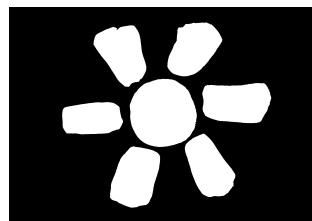


OVERVIEW

Students become “bears” to look for one or more components of habitat during this physically involving activity.



BACKGROUND

Wildlife Habitat

Wildlife is an integral part of any healthy forest community. For survival, each animal species requires four basic elements: food, cover, water and space. The combination of these elements required by each animal is referred to as that animal’s habitat. More than 141 species of plants and animals have been recorded in the various habitats in Pennsylvania through the GAP Program of the College of Agriculture, Penn State University.

Forests provide habitat for a great number and diversity of wildlife species. In return, many of these wildlife species also provide benefits to the forest, as discussed in the earlier section on Ecological Communities. Pennsylvania forests are the primary habitat for 120 species of birds and 50 species of mammals.

Different aged forests are important habitat for different wildlife species. By ensuring that the forests in Pennsylvania range from young forests to mature and old growth forests, habitat can be provided for all wildlife species that depend on the forest for survival and the rich biodiversity in Pennsylvania can be maintained.

The Black Bear

The black bear habitat limits black bear populations, especially through the influences of shelter, food supply, social tolerances and territoriality of the animal. Shelter or cover is a prime factor. Black bears need cover for feeding, hiding, bedding, traveling, raising cubs and for denning. With limits of space, adult bears will kill young bears or run them out of an area. These young bears must keep moving around either until they die or find an area vacated by the death of an adult bear.

When food supplies are reduced by factors such as climatic fluctuations, competition becomes intense. Some adult bears might temporarily move to

seldom-used areas of their home range, sometimes miles away. They are forced to live on what food is available in that area. These bears may become thin and in poor condition for winter hibernation, or as in the case of young bears, be forced from the area by more aggressive bears.

All components of habitat are important. Food, water, shelter and space must not only be available, but must be available in an arrangement suitable to meet the animals’ needs. For black bears, shelter is especially important.

All possible conditions are not covered by the design of this activity. However, by this simple illustration, it is possible for students to quickly grasp the essential nature of the concept of limiting factors.

PROCEDURES

1. Make a set of 2” x 2” cards from the colored construction paper for a group of 31–35 students. If you have a group of more or less than 31–35 students, use the chart to help determine how many cards to make. Make 30 cards of each of the five colors to represent food as follows:

Orange – Nuts (acorns, pecans, peanuts, hickory nuts); mark five pieces N-20; mark 25 pieces N-10.

Blue – Berries and fruit (blackberries, elderberries, raspberries, wild cherries); mark five pieces B-20; mark 25 pieces B-10.

Yellow – Insects (grub worms, larvae, ants, termites); mark five pieces I-12; mark 25 pieces I-6.

Red – Meat (mice, rodents, peccaries, beavers, muskrats, young deer); mark five pieces M-8; mark 25 pieces M-4.

Green – Plants (leaves, grasses, herb); mark five pieces P-20; mark 25 pieces P-10.

(The numbers on the cards represent pounds of food.)

GRADE LEVELS:

Grades 5–9

OBJECTIVES: Students will (1) define a major component of habitat and (2) identify a limiting factor.

PENNSYLVANIA PROPOSED ENVIRONMENT & ECOLOGY STANDARDS ADDRESSED:

4.6.7

- A. Explain the flows of energy and matter from organism to organism within an ecosystem.
- B. Explain the concepts of cycles.
- C. Explain how ecosystems change over time.

4.7.7

- A. Describe the diversity of plants and animals in ecosystems.
- B. Explain how species of living organisms adapt to their environment.
- C. Explain natural or human actions in relation to the loss of species.

4.6.10

- A. Explain the biotic and abiotic components of an ecosystem and their interaction.
- B. Explain how cycles affect the balance in an ecosystem.
- C. Analyze how ecosystems change over time.

4.7.10

- A. Explain the significance of diversity in ecosystems.
- B. Explain how structure, function and behavior of plants and animals affect their ability to survive.
- C. Identify and explain why adaptations can lead to specialization.

ESTIMATED DURATION: 20 – 45 minutes

MATERIALS NEEDED: five colors of construction paper (two or three sheets of each color) or an equal amount of thin poster board, one black felt marker, envelopes (one per student), pencils, one blindfold and five sheets of green construction paper (for extension activity).

