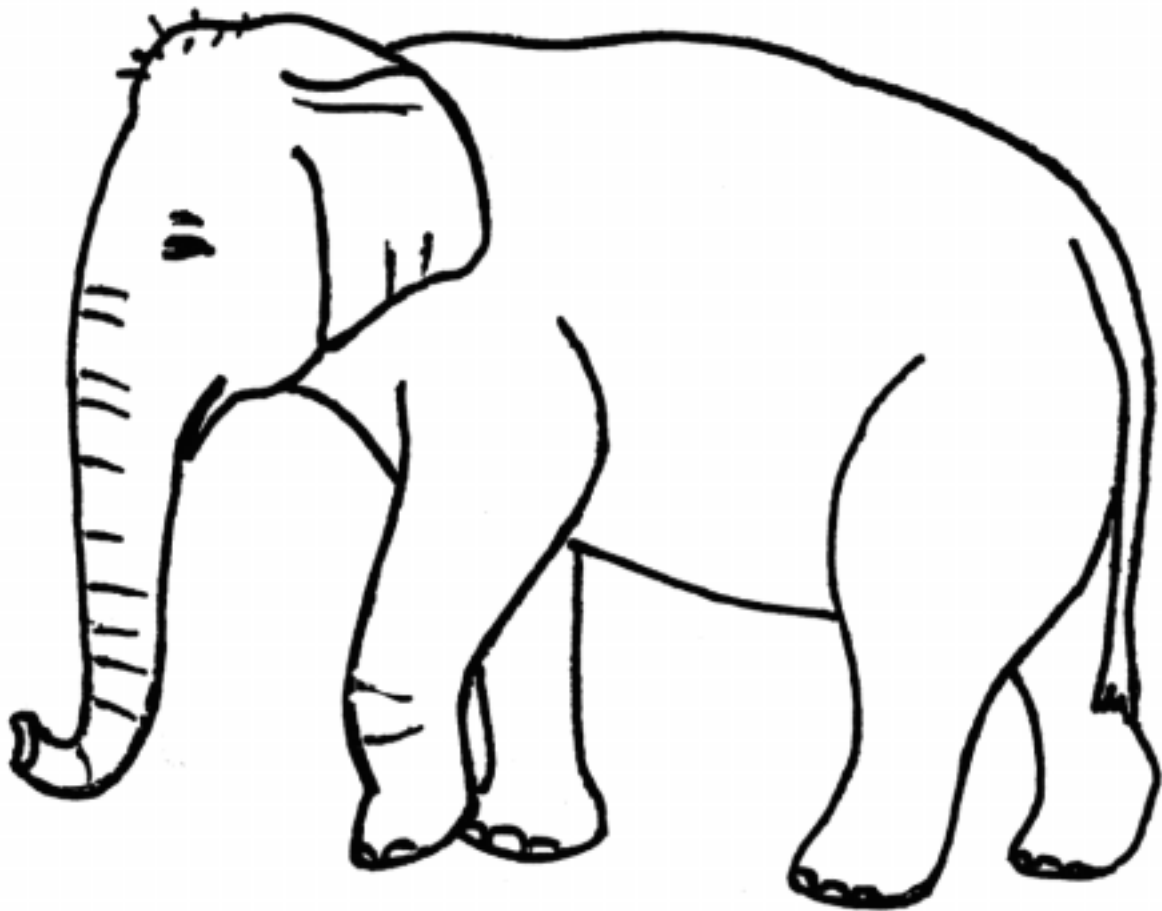


Discovering Elephants

Classroom Materials for Teachers
From the Elephant Sanctuary

Grades 4 - 8



The Elephant Sanctuary
Hohenwald, Tennessee

J. Jones 1997

Discovering Elephants: Classroom Materials for Teachers from the Elephant Sanctuary in Hohenwald, Tennessee



Materials developed by J. L. Jones, Elephant Sanctuary Education Chair, in cooperation with Carol Buckley and Scott Blais, Founders/Co-directors of the Elephant Sanctuary.

Many thanks to Judi Hayes for assistance with proofreading and editing.

These materials are intended for use with students in formal and/or informal settings. Any of the activities may be copied and adapted to fit the individual needs of students and/or curriculum requirements.

The information contained in Teacher Background sections is current and accurate as of 1998; however, continuing research on Asian elephants could necessitate changes/up-dates in the future.

The author and the Sanctuary directors appreciate any comments or suggestions from teachers, youth leaders, and others who use or review the materials. Please direct comments to:

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Nashville, TN 37217

or

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The Elephant Sanctuary
P. O. Box 393
Hohenwald, TN 37462
931-796-6500
1-800-TRUNK

The Elephant Sanctuary



The Elephant Sanctuary is located 65 miles southwest of Nashville, near Hohenwald, Tennessee. It was founded in 1995 by Carol Buckley and Scott Blais to provide a natural habitat refuge for old, sick, and needy Asian elephants. Elephants no longer needed or valued by circuses or zoos.

The first resident to move into the Sanctuary's 112 acres was Tarra, an Asian elephant born in Burma in 1974. Tarra came to the United States as a calf and Carol took care of her and trained her. Later, Carol purchased Tarra and the two spent many years performing in circuses, zoos, for films and television, and in Las Vegas. Tarra even learned to roller skate during her "show business" career, but she happily gave up her skates and the spotlight to retire to Hohenwald.

In April 1996, Tarra was joined by Barbara. Born in 1969, Barbara had spent her life in circuses and breeding facilities. When she arrived at the Sanctuary, Barbara weighed only 4,000 pounds, a ton (2,000 lbs.) less than normal for her height. She was so emaciated that her skull showed through the hollows of her face.

Apparently, Barbara had not been fed enough to keep her weight up to normal. Poor/inadequate diet also meant that her teeth had not been worn down and shed in the normal manner. (Elephants have one molar on each side of the upper and lower jaw. Barbara's upper molars cover the entire roof of her mouth. In effect, she has a mouthful of teeth that make chewing difficult and contribute to her weight problem.

Since her arrival, Barbara has been on a special diet that is both easy to chew and super nutritious and she has gained weight steadily. In the future, when she is stronger, her overgrown teeth will be surgically removed.

In September 1996, a third elephant, named Jenny, came to the Sanctuary. Jenny was born in 1970 and, like Barbara, spent her life traveling with circuses. After sustaining an injury to one leg that left her with a noticeable limp, Jenny was abandoned at an animal shelter outside Las Vegas. Crippled and severely underweight, Jenny lived with the cats and dogs at the shelter until the necessary funds could be raised to get her to Hohenwald.

Since her arrival, regular medical care, a healthy diet, a new therapeutic treatment for her arthritis, and a lot of loving care from Carol and Scott have given Jenny a new lease on life. Despite the fact that some of her injuries are permanent, Jenny is active, playful, and obviously happy to be in the company of other elephants in the Sanctuary pastures and barn.

These elephants spend their days grazing, exploring, and socializing in a secure pasture away from cheering/jeering crowds; much the way elephants live in the wild. But there are many other needy elephants waiting to join Tarra, Barbara, and Jenny. The completion of a new 12-elephant barn in early 1998 will allow the Sanctuary to take in additional animals as funds can be raised to cover food and medical care.

The Sanctuary has also launched a campaign to educate the public about this very endangered species. By focusing media attention on the Sanctuary and providing educational materials to schools, the Sanctuary's founders and supporters hope to improve the lives of all Asian elephants and save this magnificent species for future generations.

Individuals or groups interested in helping the Elephant Sanctuary can do so by becoming members, purchasing Sanctuary T-shirts or paintings by Tarra, or through the "Feed an Elephant for a Day Program."

For more information, contact the Sanctuary at
P. O. Box 393
Hohenwald, TN 37462
931-796-6500

Electronic Fieldtrips



Project DIANE

(Diversified Information and Assistance Network)

Project DIANE is a multimedia teleconference consortium supporting education, community service, and economic development in the mid-state area.

Project DIANE offers unique opportunities for distance learning and tutoring, interactive remote field trips, mentoring, library reference services, outreach, workshops, counseling, training, and much, much more.

The Elephant Sanctuary joined with Project DIANE because interactive video and multimedia teleconferencing technologies provide an effective, yet non-invasive, opportunity for schools and the general public to visit the Sanctuary and experience the elephants “live” as they pursue their daily routine.

Project DIANE technology allows us to fulfill our dual missions of providing a safe, secure habitat for the elephants and educating the public.

For more about Project DIANE, visit the website at: www.diane.tnstate.edu

For more about elephants and the Sanctuary, visit our website at: www.elephants.com

Teacher Background for “Discovering Elephants”

Introduction

Elephant! You need only say the word to spark interest, imagination and awe. Elephants are not the largest animals to ever live on earth or even the prettiest, but they capture our attention more readily than any other animal. Whether it is a circus performance, a zoo visit, or a favorite childhood story about Babar or Dumbo, nearly everyone has an “elephant memory.” For most of us those are fond memories of creatures who, though big enough to terrify, have a reputation for gentleness.

But these creatures we find so engaging are in serious trouble. In the wild, elephant populations are dwindling at an alarming rate. In captivity, some elephants, particularly older animals or those in poor health, suffer abuse and neglect.

The Elephant Sanctuary in Hohenwald, Tennessee, was founded in 1995 to provide “a natural-habitat refuge where sick, old and needy” Asian elephants can live out their lives in peace. The Elephant Sanctuary’s secondary goal is to increase public awareness about elephants.

*In the end, we will conserve only what we love.
We will love only what we understand.
We will understand only what we have been taught.*
Baba Dioum, Senegal

These words from an African conservationist remind us that the only hope for the long-term survival of elephants, or any species, is through education. Because we believe this to be true, the Elephant Sanctuary is making the “Discovering Elephants” resource packets available to educators.

We invite you to use the materials in this packet to help your students understand and love elephants. Please feel free to use all of the materials, or select those that fit your curriculum, and adapt the activities to meet the needs of your students. We welcome any comments on these activities and suggestions for future materials.

Note: The following pages contain information about elephants to give you some background. The terms in **bold** type are defined in the **Elephant Glossary**. Titles in () refer to activities included in the “Discovering Elephants” packet.

Elephant Beginnings

The ancestors of modern elephants first appear in the fossil record during the Eocene Period, or about 45 to 55 million years ago. Like the earliest ancestors of many other animals, the first elephant — Moeritherium (meer-uh-THEER-ee-um) — was quite different from today's elephant. It was about 2 feet tall and had no trunk.

Gradually, possibly in response to the earth's cooling temperatures, the descendants of Moeritherium grew larger in size and developed the nose-upper lip combination that makes elephants so unique today. The arrangement of **trunk** and **tusks** took several forms over the generations, many quite different from today's modern elephant. Biologists believe the trunk may have developed to allow the large animals with very short necks to reach food and water easily. To date, more than 150 different **species** of elephants have been catalogued, including the hairy **mammoths** and **mastodons**. (*Elephants and Their Kin: Classifying, Walk Softly and Carry a Big Trunk*)

The modern world has two surviving elephant species: the Asian elephant (*Elephas maximus*), and the African elephant (*Loxodonta africana*). Among Asian elephants there are 4 subspecies — Indian, Ceylon, Sumatran, and Malaysian. These are distinguished by physical traits related to their geographic location. For example, Ceylon (Sri Lanka) elephants tend to have larger ears which are useful for regulating body temperature in the hotter climate of Sri Lanka. (*Walk Softly and Carry a Big Trunk*)

Two Separate Species

There are several **anatomical** and **behavioral** differences between Asian and African elephants and many similarities. (*Elephant Parts, Walk Softly and Carry a Big Trunk*) Most noticeable is the difference in ears. Africans have huge ears shaped much like the continent of Africa. (One ear from a bull African elephant weighs more than 100 pounds.) Asians, who live in cooler forest areas, have smaller ears. Asians have rounded backs and relatively smooth skin. Africans display a sway back and very wrinkled skin.

Among Asian elephants only males grow long incisor teeth called tusks, and not all males have them. (This is why ivory **poaching** has not been a tremendous problem for Asian elephants.) African elephants of both sexes generally (but not always) exhibit tusks.

The trunks are also slightly different. Asian elephants have one small finger-like projection at the end of the trunk. African elephants have two "fingers." These "fingers" are very sensitive and make it possible for these huge animals to pick up very small objects. The more than 100,000 muscles in the trunk make it very flexible and strong enough to lift whole trees. (*Walk Softly and carry a Big Trunk*)

A similarity is in feeding habits. Both species are **herbivores**; they consume only plant material. The elephants of the African savanna eat mostly grasses, turning to leaves, twigs, bark, flowers, and fruits when the grasses are not available. Asians consume a similar range of plants, including large amounts of bamboo (a fast growing grass.)

Within an ecosystem, different species survive by avoiding competition for food. In any area, different animals eat specific things or feed at different times than their neighbors and therefore do not waste precious energy fighting for food. Because elephants developed after (or at the same time as) the perissodactyls (horses) and the ruminants (antelope/giraffe), they had to develop different feeding habits to survive. Elephants, therefore, developed the ability to eat a wide variety of plant materials in addition to grass. This includes the twigs and bark that horses and antelope do not generally eat. There isn't much nutrition in such woody material, but it is available year round and within the elephants' extended reach.

Though they can consume foods other animals usually don't eat, neither species of elephant has an efficient digestive system. Elephants must consume huge amounts of food each day because half of it passes through virtually undigested. (*If an Elephant Followed Me Home*) This means that both species must move about constantly in search of food and both are finding less and less space open to them. (*Population Pressure*)

Both species of elephants are **herd** animals with very definite social structure. Herds are led by a **matriarch**, usually the oldest female, and are made up of her daughters, sisters, and their offspring. Once they reach puberty, male calves leave the mother's herd and join other young males in bachelor groups. Older males tend to be solitary.

Finally, both Asian and African elephants are highly intelligent and peaceful animals whose continued existence is threatened.

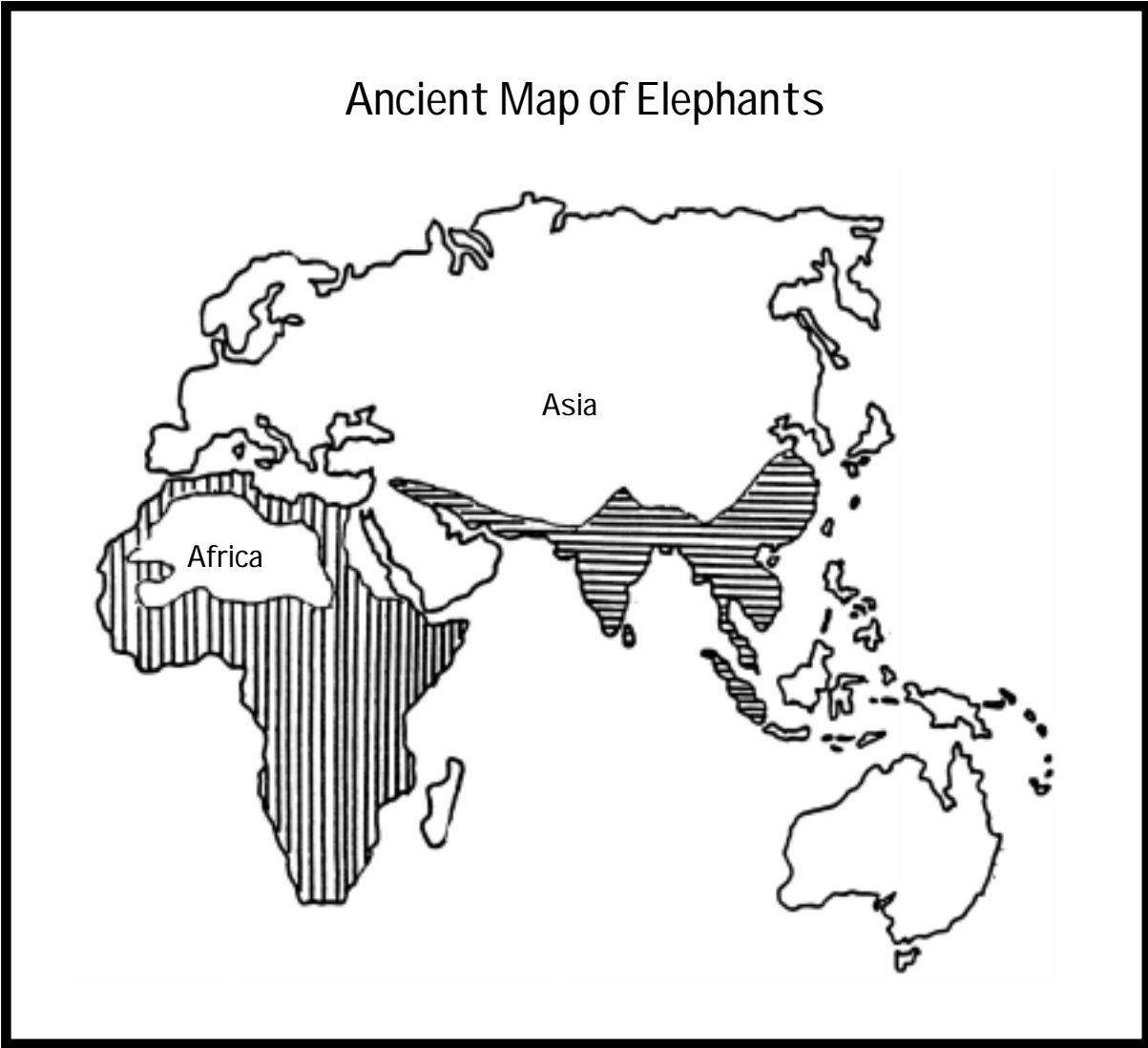
Elephant Habitat

In ancient times, elephants were found in all areas of Africa, except the Sahara Desert which covered a much smaller area, and in Asia from present-day Syria east to China and south to Sumatra.

