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TEST YOUR BAT Q

Objective: To test basic knowledge about bats

Grades: 3-5

Type of Activity: Questionnaire

Materials:

- Copies of page 8
- Pencils

Background Information

What most people believe about bats isn't even true. Because bats fly at night and are shy, they are difficult to understand. People fear most what they understand least. Lack of understanding and deliberate destruction are the most common causes of bat decline worldwide. The following text provides an introduction to bats.

Copy the one-page questionnaire (pre-test) and give to students prior to a study unit on bats or before a program. For example, use the questionnaire in combination with one of Bat Conservation International's audiovisual programs (see inside back cover). The text included here will assist in presenting key points on the importance of bats. Following a study unit or program, the questionnaires can be returned to students who should then be able to correct any errors (post-test).



Answer Key

- A. True, 2, 6, 7, 10.
- B. Circle all
- C. Nearly 6 feet, a flying fox bat from Java
- D. Bumblebee, the bumblebee bat from Thailand
- E. 1,000
- F. 40
- G. Mammals
- H. 1
- I. Circle all
- J. Everywhere except polar regions
- K. Circle all

Bats: Our Allies

Bats are animals of extraordinary importance. Many are so essential that, without them, thousands of other plant and animal species could die out, threatening entire ecosystems from rain forests to deserts.

Yet despite their importance, bats are among the world's least appreciated and most endangered animals. For centuries, people have feared and persecuted bats, exterminating whole species and threatening the survival of many more.

Bats have been neglected even by scientists and conservationists. Although nearly 1,000 kinds comprise almost a quarter of all mammal species, bats are by far the least studied. They are found everywhere except for very dry deserts and polar regions, but bats are often ignored in conservation planning, seriously jeopardizing efforts to save rain forests and other important habitats.

Like most animals, bats suffer from habitat loss and environmental pollution, but the primary cause of their decline is wanton destruction by humans acting out of fear and ignorance. Bats filled the night skies long before we walked the earth, but their survival today requires that we learn to value them as essential allies, deserving of our respect and appreciation.

Many people still believe that bats are blind flying mice that carry diseases and become entangled in women's hair. But bats are more closely related to people than to mice, none are blind, and they are far too clever to entangle themselves in anyone's hair. Bats seldom transmit disease to people or pets, and our concerns should be no different from those we apply to other wild animals. Simply do not attempt to handle them, and there is little to fear.

Bats are among the most gentle, beneficial, and even necessary animals on earth. They occupy almost every habitat worldwide, eating insects, pollinating flowers, and dispersing the seeds that make rain forests grow. Forty-three species live in the United States and Canada, but the majority live in the tropics. Wherever bats are found, they are essential elements in nature's delicate web of life.

Controlling Insects: Masters of the Night Skies

Bats are by far the most important natural predators of night-flying insects, consuming great quantities of mosquitoes, moths, beetles, crickets, leafhoppers, chinch bugs, and a variety of aquatic insects. Many of these

are serious crop pests, and others spread disease to humans or livestock.

A single little brown bat, one of North America's most abundant species, is capable of capturing 600 mosquitoes in an hour. One colony of 20 million Mexican free-tailed bats in central Texas eats up to half million pounds of insects *in a single night*.

How do they do this? Bats use their sophisticated sonar, called echolocation, to detect prey. Like dolphins, most bats communicate and navigate with these high-frequency sounds. Using echolocation alone, bats can "see" everything but color, and in total darkness can detect objects as fine as a human hair.

By consuming vast numbers of night-flying insects, bats form an integral link in ensuring environmental health. When bat populations are destroyed, insect pests can multiply, unchecked by their natural predators. The repercussions can be extremely harmful to humans.

For example, in Israel a campaign to eradicate fruit bats by poisoning their caves, instead killed almost 90% of the country's insectivorous bats. *Noctuid* moths, formerly controlled by the bats, proliferated and their caterpillars became major agricultural pests. To save crops, extensive chemical control is now required, in turn polluting the environment.

The loss of insectivorous bat populations leaves us increasingly dependent on pesticides, which already threaten our environmental and personal health. With over 850 million pounds of pesticides applied to America's crops each year, our groundwater is increasingly contaminated, and runoff is further damaging wildlife habitat in a chain of

environmental degradation that must be reversed. Protecting bats is part of the solution.

Renewers of Rain Forests, Lifegivers to Deserts

Throughout tropical regions, fruit and nectar-eating bats are vital to the survival of rain forests, which in turn play an essential role in the stability of world climates. These forests, where more than 90% of all terrestrial plant and animal species live, contain our planet's richest biological diversity. But without bats to pollinate flowers or disperse seeds, the diversity of other rain forest animals and plants would be greatly reduced, threatening delicate balances with unknown consequences.

In West Africa, bats carry 90 to 98% of the seeds of "pioneer plants" that initiate forest regrowth on cleared land. These hardy trees and shrubs grow rapidly, soon attracting other mammals and birds that in turn bring seeds of different plants. Without bats, this cycle of rain forest regeneration might never begin.

