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Black Bear Ecology

(*Ursus americanus*)

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:

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

BACKGROUND INFORMATION:

See *Black Bear Fact Sheet* and (optional) *Black Bear Instructor Sheet*

MATERIALS:

- *In the classroom:* Bear hide and skull, bear paw replica and tracking box, photographs of bear and bear signs, Star Ledger's Back Bear Poster.
- *Outdoors:* Stuffed toy bear, 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.

PROCEDURES:

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):
 - a. •**Den/nest:** (use photographs provided) point out possible den sites, their structures, and seasonal use. Explain
 - b. the difference between hibernation and torpor (including the metabolic changes which occur).
 - c. •**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.
 - d. •**Scat:** make reference to information researchers might be able to obtain from analyzing bear scat (diet; seasonal changes in diet, health).
 - e. •**Bear trees:** claw marks are made anywhere from 4 to 8 feet high on trees or telephone poles.
 - f. •**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. Tell them that we will stop at a number of different signs that have already been observed but that they should be on the lookout for additional signs.
6. Stop at the **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). Talk about what the bears are trying to communicate and the importance of communication to the bear population.
7. Next, stop is at the **live trap** (across from the spillway). Show the students how the trap works and talk about the kind of bait that might be most effective. Have students take turns entering the culver trap to experience what a bear experiences when it is caught. Ask the students what kind of information a researcher might collect from the captured bear (weight, length, blood sample, fur sample, tooth extraction, etc.). Why is this information important to collect?
8. Lead the students down the gravel road toward the wastewater treatment facility. Along the road, point out the next two telephone poles on your left - they both show signs of bear claw marks and sometimes they contain little bits of hair from the bear. Have the students look for the hair samples, but ask them not to remove them.
9. Continue down the gravel road until you reach the fenced-in wastewater area. Take the marked trail up on the ridge to the left of the fenced-in area. Let the students enjoy the view of the Big Flatbrook floodplain that sprawls out before them. Follow the marked trail to the point where you notice several depressions on the ground. Ask the students what they think these depressions are (they were made by black bear to serve as den and are referred to as bear “nests”). Have the students try them out for comfort!

10. Follow the trail until it joins the Blue Heron Trail. Take the Blue Heron Trail up the hill towards the road. Stop before you reach the road and have the students search the area 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).
11. Continue on the Blue Heron Trail until you come to the road. Walk the road towards the main office. Just passed the trail to the climbing wall, lead the students off to the left toward the **hollow tree/den**. 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 the *Black Bear Fact Sheet* for details).

WRAP-UP:

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?

LITERATURE:

- Bauer,Erwin. (1985) Erwin 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.

ADDITIONAL 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).
- Smith, K. R. and Bush, A.H. (1994) Investigating Science Through Bears. Teacher Ideas Press, Englewood, CO.
- Websites:
 - www.state.nj.us/dep/fgw/bearinfo
 - www.NewJerseySiera.org
 - www.bear-tracker.com/bear.html
 - www.bearproofing.com

Black Bear Facts

Names: Originally, people thought that bears were related to pigs. This is why a female bear is called a 'sow' and a male bear is called a 'boar'. A group of bears is referred to as a 'sloth of bears'. The scientific name for the black bear is *Ursus americanus*.

Evolution: Bears evolved over 30 million years ago (MA) in North America. Modern bears, like the ones we have today, appear in the fossil record approximately 20 MA.

Color: Black Bears are not always black. They can be black, brown, and occasionally blonde or even white. Some black bears have a white chest patch.

Adult Weight: Most wild male black bears weigh between 125 and 500 pounds, while females generally weigh between 90 and 300 pounds. Their weight depends upon their age, the season of the year, and how much food is available. The heaviest wild male ever recorded weighed 880 pounds and the heaviest female weighed 520 pounds. Black bears in captivity may exceed these records.

Adult Length: Black bears can grow to be from 50 to 80 inches long, from nose to tail, with males being larger than females.

Number of Cubs: The number of cubs in a litter is generally 2 in the western United States and 3 in the eastern United States. Bears with access to human-associated food sources (agricultural products and garbage) grow faster and produce more offspring than other bear. Parts of Pennsylvania have excellent bear habitat and a few litters of 6 cubs have been reported there.

Mating Season: Black bears generally mate between late May and early July.

Birth: Cubs are born in January or early February – in the den.

Birth Weight: Cubs weigh 1/2 to 1 pound at birth.

Fall Weight of Cubs: By their first fall the cubs may weigh from 15 pounds to more than 165 pounds, depending on food supply.

Parental Care: Cubs usually stay with their mother **for 17 months**. Mother stop traveling with their cubs when they are ready to mate again in the summer.

Age at First Pregnancy: Typically female black bears first produce cubs when they are between 3 and 7 years old. Depending on food supply they may mate as young as 2 or as old as 11.

Interval Between Litters of Cubs: Once females give birth, they generally have cubs every 2 years, unless food is scarce.

Vision: Bears see in color and have good vision close-up. Their distance vision is not known.

Hearing & Smelling: Bears can hear and smell much better than humans.

Intelligence: Black Bears have a large brain compared to their size and are one of the more intelligent mammals. They have excellent long-term memory.

Sounds: Black bears make a variety of grunts when they are relaxed. When they are frightened they make a loud blowing noise. They use their "voice" to express a range of emotions. Black bears do not threaten by growling.