At the beginning of this century, Africa's elephant **population** was probably between 5 and 10 million. (No one knows for sure — there were too many to count.) At the same time Asian elephants numbered about 200,000. Today, there are perhaps a million African elephants and between 35,000 and 50,000 Asian elephants in the wild. Because they need the same things humans need (land, food, and water) and because human populations in Africa and Asia are growing, elephants are being pushed into smaller and smaller areas. Some biologists worry that elephants will not survive in small, fragmented **habitats**. If elephants do not survive, many other species will also perish. Elephants are what scientists call a "keystone species." This means that elephants need a large habitat, but they share that habitat with many other species who are not so visible. If the elephant habitat and elephants disappear, the other species will be lost as well. (**Disappearing Elephants: Information from Maps**)

Wildlife managers and **conservationists** from around the world hope to set aside enough protected areas to give elephants a chance, but with Asia's population expected to double in the next 50 years the competition for space will be intense. (**Population Pressure: Using Charts and Graphs**)

Ancient Map of Elephants



Elephants and People

Another difference between Asian and African elephants is their relationship with people. In ancient Africa where the land was vast and the population small and very clustered, elephants and people had few close contacts.

In Asia the situation was far different. Archaeologists working in the Indus River Valley have found evidence that elephants were used as **domestic** animals more than 4,000 years ago. From these early times to the present, elephants have provided transportation, helped clear forests, pulled heavy loads, and chased away tigers. At the same time they became important figures in the Hindu and Buddhist religions.

War elephants, outfitted with armor and swords on their tusks, were the ancient equivalent of tanks. Alexander the Great brought elephants to Europe from his Asian conquests. Hannibal crossed the Alps with elephants to attack ancient Rome, and the Romans featured elephants in their bloody gladiator spectacles so often that some African subspecies became **extinct**. Elephants were used in war right into the 20th century in World War II and in Vietnam.

The cyclops, a giant one-eyed figure from ancient folklore, may have been inspired by an elephant's skull. Probably, someone who had never seen a living elephant came upon an elephant skull. The size would make anyone think of a giant; and without seeing an elephant with its trunk, it would be easy to guess the hole in the front of the skull was for a single eye. Actually, an elephant's eyes are at the side of the head and the large opening at the front of the skull is where the nose (trunk) attaches. (*Folklore and Nature, Explanation and Description*)

Because Asian elephants are easy to train, they were imported into Renaissance Europe as attractions in zoological gardens or as pets for royalty. The emperor Charlemagne had a pet elephant who travelled with him regularly.

The first elephant in America was an Asian calf brought by a sailing ship captain in 1796. The little animal created quite a sensation as she was exhibited in barns and village commons from New England to Georgia. Eventually, she visited all 13 states, and some reports claim that even President George Washington came to see her. Elephants later became a fixture in animal shows, circuses, and zoological parks across the continent.

Over the years these highly intelligent creatures have been taught, or learned on their own, to do hundreds of "tricks" from standing on their heads to roller skating. In circuses, on television, and in films, elephants have been entertaining people for centuries. Now they need our help.

Elephant Conservation

Population growth, economic pressures, and warfare have all taken a terrible toll on elephant habitat in Asia. Adding to the problem is the fact that the areas still available to elephants are too fragmented, leaving herds isolated in dwindling pockets of forest.

In the past, elephant populations not only traveled great distances each day in search of food, they also **migrated** according to the season and the cycle of rains and growth. Forest clearing, agriculture, plantations of teak and rubber trees, hydroelectric dams, and irrigation projects have now cut off most of the elephant's traditional migration routes. (*Disappearing Elephants*)

Some herds are effectively stranded in habitat areas that may or may not be able to support them. Thus isolated, herds not only become crop raiders, but they lose genetic diversity and become more susceptible to disease, particularly cattle diseases for which they have no immunity.

Biologists, conservationists, and some government officials are beginning to realize that just setting aside small "preserves" for wildlife is not enough. To ensure the future of wildlife populations requires preserves and national parks with connecting corridors that allow animals to move from area to area.

In Asia, the International Union for the Conservation of Nature and Natural Resources (IUCN), the Convention on the International Trade in Endangered Species (CITES), the World Wildlife Fund (WWF), Wildlife Conservation International. And other government and private agencies are working to provide connected preserves. These organizations have also recognized the need to educate local people about the wildlife and enlist their help in conservation. A growing number of Asians are now earning a living by protecting wildlife and encouraging tourists to visit their areas.

These efforts are helping save not only elephants, but tigers, rhinos, and many other species threatened with extinction, but the future is not entirely rosy. Asia must still deal with a growing population and the economic pressures of the modern world. Such economic pressures have resulted in serious **poaching** problems among the elephants of southern India and Sri Lanka. The ban on the ivory trade that has benefitted the African elephant, has caused some ivory merchants to encourage illegal hunting of Asian males for their tusks. The removal mature males further reduces the genetic diversity of populations and can have disastrous results.

We can help elephants and other species even though we are far from Asia. By refusing to buy products made from threatened or endangered species of animals or plants, by using our own resources wisely, and by becoming educated about wildlife and environmental problems we can make a difference for the future of all life on this planet.

A Few Elephant Facts

Travellers to elephant-populated areas are advised not to carry citrus fruits. Elephants coming to watering holes may smell the fruits and try to find them in tents, backpacks, etc.

Elephants are not afraid of mice. Several experiments have placed elephants and mice in the same enclosures, and the elephants merely stepped on any that happened to get underfoot. One researcher did find, however, that dachshunds and rabbits tended to make the subject elephants nervous.

Elephants belong to the pachyderm family. The word comes from the Greek and means "thick skinned." Elephant skin is about 1.5 inches thick but is very sensitive. Elephants will leave a good feeding area if there are too many mosquitoes. They do not have a layer of fat to protect them from temperatures below freezing, and they have few sweat glands. Elephants get rid of excess heat by fanning their ears, taking baths and by rolling in mud.

Elephants can reach speeds of more than 25 mph, but they cannot jump. So a ditch too wide to step across and too steep to climb is an impenetrable barrier.

The location of their eyes and their enormous size mean elephants cannot see behind them without turning around. They also cannot see directly below them, but they use their trunks and feet to locate obstacles (and small calves).

Elephants are very good swimmers. They regulate buoyancy by swallowing air and use their trunks as snorkels.

An elephant's brain weighs about 13 pounds (human brain about 3.3 pounds) and has far more folds in the temporal lobe than human brains, an indication that elephants really do have a tremendous memory.

Elephants are not clumsy. They can step on a coconut just hard enough to crack the shell without damaging the meat. The feet of an elephant have a combined surface area of 3.5 sq. feet, so their weight is evenly distributed. A lady's high heel has greater pressure per square inch than an elephant's foot.

In 1982 an attendant at the zoo in Prague reported that he had gotten some bad stains on his shirt. He sent the shirt to the laundry, but the stains were still visible when he got the shirt back. He wore the shirt to work and, on a very hot day, took it off and laid it aside. An elephant grabbed the shirt and gulped it down before the attendant could get it back. When the shirt reappeared at the other end of the elephant a day or two later, it was still intact; and the stains were gone!

Elephant Parts

For the Teacher

Primary, Intermediate
Language Arts

The following poem explains some of the ways in which Asian and African elephants are different. You may read the poem to the students or allow them to read it for themselves. Then discuss the ways the two elephants are different. Do the students know of any other differences?

Give each student a copy of the *Elephant Parts Puzzle* hand-out and allow time to color, cut out, and assemble the pieces into two elephants.

An Elephant Description

There are, in the world today,
two sorts of elephants, large and grey.

Though they share a name and the color of their skin,
there are many differences between these who are kin.

The elephant of Africa has huge ears to fan,
and creates a nice breeze wherever it stands.

The elephant of Asia's ears are smaller in size and shape,
less fanning required in deep forest glades.

The elephant of Asia has a back rounded in shape,
from neck to tail, a dome it does make.

The elephant of Africa's back has a definite sway,
a dip between shoulders and hips, about halfway.

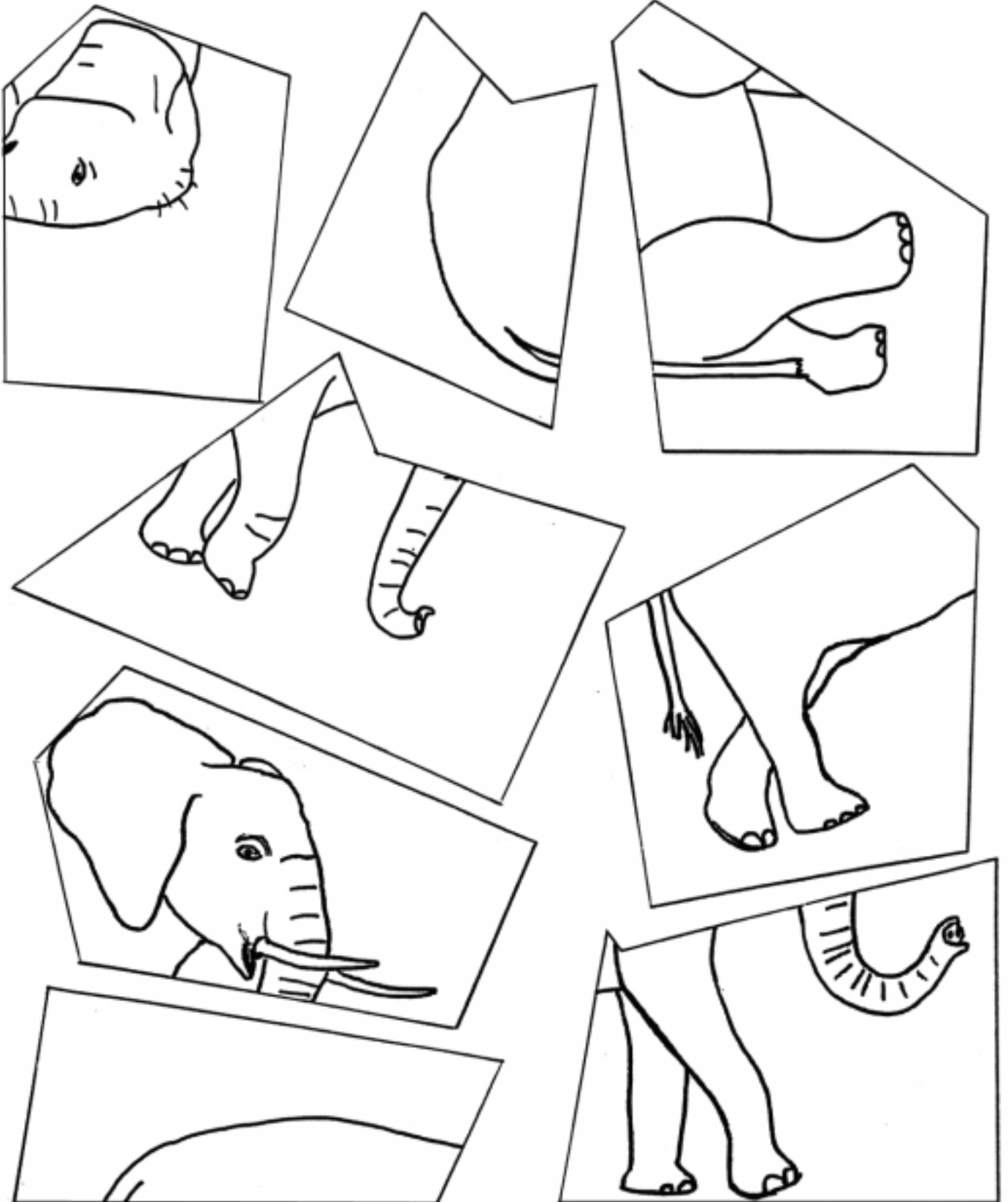
The elephant of Asia has, at the very tip of its trunk nose,
one little finger to help it feel and probe.

The elephant of Africa's trunk has one more,
two fingers with which to explore.

Finally, and check this if you can,
the elephant of Africa has more wrinkly skin.

Elephant Parts

Cut out each of the pieces below and put them together to make two elephants;
one Asian and one African.



Elephant Words

Elephants are members of a **mammal** group known as pachyderms. **Pachyderm** is a Greek word that means “thick skin.” An elephant’s skin may be 1.5 inches thick, but it is also sensitive. Elephants spend part of every day bathing, taking mud baths and throwing dirt on their backs to protect their skin from biting insects and the sun. Other members of the pachyderm group, **hippos**, **rhinos**, and tapirs, also enjoy mud baths or spend time in the water.

Modern elephants are the descendants of many prehistoric animals. In fact, scientists believe there may have been more than 150 species of elephant ancestors on the earth. Among those ancient elephant relatives were the **mammoth** and the mastodon. Only two **species** of elephants survive today, the **Asian elephant** and the **African elephant**. Another descendant of ancient elephants is the **manatee**, or sea cow.

The two elephant species have many things in common and some differences that make it easy to identify them. All elephants have a long upper lip-nose called a **trunk** that is used for a variety of purposes. Equally obvious is the fact that elephants are large, the largest land mammals on earth. Surprisingly, elephants grow to their deluxe size by eating only plants; they are **herbivores**.

Both species of elephants are very **social** animals. Elephants are born into **herds** that are made up of adult females, or **cows**, and their young **calves**. Each herd is led by a dominant female called a **matriarch**. Females stay with the herd throughout their lives. Male calves stay with the mother’s herd until they reach puberty at 10 to 14 years. At that point they leave the herd and join a **bachelor** group with other young **bulls**.

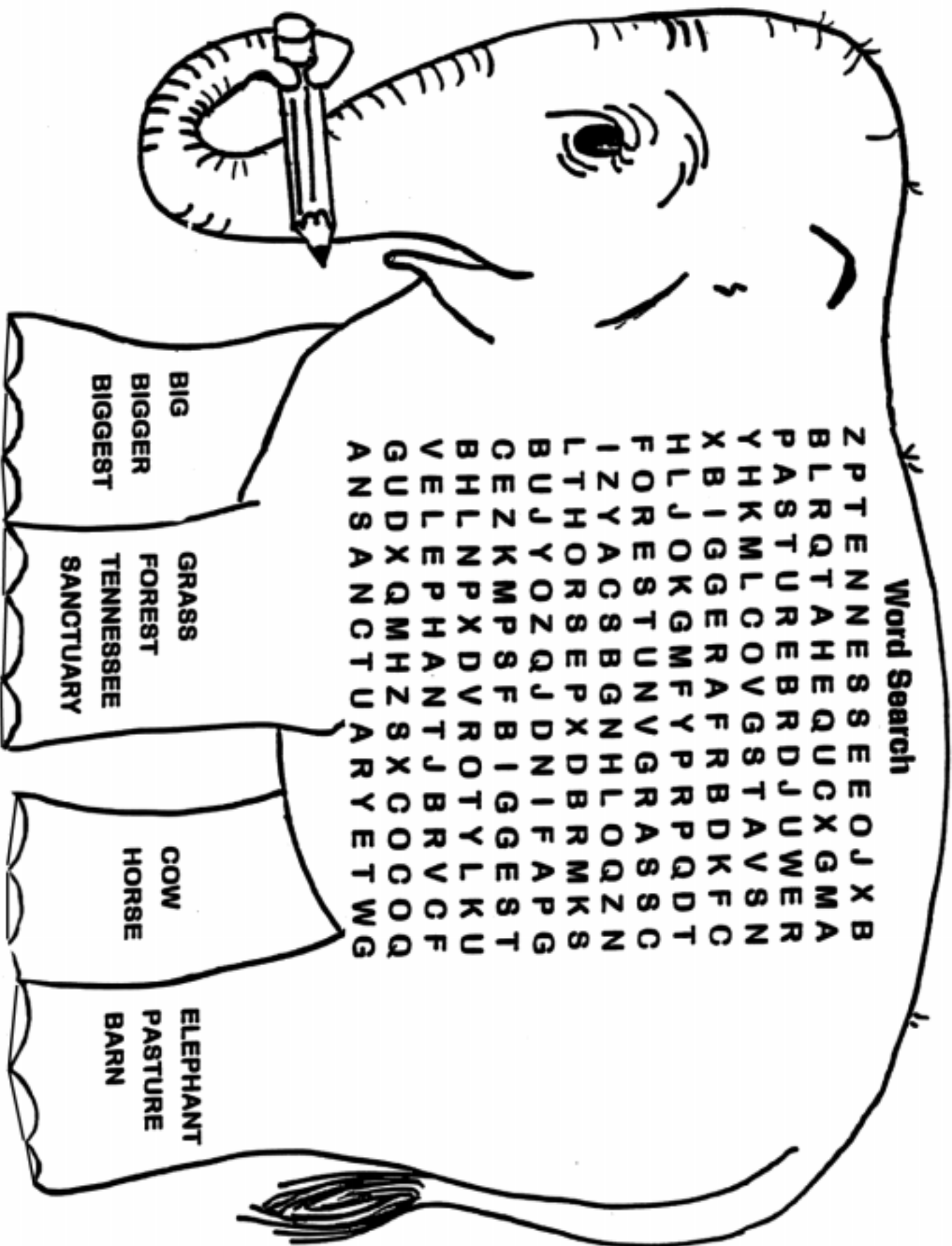
Though there are many similarities, Asian and African elephants are separate species and there are several differences between them. Asian elephants have smaller ears and tend to be smaller overall than their African cousins. Nearly all African elephants grow large, visible **incisor** teeth called **tusks**. Among Asians, usually only the males exhibit tusks. The tusks are made of **ivory** and grow throughout the animal’s lifetime.

