

INTRO TO TEACHERS' GUIDE

This guide will be useful to college and high school teachers of biology, environmental science, conservation biology, ecology and related disciplines. Green TV's Tina Cheng prepared this teachers' guide with the help of several current science teachers. We consider it a work-in-progress and welcome comments and feedback.

For e-mailed answers to the questions in this guide please email fgreen@greentv.org.

COUNTING SHEEP

Teachers' Guide

Before Viewing: Understanding Key Concepts

Purpose:

To introduce the subject matter in *Counting Sheep*, build student interest in the topic, and promote understanding of the film during viewing.

Goals:

1. Students should have basic knowledge of bighorn sheep and mountain lions, and recognize the predator-prey relationship between the two animals.
2. Students should understand what an endangered species is.
3. Students should understand the importance of genetics in wildlife management.

Directions:

Split the class into groups of four. Assign each member of the group a topic to research at the library, in their textbook or online. The student should research and answer the following questions, and then share their knowledge with the class.

1. Sierra Nevada bighorn sheep
 - a. What special physical adaptations have allowed Sierra Nevada bighorn sheep to survive in their rocky, dry high altitude habitat?
 - b. Bighorn sheep have historically thrived throughout the high mountains of the Sierra Nevada range but beginning in the mid-1800's, their populations started drastically declining. What events are thought to have contributed the decline of bighorn populations after the mid-1800's?
 - c. If you were a conservation biologist protecting Sierra Nevada bighorn sheep, what measures might you take to encourage survival of their species?
2. Mountain lions
 - a. What adaptations do mountain lions have that allow them to be successful predators?

- b. Mountain lions have historically existed in California in healthy populations until the early 1900's when their populations started to decline. What events contributed to the decline of mountain lions?
 - c. If you were a conservation biologist interested in protecting mountain lions, what measures would you take to support the survival of their species?
3. Endangered species
- a. What is an endangered species?
 - b. What is the US Fish & Wildlife Service's List of Threatened and Endangered Species and how does a species get its name on the list?
 - c. What kind of endangered species do you know about?
 - d. Is it necessary or important to protect all species of life? Why?
4. Wildlife conservation genetics
- a. What is a gene pool?
 - b. What is genetic diversity?
 - c. Why is genetic diversity important to the survival of an endangered species?
 - d. Why would a conservation biologist be interested in obtaining DNA from many individuals in a population of animals?

Activities Before Viewing: Understanding Human Aspects of Conservation Biology

Purpose: To help students understand the role that people play in the conservation of an endangered species.

Goals:

1. Students should be familiar with the role of a conservation biologist.
2. Students should be familiar with the interests of an animal rights group.
3. Students should recognize the conflicts between different groups in conservation.

Background:

In Redrock National Park, there has been a drastic decline in the native wolf population due to hunting, trapping and disease. As a result of the decreasing wolf population, the wild deer and elk populations have significantly increased. Consequently, native vegetation has suffered.

The Save the Wolves group has lobbied for the National Park to create a recovery and reintroduction program to re-establish a healthy wolf population, which would involve capturing and importing wild wolves from other regions.

Deer Hunters United fears a healthy wolf population will reduce deer and elk available for sport hunting, and they oppose the wolf recovery program. The Livestock Association joins the hunters group, out of concern for wolf predation on cattle. The National Park has formed a group of conservation biologists and wildlife specialists to develop a proposal and a management plan for a wolf recovery program which must consider all the competing interests.

Directions:

Split students into four groups

- Save the Wolves -- advocates for wild wolves and other wildlife
- Livestock and Cattle Association -- organization of local ranchers
- Deer Hunters United -- Hunters and outdoorsmen advocacy group
- Redrock National Park Wolf Task Force -- a working group of biologists and wildlife experts who work for the National Park in the Rocky Mountains to develop a Wolf Recovery Plan.

