could be linked to ICT with PowerPoint to use for a multimedia presentation.
- Research areas of conflict between native peoples and conservation groups, then divide the class into opposing roles. Allow them to research and prepare a group discussion in which the issues they have raised are discussed. Invite in a guest speaker to act as an arbitrator or to input additional information as required.
- Prepare a series of questions for use within a literacy hour, where the children will need to use the organizational features of the website and scanning skills to find the information required within the allocated time.
- Write an article on a conservation issue, publishing it, using a Microsoft Publisher wizard, in the format of a newsletter or newspaper article. Link this to ICT and desktop publication. Edit the first draft and revise as necessary, bringing the work to publication standard. (Instead of an article the children might try to produce their own poetry, stories etc.)
- Using information gathered from the website, get the children to write, and bring to publication standard, an information leaflet or petition which seeks to raise public interest in the issue which they have chosen to

investigate. Link the writing of the leaflet to the organization and purpose requirements raised in SATs marking codes, using these to heighten and raise the children's performance in these areas.

Information taken from website: [www.rainforestlive.org](http://www.rainforestlive.org)

**Post Field Trip Activities:**

*Behind each activity you will find state goals that can be applied to each activity.*

Have students use the identification key to identify the species of gibbon seen at Niabi Zoo.

Discuss endangered and threatened animals with students. Choose an animal to research. Is this animal endangered, threatened, or not threatened? Why? What can be done or is being done to revive the species population? Develop a class project directed towards conservation efforts and carry out the project. (1C; 3A, 3B, 3C; 4A, 4B; 5A, 5B, 5C; 12A, 12B; 16E; 17A, 17C)

Have students make a homemade “Zoo Book” about their trip to Niabi Zoo! (3A, 3B, 3C)

Have students use their “Animal Investigators” worksheet to create animal fact cards. These cards should contain true or false facts on various animal(s) studied. Use 3x5 index cards. Add creativity by having students draw pictures or cut out pictures and glue to the cards. (3A, 3B, 3C; 4A, 4B; 5A, 5B, 5C; 12A, 12B)

Have students complete the last part of the “What I Know” worksheet. Have each student tell the class what their fact they know about Niabi Zoo, or zoos in general! (3A, 3B, 3C; 4A, 4B)

Have students write a paragraph telling which animal was their favorite and why. Include in the paragraph a fact about that animal that you did not know before visiting the zoo! Have students read their paragraph to the class! (3A, 3B, 3C; 4A, 4B)

Have students choose an animal they did not see at the zoo and research it further. Have them find information and pictures and put it together to present their findings to the class. This will give students a chance to learn about many species of animals. (3A, 3B, 3C; 4A, 4B; 5A, 5B, 5C; 12A, 12B)

Have students put together a book which includes 1) a fictional story about an animal of their choice 2) pictures to go along with the story. Choose several students to read their stories to the class. (3A, 3B, 3C; 4A, 4B)

Have students research a gibbon, and use the Primate question sheet to develop information. (3A, 3B, 3C; 5A, 5B, 5C; 12A, 12B)

## **IDENTIFICATION KEY TO GIBBONS**

		Species names are linked to the Photo Gallery
<b>1a</b>	-Completely black, without light pattern:	<b><u>2</u></b>
<b>1b</b>	-Not black or not completely black:	<b><u>4</u></b>
x		
<b>2a</b>	-Body weight 8-15 kg; -large, inflatable throat sac; -males with long genital tuft ( <i>ca</i> 13.5 cm):	<u><i>S. syndactylus</i></u>
<b>2b</b>	-Body weight lower than 11 kg, -throat sac very small or absent; -genital tuft in males short and inconspicuous (less than 6 cm):	<b><u>3</u></b>
x		
<b>3a</b>	-Body weight 5-7 kg; -no throat sac; -crown fur without crest:	<u><i>H. klossii</i></u>
<b>3b</b>	-Body weight 6-10 kg; -throat sac very small and visible only when inflated during certain localizations; -crown fur stands straight up, with prolonged hairs forming a crest:	<u><i>N. concolor, male</i></u>
x		
<b>4a</b>	-Almost completely black, but with light (whitish or yellowish) elements (facial pattern, genital tuft, hands and feet):	<b><u>5</u></b>
<b>4b</b>	-Not dominantly black:	<b><u>10</u></b>
x		
<b>5a</b>	-Crown fur stands straight up, with prolonged hairs forming a crest; -body weight 6-10 kg; -light cheek beard:	<b><u>6</u></b>
<b>5b</b>	-Crown without crest; -body weight 4-9 kg; -light cheek beard present or absent:	<b><u>7</u></b>
x		
<b>6a</b>	-Cheek beard pale yellow or orange, standing out on sides as if “brushed” outwards, with the hairs spreading out from the corners of the mouth like a fan; -fur on chest rusty brown, not black:	<u><i>N. gabriellae, male</i></u>