African elephant populations declined very rapidly in the 1970s and 1980s as thousands were killed for their ivory. Asian elephant populations have not been as much of a target for ivory hunters because only the males have tusks. In Asia, people have always lived more closely with the elephant than people in Africa. The Asian elephant has been worshipped as a god and **domesticated** for use in clearing land and logging the forests. For many generations elephant handlers, called **mahouts** (MA hoots), have captured young elephants and trained them to work at these tasks. Asian elephants have also been used in battles and for parades and ceremonies.

In spite of their usefulness to humans, Asian elephant numbers have also declined over the last 40 years. The decline of the Asian elephant population is due primarily to **habitat destruction**. The growth of the human population in India, Sri Lanka, Indonesia, Nepal, Bangladesh and Southeast Asia has resulted in the elephants being pushed out of their

traditional homes. Such habitat destruction has also blocked **migration** routes followed by elephants for hundreds of years as they searched for food and water. As human populations and human activities block their migration, elephants are forced to stay in very confined areas. Unable to move to their feeding grounds, elephants frequently eat whatever is available, sometimes farm crops. This leads to conflicts between humans and elephants which the elephants lose in the end. Loss of habitat and declining populations have made the Asian elephant an **endangered** species.

The close association between humans and Asian elephants led to the use of elephants in circuses and other entertainment. There are many performing elephants in North America today, and some are well treated and healthy. Unfortunately, others are not so lucky. Despite its great size, the elephant is a gentle creature and can easily be abused by people. The **Elephant Sanctuary** in Hohenwald, Tennessee was established to provide a safe home for some of these elephants.



Word Search

Z P T E N N E S S E E O J X B
 B L R Q T A H E Q U C X G M A
 P A S T U R E B R D J U W E R
 Y H K M L C O V G S T A V S N
 X B I G G E R A F R B D K F C
 H L J O K G M F Y P R P Q D T
 F O R E S T U N V G R A S S C
 I Z Y A C S B G N H L O Q Z N
 L T H O R S E P X D B R M K S
 B U J Y O Z Q J D N I F A P G
 C E Z K M P S F B I G G E S T
 B H L N P X D V R O T Y L K U
 V E L E P H A N T J B R V C F
 G U D X Q M H Z S X C O O Q
 A N S A N C T U A R Y E T W G

BIG
 BIGGER
 BIGGEST

GRASS
 FOREST
 TENNESSEE
 SANCTUARY

COW
 HORSE

ELEPHANT
 PASTURE
 BARN

"If An Elephant Followed Me Home..."

For The Teacher

Math/Health-Nutrition/
Social Studies

This activity might begin with a class discussion of pets and a pet owner's responsibilities. You may want to have the students make a chart to compare the needs of common companion animals such as cats, dogs, fish and so on.

Another comparison could be made by size. While a cat may weigh from 6 to 20 pounds and a dog from 4 to 160 pounds, an Asian elephant may weigh from 9,000 to 12,000 pounds. Compare this weight to automobiles to give students an idea of the size of the elephant.

Proper diet is one requirement for good health and elephants consume a very large amount of food. A full-grown elephant needs to eat from 150 to 220 pounds of food per day. Elephants are herbivores. They eat only plant material, but they cannot digest the tough fibers of plants very efficiently (unlike cows and giraffes who chew their food twice). About 50% of what they take in passes through as waste, so they have to eat A LOT to get enough nutrition.

Both species, Asian and African, consume large amounts of grasses. From 30 to 60% of the diet is grass, depending on availability. African elephants tend to **browse** more, feeding on leaves, bark and twigs up to 60% of the time. Asians **graze** more, supplementing their grass diet with some leaves, vines, fruit and roots.

The following diets for Sanctuary elephants Tarra, Jenny and Barbara are designed to meet the specific nutritional needs of each animal. Barbara, for example, has dental problems that make it a bet difficult to chew hay and she is very underweight, so she gets less hay and has high calorie/protein calf manna added to her diet.

What The Sanctuary Elephants Eat Each Day

Tarra	Jenny	Barbara
130 pounds of hay or vegetation 5 pounds of elephant chow 1 pound of rolled oats 1/2 pound of wheat bran 10 pounds of fruits and vegetables	130 pounds of hay or vegetation 10 pounds of elephant chow 10 pounds of rolled oats 2 pounds of ground corn 1 pound of wheat bran 10 pounds of fruits and vegetables	115pounds of hay or vegetation 12 pounds of elephant chow 12 pounds of rolled oats 6 pounds of calf manna 4 pounds of ground corn 1 pound of wheat bran 10 pounds of fruits and vegetables
favorite: 1st — watermelon 2nd — <input type="checkbox"/> apples	favorite: 1st — potatoes 2nd — <input type="checkbox"/> apples	favorite: 1st — watermelon 2nd — <input type="checkbox"/> carrots

"If An Elephant Followed Me Home..." — continued

During much of the year the elephants can graze 50 to 75% of their food from the natural vegetation on the Sanctuary property. During colder months, nearly all of the diet has to be supplied, making winter feed bills much higher.

Additional Activities

research yields for hay per acre, and find out how large the schoolyard or a nearby field is. Then determine how much elephant food could be grown in the space.

Check grocery stores and produce markets for prices of fresh fruits and vegetables and figure out how much the grocery bill is for an elephant.

Elephant Chow	50 lb. bag	\$17.50
Rolled Oats	50 lb. bag	\$ 8.90
Ground Corn	50 lb. bag	\$ 5.50
Wheat Bran	50 lb. bag	\$ 7.75
Timothy Hay	bale	\$ 4.00

Find the dimensions of a bale of hay and the dimensions of the classroom. How many bales of hay could be stored in the classroom? How long would it take an elephant to eat a "classroom" of hay?

Elephants, like all animals, need to exercise in order to stay healthy. In the wild, they walk 30 to 50 miles per day to find enough food and water. At the Sanctuary, the elephants also roam miles per day, though they don't have to search for food. Use a map and map scale to determine how far "elephant walking" would take the students each day. How many days would be needed to walk across the state?

Food and exercise results in waste products, called dung or manure. Many zoos sell the barely digested elephant dung as fertilizer called "Zoo Doo." Have the students determine how much fertilizer one elephant could produce in a year.

A feeding elephant creates enough methane gas each day to power an average car for 20 miles. Perhaps the students could brainstorm ways to capitalize on this resource the ways zoos are using dung.

Note — African elephants are larger and their dung contains more fluid, so it is noticeably heavier than Asian elephant dung. African elephants eat more and poop more but also produce more fertilizer.

"If an Elephant Followed Me Home" — continued

Class Project Idea — Feed an Elephant for a Day

For a \$25 donation to the Elephant Sanctuary, the class can feed one of the resident elephants for one day. You can choose which elephant(s) you want to feed. The donor receives a certificate and photo of the chosen elephant. For information contact

The Elephant Sanctuary
615) 796-6500
or check the Internet at
www.elephants.com



Answers to
"If An Elephant Followed Me Home" Questions

1. $\frac{4}{5}$ of 160 pounds = 128 pounds
2. About 2 $\frac{1}{2}$ bales per day, 17 $\frac{1}{2}$ bales per week
3. 32 pounds
4. About 10 pounds per day, 70 pounds per week
5. 10 to 12 pounds per day
6. 30 gallons of water would require 6 five-gallon buckets
50 gallons (hot weather) would require 10 five-gallon buckets
7. $8\frac{1}{2}$ pounds \times 6 = 57 pounds; $8\frac{1}{2}$ \times 10 = 85 pounds
8. 2,000 divided by 57 = 35 days; 2,000 divided by 85 = 23 $\frac{1}{2}$ days
9. 30 miles divided by $\frac{1}{4}$ = 120 laps
10. 528 cubic feet
11. 24 hours divided by 6 = 4 \times 20 pounds = 80 pounds of dung per day; 80 \times 7 days = 560 pounds per week; 560 \times 52 weeks = 29,120 pounds per year!

If An Elephant Followed Me Home, Could I Keep It?

Have you ever promised to take care of a pet? If you have, you know that caring for an animal is a big responsibility . If you were to keep an elephant as a pet, you would have a HUGE responsibility. This survey will give you an idea just how HUGE and help you understand how elephants are cared for.

Food

An average Asian elephant needs to eat about 160 pounds of food **each day**. The diet must include grasses and other plants, grains, elephant chow and fruits and vegetables. Elephants are herbivores, so no meat or dairy products are required.

1. If 4/5 of the daily diet is hay and other vegetation, how many pounds is that per day?

2. If one bale of hay weighs about 50 pounds, how many bales would your elephant need each day? _____ How many each week? _____
3. The other 1/5 of the elephant's diet is made up of grains (rolled oats, ground corn, wheat bran), elephant chow, and fresh fruits and vegetables (potatoes, apples, carrots, watermelon, cantaloupe, celery, cabbage, etc.) How many pounds of chow, grains, fruits and vegetables will your elephant eat each day? _____
4. If 1/3 of this amount is elephant chow, how many pounds of chow will you need per day? _____ How many pounds per week? _____
5. Another 1/3 of the grain/chow/fruit & vegetable portion of the diet is fresh fruit and vegetables. How many pounds is this per day? _____

EXTRA: How many potatoes in a pound? _____
How many apples in a pound? _____

NOTE: If you have a VERY, VERY big back yard, your elephant can eat leaves, vines, grass and other wild vegetation during much of the year.

Water

6. Your elephant will need to drink 30 to 50 gallons of water each day, depending on the season. How many 5-gallon buckets of water will you need to bring your elephant each day? _____
7. A gallon of water weighs about 8 1/2 pounds. How many pounds of water will you be carrying per day? _____

If An Elephant Followed Me Home, Could I Keep It? — continued

8. How long will it take your elephant to drink a ton of water? _____

Exercise

Elephants are large animals, but they are not lazy. In the wild, elephants walk more than 30 miles each day. To keep your elephant healthy, you will need to “walk” it at least that far daily.

9. If a standard running track is about 1/4 mile around, how many laps will you need to walk your elephant to get enough exercise? _____

Grooming/Clean Up

10. Your elephant will need a bath every day to keep its skin healthy. If an elephant is 11 feet tall, 12 feet long and 4 feet wide, how big will its bath tub need to be to allow the elephant to be covered with water? (This answer will be in cubic feet.) _____

Of course you will have to scoop your elephant’s poop every day — lots of poop! Elephant digestive systems are not very efficient. They actually use less than 50% of what they eat. The rest passes through as waste products.

11. Elephants “poop” about every 6 hours, leaving a pile that weighs an average of 20 pounds each time. How much poop (called dung or manure) will you be scooping each day? _____ How much per week? _____ Per year? _____

Companionship

Feeding, walking and cleaning up is not all that is required of pet owners. Companionship is very important, especially with elephants. Elephants are social animals. If left alone for long periods, they may become bored, depressed or angry. Since you would not want your elephant to have these problems, you will have to provide it with company about 20 hours a day — (even elephants sleep sometimes.) You could do this yourself; your family might help; or you could get another elephant to keep yours company!

12. How much food and water would you need for 2 elephants? _____

(NOTE: Elephants are living creatures and no two are alike in their appetites, favorite foods, or defecation habits. The numbers in this survey are averages or ranges and many of your answers will also be approximate. This exercise is designed to help you understand how BIG the job of elephant keeper really is.)

Walk Softly and Carry a Big Trunk

For the Teacher

Science
Language Arts

Elephants, or elephant-like creatures, have been around for more than 40 million years. In that time the earth has undergone changes that range from continental drift to the Ice Ages. Such changes force **species** of plants and animals to **adapt** or become **extinct**. The **ancestors** of the modern elephant adapted in many ways that helped them survive. This activity focuses on 7 physical **adaptations** and the ways in which they benefit elephants. The questions at the end of each section allow the students to check their understanding of the adaptation and make comparisons with other species.

These pages will give you additional information, some **vocabulary**, and suggestions for answers to the questions. Many of the questions have more than one answer and should be used to stimulate thinking and discussion.

The activity sheet titled *Elephant Parts – Adaptation* will allow the students to test their comprehension and memory.

A fun follow-up to this lesson is the activity titled *Build a Paper Pachyderm* which is included in the *Discovering Elephants* packet.

Size

When talking about animal size, biologists often refer to Bergmann's Rule which states that the size of warm-blooded animals (mammals and birds) increases as the distance from the equator increases. More simply, southern bald eagles are considerably smaller than northern bald eagles; white tail deer in Minnesota are far larger than the white tail deer found in the Florida Everglades. This is because in colder climates animals need greater size in order to conserve body heat and maintain the constant temperature that makes them warm blooded.

At the time **Moeritherium** developed, the earth's surface was very warm, and this pig-sized elephant ancestor lived very comfortably. The onset of cooler weather and the **Ice Ages** forced the elephant ancestors to grow larger and bulkier in order to stay warm. The huge mastodons and mammoths are examples of the great size attained by the elephant's relatives. Some even grew woolly fur coats.

By the time the glaciers receded and the earth's climate settled into the patterns we know, the elephant had developed into the huge animal we see today. Now the climate of elephant habitat has come full circle and is once again warm. Modern elephants no longer need size to stay warm; instead they need to lose heat. More recent physical and behavioral adaptations help them do just that.

Wrinkles may not seem very important to an animal's survival, but they are an important

part of body cooling. Heat is radiated away primarily through the skin. Wrinkles give the elephant more total skin area without increasing its size. Additionally, moisture and/or mud trapped in the folds of skin evaporate more slowly and prolong the cooling effect of bathing or a mud pack.

Equally important is the fact that large animals such as elephants produce less body heat than smaller animals. A biologist once noted that if a cow produced body heat as quickly as a mouse, its skin temperature would rise above the boiling point. And a mouse that produced heat as slowly as a cow would need fur 8 inches thick to stay warm!

Q. What are the advantages and disadvantages of large size?

A. Because they are so large, elephants really have only one enemy — humans. Usually only young calves are at risk from attack by other predators. Another advantage of large size is the ability to reach a greater variety of food.

A. One of the disadvantages of large size is the enormous quantities of food necessary. An elephant needs between 150 and 300 pounds of food each day.

Trunk

The elephant's trunk developed in response to the growth of its body. If the very short-necked elephant had to get down on its knees each time it wanted a bite of grass, it would probably starve. The fabulous appendage that replaces nose and upper lip makes it possible for the elephant not only to feed while standing but also to feed while moving.

The trunk is also used for drinking, but elephants do not drink through their nose! They simply suck water into the trunk (several gallons at a time) and squirt it into the mouth. Of course they can also squirt it on their backs, at other elephants, or at zoo visitors. The trunk is the ultimate squirt gun.

Q. Can you think of any other animal with a long nose used for food gathering?

A. Anteaters and their relatives have elongated snouts that include mouth and nose. The snout and a very long tongue are used to get termites, ants, and other insects out of their nests.

Q. What do you think would happen to an elephant whose trunk was seriously injured?

A. For an elephant, a very serious trunk injury can mean death, either by bleeding or due to slow starvation

Extension Idea:

Read the Rudyard Kipling story *How the Elephant Got Its Trunk*. (An adapted version is included with the *Folklore and Nature* activity in *Discovering Elephants*.)

Ears

Ears are one of the ways we distinguish between the Asian and African species. An African has huge ears shaped like the continent of Africa. One ear from an African bull weighs over 100 pounds. The Africans have larger ears for the same reason they have more wrinkles in their skin; they live in a hotter climate and habitat than the Asians.

Among Asian elephants, those that live in Sri Lanka have larger ears than those that are native to Nepal because it is hotter in Sri Lanka than in Nepal.