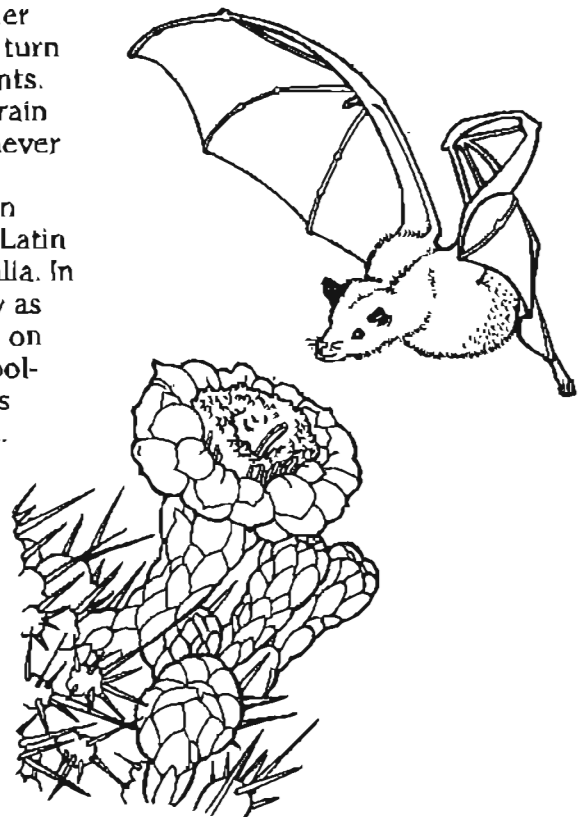
Bats also play key roles in other tropical forests from Latin America to Asia and Australia. In the Pacific islands, as many as 40% of tree species depend on bats for seed dispersal or pollination, and further studies likely will reveal even more.

On the savannas of East Africa, the giant baobab is known as the "Tree of Life" because so many other plants and animals depend on it for their survival. But the tree itself depends on bats. Its showy white flowers open only at night and are specially adapted to

be pollinated by bats. Without bats, the baobab could die out, triggering a chain of linked extinctions and threatening plant and animal life throughout the region.

In the Sonoran Desert of the southwestern United States and Mexico, long-nosed bats play a similarly critical role in the lives of several species of agaves (century plants) and giant cacti. As with Africa's baobab tree, the giant cacti provide food and shelter for countless other animals. The bats that pollinate their flowers and disperse their seeds were recently declared endangered; if they disappear, these majestic plants and the wildlife that rely on them, could be seriously threatened.

The relationships between plants and their animal pollinators and seed dispersers are the result of millions of years of evolutionary interplay. Ecologists



now know that even small disturbances can destroy entire systems of plant and animal life, and that it takes millions of additional years for species diversity to even begin recovery. Loss of plant and animal diversity is perhaps the most serious of long-term global problems we face.

Bats and Economics

Many of the world's most economically important plants rely on bats. Some crops from these plants are valued in the hundreds of millions of dollars each year and are crucial to the economies of cash-poor developing countries.

In Africa, rapidly declining flying foxes are the only known seed dispersers for the Iroko tree, whose timber is worth millions of dollars annually. A recent study documented nearly 300 plant species in the Old World tropics alone that rely on bats. Some 450 commercial products come from these plants. Just one, the durian fruit of Southeast Asia, adds \$120 million to local economies. Other products include medicines, food and beverages, timber, ornamentals, fiber and cordage, and dyes and tannins.

Many of our cultivated crop plants still rely on bats for their survival in the wild. These include fruits such as bananas, plantain, breadfruit, avocados, dates, figs, peaches, and mangoes. Other bat-dependent products are cloves, cashews, carob, balsa wood, kapok filler for life preservers, and tequila, which comes from agaves.

Although most of these plants are now commercially cultivated, wild ancestral stocks remain essential. They are the only source of genetic material for development of disease-resistant strains and for producing new, more productive plants in the future.

With many flying fox populations in jeopardy, the need to understand their vital ecological and economic roles is crucial.

People Need Bats

Bats affect our lives in more ways than we realize. Without bats, our grocery stores might not look the same, and mosquitoes would find the world a much safer place to live. Imagine an Arizona sunset without giant cacti

production, and improved detergents. Still others may soon be used in the production of new antibiotics.

When a colony of cave-dwelling bats is lost, the potential benefits of countless microorganisms and other animals perish with them. Some of these live in only one bat cave in all the world.

Loss of bats may seriously damage entire ecosystems upon which we ourselves depend. These losses are not reversible; the consequences are unpredictable and potentially disastrous.

The Need for Bat Conservation

The contributions bats make to the quality of life on earth and to the welfare of humans are many.



or the savannas of East Africa without baobab trees.