<b>6b</b>	-Cheek beard white, rarely pale yellow, not “brushed” outwards; -fur on chest black:	<u><i>N. leucogenys</i>, male</u>
x		
<b>7a</b>	-Fur on hands and feet white:	<u><b>8</b></u>
<b>7b</b>	-Fur on hands and feet not white:	<u><b>9</b></u>
x		
<b>8a</b>	-White face ring relatively broad and usually complete; -no light corona around crown of head; -hands and feet white up to wrist and ankle, respectively; -genital tuft not white:	<u><i>H. lar</i></u>
<b>8b</b>	-White face ring relatively thin, broad only above eyes; -light corona around crown of head; -hands and feet white only distally of wrist and ankle, respectively; -white genital tuft:	<u><i>H. pileatus</i>, male</u>
x		
<b>9a</b>	-White brow band; -body weight 6-9 kg; -no light cheeks; -distinct goatee beard; -long genital tuft ( <i>ca</i> 7.5 cm):	<u><i>B. hoolock</i>, male</u>
<b>9b</b>	-White or grey brow band (often reduced in older females); -body weight 4.5-7 kg; -males often with light cheeks (grey or whitish), females often without these; -no distinct goatee beard; -males with distinct, but relatively small genital tuft ( <i>ca</i> 5 cm):	<u><i>H. agilis</i></u>
x		
<b>10a</b>	-Back and limbs pale yellow, yellow, orange or beige brown, not grey or dark brown; -black cap usually set off sharply from surrounding lighter fur, with crown fur (including cap) standing straight up; -body weight 6-10 kg:	<u><b>11</b></u>
<b>10b</b>	-Back and limbs pale yellow, yellow, orange or beige brown, but also grey or dark brown; -black cap, if present, with crown hairs lying flat -body weight 4-9 kg:	<u><b>13</b></u>
x		
<b>11a</b>	-Fur on chest (and sometimes belly) black or dark brown, contrasting with light back:	<u><i>N. concolor</i>, female, but excluding <i>N. sp.</i></u>

		<u>Cf. nasutus hainanus</u> or <u>N. sp. Cf. nasutus ssp. Nov.</u>
<b>11b</b>	-Fur on chest and belly light, as back:	<b><u>12</u></b>
x		
<b>12a</b>	-Face ring usually yellowish (rarely white), often not contrastingly lighter than neck or incomplete; -cheek fur usually standing out on sides, as if “brushed” outwards, with the hairs spreading out from the corners of the mouth like a fan:	<u>N. gabriellae, female</u>
<b>12b</b>	-Face ring usually white and distinctly lighter than neck, often thin, but usually complete; -cheek fur not standing out on sides:	<u>N. leucogenys, female</u> or <u>N. sp. Cf. nasutus hainanus</u> or <u>N. sp. Cf. nasutus ssp. Nov., female</u>
x		
<b>13a</b>	-Crown fur lying flat and being light beige, contrastingly lighter than dark brown cheeks; -body weight 6-9 kg; -a thin stripe of white hair starts from cheeks and crossing the face below the eyes goes upwards across the nasal ridge; -distinct light goatee beard:	<u>B. hoolock, female</u>
<b>13b</b>	-Crown fur variably lying flat or standing up, not contrastingly lighter than cheeks; -body weight 4-8 kg; -no stripe of white hair below eyes and across nasal ridge -with or without distinct light goatee beard:	<b><u>14</u></b>
x		
<b>14a</b>	-Cap and ventral area black, both sharply set off from surrounding light grey fur; ventral shield three-cornered, with lower tip reaching genital area; -back and limbs light grey or cream; -no light face ring; thin white brow band may be present but is usually lacking; -long, white temple fringes hanging over black cheek region and ears:	<u>H. pileatus, female</u>
<b>14b</b>	-Cap and ventral area may or may not be darker than surrounding fur; if these areas are black, they are rarely set off sharply and the ventral area has no distinctly three-cornered pattern; -back and limbs light or dark, of variable colouration; -with or without light face ring; light brow band usually	<b><u>15</u></b>