Q. Do other animals have multiple-function ears?

A. Yes, many animals can use their ears to discourage insects and radiate away excess body heat. Deer and rabbits are examples of animals that do this; but, of course, no animal does it as well as elephants.

Teeth

The elephant's ivory tusks have been prized for jewelry, furniture, and decoration for centuries. The ancient Arabs traded so much ivory that the elephant populations of the Middle East were wiped out. Today, any of the populations that survive in Asia are those that produce less ivory. Perhaps being tuskless is a genetic trait passed down by elephants who survived to breed because they had no ivory.

The elephant's other teeth, the molars, are actually as impressive as the tusks, though not as beautiful. These huge grinding teeth grown in grooves in the jaw bones rather than individual sockets like human teeth. Usually only one tooth is in use on each side of the upper and lower jaw (4 in all). As a tooth becomes worn from chewing, it is pushed forward by the next tooth and the front pieces of the old tooth break off.

The last of the elephant's six sets of molars are 40-year molars (come in the elephant's 40s) and must last the rest of the animal's life. Once this set is worn out, the elephant gradually starves, generally somewhere around 60 years old. Biologists judge the age of elephants by the size and condition of the teeth.

Like rodents, the elephant must chew to wear down the teeth. New teeth form and come into the mouth whether or not the old ones have worn away. Barbara, one of the elephants at The Elephant Sanctuary, was not fed enough in the past to wear her teeth down. Now she has too many teeth in her mouth and finds it difficult to eat. When she is in better health, the vets will operate to remove some of the excess teeth.

Q. How many incisors and molars do you have? What other kinds of teeth do humans have?

A. Humans get only two sets of teeth in their lives, the milk teeth or baby teeth that begin to show during the first year, and permanent teeth that start to come in at around age 6. A full set of teeth is 16 on top and 16 on

bottom for a total of 32. They includes 8 incisors, 12 molars, 4 canines, and 8 bicuspid (also called premolars.)

Q. Why don't elephants need the other types of teeth?

A. Elephants are herbivores, eating only plants, so they do not need the canine or bicuspid teeth which are designed for tearing and chewing meat.

Feet and Legs

Most animals have legs that are normally slightly flexed at knee or elbow to allow for quick starts and graceful running. The elephant has no natural predators and no need for fast starts. It does have a massive body that needs sturdy support, so it has pillar-like legs. An elephant walks and runs a bit stiff-legged but can achieve speeds of up to 34 miles per hour when necessary.

The elephant's feet are adapted to cushion the stiff-legged walk. Biologists refer to the elephant as a **digitigrade** animal, one that walks on its toes. Humans are **plantigrade**, walking on the whole foot. Horses, cats, and dogs are also digitigrade; while bears are plantigrade.

An elephant's feet are very broad and help the animal walk softly by smothering sounds beneath them. Though they are big, elephants can move very quietly.

The elephant's large feet have large toenails. In the wild they wear the toenails down by walking as much as 30 miles a day to feed. In captivity the elephant must get a regular pedicure to prevent the nails from becoming overgrown and causing serious foot problems. Elephants are on their feet most of the time. Lying down for too long puts too much pressure on internal organs. So an elephant with foot problems can be in serious trouble. Jenny, at The Elephant Sanctuary, has been treated for both foot and knee problems that once made it very difficult for her to walk.

Q. Do you know of any other animal that walks on its toes?

A. Horses, cats, and dogs walk on their toes. (See above)

Q. Do you know of any other animals with feet that are adapted to special conditions?

A. Lots of animals have specially adapted feet. Polar bears have fur on the bottoms of their feet to protect them from cold and sharp ice. Moose have hooves that spread (splay) to allow them to walk in swampy areas without sinking. Camels, snowshoe hares, gerbils, most birds, and many other animals have special feet.

Tail

Like many animals, the elephant uses its tail as a swatter. Young elephants, like kittens, also play with each other's tails, and the mother may use the tail to hold on to her youngster.

At the end of the elephant's tail are several thick hairs which are sometimes used by native people to make bracelets.

- Q. Can you think of any animals that do not have tails? How do they chase away insects?
- A. Most apes do not have tails and must use their "hands" to discourage insects. Pigs and rhinos don't have much of a tail, and they depend on mud wallows to keep the insects away.

Senses

Like most animals that live in the wild, elephants have some very keen senses. Their eyesight is not the best of all, but the placement of their eyes and their height give elephants a wide view of their surroundings.

Elephants depend more on hearing, smell, and touch to experience their surroundings. The trunk is used to touch and feel many things, from food to other elephants. When two elephants meet, they frequently place the end of their trunks in or near the other's mouth to smell/taste the other elephant.

Researchers working in zoos and in the wild are currently cataloging the sounds elephants use to communicate. Using special recording devices that can detect infrasound, they have identified a number of calls and warnings that the elephants hear but humans cannot.

- Q. Why doesn't an elephant need the same keen eyesight that tigers and leopards have?
- A. Elephants are not predators, so they do not need to see a possible meal from a distance and watch it until it is caught.
- Q. What advantage is there in knowing the fruit on a tree is ripe?
- A. Ripe fruit is a food many animals compete for, and those who get to it first are likely to get the best meal. Elephants can smell the fruit as it ripens and pluck it from the tree before it falls to be snatched by smaller animals or trampled under foot.

Walk Softly and Carry a Big Trunk

For The Student

Adaptations for Survival

An **adaptation** is a physical characteristic or a behavior that a **species** develops in response to its environment. Those animals that adapt survive in greater numbers than those that do not and are able to pass on their genes to the next **generation**. Physical **adaptations** occur over many generations; behavioral adaptations happen much more quickly. The following paragraphs describe many of the physical adaptations that have helped elephants survive for thousands of years.

Size

The original ancestor of the elephant lived at a time when the earth was much, much warmer. In warm or hot climates mammals must lose most of the body heat created by digestion, respiration, and other body processes. Since heat is lost through the skin and smaller animals have a greater skin area relative to body size, smaller animals lose heat more efficiently.

Moeritherium, the first elephant-like animal, was about the size of a large pig, an ideal size for a herbivore in hot weather.

As the earth cooled, however, mammals needed to be larger to hold body heat and maintain a constant temperature. So the ancestors of elephants gradually grew larger and larger, and the mammoths even grew a wooly fur coat. Modern elephants are the largest living land animals as a result of this adaptation.

Today the earth is not as cool as it was during the Ice Ages; and many mammals, including elephants, have adapted to allow them to lose body heat. Wrinkles, for example, increase the skin area without increasing the size of the animal. Another adaptation is in metabolism. Large mammals produce less body heat and maintain a lower body temperature than smaller mammals. An elephant's normal temperature is 97.2° F, and an elephant generates enough additional heat from digestion to warm a small house, so it must lose a lot of heat to stay at its normal temperature.

- Q. What are the advantages of large size?
Besides the possibility of overheating, what disadvantages come with large size?

Trunk

The elephant's trunk, a combination of nose and upper lip, is unique in the animal world. Some other animals have long noses or flexible upper lips, but none has anything as versatile as a trunk.

To begin with, the trunk is extremely flexible. It can telescope several inches to increase the animal's reach, and it can curl back over the head or to either side and into the mouth. This incredible flexibility depends on muscles, lots of muscles. New research puts the number of muscles in an elephant's trunk at more than 100,000! The trunk has ridges on the underside to allow it to grip, and a finger-like extension at the tip for delicate tasks. An elephant can pick up a log or a blade of grass with this amazing appendage.

The trunk is used as a snorkel for swimming, as a swatter to deal with biting insects, as a hand to greet friends or help unsteady calves, and as an antenna to explore the environment. But the trunk is not just useful; it is vital. Elephants have short necks to hold up their massive heads. Without the trunk to lift food and water to the mouth, elephants would have a very difficult time getting enough to eat and drink.

- Q. Can you think of any other animal with a long nose used for food gathering? What do you think would happen to an elephant whose trunk was seriously injured?

Ears

an elephant's ears are more than external hearing organs. Ears are signal flags, fly chasers, and radiators. When an elephant is angry or feels threatened, it may spread its ears wide, making its huge head appear even larger. When insects buzz around the elephant's head, fanning one or both ears helps chase them away.

The most important function of the ears, other than hearing, is in radiating away excess body heat. Each ear is laced with blood vessels. The elephant can dilate or contract these vessels to control blood flow through the ears. If the animal is too warm, the vessels are dilated; and blood flows through the ears where it is cooled by the air and sent back through the body. All of an elephant's blood, about 100 gallons, can be circulated through the ears in 20 minutes. This process can reduce the elephant's temperature by 10 degrees. To speed up the process, the elephant just flaps the ears like a fan.

- Q. Do other animals have multiple-function ears?

Teeth

An elephant's tusks are really overgrown incisor teeth. They are made of a hard material called ivory. Among Asian elephants, tusks are exhibited by about 60% of the males. Females have smaller incisors that are not visible.

Elephants also have molars, teeth with large flat surfaces for grinding the grass, leaves, fruits, and other **vegetation** they eat. There are 4 molars, one on each side of the upper and lower jaw, that grow in grooves rather than sockets like human teeth. Elephants chew tons of food each year and wear the molars down. As each molar is being worn down by grinding food, another is forming in the groove behind it. Eventually, the new tooth pushes the old tooth out. This happens 6 times for each of the 4 molars during an elephant's lifetime (24 teeth in all.) The last set of molars is huge. Each is about a foot long and weighs nearly 10 pounds. These teeth must last for the rest of the animal's life.

- Q. How many incisors and molars do you have? What other kinds of teeth do humans have?
Why don't elephants need these other types of teeth?

Feet & Legs

An elephant's weight is measured in tons, and it takes a pretty sturdy foundation to support such weight. The feet and legs of the elephant are well suited for the task. The leg bones are stacked straight to form solid pillars. The knees and elbows are more rigid than a human's which means the **pachyderms** have a somewhat stiff-legged gait.

Nature compensates for the lack of flex and spring in the elephant's legs by having them walk on tiptoe. A large pad of fat between the foot bones and the soles of the feet help cushion each step.

These broad feet, with a combined surface area of more than 3 square feet, enable the elephant to walk very softly, barely leaving tracks. They also allow the elephant to wade into swamps to feed on tasty grasses and to walk in mud without sinking too far.

- Q. Do you know of any other animal that walks on its toes?
Do any other animals have feet adapted to special conditions?

Tail

At the far end of the elephant hangs the tail. Though not as impressive or useful as the fabulous trunk, the tail does serve its purpose. Tails are used to shoo away biting insects the trunk cannot reach. A calf's tail provides its mother with a built-in "leash" so she can control her curious youngster.

- Q. Can you think of any animals that do not have tails? How do they chase away the insects?

Senses

Elephants have relatively small eyes which are located on the sides of the head. Because they have short necks, elephants cannot turn their heads to look at something to the side, behind, or below. Overall, an elephant's eyesight is somewhat limited.

Its hearing and sense of smell, however, are outstanding. Elephants hear a greater range of sound than humans, including very low frequency sounds called infrasounds. This is important for communication in forests or over long distances because low frequency sounds travel in long sound waves that bend around objects rather than scatter. Infrasounds can travel for many miles, allowing herds to stay in contact.

An elephant's sense of smell is even better than a dog's. Because it can raise and lower its nostrils, the elephant can catch the scents carried by the wind and those left on the ground. So it can detect the odor of fruits just ripening on the trees or water hidden below the ground surface.

Q. Why doesn't an elephant need the same keen eyesight that tigers and leopards have?

What advantage is there in knowing the fruit on the tree is ripe?

Test Your Memory:

Look at the sheet titled *Elephant Parts — Adaptations*. Beside each part list the ways that part helps the elephant survive.

Elephant Parts — Adaptations

Trunk



Ear



Teeth



Elephant Parts — Adaptations

Legs & Feet



Size

Build a Paper Pachyderm (adapted from a Nature Scope Activity)

Math, Art, Science

Materials: Butcher paper, kraft paper (or newspaper) markers, scissors, masking tape, lots of patience, and the Elephant Pattern Pieces.

Copy the Elephant Pattern pieces onto separate sheets of paper, being sure to include all dimensions. Divide the class into teams and assign each team a piece (or pieces). Each team will be responsible for drawing and cutting out the assigned pattern pieces on the butcher paper. Since the finished elephant will be a huge profile, you will only need one front and one back leg and one ear. Make as many footprints as you want.

You may want the students to use the shape and dimensions with a grid to lay out the full-sized parts. Or, you can use an overhead projector to enlarge each part to the correct size and project it on paper suspended from a wall. Allow the students to trace the parts, then cut them out for assembly.

The pattern pieces represent the dimensions of **Tarra**, one of the elephants at the **Elephant Sanctuary**. Tarra is an adult Asian elephant cow (female).

When the pieces are finished, lay them out on the floor and use plenty of masking tape to put them together. (You might put the tape on the back side for legs, tail, and trunk.) Use a black marker or crayon to outline the ear and tape it on at the front edge so it can flap.

If you have a big enough wall, mount the elephant profile on the wall so the students can visualize how big Tarra really is. You can also measure out 4 feet from the wall and put a tape mark on the floor to add depth to the profile.

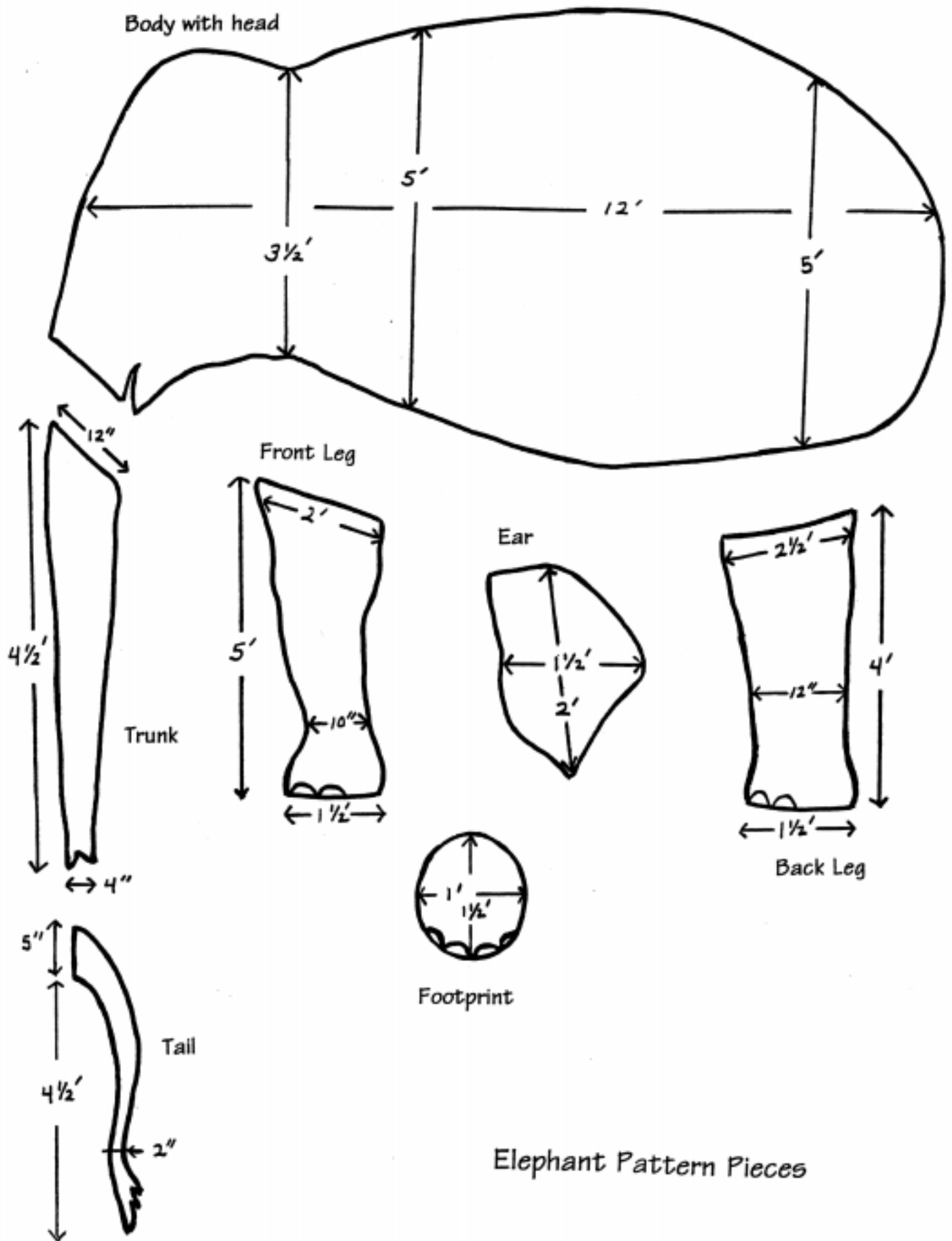
Measure the students against the elephant or against one leg.

How many students would fit in the elephant outline?

Lay out footprints behind your elephant. (An elephant's stride is 2 1/2 to 3 feet long.) Then find out how many steps students must take to cover the same distance.

Invite other students to see your Tarra profile.