There should be less than 80 pounds of food per student so that there is not actually enough food in the area for all the “bears” to survive. The following estimates of total pounds of food for one bear in ten days are used for this activity:

Nuts	20 pounds = 25%
Berries and Fruit	20 pounds = 25%
Insects	12 pounds = 15%
Meat	8 pounds = 10%
Plants	<u>20 pounds = 25%</u>
	80 pounds = 100%

NOTE: These figures represent a typical bear’s food. The components of an actual bear’s diet will vary between areas, seasons and years. For example, a bear in the state of Alaska would likely eat more meat (fish) and fewer nuts than a bear in Pennsylvania. One similarity among black bears everywhere is that the majority of their diet is normally made up of vegetative materials. If you want, you can also include “water” by making an additional 50 square of light blue paper. Mark each stack of ten cards with one of these letters: R, L, ST, SP and M (representing rivers, lakes, streams, springs and marshes — all places where a bear could find water).

- In a fairly large open area (e.g., 50’ x 50’), scatter the colored pieces of paper.
- Have each student write his/her name on an envelope. This will represent the student’s “den site” and should be left on the ground (perhaps anchored with a rock) at the starting line on the perimeter of the field.
- Have the students line up on the starting line, leaving their envelopes between their feet on the ground. Give students the following instructions: “You are now all black bears. All black bears are not alike, just as you and I are not exactly alike. Among you is a young male bear that has not yet found his own territory. Last week he met up with a larger male bear in the big bear’s territory and before he could get away he was hurt. He has a broken leg. (Assign one student to be the crippled bear. This bear must hunt by hopping on one leg.) Another bear is a young female who investigated a porcupine too closely and was blinded by the

quills. (Assign one student as the blind bear. This bear must hunt blindfolded.) The third special bear is a mother bear with two small cubs. She must gather twice as much food as the other bears. (Assign one student as the mother bear.)”

- Do not tell the students what the colors, initials and numbers on the pieces of paper represent. Tell them only that the pieces of paper represent various kinds of bear food. Since bears are omnivores, they like a wide assortment of food, they should gather different colored squares to represent a variety of food.
- Instruct students to walk into the “forest.” Bears do not run down their food, they gather it. When students find a colored square, they should pick it up (one at a time) and return it to their “den” before picking up another colored square. (Bears would not actually return to their den to eat, they would eat the food as they found it.)
- When all of the colored squares have been picked up, the food gathering is over. Have students pick up their “den” envelopes containing the food they gathered and return to class.
- Explain what the colors and numbers on the papers represent. Each color is a kind of food and the numbers represent pounds of food eaten. Ask each student to add up the total number of pounds of food he/she gathered — whether it is nuts, meat, insects, berries or plant materials. Each student should write the total weight on his/her envelope.
- Using a chalkboard, list “blind,” “injured” and “mother.” Ask the blind bear how much food it gathered. Write the amount after the word “blind.” Ask the crippled bear and the mother bear how much food they gathered and record their information. Ask each of the other students to tell how much food they found. Record each response on the chalkboard. Tell the students that each bear needs 80 pounds of food to survive. Which bears survived? Is there enough to feed all the bears? How many pounds did the crippled bear collect? Will it survive? What about the mother bear? Did she get twice the amount needed to survive? What will happen to her cubs? Will she

feed her cubs first, or herself? Why? What would happen to her if she fed the cubs? What if she ate first? If the cubs die, can she have more cubs in the future, perhaps richer years? (The mother bear will eat first and the cubs will get whatever, if any, is left. The mother must survive. She is the hope for continued bear population. She can have more cubs in her life. Only one cub needs to survive in order for the population to remain static.)

10. If you included the water square, each “bear” should have picked up at least one square representing a water source or that bear does not survive. Water can be a limiting factor and is an essential component of habitat.
11. Ask each student to record how many pounds of each of the five categories he/she gathered. Ask each student to convert these numbers into percentages of the total poundage of food each gathered. Provide the students with the background information about black bears so they can compare their percentages with the percentages typical of food eaten by black bears in Pennsylvania. Ask each student to attempt to guess how healthy his/her bear would be. How do the bears’ requirements for a diet seem

to compare with the needs of humans for a balanced, nutritious diet?

12. Ask students to arrive at a class total for all the pounds of food they gathered as bears. Divide the total by the 80 pounds needed by an individual bear (approximately) in order to survive a ten-day period. How many bears would the habitat support? Why then, did only “X” amount of bears survive when your class did this activity? Is this realistic? What percentage of the bears survived? What percentage would have survived had the food been evenly divided? In each case, what percentage would not survive? What limiting factors, cultural and natural, would be likely to actually influence the survival of individual bear and populations of bears in an area?

ASSESSMENT

1. Define “limiting factor” and describe some of the factors that may limit the survival of an animal that lives in your area.
2. Invent a board game to demonstrate some of the limiting factors associated with wildlife.

Adapted from Project Wild, Council for Environmental Education, 1998, “How Many Bear Can Live in the Forest.”