

This guide is designed to accompany the video "Giant Pandas: The Science of Finding Food." Some sections are more appropriate for use after viewing the program, while others are independent of the program and can be used at any time.

Objectives:

1. Introduce basic facts about giant pandas. See **Panda Facts** on page 2
2. Assess information learned on the video about giant pandas and the foraging experiment.

Habitat Awareness can be used before and after watching the video.

Objectives:

1. Review "habitat" and "endangered" definitions.
2. Jump start discussion or individual research on conservation issues. Assessment items: Three discussion questions on conservation can be used in class, small group or individual settings.

Culture can be used before or after watching the video.

Objectives:

1. Offer cross-curricular studies in Chinese art, history, and literature.
2. Provide activities in cross-curricular studies using the giant panda as a central figure.

Behavior Study & Be A Scientist Worksheets should be used after watching the video.

Objectives:

1. Learning about the scientific process. Every scientist uses the scientific method when conducting an experiment. What is the scientific method?
 - Make an observation.
 - Ask a question about something you've observed.
 - From that question, form a hypothesis where you predict the answer to your question.
 - Create a method to test your hypothesis. Make observations and record data according to the method you created.
 - Analyze the data.
 - Form a conclusion about whether your prediction was confirmed or not.
2. Conduct experiments using the scientific process.

Panda Facts:

3. Giant pandas have lived for millions of years in China's bamboo forests. They have become uniquely adapted to feeding and reproducing in this habitat. Human disruption of the bamboo forests has put them in serious danger of extinction.
4. Giant pandas spend most of their time doing two things, eating and sleeping.
5. A panda's life revolves around bamboo. Ninety-nine percent of its diet comes from this plant.
6. Bamboo is a tough plant to chew and digest, but pandas are built to take on the job. A panda's thick, heavy skull, massive jaw muscles, and powerful teeth help it to eat bamboo as easily as you eat celery.
7. Giant pandas bite off pieces of bamboo with their molars, or back teeth. Their molars are seven times as big as human molars.
8. A panda has a tough esophagus and thick stomach walls to protect it from sharp bamboo splinters. But bamboo is 90 percent indigestible plant material. To get adequate nutrients from the bamboo, pandas must eat a lot of it. Because of this, they need to have access to huge areas of it in the wild.
9. Pandas have a false "thumb"; it is really an extension of the wrist bone. (Humans have a true opposable thumb.) When it holds bamboo, a panda presses the shaft against the sixth "digit" of its paw. It can't wrap the false thumb around an object as humans do.
10. In the course of a year, pandas will mate only during two or three days in the spring. They may encounter other pandas at different times of the year but will not mate.
11. A female panda doesn't look pregnant, even when she is about to give birth. Her cub is so small that she doesn't gain any weight.
12. A female panda will bear one or two cubs. Twins are common, but one usually dies. The cubs generally have a high death rate (about 50 percent in the wild). A newborn cub is very small, weighing only about the same as a stick of butter—around four ounces. Weak and fragile, it is completely dependent on its mother.
13. A panda cub will stay with its mother until it is about two years old. A panda reaches maturity in the wild at age five or six.
14. Pandas may look cute, but they are wild animals and therefore can be dangerous. Giant pandas will defend their territory with their long claws and sharp teeth.

Habitat Awareness

Definitions

healthy habitat:

A healthy habitat is a place where a living thing can find food, shelter, water, mates, and a place to raise young.

healthy panda habitat:

A healthy panda habitat would be a temperate forest that has bamboo, since that is their largest source of food; some kind of shelter, like a cave, hollow tree, or grotto; and a place to raise their young. Not only are these elements important, but the size of the habitat is important, too. A healthy panda habitat would need enough space to allow the pandas to find enough bamboo of the correct mix of species and find unrelated mates.

endangered:

An endangered species is a species with so few individuals left that it is in danger of extinction. The giant panda is endangered because of human encroachment on habitat, habitat destruction due to logging and other human activities, and the fragmentation of the remaining habitat into small isolated patches. Learn more about the [panda's habitat](#).

Think About It!

1. What have you done to lessen your impact on your environment?
2. Over the course of a year, a giant panda's home range can extend from a couple of square miles of habitat to as many as 15 square miles. In order to save giant pandas from extinction, their natural habitat must be preserved. What can you do to help giant pandas survive in the wild?
3. Could a panda live in your neighborhood? Why? Why not?
4. Compare your answer with Lisa Stevens' answer in the video. We asked her the question, "Could the giant panda live on the East Coast of the United States?"

Calligraphy

The word *calligraphy* comes from the Greek words *kale* and *graphe* meaning beautiful writing. In China the use of calligraphy dates back to the 12th century B.C.E. Today there are two forms of calligraphy used in Chinese writing: the simplified form used in China and the traditional form used in Taiwan. Since the giant pandas are from China, we have chosen to use the simplified form.