To learn more about the parts of an elephant, see the activity *Walk Softly and Carry a Big Trunk*. To learn more about how much an animal this size eats, check out the activity *If an Elephant Followed Me Home*. Both activities are included in the *Discovering Elephants* packet for teachers.



Elephant Pattern Pieces

Folklore and Nature

For The Teacher

Grade 5 and up
Language Arts,
Social Studies

Background

For as long as humans have had language, people have tried to explain the world around them. Today we rely on science and some very technical vocabulary to help us understand and explain why things are the way they are.

Earlier people, without benefit of modern technology, found their own ways to explain nature. The reading selections for this activity come to us from different parts of the world, different times, and different cultures. Both seek to explain a physical attribute of an animal common to the storyteller's experience.

You may want to spend some time researching the world of Colonial Asia as known by Rudyard Kipling and the culture of the Cherokee people as a prelude to this activity. Have the students locate India, Africa, the Limpopo River, and the areas inhabited by the Cherokee on a map.

Reading Selections

“How the Elephant Got Its Trunk” — adapted from *The Just So Stories* by Rudyard Kipling

“Why Possum Has a Naked Tail” — a Cherokee Story from *Keepers of the Animals* by Michael J. Caduto and Joseph Bruchac

Depending on the age / ability of the students, you may want to read the selections aloud, have the students read both selections for themselves, or have half of the group read and report on one story and half on the other.

Discussion Questions

- Q. Why do humans create stories such as these? Do the students think the stories were created by parents to answer their children's questions?
- Q. Can the students think of any other examples of stories that explain something from nature? (fables, folk tales, and tall tales.)
- Q. Both the Elephant Child's long nose and the Possum's naked tail are described as ugly. Who determines what is ugly and what is beautiful? Does everyone agree? (How about the phrase “Beauty is in the eye of the beholder.”)

- Q. How much does usefulness count in this decision? How is possum's naked tail useful?
- Q. Do the students know the story of Dumbo? How was Dumbo treated by the other elephants? Why?

Writing Activity

Students should work in pairs or small groups to create their own short stories to explain one of the following:

How the elephant came to be so big

Why elephants have big ears

Why some elephants have tusks

Why the big elephant has a small tail

Extension

The Bi-Colored-Python-Rock-Snake is a “good guy” in Kipling’s story, and the rabbit is a tricky fellow in the Cherokee story. Is this the way these animals are usually depicted? What other story has a rabbit (hare) being tricked by a “slower” animal? What animal is usually considered wise?

How the Elephant Got Its Trunk from Rudyard Kipling's "Just So Stories"

The story goes that an "Elephant's Child" with much curiosity set out for the banks of the "great grey-green, greasy" Limpopo River to find out what the crocodile has for dinner. At this time the elephant had no trunk. Finally arriving at the river, the elephant child soon found himself in a tug-of-war for his life, as the crocodile dragged the elephant by the nose ("no bigger than a boot") and tried to pull the child into the water, where the answer to the dinner query would have been all too clear. Aided by a sympathetic "Bi-colored-Python-Rock-Snake," the elephant, after a tremendous struggle, freed himself.

Then the Elephant's child sat down hard and sudden; but first he was careful to say "Thank you" to the Bi-colored-Python-Rock-Snake; and next he was kind to his poor pulled nose, and wrapped it up in cool banana leaves, and hung it in the great grey-green, greasy Limpopo to cool.

"What are you doing that for?" said the Bi-Colored-Python-Rock-Snake.

"Scuse me," said the Elephant's Child, "but my nose is badly out of shape and I am waiting for it to shrink."

"Then you will have to wait a long time," said the Bi-Colored-Python-Rock-Snake. "Some people do not know what is good for them."

The Elephant's Child sat there for three days waiting for his nose to shrink. But it never grew any shorter, and, besides, it made him squint. For, O Best Beloved, you will see and understand that the Crocodile had pulled it out into a really truly trunk same as all elephants have today.

At the end of the third day a fly came and bit him on the shoulder, and before he knew what he was doing he lifted up his trunk and hit the fly dead with the end of it.

"Vantage number one!" said the Bi-Colored-Python-Rock-Snake. "You couldn't have done that with a mere-smear nose. Try and eat a little now.

Before he thought what he was doing, the Elephant's Child put out his trunk and plucked a large bundle of grass, dusted it clean against his fore-legs, and stuffed it into his own mouth.

"Vantage number two!" said the Bi-Colored-Python-Rock-Snake. "You couldn't have done that with a mere-smear nose. Don't you think the sun is very hot here?"

"It is," said the Elephant's Child, and before he thought what he was doing, he schlooped up a schloop of mud from the banks of the great grey-green greasy Limpopo, and slapped it on his head, where it made a cool schloopy-sloshy mud-cap all trickly behinds his ears.

“Vantage number three!” said the Bi-Colored-Python-Rock-Snake. “You couldn’t have done that with a mere-smear nose. As a matter of fact, I think you will find your new nose much more useful than your old mere-smear nose. Perhaps you should go home and show your new nose to your dear family.”

So the Elephant’s Child went home across Africa frisking and whisking his trunk. When he wanted fruit to eat he pulled fruit down from a tree, instead of waiting for it to fall as he used to do. When he wanted grass he plucked grass up from the ground, instead of going to his knees as he used to do. When the flies bit him he broke off a branch of a tree and used it as a fly-whisk; and he made himself a new, cool, slushy-squishy mud-cap whenever the sun was hot. When he felt lonely walking through Africa he sang to himself down his trunk, and the noise was louder than several brass bands.

At last the Elephant’s Child returned home to his dear family and revealed his marvelous new nose to them.

“It looks very ugly,” said his Giant, Hairy Uncle.

“It does,” said the Elephant’s Child. “But it is very useful.” and he reached up into the tall tree and plucked the juicy fruit that his Giant, Hairy Uncle had been patiently waiting to fall. Handing the fruit to his uncle, the Elephant’s Child asked, “What do you think of my ugly nose now?”

“I think that we must not be so quick to judge what we see as strange and ugly,” said the Giant, Hairy Uncle. “Because it is different does not mean it is not useful and in its own way wonderful and beautiful. All of us have our own purpose that makes us special and permits us to do something different than anybody else. That doesn’t make us better or worse, just different; and we must learn to appreciate each other for what we are.”

“Wise words,” said the Bi-Colored-Python-Rock-Snake, who had slithered along after the Elephant’s Child to see how he got along with his new nose. “Wise words indeed!”

Why Possum Has a Naked Tail

— A Cherokee Story —

In the old days, Possum had the most beautiful tail of all the animals. It was covered with long, silky hair and Possum liked nothing better than to wave it around when the Animal People met together in council. He would hold up his tail and show it to the Animal People.

“You see my tail,” he would say. “Is it not the most beautiful tail you have ever seen? Surely it is finer than any other animal’s tail!”

He was so proud of his tail that the other animals became tired of hearing him brag about it. Finally, Rabbit decided to do something about it. Rabbit was the messenger for the animals and he was the one who always told them when there was to be a council meeting. He went to Possum’s house.

“My friend,” Rabbit said, “there is going to be a great meeting. Our chief, Bear, wants you to sit next to him in council. He wants you to be the first one to speak because you have such a beautiful tail.”

Possum was flattered. “It is true,” he said, “one who has such a beautiful and perfect tail as I have should be the first one to speak in council.” He held up his tail, combing it with his long fingers. “Is my tail not the most wonderful thing you have ever seen?”

Rabbit looked closely at Possum’s tail.

“My friend,” Rabbit said, “it seems to me that your tail is a little dirty. I think that it would look even better if you would allow me to clean it. I have some special medicine that will make your tail look just the way it should look.”

Possum looked closely at his tail. It did seem to be just a little bit dirty. “Yes,” Possum said, “that is a good idea. I want all of the animals to admire my tail when I speak in council.”

Then Rabbit mixed up his medicine. It was very strong, so strong that it loosened all of the hair on Possum’s tail. But as he put the medicine on Possum’s tail, Rabbit wrapped the tail in the skin which had been shed by a snake.

“This snakeskin will make sure the medicine works well,” Rabbit said. “Do not take it off until you speak in council tomorrow. Then the people will all see your tail just as it should be seen.”

Possum did as Rabbit said. He kept the snakeskin wrapped tightly around his tail through the night.

The next day, when the animals met for council, Possum sat next to Chief Bear. As soon as the meeting began, he stood up to speak. As Possum spoke, he walked back and forth, swinging his tail, which was wrapped in the snakeskin. He smiled as he thought of how good his tail would look because of the medicine Rabbit put on it. All of the animals were watching him very closely, looking at his tail. Possum grinned at the thought of how beautiful his tail would look. The time was right.

“My friends,” Possum said, holding up his tail and beginning to unwrap the snakeskin, “I have been chosen to start this council because of my tail. It is the finest of all tails. Look at my beautiful tail!”

Possum pulled off the snakeskin wrapping and as he did so, all of the hair fell off of his tail. His tail was naked and ugly and when Possum saw it, the grin froze on his face. All of the animals were looking at him. Possum was so ashamed, that he fell down on the ground and pretended to be dead. He did not move until long after all the other animals had gone.

To this day, Possum still has that foolish grin on his face and whenever he feels threatened, he pretends that he is dead. And, because he was so proud and bragged so much, Possum has the ugliest tail of all the animals.”

Explanation and Description

For The Teacher

Grade 4 and up
Language Arts

Accuracy in describing and explaining depend on our perceptions and knowledge. Obviously, it is easier to describe or explain something that we know well. It is also easier to explain something to a person who shares our culture because we have reference points to help us get the message across.

When trying to explain something to a total stranger, we have a more difficult time and must be more precise if we want the listener to understand.

The two selections titled *Elephant Poetry* are examples of characters trying to describe an elephant. Sam the Hobbit has heard a poem about an elephant (or oliphaunt as he calls it) and knows enough to recognize the creature when he sees one. His description is full of reference points to help his listener understand the creature.

The six men of Indostan also use references to various objects to describe the elephant. The difference is that none of the blind men experiences the entire elephant, so each tends to describe only what he contacts.

Read the selections aloud or have the students read individually, and talk about how the elephant is described.

Discussion Questions

- Q. What features capture the attention of both poets?
- Q. What single feature seems to impress the hobbit Sam the most?
- Q. What are the six things the blind men compare to the elephant?
- Q. How do you think the blind men might have described the elephant if given time to experience the whole animal?

To give students a feel for an elephant's actual size, using masking tape to mark the following dimensions on a wall:

Height: 11 feet
Length: 12 feet

Trunk length: 4 1/2 feet
Tail length: 4 1/2 feet

On the floor, measure out 4 feet from the wall and mark the distance with tape. This is approximately the space an adult elephant would occupy if it came to visit your

classroom (is your ceiling high enough?) Also note, an adult elephant may weight 11,000 pounds. An average car weighs between 2,000 and 3,000 pounds.

Writing Assignment

Have the students imagine they have met someone, perhaps a hermit or space alien, who has never seen or heard of an elephant. How would they describe an elephant to the visitor?

Extension

Have students write their descriptions in a poem or song lyric. Find other poetry or songs that attempt to describe elephants.

Six Men of Indostan

It was six men of Indostan
To learning much inclined,
Who went to see the Elephant
(Though all of them were blind),
That each by observation
Might satisfy his mind.
The First approached the Elephant,
And happening to fall
Against his broad and sturdy side,
At once began to bawl:
"God bless me! but the Elephant
Is very like a wall!"
The Second, feeling of the tusk,
Cried, "Ho! what have we here
So very round and smooth and sharp?
To me 'tis might clear
This wonder of an Elephant
Is very like a spear!"
The Third approached the animal,
And happened to take
The squirming trunk within his hands,
Thus boldly up and spake:
"I see," quoth he, "the Elephant
Is very like a snake."

The Fourth reached out an eager hand,
And felt about the knee.
"What most this wondrous beast is like
Is mighty plain," quoth he;
"Tis clear enough the Elephant
Is very like a tree."
The Fifth, who chanced to touch the ear,
Said: "E'en the blindest man
Can tell what this resembles most;
Deny the fact who can,
This marvel of an elephant
Is very like a fan!"
The Sixth no sooner had begun
About the beast to grope,
Then, seizing on the swinging tail
That fell within his scope,
"I see," quoth he, "the Elephant
Is very like a rope."
And so these men of Indostan
Disputed loud and long
Each in his own opinion
Exceeding stiff and strong,
Though each was partly in the right,
And all were in the wrong!

Population Pressure

Using Charts and Graphs

For The Teacher

Math, Social Studies

Every day plant and animal species become extinct. Thousands of other species are threatened with extinction in every part of the world. The reasons for extinction are numerous. A small percentage of species become extinct as a normal part of development. Natural disasters such as hurricanes and volcanic eruptions can destroy small, isolated populations, particularly in island **habitats**. But most extinctions are the result of human activities. Pollution, illegal hunting, the pet trade, and the market for rare plant/animals/animal parts contribute to extinction. The single greatest threat, however, comes from **habitat loss**.

Hourly, around the globe, forests are cut, wetlands drained, grasslands plowed, and coastal areas developed as humans pursue wealth, leisure, or merely a place to live. In the developing nations of Africa, Asia, and Latin America, habitat destruction is fueled by the need to feed and house rapidly growing populations.

Better sanitation, widespread use of vaccines to prevent death from diseases, and improved medical care have brought death rates down in most developing nations, while birth rates remain high. The net result is a population explosion.

Between 1950 and 1990, the world's population doubled, going from 2.5 billion to 5 billion in only 4 decades. The majority of this growth occurred in Africa, Asia, and Latin America; and in all of those areas habitat loss has meant trouble for too many species.

In Southeast Asia and the Indian Subcontinent the growing population has pushed many species into the **threatened** and **endangered** categories, including the Asian elephant.

The activity titled *Population Pressure, Using Charts and Graphs* focuses on the competition between the people of India and elephants for land and food. The charts — *Comparing Two Countries: India and the United States* and *Population Growth: Indian and the U.S.* give students an opportunity to compare conditions in the United States with those in India and perhaps develop an understanding of the population pressure on elephants and other species.

You may want to spend some time discussing the information in the charts to be certain the students understand what the numbers represent.

Area in Sq. Miles:	How big is the country? This figure includes mountains, deserts, and other areas not suitable for farming.
Population:	The best estimate of the number of people in the country. How do we determine population and what problems might cause the census to be incorrect?
People Per Sq. Mile:	Divide the population by the area to see how crowded the country is. This is called population density .
Population Growth Rate:	How many people are being added to the population each year. 1.6% may not seem like much, but if you do the math you will find it comes to more than 1 million people per year.
Life Expectancy:	The average number of years people live. Some live longer, and some do not reach the average. Because females tend to live longer than males, the figures are given by sex.
Doctor to Patient Ratio:	Divide the population by the number of doctors to find how many patients each doctor would have if they were spread equally. Of course, patients aren't spread equally in real life, but this figure gives you some idea of health care availability.
Infant Mortality Per 1000:	For every 1000 babies born alive, how many survive the first year. This figure tells much about health care and nutrition in a country.
Telephone to Person Ratio:	Divide the number of people by the number of telephones. This tells us how many people would share a phone if all phones were distributed evenly.
Television to Person Ratio:	As with the telephone figure, this tells us how many people would share a TV if TVs were distributed evenly. Of course they aren't; some people have more than one while others haven't any. But the figures do tell us something about communications in the two countries. You may want to check statistics for newspapers and radios to see if the differences are as great. Another statistic you might want to research is literacy rates.

