

Black Bear Ecology

(*Ursus Americanus*)

Subject Area: Natural Science

Core Curriculum Content Standards: 3.3A, 3.4A, 4.2D, 5.1A, 5.5A&B, 5.10A&B, 6.6E, 9.1A

Session Description

This investigation of the Black Bear (*Ursus Americanus*) concentrates on adaptations, ecological relationships, conservation and management, and the general life history traits of this species. Participants will have the opportunity to examine a black bear pelt and skull, to discuss the natural history of black bear in New Jersey, to learn about the research techniques that have been employed to study these large omnivores, and to look for bear signs while hiking around the forested SOC campus. In the field, students will observe evidence of bear activity, examine a live-trap used for capturing black bear, investigate several den sites, and cover the data that bear researchers record. The session will conclude with an examination of the issues surrounding the interface of black bears and humans, and the impact humans have on the availability of black bear habitat.

Objectives

1. Students will describe black bear natural history and ecology in New Jersey.
2. Students will locate and identify signs of black bear in the forest during a hike and relate the signs to specific survival behaviors.
3. Students will develop observational/inquiry skills by generating questions about black bear ecology.
4. Students will compare, contrast and evaluate black bear conservation and management possibilities.

Background Information

See Black Bear Fact Sheet and Black Bear Instructor Sheet

•Materials

In the classroom

Bear hide and skull, bear track replica and tracking box, photographs of bear and bear signs, Star Ledger's Back Bear Poster.

Outdoors

Styrofoam bear, stuffed toy bear, culver live- trap, and (optional) researcher's backpack and tool box.

•*Prior to Class*

Place the stuffed toy bear in the hollow log den if weather permits.

•Procedure

1. Begin the session by asking students what they know about black bear. They can provide information that they may have read or seen on TV, or they can just make an observation based on the pelt and skull on the table in front of them. Use the *Black Bear Fact Sheet* to elaborate on the information the students provide.
2. Ask the students where they would obtain information if asked to write a report on black bears (books, websites, and magazine articles)? Ask the students if they know how this information is obtained (through scientific research by biologists, mammalogists, ecologists, etc). How do researchers locate bears? What signs do they look for and where?
3. Help the students to compile a list of **bear signs** (see the *Black Bear Fact Sheet* for more information):
 - Den/nest:** (use photographs provided) point out possible den sites, their structures, and seasonal use. Explain the difference between hibernation and torpor (including the metabolic changes which occur).
 - Bent twigs, turned over logs and stones:** Showing students a bear skull and examining the teeth while making reference to their function (small front teeth for nipping off vegetation, canines for ripping flesh, and flattened molars for grinding food) ask students to list types of food eaten by bears. Bears are omnivores. Their jaws are powerful but unable to crush large bones.
 - Scat:** make reference to information researchers might be able to obtain from analyzing bear scat (diet; seasonal changes in diet, health).

- Bear trees:** claw marks are made anywhere from 4 to 8 feet high on trees or telephone poles.
 - Tracks:** are used to indicate the direction of travel and assist researchers in locating the bears.
4. Invite students to the tracking box and press the black bear paw replica into the sand. Explain that bears are **plantigrade** walkers (that is they walk on the soles of their feet), their hind foot often steps in the track of their front foot, and they use trails traveled by other bears (often stepping in the exact spot a previous bear has stepped in). The flatness of their tracks may resemble human tracks (humans are also plantigrades).
 5. At this point, explain to the students that they will be going on a hike to look for signs of black bear in the area. While hiking around Lake Wapalanne test their knowledge of bear signs by asking them to list the signs. Provide leading questions to assist students in locating the black bear signs for themselves.
 6. Stop at the following black bear signs and discuss **bear tree** (telephone pole in front of Long House) Examine the claw and bite marks. What is the significance of this behavior? (visual and olfactory signals to other bear).
 7. Next, stop at the **culvert trap** (across from the spill way). Once researchers suspect a bear is frequenting a given area, a trap can be baited with food and set in that area. Upon capture a radio collar will be placed on the bear so that it may be followed. Have students take turns entering the culvert trap to experience what a bear experiences when it is caught. Ask the students what kind of information the researcher would collect from the captured bear (weight, length, blood sample, fur sample, tooth extraction, etc.).
 8. Lead the students to an area where they can search for the kinds of food a bear would eat (nuts, berries, ants, skunk cabbage, etc.). Give the students about ten minutes to collect food and then review the findings with them. Point out how difficult food finding can be and discuss why bears raid garbage cans (lots of food in a small area).
 9. Lead the students to the **hollow tree/den with toy stuffed bear inside** (hollow tree near the climbing wall). Encourage them to think about the surrounding habitat and what factors might influence den site (availability of food, water and shelter). This is also a good time to talk about the logistics of black bear reproduction since birth takes place in the den (see fact sheet for details).
 10. **If time permits**, have the students record bear's coloration, weight, take body measurements, collect hair, simulate taking blood samples, sex bear, roughly predict it's age and simulated tooth extraction. Instructor should use the Instructor's Black Bear Handling Report Sheet and the Black Bear Fact Sheet to make reference to biological and ecological facts (adaptive coloration, gestation period, litter size, sexual dimorphism, home range, average weight, behavior, and population distribution) and to explain the significance of the data being collected.

Summary

Engage students in a discussion aimed at addressing New Jersey's human/bear conflict, encouraging them to share their feelings and suggest possible solutions to the conflict while applying information learned during the session to back up their ideas. Is it possible for bears and humans to co-exist? Do human activities have an impact on New Jersey's black bear population? Are black bears an endangered species? Should we help to insure that black bear remain in New Jersey?

Classroom Extension

Have students design a housing development plan aimed at maintaining a sustainable black bear population while minimizing human/bear conflict.

Bibliography

- Bauer,Erwin. (1985) Erwin's Bauer's Bear in Their World. Outdoor Life Books, New York.
- Murie O.J. (1974) A Field Guide to Animal Tracks; The Peterson Field Guide Series. Houghton Mifflin Company, New York.
- New Jersey Department of Environmental Protection, New Jersey Division of Fish and Wildlife, Bureau of Wildlife Management (2004). Black Bear in New Jersey Status Report 2004.
- Paetkau D., Strobeck C., (1998) Ecological Genetic Studies of Bears Using Maicrosatellite Analysis. Ursus 10: 299-306.
- Wooding S Ward R.H. (1998) Pattern of Genetic Diversity in a Black Bear Population Indicate Recent Immigration. Ursus 10: 329-333.

Additional Teacher Resources

- Project WILD Activity Guide (1992), Western Regional Environmental Education Council Boulder, CO. Bearly Born pp6-9. & How Many Bears Can Live in this Forest? pp. 134-137.
- Scholastic, New York, N.Y.; Bears: An Interactive Animal Kit (1998) (Includes a poster and cassette).
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www.bear-tracker.com/bear.html www.bearproofing.com