	present; -no long, white temple fringes hanging over black cheek region and ears:	
x		
<b>15a</b>	-White hands and feet; -fur colouration variable: pale yellow, yellow, beige brown, hazel, dark brown (or black, see also <b>8a</b> ), but not grey; -usually no dark cap and no dark ventral area (if present, these areas are brown or dark brown, not blackish); -face ring white and usually complete:	<u><i>H. lar</i></u>
<b>15b</b>	-Hands and feet not white; -fur colouration variable like <b>15a</b> , but may also be grey; -with or without dark (dark brown or blackish) cap and dark ventral area; -face ring only partly white, usually incomplete, often reduced to brow band:	<b>16</b>
x		
<b>16a</b>	-Silvery grey fur colouration; only cap and ventral area may be contrastingly darker (dark-gray or black) in some animals; -brow band broad and whitish, usually distinct and sharply set off, pointed laterally of the eyes; -distinct, forward projecting, whitish goatee beard:	<u><i>H. moloch</i></u>
<b>16b</b>	-Fur colouration variable; grey individuals are mouse grey rather than silvery grey; cap, underparts and limbs may be contrastingly darker (dark grey, blackish brown or black) than back; hands and toes contrastingly black in some animals; -brow band variable in both colouration (whitish, light grey, light buff) and extent (broad, thin, absent); -no distinct, forward projecting, whitish goatee beard:	<b>17</b>
x		
<b>17a</b>	-Fur colouration variable: mouse grey, grey brown, hazel, or dark brown, but not yellow; -feet may be distinctly paler than legs in some animals (but not white as in <i>H. lar</i> ); -light brow band very variable in its extent, more or less distinct, but rarely missing; -usually no distinctly light cheek patches; -genital tuft of male very small ( <i>ca</i> 2.5 cm) and usually blackish:	<u><i>H. muelleri</i></u>

**17b**

-Fur colouration variable: pale yellow, yellow, beige brown, grey brown, nut-brown, dark brown (or almost black, see also **9b**);  
-feet not distinctly paler than legs;  
-brow band usually white, but may be completely absent in older blackish females;  
-males often with grey, whitish or pale brownish cheek patches (often joined under the chin), females often without these;  
-males with distinct, but relatively small genital tuft (*ca* 5 cm) which may be of contrastingly light colour in some brown animals (intermediate phase), but not contrasting with ventral fur in others:

## Primate Observation Sheet

What is your primate doing?	Make a / each time you see it	Where is your primate?	Make a / each time you see it
 <p>sitting</p>		<p>high canopy</p>	
 <p>jumping</p>			
 <p>climbing</p>		<p>middle canopy</p>	
 <p>brachiating</p>			
 <p>hanging</p>		<p>on the ground</p>	



## **RESEARCH QUESTIONS**

*Have the students write a research paper on the animals they have been studying. The following are some questions to answer in their research paper. Also include their observation finding from the field trip.*

1. Which primate are you going to research?

2. What does your primate look like?

What color is it?

What type of hands and feet does it have?

How long is the body?

Does it have a tail? Yes N If it has a tail, how long is it?

How much does your primate weigh?

What type of teeth does it have?

3. Tell about where your primate lives:

What countries does it live in?

What habitat or biomes does it live in?

Where does your primate like to be most of the time

4. What does your primate like to eat?

5. What size of group does your primate live in?

6. Who is the boss of the group?

7. How many babies does the female have at one time?

8. Who takes care of the babies?

9. Tell how your primate moves around.

10. What sounds does your primate make to communicate with others?

11. How does your primate protect its territory?

12. Where does your primate sleep?
13. How long does your primate live?
14. Tell about whether your primate is endangered. If so, why and what is being done to prevent it from becoming extinct.
15. How many of your primates are there in the world?
16. Is there anything else interesting about your primate that you wish to tell?