Swimming Distance: Black bears are good swimmers. They can swim at least a mile and a half in fresh water. One bear swam 9 miles in the Gulf of Mexico.

Running Speed: Bears can run uphill and downhill and on flat ground. Lean bears can run faster than 30 miles per hour. Fat bears in their winter coats overheat and tire quickly when running.

Daily Activity Period: Most bears become active a half-hour before sunrise, take a nap or two during the day, and bed down for the night an hour or two after sunset. Some bears reverse the pattern and become nocturnal (active at night) to avoid people.

Preferred Foods: Black bear feed primarily on vegetation. In spring they feed mostly on grasses, forbs (like skunk cabbage), mushrooms, sprouting trees, forest nuts (hickory, beechnuts, acorns) and buds and leaves of woody plants. Berries and fruit are major summer food items added to their spring diet. In the fall, beechnuts, acorns, and hickory nuts are utilized heavily based on availability. Bears living near farms consume grain crops and orchard fruits. Bears also visit garbage dumps, camp sites and

residential garbage cans. The most common animal matter found in black bear scat consists of colonial insects (ants), beetles, crayfish, frogs, and salamanders. Mammalian vertebrates (mostly mice and voles) are rarely consumed except when the opportunity presents itself. Fish and eggs are also consumed when available.

Hibernation: Black bears may hibernate up to 7 months in the north where food is scarce between September and April. Some do not hibernate at all in the south where food is available year-round. Bears that must hibernate for long periods reduce their metabolism more than do bears that hibernate in the south. However, black bears *are not considered to be "true" hibernators* since their body temperature does not drop significantly and they can (and do) become active on mild winter days.

Potential Longevity (lifespan): Black bears can live 21-33 years or more if they are not killed.

Causes of Death: Very few adult bears outside of national parks die of natural causes. Nearly all adult bears die from human-related causes. Most are eventually shot and vehicles kill some. The average age of death in unprotected populations is three to five years of age. Bears less than 17 months old sometimes die from starvation, predation, falls from trees, getting hit by vehicles, and other accidental causes. Very few bears die of disease.

Range: Black bears mostly live in forests with low human populations. They live as far south as Florida and northern Mexico and as far north as the tree-line in Alaska and Canada. Some black bears have moved into areas of open tundra in Labrador where there are no longer any brown (grizzly) bears. People are becoming more tolerant of black bears as they learn more about them. This has made it possible for bears to live more closely among people in places where bears were once feared and killed.

Ideal Habitat: Black bears like large forests with many different kinds of fruits and nuts. Small sunny openings within the forest provide many kinds of food for the bears. Lowlands and wetlands are important sources of succulent vegetation. Streams and woodland pools are important for drinking and cooling, and finding crayfish, salamanders and frogs. Mothers with cubs like large trees (over 20 inches in diameter) with furrowed bark (like white pines or hemlocks) for bedding sites. These trees are safest for small cubs to climb.

Living with Bears: Many people are moving into black bear habitat. The bears' future depends on how well we understand and tolerate them.

Dens: Den sites include hollow trees, rood cavities, blow-downs/brush piles and dirt mounds—they are rarely re-used from year to year.

Problems: Bears become pests when they feed on agricultural products and garbage, and raid garage cans and homes for food.

Other Bear Species: Zoologists generally recognize eight bear species (with a number of sub-species) world-wide: American black bear (North America), Asiatic black bear (Southern Asia), brown bear (North America, Europe, Japan, and North Asia), polar bear (Northern polar regions), sloth bear (India and Sri Lanka), sun bear (Southeast Asia), spectacled bear (South America), and giant panda bear (Southwest China). Some zoologists recognize 18 subspecies of black bear in the U.S. and Canada. Brown bears (*Ursus arctos*) have a large shoulder hump, which is caused by muscles associated with digging. Brown bears are also called grizzly bears in the states. The island brown bears of Alaska (Kodiak and Admiralty) are considered the largest land carnivores in the world, and live on a diet of fish and other rich food.

Greatest misconception: One of the greatest misconceptions is that mother black bears are likely to defend their cubs against people. They usually do not. While grizzly bear mothers can be dangerous, no human deaths are known from black bear mothers defending cubs. Researchers often capture screaming black bear cubs in the presence of their mothers, and no attacks have been reported.

NJ History: Black bear existed state-wide through the 1800's, but by the mid 1900's less than 100 existed, mainly in the northern part of the state. In 1953 NJ listed the black bear as a "game species" which afforded it protection. ***Between 1958 and 1970 there were 10 legal hunting seasons for bear which yielded a total of 46 bears.*** Since 1980 the black bear population has increased significantly and recently there have been more and more reports of negative people/bear interactions.

Numbers: Estimates of black bear numbers in North America are in the neighborhood of 750,000. New Jersey was estimated to have more than 1200 in 2003 and over 3400 in 2010. The number of bear in neighboring Pennsylvania is around 7000.

Hunting NJ Black Bear: In 2003 NJ had their first bear hunt in 43 years - a 6-day bear hunt took 328 black bear, mostly (233) in Sussex County. The largest female was estimated at 413lbs while the largest male taken in the hunt weighed 675lbs. In 2005 a second bear hunt took 298 bears: 125 males/173 females, 196 from Sussex County. The largest female was 327lbs, the largest male was 739lbs. In 2010 NJ issued permits for \$2 for a bear hunt: 591 bear were taken.