Each of the three interest groups must draft a petition to the Wolf Task Force, explaining their position. The Task Force must develop a strategy for a wolf recovery program that takes into account the competing interests at stake.

Post-viewing: Understanding the film

1. What are three things that make Sierra Nevada bighorn sheep unique from other animals?
2. What did John Wehausen mean when he said, "I tell people to look for the rocks with legs on them"?
3. John Wehausen observed that over several years, there had been 49 adult bighorn kills by mountain lions. He considered this level of predation to be normal. However, he still believed that predator control was the answer to bighorn sheep restoration. Why?
4. In the 1800s, Sierra Nevada bighorn sheep existed in great numbers throughout the Sierras. However, by 1995, Sierra Nevada bighorn sheep numbered just over 100. What influences, both human and natural, contributed to their decline?
5. Why does the Mountain Lion Foundation say mountain lions should be protected?
6. Why does John Wehausen collect bighorn sheep dung?
7. John Wehausen makes an important distinction between animal rights and conservation. As an animal rights activists, the mountain lion group is interested in the life of an _____ animal. As a conservationist, John Wehausen is interested in looking at a _____ of animals.

8. What kind of data did biologist Becky Pierce take from the captured mountain lion? How is this data useful?
9. Why are domestic sheep being removed from their historic grazing lands? Why are the sheep ranchers angry about this?

For further discussion:

1. What can John learn by genotyping the Sierra bighorn groups?
2. What are the advantages of tracking a mountain lion using radio collars versus hand tracking with dogs?
3. What is captive breeding? How might it help bighorn sheep to increase their population?
4. What is the difference between state protection of the mountain lion in California and the Federal listing of Sierra Nevada bighorn sheep as an Endangered Species?
5. At the end of the film, John Wehausen says, "I don't think we can pretend to recreate the past, we don't even know what it was, all we can do is ask the question, 'What do we want in the future?'" As a conservation biologist, what do you think he meant by that? Do you agree with him?
6. Why did the California Department of Fish and Game decide to shoot problem mountain lions that were a threat to Sierra Nevada bighorn sheep instead of relocating them? Do you agree with their reasoning?
7. Why do you think it is important to protect Sierra Nevada bighorn sheep?

Post-viewing Activity: Wildlife management

Purpose: To help students understand the dynamics involved between different interest groups and organizations in the management of mountain lions and bighorn sheep, as depicted in *Counting Sheep*.

Goals:

1. Students should be familiar with the role of a conservation biologist.
2. Students should be familiar with the interests of an animal rights group.
3. Students should recognize the conflicts between different organizations in conservation.
4. Students should be able to plan and propose a management plan for protecting bighorn sheep and mountain lions.

Directions:

Divide class into three home groups:

- Bighorn sheep group

- Mountain lion group
- Conservation biologists & CA Department of Fish and Game (CDFG)

Give these descriptions to each group:

- Bighorn group: You are an animal activist group interested in protecting Sierra Nevada bighorn sheep. Make a list of arguments for why they should be protected.
- Mountain lion group: You are an animal activist group interested in protecting the last of the largest predators in California, the mountain lion. Make a list of arguments for why mountain lions should be protected.
- Biologists and CDFG: You are interested in re-balancing the ecosystem in which Sierra Nevada bighorn sheep and mountain lions can co-exist. How can you ensure a healthy population of Sierra Nevada bighorn sheep while still protecting mountain lions? (Keep in mind a more complex ecosystem and relationship in the food web between rainfall, vegetation, mule deer population, lion population, and bighorn sheep.)

Now within each home group, number the students off from 1-6 to form six satellite discussion groups. Each discussion group should have at least one person from a home group. Each discussion group now has to work together to develop a management plan to increase populations of Sierra Nevada bighorn sheep. Students should keep in mind what kind of people and animals will be affected by the management plan.

Follow-up activity:

Within each discussion group, discuss the role that humans play in the natural world today, both negative and positive.