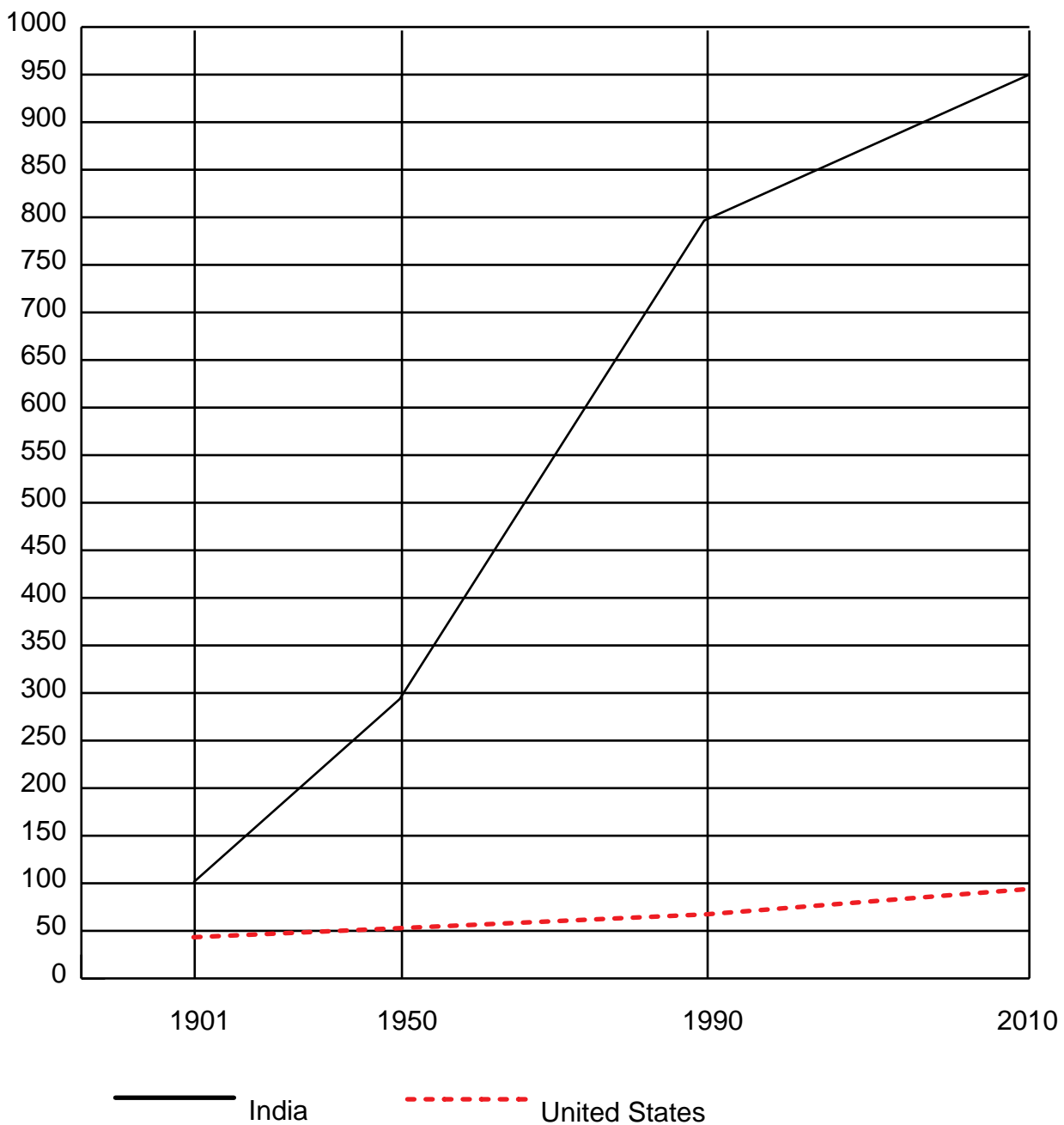
The figures for population growth are given in unequal increments (i.e. 1901 to 1950, 1950 to 1990) because much of the world does not do a census every 10 years. The figures for 2010 are projections based on population growth rates and the previous rate of growth. So far, these predictions have proven fairly accurate.

All figures are from the 1997 World Almanac.

Answers to "Population Pressure" activity sheet.

1. The United States
2. India
3. The United States
4. Life Expectancy, Doctor to Patient Ratio, Infant Mortality.
5. The United States
6. Telephones, Televisions to Person Ratio
7. 125,000,000
8. 529,000,000
9. 265,830,000
10. 945
11. Elephants may not survive because they need large ranges to find enough food and there may be no room left for them.
12. On the graph, the period from 1950 to 1990 should be the steepest.
13. The curve for the United States is much flatter, showing very little rise from 1901 through 2010
14. The population density for elephants decreased from 1901 to 1990.

Population Density India & United States
All figures from the 1997 World Almanac



Population Pressure Using Charts and Graphs

As crops ripen in the fields, people in small farming villages in India keep watch for “pests” who would eat their rice, maize, or sugar cane. The “pests” they watch for are not mice, or rats, or birds, or deer. No, these crop-raiders are far larger and more destructive. No scarecrow or fence will stop them. Shouting, noise makers and bonfires won’t even slow them down.

Farmers in India, Sri Lanka, Malaysia, and elsewhere in Asia find their crops increasingly threatened by **elephants**. Even in Nepal where the elephant population is less than 100 animals, farmers have to fight for their crops, sometimes calling in the army for help.

This competition between people and elephants is a fairly recent development. For centuries the people of India, along with most Asians, have honored and respected the elephant. Because they chase away tigers, many Asians worshiped elephants. Historically, elephants have played a major role in Hindu religious ceremonies. Also considered sacred by Buddhists, Asian elephants were friends to humans for many generations.

Asian elephants have also been domestic animals throughout most of Asia’s history. They have three times the strength of camels and have been used to pull heavy loads, to clear land for farming, even to hunt tigers and to fight wars.

So why are modern people and elephants at odds? The answer is **population**. India has a human population of nearly one billion! Improvements in sanitation and nutrition and the availability of vaccines against many diseases have helped the people of India live longer lives. The result is a population explosion. Today, India is home to one sixth of the world’s population on 2.2% of the world’s land surface. There are more people in India than in all of the countries of Africa combined. Nearly 75% of India’s vast population lives in small villages, and 65% of the labor force works in agriculture. The growing population means India must use more and more of its land for crops.

The clearing and planting of land once used by elephants for feeding has pushed elephant populations into smaller and smaller ranges, mostly on hillsides unsuitable for farming. When these areas cannot provide enough food, the elephants return to their former feeding grounds and eat the farmers’ crops; and the farmers must protect their crops or starve.

This competition for land and food between humans and elephants has had a disastrous effect on elephant populations. Elephants and people are killed each year as villagers fight to protect their crops. Ultimately, the elephants are the losers, both because they need so much range to survive and because they reproduce very slowly.

The Asian elephant population is disappearing so quickly that the International Union for the Conservation of Nature and Natural Resources (IUCN) and the Convention of

International Trade In Endangered Species (CITES) declared Asian Elephants an **endangered species** in July 1975. Since then, the IUCN and other government and private organizations have been working to protect and preserve the species.

In 1901, there were approximately 80,000 elephants in India. (Some overlap into neighboring countries.) Today there may be 24,000 wild elephants remaining in India and only 50,000 in all of Asia. (They are difficult to count because they live in densely forested areas that are not easily accessible.) The fact that nearly half of the remaining elephants live in India is amazing given the country's population. The question is, will there be room for elephants in India in the next century? The charts below illustrate the population pressures facing India and those who want to protect the elephants.

Comparing Two Countries: India & the United States		
	India	United States
Area in Square Miles	1,222,737	3,536,278
Population	952,107,694	265,562,845
People Per Square Mile	779	75
Population Growth Rate	1.6%	0.6%
Life Expectancy	59 male/60 female	73 male/79 female
Doctor to Patient Ratio	1 per 2,211	1 per 391
Infant Mortality Per 1000	71	7
Telephones to Person Ratio	1 per 112	1 per 1.7
Televisions to Person Ratio	1 per 47	1 per 1.2

Population Growth: India & the U.S.		
Year	India	United States
1901	236,000,000	100,000,000
1950	361,000,000	166,000,000
1990	890,000,000	260,000,000
2010*	1,155,830,000	298,000,000
*Projected		

Source: 1997 World Almanac

Population Pressure Using Charts & Graphs

Use the charts titled **Comparing Two Countries: India and the United States**, and **Population Growth** to answer the following questions.

1. Which country has the most land area? _____
2. Which country has the most people? _____
3. Which country has better health care _____
4. What statistics from the charts tell you about health care? _____
5. Which country has better communication? _____
6. What statistics tell you about communication? _____
7. How much did India's population grow between 1901 and 1950? _____
8. How many more people were added between 1950 and 1990? _____
9. How many more people is India expected to have by 2010? _____
10. What will India's population per square mile be in 2010? _____
11. What do you think will happen to the elephant population if India's human population reaches the number projected for 2010? _____

Make a Graph

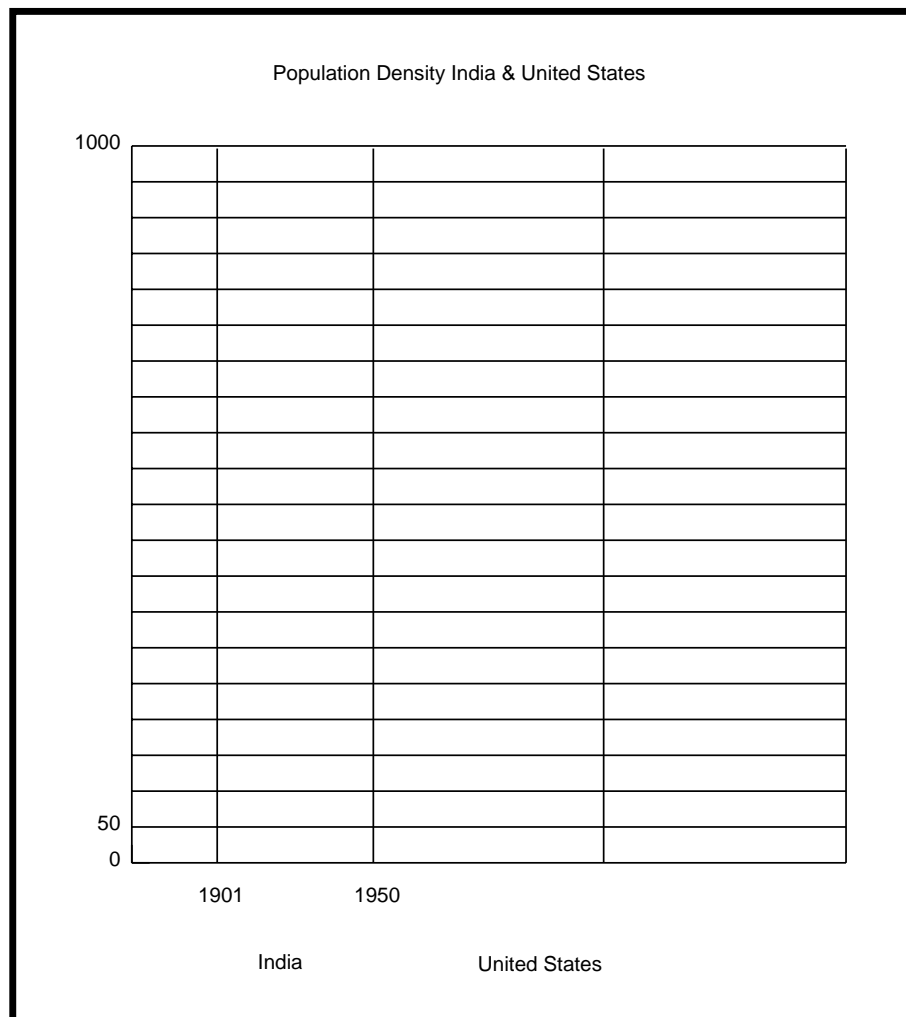
Using the charts, figure out the people per square mile (population density) for India and the United States for 1901, 1950, and 2010. For 1990, use the numbers given in the chart.

On the graph titled **Population Density India & United States**, finish filling in the years and people per square mile on the x and y axis.

Plot the population density for India using one color and the population density for the United States using another.

Use the graph to answer the following questions.

12. When did India's population density make its steepest rise?
13. How does the curve for U. S. population density compare to the curve for India?
14. Figure out the population density for elephants in India in 1901 and 1990. How are these numbers different from the human population density figures?



Disappearing Elephants

Information from Maps

For The Teacher

Elephants were once common across Asia from Syria to China and south to the island of Sumatra. No one knows exactly how many Asian elephants there were in ancient times, but the number almost certainly would have been over a million. It has been estimated that there were approximately 200,000 Asian elephants remaining at the beginning of this century. As we near the end of the century there may be only 50,000 wild elephants left in Asia.

What has happened to make such huge animals disappear? The answer is that a number of factors have combined to push Asian elephants to the brink of extinction. While some losses are part of the natural progression of species and their habitats, most of the problems for elephants and their ancestors are directly related to human activities.

Since the Stone Age, humans have hunted elephants, or their ancestors, for meat, bones, and ivory tusks. Just as Native Americans of the Great Plains used every part of the bison they hunted, Stone Age hunters used every part of the great mammoths they killed, including the tusks. (Archaeologists have found evidence of ivory carving in sites that date back 50,000 years.)

As agriculture, and then civilization, developed, elephant meat and bones were no longer needed, but ivory remained an important commodity. King Tutankhamen's burial goods include many items made of ivory. King Solomon is said to have sat on an ivory throne, and the ancient Romans used ivory as a symbol of wealth and power. The wealthiest Romans had tables, beds, even floors made of ivory.

By the 10th century A.D., with population of Asian elephants gone from the Middle East, Arab traders ventured into east Africa to collect ivory. The tusks were transported to carvers in China where ivory carving had been a valued art for more than 5,000 years. Raw ivory and carved jewelry and art works were traded throughout the Arab Empire and beyond.

In the 15th century, the Portuguese began trading in ivory, primarily from Africa. Eventually, they also traded in slaves who were used to carry the ivory tusks from the African interior to the coast.

European colonization of Asia put added pressure on the Asian elephant. Railroads and plantations cut into the forests that had been the elephants' home. As tea and teak became important exports for the British in Asia, even swamplands became valuable. Malaria carrying mosquitos had long kept the natives from settling the swamps and those areas were left to the animals. The Western development of insecticides and medical treatments for malaria allowed the British to open up lands once only suitable for wild animals, and elephants lost more of their ancient range.

The British also brought sport hunting to Asia. Elephants were in great demand to carry white hunters into the forests in search of tigers, rhinoceros, and other “big game.” At times the elephants themselves were the game. Sport hunting is no longer a major threat to Asian wildlife, but other dangers have taken the place of hunting.

In the second half of the 20th century, population growth in Asia has created even larger problems. Elephants are being crowded into smaller and smaller areas, usually cut off from other elephants and from traditional feeding ranges. As the elephants attempt to feed in their former ranges, they encounter farmers protecting their crops. Each year elephants and people are killed in this competition for land and food.

Another problem for elephants is the introduction of diseases carried by domestic cattle. The elephants have no immunity for these diseases that have not been present in the forest before.

Ironically, it may be disease that brings some balance back to the situation. As humans have cleared and settled more and more jungle area in Asia and Africa, new diseases such as Eubola and hemorrhagic fevers have sprung up to take a deadly toll. And malaria, once thought conquered, has reemerged in drug-resistant strains. Perhaps some areas of the forest will have to be left to the wildlife because the diseases they harbor are too much even for modern medical science.

The activity **Disappearing Elephants** uses a population map to illustrate the decline of elephants on the Indian Subcontinent. Students should use the map to answer the **Disappearing Elephants** worksheet questions.

Answers to Disappearing Elephants Worksheet

- | | | | |
|----|---------|-----|-----------------------------|
| 1. | west | 9. | elephants not colored |
| 2. | 25,10 | | $10 \times 4,000 = 40,000$ |
| 3. | 6,8,9 | 10. | 40% |
| 4. | 9,11 | 11. | $3.5 \times 4,000 = 14,000$ |
| 5. | 25 | 12. | 26,000 |
| 6. | 25 | 13. | 26% |
| 7. | 4,000 | 14. | northeast |
| 8. | 100,000 | | |

Bonus

The availability of water, fertile soil, and fairly flat land would attract people and elephants.

Only Asian elephants, only males have tusks.

Disappearing Elephants

Information from Maps

Use the map titled **The Indian Subcontinent** to complete the following activity.

Map Reading Skills

1. Which direction are the elephants facing? _____
2. Which elephant (number) is farthest south? _____ Which elephant (number) is farthest east? _____
3. Which elephants (numbers) represent elephant populations that reach into Nepal?

4. Which elephants (numbers) represent elephant population in Bhutan?

5. Which elephant (number) represents the elephant population in Sri Lanka?

6. How many elephants are pictured on the map (not in the key)? _____
7. How many real elephants does each symbol represent? _____.
8. What is the total number of elephants represented on the map?
_____. This was the elephant population of the Indian Subcontinent in 1901.

Color the following elephants red:

1, 2, 3, 5, 7, 9, 12, 13, 14, 16, 17, 18, 19, 20, 22

The red elephants represent the number lost to hunting, poaching, disease, capture, and other problems between 1901 and 1979.

9. How many elephants were left in 1979? _____

10. What percentage of the 1901 population was left in 1979? _____

Color the following elephants yellow: 4

Color the following elephants 1/2 yellow: 6, 8, 15, 21, 23

The yellow (or part yellow) elephants represent the numbers lost between 1979 and 1990.

11. How many elephants were lost between 1979 and 1990? _____

12. How many elephants are left? _____

13. What percentage of the 1901 elephant population remains? _____

14. What area of the Indian Subcontinent has the largest number of elephants today?

Map Key

Locate the box in the map key marked **1901 population**. Color 1/3 of the box red, color 1/3 yellow, and 1/3 green. All elephants should be one of these colors, so this box represents the total elephant population in 1901.