Even in places so hidden from humans that we are rarely aware of them, organisms that depend on bats for their survival are yielding treasures of great benefit to us. New species of bacteria discovered in American bat caves are now being studied by major corporations for use in chemical waste detoxification, gasohol

Yet humans are needlessly destroying bats nearly everywhere.

Bats are virtually defenseless, and large colonies make easy targets. A single act of vandalism can kill millions at a time, having a significant impact on the survival of an entire species. Many bats require large numbers for successful rearing of young, and most produce only one pup per year. These factors combine to make bats exceptionally vulnerable to extinction.

The Decline of Bats in Europe and North America

In Europe, bats that were common only 30 years ago are now endangered. In the United States, nearly 40% of our 43 bat species are on the endangered list or are official candidates for it. Vandalism and repeated disturbance in roosting caves is a primary cause.

Gray bats were among our most abundant animals at the turn of the century; now they are endangered. Indiana bats, also endangered, declined by 55% in less than 10 years.

In the early 1960s, Eagle Creek Cave in Arizona housed the world's largest known bat colony, approximately 30 million Mexican free-tailed bats. Yet they declined 99.9% in only six years. Imagine the local impact of more than a half million pounds of additional insects left uneaten each summer night.

The Plight of Flying Foxes and Other Tropical Bats

Some governments list bats as pests, targeting them for eradication. In Queensland, Australia, mass hunts have killed thousands of flying foxes at a time, even though many of Australia's most economically important timber trees rely on bats for pollination or seed dispersal. Flying fox numbers have declined drastically.

In Latin America, the common vampire bat, who feeds on blood, has proliferated with the arrival of humans who introduced livestock. In many places vampires now require control, but poorly trained government agents and local farmers often indiscriminately kill all bats, unaware that the majority of Latin America's

270 other bat species are highly beneficial.

Dawn bats, the primary pollinators of Southeast Asia's 120 million dollar durian crop, are declining rapidly from loss of cave roosts and uncontrolled harvest for human food.

Throughout Southeast Asia and the Pacific and Indian Ocean islands, flying fox populations are in jeopardy. On Guam, where bats are considered a delicacy, one of the island's two flying fox species recently became extinct without even being listed as endangered, and the second is now in serious trouble. Commercial export of flying foxes to Guam has decimated additional populations. Several species are now extinct from this and other unregulated hunting.

The Need is Urgent


The status of bats is so poorly known in most parts of the world that species are becoming extinct before they can be recognized as endangered. Even in the United States, we do not know the true status of some of our most widespread species.

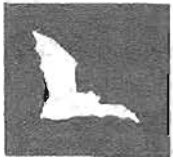
Major ecosystem studies in tropical forests, where bats comprise almost half of all mammal species, have ignored bats as though they did not exist. Conservation planners, therefore, often fail to consider bats in projects to save tropical forests, even when the results of such neglect may seriously threaten their success.

In many places, once vast populations of bats now survive only as mere remnants. Many of the species needed in large numbers to maintain the balance of nature are, instead, at such low population levels that they are almost ecologically irrelevant.

For some it is too late, but for many others protective action now can save them.

Education is Essential

Bats are among the most intensely feared and relentlessly persecuted animals on earth. Through ignorance, many populations have been needlessly destroyed. Most people know little about bats, often believing popular myths. Changing these false perceptions is essential for lasting conservation progress. 



TEST YOUR BAT Q

A. True or False?

- ___ 1. Bats swoop down and become caught in people's hair.
- ___ 2. Bats are the only kind of mammals that can fly.
- ___ 3. Bats are flying mice.
- ___ 4. Bats are blind.
- ___ 5. Most bats are dirty and carry rabies.
- ___ 6. If you see a bat on the ground during the day it might be sick.
- ___ 7. There really are bats that feed on blood.
- ___ 8. Bats produce several litters a year, just like mice.
- ___ 9. Bats are ugly animals.
- ___ 10. A single bat can catch 600 mosquitoes in just one hour.

B. Bats around the world eat which of the following things:

(Circle all correct answers.)

- fruit nectar insects fish blood

(Circle the correct answer to questions C through H.)

C. The biggest bat in the world has a wingspan of what size:

- 1 foot 3 feet 6 feet 50 feet

D. The smallest bat in the world is the size of what animal:

- ant mouse guinea pig bumblebee

E. Worldwide there are about _____ different species (kinds) of bats:

- 10 100 500 1,000

F. In the United States there are about _____ kinds of bats:

- 5 10 40 100

G. Bats are what kind of animals:

- birds reptiles amphibians mammals

H. Most bats produce _____ baby(ies) a year:

- 10 5 1 25

I. Bats are found in which of the following places:

(Circle all correct answers.)

- tree holes caves attics plant leaves
bridges mines tree bark rock crevices

J. Bats live in which of the following kinds of areas:

(Circle all correct answers.)

- mountains deserts rain forests cities
prairies wetlands farmland polar regions

K. Bats are important to the environment because they:

(Circle all correct answers.)

- pollinate flowers distribute plant seeds eat insects