美香
Mei Xiang

添添
Tian Tian

熊猫
panda

食品
food

美国
United States

中国
China

合作
cooperation

和平
peace

Special thanks to Huchen Zhang for creating the calligraphy representations.

Literature

According to the Friends of the National Zoo's magazine *Zoogoer*, the giant panda first appeared in literature more than 3,000 years ago in *The Book of History* and *The Book of Songs* which is the earliest collection of Chinese poetry. There are many stories about pandas, but our favorite is the ancient legend about why pandas have their distinctive black and white coats.

How Did Pandas Get Their Markings?

There was a time long ago in the bamboo forests of China when giant pandas were all white. One day a certain panda, while sitting contentedly and browsing on a bamboo branch, was attacked by a hungry leopard. A brave shepherdess named Losang, who was guarding her flock nearby with her three sisters, heard the terrified panda and rushed to save it.

But the four shepherdesses and the panda together were no match for the leopard. News soon spread that the lives of the panda and all four of the shepherdesses were lost in the big cat's attack.

The other pandas living high in the mountains soon discovered that one of their kin had died and that the four shepherdesses had perished trying to save him. They ambled down into the valley, crying all the while, to attend the funeral. The pandas all wore black arm bands to show their grief.

As the pandas wept, they rubbed their eyes, grabbed their ears, and hugged each other. The dye from the arm bands, wetted by their tears, began to run. Soon the pandas' white coats were stained dark around their eyes and ears and in big bands across their bodies. Every panda born since that time has carried these same markings on its coat.

Activities:

1. Calligraphy: Try your hand at recreating some of the calligraphy used in this section
2. Literature: Write a poem about the giant panda using food as the theme.
3. Art: Create a habitat conservation poster using the giant panda as the focus. Show the giant panda in its habitat and include the images that depict why the giant panda habitat is disappearing.

BE A SCIENTIST

Animal Behavior Checklist

Kind of Animal: _____

Animal Age: **Young** or **Adult** (circle one)

Study Location: _____

Date: _____ Time Started: _____

Weather: **Sunny** or **Cloudy** or **Rainy** (circle one)

Temperature: _____

Other Identification Notes:

TRIAL	MOVING	RESTING	EATING/ DRINKING	SOCIAL ACTIVITY	CAN'T SEE	ANYTHING ELSE
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
Total =						
Percent =						

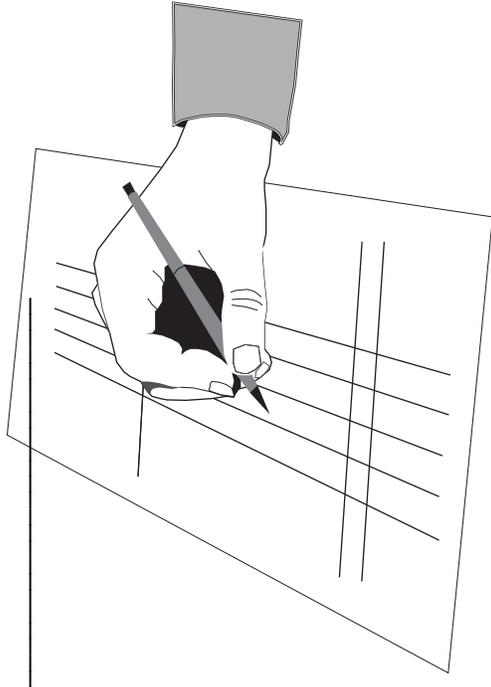
Directions: Watch the animal for 5 minutes. At the end of each 30 seconds, check off the activity that you see the animal doing. You will end up with 10 check marks.

BEHAVIOR DEFINITIONS	
Moving	When an animal moves from one location to another. (Includes climbing, walking, running, jumping)
Resting	When an animal is not changing location (includes sleeping, sitting, standing)
Eating/Drinking	When an animal eats or drinks
Social Activity	When an animal is interacting with another animal (includes playing, chasing, grooming, fighting, breeding)
Can't See	When an animal is out of view
Anything Else	When an animal is doing something not listed above

BEHAVIOR STUDY

Definitions

- Moving** When an animal moves from one location to another. (Includes climbing, walking, running, jumping).
- Resting** When an animal is not changing location. (Includes sleeping, sitting or standing).
- Eating/Drinking** When an animal eats or drinks.
- Social Activity** When an animal is interacting with another animal. (Includes playing, chasing, grooming, fighting, breeding).
- Can't See** When an animal is out of view.
- Anything Else** When an animal is doing something not listed above.



Date	
Time Started	
Study Location	
Animal	
Animal's Age	Young Adult
Study Location	
Weather	Sunny Cloudy Rainy
Temperature	

Trial	Moving	Resting	Eating/Drinking	Social Activity	Can't See	Anything Else
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
Total						
Percent						