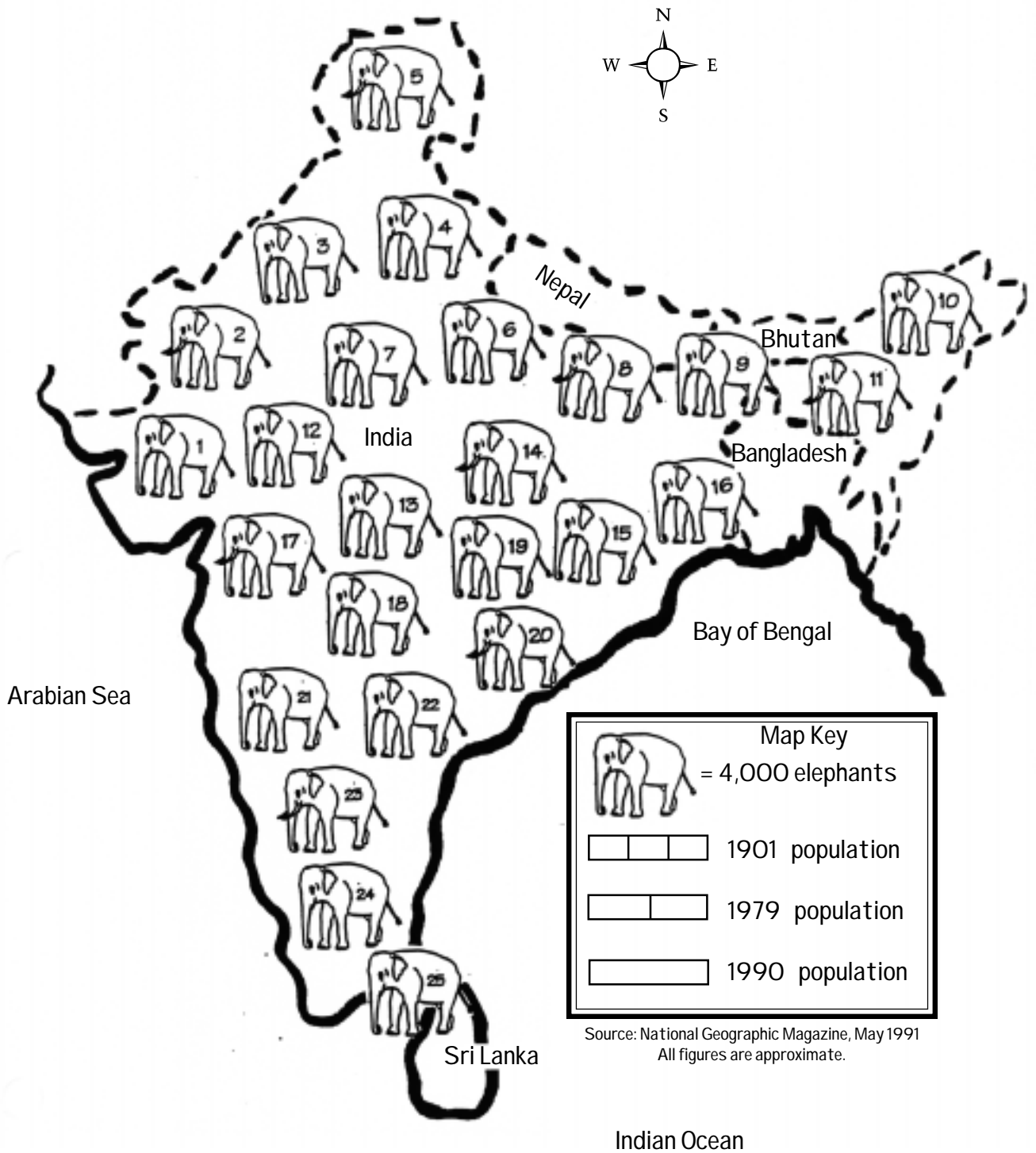
Locate the box marked **1979 population**. Color the box 1/2 yellow and 1/2 green. This box represents the elephants still left on the Indian Subcontinent in 1979.

Locate the box marked **1990 population**. Color the box green. The green elephants are the only remaining elephants in the 1990s.

Bonus

Can you guess why elephants and people might want to live in the same area?

Why do some of the elephants on the map have tusks and others do not?



The Indian Subcontinent

Elephants and Their Kin

Classifying

For The Teacher

Grade 6 and up
Science
Language Arts
Social Studies

When faced with a lot of something, human beings tend to sort, or classify, things into piles, stacks, or categories. We do this to reduce overwhelming numbers to more manageable blocks and to give ourselves a reference for identifying new things. Generally, classification systems, formal or informal, are based on comparison. Things that seem similar are grouped together, which makes studying or evaluating them easier.

A system of classification may be based on any criteria: size, shape, composition, use, etc. The system depends on what the classifier wants to learn from the objects.

Try This:

Take 6 plastic sandwich bags (or other containers) and place an identical collection of objects in each. Objects should be of various sizes, shapes, materials, and uses. For example: paper clip, rubber band, bolt, marble, twist tie, toothpick, string, peanut, and a small shell (You can use any combination you want as long as all containers are alike.)

Give each group of 4 to 6 students a bag and ask them to sort and classify the items.

Ask each group to explain how they classified, what criteria they used (material, shape, use, etc.) Discuss the differences in classification systems developed by the groups.

When classifying objects is formalized and used as part of a scientific study we call it **taxonomy** and the scientists who specialize in classification are called **taxonomists**. One of the earliest taxonomists was the Greek scientist/philosopher Aristotle. He created a system of classification for plants and animals based on his observations.

In the 1600s an English scientist named John Ray worked out a system to put animals into large groups and then divide them into smaller and smaller groups according to various characteristics.

In the 1700s a Swedish botanist named Carl von Linne (and known as Linnaeus) developed a system based on anatomy and structure. In Linnaeus' system plants and animals were sorted into smaller and smaller categories until each organism was identified individually. The categories he used were (from largest to smallest) **Kingdom, phylum, class, order, family, genus, species**. Each group within a category is given a name and the last

two group names (genus and species) become the plant or animal **scientific name**, which is usually in Latin.

Since Linnaeus' time a lot has been learned about the internal structure of plants, animals, and other living things (Linnaeus thought every living thing was either plant or animal.) Better microscopes, the discovery of DNA, and other advances let us look at organisms at the cellular level, so today's taxonomist has a much more complicated task. Linnaeus' basic system is still used, but additional kingdoms have been recognized and several new categories have been plugged in.

The **Taxonomy Chart** demonstrates the progression from kingdom to species, with the addition of subphylum and superorder, for the Wooley Mammoth, West Indian Manatee, Rock Hyrax, and the Asian Elephant.

You may create a transparency of this chart or duplicate it for the students. The spaces for **Human** and **Domestic Cat** have been left for the class to fill in. (Don't panic; the necessary information is provided.)

The first category, **kingdom - Animalia**, includes all 4 listed species and every other multi-cell organism that does not make its own food. Eliminated are plants, fungi, bacteria, and protozoans.

The next category, **phylum - Chordata**, includes only animals with a dorsal nerve cord.

Next is an addition to the original system, **subphylum - Vertebrata**, animals that have a spinal cord that is protected by a column of bones called vertebrae. (These animals are often referred to as vertebrates. Animals that do not fit this category are called invertebrates. Many only consider vertebrate or invertebrate and ignore the rest.)

Vertebrate animals fall into one of 7 **classes**: 3 classes of fish, amphibians, reptiles, birds, or mammals. Mammoth, manatee, hyrax and elephant are **Class - mammalia**.

The class mammalia includes a wide variety of animals that are further sorted by diet, structure, and developmental history. At one time, all animals with hooves were grouped together into the **order** ungulata. This order included horses, cattle, deer, antelope, rhinoceroses, elephants, and so on.

The ungulates included a lot of species and was difficult to study, so taxonomists divided the order into 2 new orders: Perissodactyla, odd-toed ungulates like horses and rhinos; and Artiodactyla, even-toed ungulates like deer and cattle.

Elephants and hyraxes, once listed as ungulates, posed a problem because they have both even and odd numbers of toes (front and back) and they aren't always consistent. The manatee was also a problem because its bone structure resembled an elephant more than any aquatic mammal. To deal with this problem, taxonomists created a superorder called subungulata and included elephants, hyraxes, manatees, and the manatee's cousins, dugongs.

Within that superorder, there are 3 orders: Proboscidae, animals with trunk noses; Sirenia, animals once thought to be mermaids; and Hyracoidea, an order made up entirely of different species of hyraxes.

Finally, we get down to **genus** and **species**. Within a genus are organisms that are related but still distinct species. A species consists of organisms that vary only in things such as color, size, or location. Members of a species, no matter where they are from, can mate and produce **fertile offspring**. Species is therefore a reproductive unit. Different species within a genus may mate and produce offspring, but the offspring cannot reproduce. For example, a horse and donkey may mate, but the resulting mule is an **infertile hybrid**.

It is possible to divide a species down into subspecies. This is usually done when organisms from different geographic regions or populations display different characteristics. An example could be Asian elephants from India and from Ceylon (Sri Lanka.) They are physically distinct enough to be considered subspecies, but the two can mate and produce fertile offspring.

African elephants are from the genus/species ***Loxodonta africana***. When animals and plants are called by their scientific names, both genus and species are given, only the genus is capitalized, and the name is underlined or italicized.

Activity

Using the Taxonomy Chart either as a hand-out or as a transparency, work through the activity **Elephants and Their Kin: Taxonomy**.

Discussion

- Q. Why are classification systems needed and what other areas of study might use a classification system? If any students have collections (stamps, dolls, sports cards, etc.) do they sort or classify the items? Why?
- Q. Why are scientific names for species necessary? Can students think of any plants or animals with several common names?
- Q. Talk about the terms **anatomy** and **physiology** to be certain students understand the difference. How can animals that look so different (elephant, manatee, hyrax) be related?

A Fun Extension Activity: Create a Critter

- Background:** The shape and size of every animal is determined by deoxyribonucleic acid (DNA) in the cells. DNA is made up of 4 bases — adenine, thymine, cytosine, and guanine — which are joined into strands and molecules. The same 4 bases are found in all animals. The combinations vary to give us millions of different species. Internally, particularly at the cellular level, species are far more alike than we might imagine.
- Object:** Each group of students will create a model of a new species. The materials used by each group will be the same but quantities may vary and materials may be used in different ways (otherwise how could elephants and hyraxes have such different noses?)
- Materials:** Variety of craft/scrap materials such as construction paper, string, pipe cleaners, toothpicks, cardboard tubes, cotton balls, yarn, wire, paper clips, brass fasteners, glue, etc.
- Each group must have the same materials but slightly different quantities. For example:
- Group A - cardboard tube from paper towel roll, 1 1/2 sheets of construction paper, 2 cotton balls, 4 pipe cleaners, some string, and glue.
- Group B - cardboard tube from toilet paper roll, 1 sheet of construction paper, 5 cotton balls, 6 pipe cleaners, some string, and glue.
- And so on with other groups.
- Procedure:** Each group must construct a new animal species using all of the materials provided and nothing more. Each group should present its animal and tell the following:
- What is its diet?
 - What kind of habitat does it prefer?
 - Does it live in groups or alone? Is there a social structure?
 - Does it reproduce slowly or quickly?
 - Does it have any natural enemies?
- Additional:** Create scientific names for the animals and then make a Taxonomy chart to compare the various new "species." Learn more about James Watson and Francis Crick, the discoverers of DNA.

Taxonomy Chart

	Woolley Mammoth	West Indian Manatee	Rock Hyrax	Asian Elephant	Human	Domestic Cat
Kingdom	Animalia	Animalia	Animalia	Animalia	Animalia	Animalia
Phylum	Chordata	Chordata	Chordata	Chordata	Chordata	Chordata
SubPhylum	Vertebrata	Vertebrata	Vertebrata	Vertebrata	Vertebrata	Vertebrata
Class	Mammalia	Mammalia	Mammalia	Mammalia	Mammalia	Mammalia
Superorder	Subungulata	Subungulata	Subungulata	Subungulata	N/A	N/A
Order	Proboscidae	Sirenia	Hyracoidae	Proboscidae	Primate	Carnivora
Family	Elephantidae	Trichechidae	Procaviidae	Elephantidae	Hominidae	Felidae
Genus Species	Mammuthus primigenius	Trichechus manatus	Heterohyrax chapini	Elephes maximus	Homo sapiens	Felis catus

Taxonomy Chart

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Kingdom	Animalia	Animalia	Animalia	Animalia		
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Class	Mammalia	Mammalia	Mammalia	Mammalia		
Superorder	Subungulata	Subungulata	Subungulata	Subungulata		
Order	Proboscidae	Sirenia	Hyracoidae	Proboscidae		
Family	Elephantidae	Trichechidae	Procaviidae	Elephantidae		
Genus Species	Mammuthus primigenius	Trichechus manatus	Heterohyrax chapini	Elephes maximus		

Answers to Student Activity

1. How many ways are the 3 species like? The previous paragraphs list 8 ways.

All are animals, all have spinal cord/backbone, all have live young/fed milk, all are herbivores, all have similar skeletons, all breed slowly, all have mammary glands on chest rather than abdomen, and all have similar teeth.

2. How far down the chart are all of the animals the same?

5 categories

3. What does this tell you about how closely elephants and mammoths are related?

The more categories species have in common, the closer their relationship.

4. Add Humans and Cats

Information provided on separate chart

5. How far down the chart are all species the same now?

4 categories

6. Does this mean humans, cats, mammoths, elephants, manatees and hyraxes are alike or different or both?

Both. All 6 species have several things in common and many differences.

7. List ways the species are alike.

All animals, all mammals, all have live young (some mammals do not); also obvious things like ears, noses, finger/toe nails, etc. Students may come up with others which are common to all 6 species.

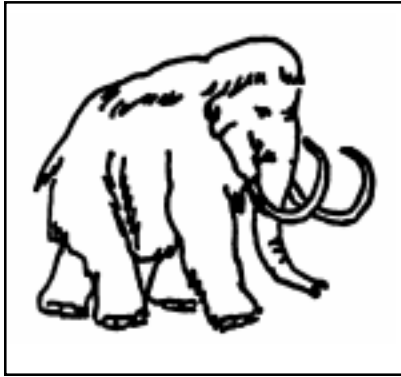
8. Do you think the world would miss elephants or manatees if they became extinct?

Elephants and manatees share their habitats with many other species and some of those species depend on the elephants/manatees, directly or indirectly. They would surely be impacted if elephants/manatees disappeared.

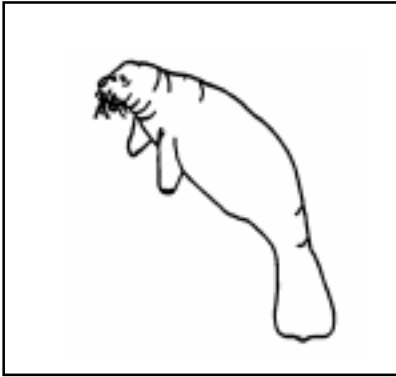
On a larger scale, the loss of any species, large or small, reduces the genetic/species diversity of the earth and science does not know the full long-term effect of such loss. The answer to the question is most likely yes, but we are not sure just how much either species would be missed. Since extinctions not reversible, it makes sense to protect endangered species for as long as possible.

Elephants and Their Kin

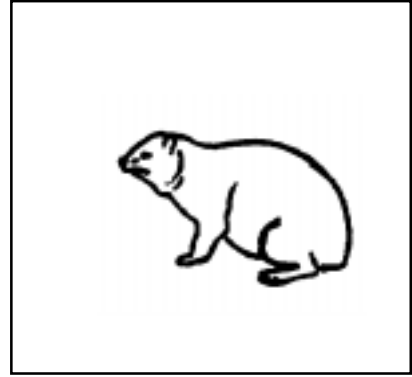
Taxonomy



Woolley Mammoth



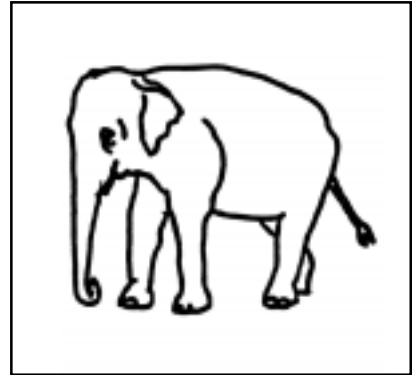
West Indian Manatee



Rock Hyrax

What do these three animals have in common?

All are related to the ASIAN ELEPHANT



It is pretty easy to see that mammoths and elephants are related. Mammoths, though extinct now, looked much like modern-day elephants, but what about manatees and hyraxes

Manatees live in water and don't have a trunk or long legs. Hyraxes are about the size of rabbits and also trunkless. So how are they related to elephants?

In order to understand how such different animals are related, we need to look at a science specialty called **taxonomy**. This special area of science deals with classifying living organisms. Taxonomists look at more than size and shape. They study the anatomy, physiology, and development of each organism and compare it to other organisms that have already been classified. Even the cell structure and the DNA of a new organism is examined before it is placed in a "family tree."

A taxonomist begins examining a new organism by asking questions. So let's compare elephants, manatees, and hyraxes by asking some questions.

- Q. Are all 3 animals; not plants, molds, fungus, bacteria, or one-celled organisms?
- Q. Do all 3 have a spinal cord and backbone?
- Q. Do all 3 give birth to live young and do females feed the young milk?

Yes to all of these questions means elephants, manatees, and hyraxes are all members of the group called mammals. So far, so good, but let's look a little closer.

All 3 animals are herbivores; they only eat plants. They also have digestive systems that use microbes in the intestine to break down food (biologists call this "hindgut digestion.")

All 3 have skeletons with thick, dense bones. Hyraxes and elephants both walk on their toes and have pads of fat between the bones and the sole of the foot.

Elephants, manatees, and hyraxes are slow breeders. Most rabbit-size animals have a gestation period of about a month; the hyrax is pregnant for 8 months. Manatees are pregnant for 13 months, and elephants for 22 to 24 months.

Mothers of all 3 species feed their young milk from mammary glands located on the chest, not the abdomen, and all three take care of their young for long periods of time.

In elephants and manatees, teeth called molars grow in the back of the jaw and migrate forward in grooves to replace teeth worn out from chewing vegetation. In hyraxes and many male elephants, the upper incisor teeth grown throughout the animal's life and are called tusks.

Student Activity

Elephants and their Kin

1. How many ways are the 3 species alike? _____

The **Taxonomy Chart** shows how scientists classify mammoths, manatees, hyraxes and Asian elephants. Look at the chart and answer the following questions:

2. How far down the chart (how many categories) are all the animals the same?
3. How far down the chart are elephants and mammoths the same? _____
4. What does this tell you about how closely elephants and mammoths are related?

Add Humans and Domestic Cats to the chart

5. How far down the chart are all species the same now? _____
6. Does this mean that humans, cats, mammoths, elephants, manatees, and hyraxes are alike or different (or both?) _____

7. Make a list of ways all 6 species are alike.

8. Manatees and Asian elephants are both **endangered species**. Do you think the world would miss these species if they become extinct? Why or why not?

Elephant Glossary

- aardvark a large burrowing mammal from South Africa with a long, flexible tube-like snout. Not related to elephants, but a good word to begin a glossary.
- adapt to change in response to changing surroundings and conditions.
- adaptation process by which organisms change to increase their chance of survival.
- anatomy structural make-up of a plant or animal.
- ancestor one from whom an individual is descended. Grandparents and great grandparents are ancestors.
- browse to feed on young plant shoots, twigs, and foliage.
- bull an adult male elephant.
- calf a young elephant of either sex.
- carnivore an animal that eats other animals; a meat-eater.
- census a formal count of people, animals, etc. within a specific area.
- conservation the protection and careful use of wildlife and natural resources.
- cow an adult female elephant.
- DNA..... (deoxyribonucleic acid) a substance in the nucleus of each living cell that holds all the inherited characteristics of an organism.
- domestic living with or under the care of human beings; tame.
- ecosystem a community consisting of plants, animals, other organisms, and physical features considered as a unit.
- endangered species a group of living things (plants or animals) that may die out if protective measures are not taken.
- extinct a species that no longer exists anywhere on the earth. The wooley mammoth is extinct.

Elephant Glossary - continued

- generation single stage in a family history. Parents and offspring belong to different generations. Brothers, sisters, and cousins belong to the same generation.
- gestation the period of development of a mammal embryo inside the mother's womb; the time between fertilization of the egg and birth of the fetus.
- graze to eat grass and other low-growing plants.
- habitat the place where a plant grows naturally or an animal usually lives in the wild.
- habitat loss the destruction or alteration of an area that makes it unsuitable for the species that once lived there.
- herbivore any animal that feeds only on plant materials. Elephants are herbivores.
- herd a group of animals that feed and live together in the wild.
- howdah..... an elephant "saddle."
- hyrax a rabbit-sized mammal native to Africa, relative of the elephant.
- Ice Age one of several long, cold periods in the history of the earth when glaciers covered large parts of the northern hemisphere.
- incisor a sharp, chisel-shaped mammalian tooth used for biting, nibbling, and gnawing.
- infrasound sound waves with frequencies so low they are inaudible to humans.
- ivory the hard, white material which makes up the tusks of elephants, walruses, mammoths.
- mahout (MA hoot) an elephant handler.
- mammal a warm-blooded animal with a backbone. Mammals generally have body hair at some stage in their lives, have a well-developed brain, a four-chamber heart, and females feed offspring with milk from mammary glands. Humans, elephants, dogs, and cats are mammals.

Elephant Glossary - continued

- mammoth a very large, hairy elephant relative with curved tusks which became extinct about 10,000 years ago.
- manatee a large marine mammal, also called a sea cow; related to elephants and mammoths.
- matriarch oldest female in a family unit; leader of the group.
- migrate to pass from one region to another on a regular basis, usually to feed or breed.
- Moeritherium (meer-uh-THEER-ee-um) pig-sized prehistoric mammal from which elephants are descended; elephant ancestors.
- molar a tooth with a broad surface used for grinding; a back tooth.
- omnivore an animal that eats both plants and meat. Humans are omnivores.
- pachyderm any of several large, thick-skinned animals such as elephant, rhinoceros, hippopotamus.
- physiology the internal working of a living body and its parts (cells and organs).
- poaching hunting or fishing illegally.
- population the total number of members of a species living in a particular area at any one time.
- predator any animal that hunts and eats other animals (prey).
- quadruped an animal that walks on four feet.
- sanctuary a place of safety and protection.
- species a unit of classification in animals and plants. Members of the same species can mate and produce fertile offspring.
- taxonomy classification (as of animals) using a system that is usually based on relationship.
- threatened a species that is in decline and may become endangered or extinct if it is not protected.
- trunk the long, flexible combination of nose and upper lip found on elephants.

Elephant Glossary - continued

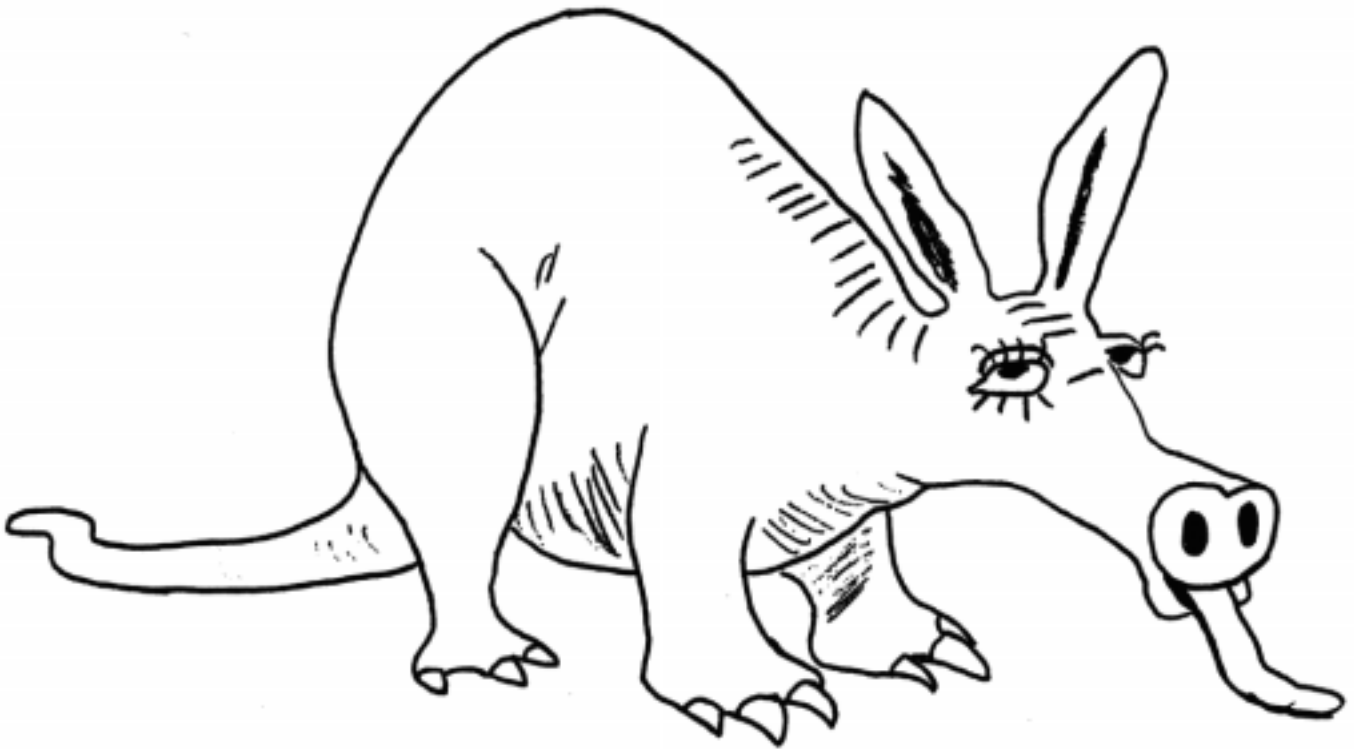
tusk..... an enlarged upper incisor that grows outside the mouth of certain animals.

ungulate a hoofed mammal such as elephant, horse, cattle, deer, etc.

vegetation..... all plant life.

vertebrate any animal that has a skeleton of bone or cartilage with a backbone, skull, and well-developed brain.

zoology scientific study of all forms of animal life.



Aardvark

Note long nose and longer tongue

Acres For Elephants

Square inch, square foot, square yard, square mile, square elephant . . . square elephant?

All living things need space. Some things, such as plants and barnacles, need very little space in which to live out their lives. Others need considerably more room, but every living thing needs some amount of space.

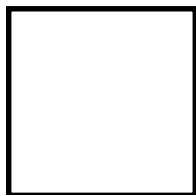
The exact amount of space any species needs is determined by a number of factors, such as — size of individuals, size of family groups, diet, and the resources within a particular habitat. For example, a 300-pound tiger living in a forest inhabited by many species of deer, antelope, monkeys, etc. will need less territory than a 150-pound Florida panther living in a cypress swamp where there are fewer and smaller animals to prey upon.

A species that feeds on specific vegetation and then migrates to a new area when that vegetation is eaten requires more space than an animal that can eat a variety of foods and therefore stay in one area.

A large animal with a big appetite needs more space than a small animal.

The only thing that is true for all is that everyone needs “space.”

ACTIVITY IDEAS AND DISCUSSION QUESTIONS



This box is 1 inch wide and 1 inch long, or a square inch. Use rulers, yardsticks, or tape measures, and masking tape to mark out a **square foot** and a **square yard** on the floor. (This can be done with chalk on the parking lot or playground.)

Think of some species (plants and animals) that could live within these spaces. (Don't forget about single-celled species.) Consult the planting directions on seed packets or in gardening books to determine how many tomato plants, corn stalks, etc. could grow in a square foot or square yard.

Why do plants need space?

Do all plants have the same space requirements?

How are animal space requirements different?

Now determine how much space you need. Work in pairs, or small groups, using rulers, yardsticks, and masking tape. While each student stands in a comfortable position his/her partner(s) use the rulers and masking tape to mark out the person's space. Remember, the person may be wider at the shoulders than at the feet and the space goes up from the floor.

(With younger students it might be necessary to use cardboard to demonstrate the 3-dimensional aspect of personal space. With older students try calculating the volume, or cubic footage, of a personal space.)

After each person in the group has a marked “space”, test the spaces to see how “livable” they are. Have each person occupy his/her space and time them to see how long they can stay within that space.

Repeat the activity but have each person sit down (or lie down) before their “space” is marked. How does this added area affect the amount of time each person can stay within his/her own space.

TALK ABOUT

- Could the students realistically live in such small spaces? Why not?
- Are some people more uncomfortable than others in small spaces? How about crowds?
- If the classroom were a country, would there be “space” for everyone in a standing position?
- How about sitting or lying down?
- Would there be any “wild” or unclaimed space left for other species?
- What do the students know about population pressures on wild species (plants as well as animals)? (See the Activity “Population Pressure” from Discovering Elephants.)

SQUARE ELEPHANTS

Using a tape measure and masking tape, lay out a rectangle on the floor that is 6 feet wide and 12 feet long. This is about the amount of space you would have marked if Tarra the Elephant had been in your group in the first part of the activity. This is how much space Tarra needs just to stand still — a **square elephant (SqE)** (trunk and tail included.) (In order for Tarra to lie down, you would need a space 9 feet wide and 14 feet long — a **sleepy square elephant.**) (SSqE)

- How many student spaces could fit into a *square elephant*? (First calculate an “average” student space.)
- How many *square elephants* could you get into the classroom, the gym, or the playground?
- Do the students think this is enough space for an elephant to live? Why not?

ELEPHANT SPACES

Elephants are herbivores, plant eaters. Specifically, elephants are grazers, they eat mostly grass with some leaves, twigs, fruits, roots and berries thrown in to balance their diets. A 7,000-pound elephant needs to eat 150 - 200 pounds of food every day to stay in shape (elephant shape). Obviously, an elephant cannot find that much food in a **elephant square**

(unless someone brings it to them), but must walk around to find grasses, leaves, vines, and so on. In the wild, elephants spend 16 to 20 hours every day walking and eating, and may walk 30 to 50 miles to find enough food.

Since elephants in the wild live in herds, and each elephant has a big appetite, you might think elephants are pretty hard on the environment. In fact, elephants are good for their environment for several reasons. First, 50% to 80% of the nutrients they consume are not fully digested and become elephant manure, which is excellent fertilizer. Second, elephants spread seeds from many plants as they eat and walk, helping to reseed their environment. Finally, the elephants' appetites keep the vegetation from becoming too overgrown.

Walking and eating over a large area is good for the elephants, too. It keeps them in shape (elephant shape), keeps their toenails and the pads of their feet worn down, and allows them to socialize with other elephants, all important for elephant survival.

The key to this mutual benefit is that elephants must have a large enough territory (space) in which they can walk and eat without overgrazing any one area. Population growth in Asia (and Africa) means humans are taking more and more of the elephants' space and wild elephants are being pushed into territories too small to meet their needs.

In the wild, Asian elephants need an area from 200 square kilometers to 1000 square kilometers in size in order to find enough food. The variation in size depends upon the availability of food. In an area where the plants are plentiful and grow quickly, the space needed is closer to 200 sq. km. In those areas where parts of the forest have been cleared, or dry periods prevent the plants from growing quickly, the elephants need much more space, up to 1000 km. A square kilometer is equal to about 247 acres (247.1).

In an area with plenty of plants, how many acres would an elephant need? (200 sq. km x 247 acres = 49,400 acres)

SQUARE ELEPHANT MATH (SqEM)

If a SqE is 6 feet x 12 feet, it equals 72 square feet or 8 square yards. One acre is then equal to 605 SqE, and 1 square mile equals 387,200 SqE. A square kilometer is equivalent to 149,495.5 SqE.

A Sleepy Square Elephant is 9 feet x 14 feet, or 126 square feet, which equals 14 square yards. So, an acre contains about 346 SSqE (345.7 to be exact.) A square mile is equal to 221,257 SSqE, and a square kilometer equals 85,422.5 SSqE.

THE ELEPHANT SANCTUARY

For most captive elephants space is a rare luxury and being able to walk and eat like wild elephants is only a dream.

The Elephant Sanctuary in Hohenwald, Tennessee is a captive elephant's dream come true. There the resident elephants spend their days peacefully walking, eating, and socializing. The current residents, Tarra, Barbara, Jenny, and Shirley have more than 100 acres of grass, trees, shrubs, wildflowers, and berry bushes to choose from. And they do move around, choosing to feed from different areas and plants at different times in the growing season. They know that some plants are more tasty and nutritious early in the growth cycle while others are better left to ripen. Tarra particularly keeps an eye on the blackberry bushes so she can (carefully) pick the ripe berries before the birds eat them.

This freedom for the elephants to roam about and feed themselves is central to the Sanctuary's mission of providing a "natural-habitat refuge where sick, old and needy elephants can once more walk the earth in peace and dignity."

ACRES FOR ELEPHANTS

The Sanctuary now has an opportunity to add nearly 100 acres to its existing property. Champion Paper has offered to sell 93 acres that adjoin the Sanctuary. These additional acres will not only ensure that the Sanctuary elephants will have plenty of space to walk and eat, but will also serve as a buffer to insulate the elephants from the outside world and maintain their peaceful existence.

(The 93 acres Champion has offered the Sanctuary equals 56,265 SqEs. (93 acres x 605 SqE per acre.)

The **Acres for Elephants** campaign goal is to raise the money to purchase these acres and build a fund to purchase additional land in the future. Individuals and groups can help us reach this goal by "purchasing" one or more **Square Elephants** for a mere \$2.00 each. Larger parcels are also available for "purchase":

<u>Categories</u>	<u>Donation</u>
Sleepy Square Elephant - - - 1 SSqE or 9 x 14 feet	\$ 3.00
Dumbo - - - 20 SqE or 1,440 square feet (house size)	35.00
Jumbo - - - 151 SqE or 1/4 acre	246.00
Mammoth - - - 1 full acre	984.00

For more information on Acres for Elephants and what you or your group can do to help, call the Elephant Sanctuary at **800-98-TRUNK** or check our website at www.elephants.com.