

ANIMAL CHARADES



Objective Students will be able to define wildlife, as well as to distinguish between domesticated and non-domesticated animals.

Background An animal is generally referred to as any living organism other than a plant. Wildlife is any animal that lives in a basically free condition, providing for its own food, shelter, and other needs in an environment that serves as a suitable habitat. Wildlife refers to animals that are not tamed or domesticated. Wildlife may be small organisms only visible to humans if seen through a microscope, or as large as a whale. Wildlife includes, but is not limited to, insects, spiders, birds, reptiles, fish, amphibians, and mammals, if non-domesticated. Domesticated animals are those which humans have tamed, kept in captivity, and bred for special purposes. The process of domestication

takes place over a long period of time and has involved genetic manipulation through selective breeding. All domesticated animals have their origins in wild ancestors. Cattle used for food and other products; sheep for wool and other products, as well as dogs, cats, birds, and fish commonly kept as pets are all examples of domesticated animals.

Confusion can arise about animals that sometimes may be wild, sometimes may be tamed, and sometimes may be domesticated. If the animal, or population of animals, can live on its

Age: Grades 4—12

Subjects: Language Arts, Science, Drama

Skills: physical interpretation of concepts, observation, analysis

Duration: 30 minutes

Group Size: 30—40 students, or fewer

Setting: indoors or outdoors

Conceptual Framework Reference: I.B.4., V.A.1

Key Vocabulary: animal, wild, domesticated

own, survive, and even reproduce, it is probably wild. Individual animals may be tamed—like some animals in zoos—while most of their numbers remain wild. A wild animal may appear to be tame, but still should be considered wild unless it is both tamed and domesticated. Some animals that are usually considered domesticated—like dogs, cats, horses, and goats—may become wild. When they do, the term “feral” is used. For example, there are feral goats on Catalina Isle, and feral horses and burros in some areas of western states in the U.S.

Where it is difficult to distinguish whether an animal is wild or domesticated, encourage the students to think in terms of what is **usually** the case. Remember that wild animals basically take care of themselves, as long as they have a suitable environment or habitat in which to live. Domesticated or tamed animals basically depend on people to feed and take care of them, and are typically used by people; for example, as a source of products and as pets. Whereas domesticated animals like cats and dogs are normally considered suitable pets, wild animals—even if tamed—are nearly always unsuitable, inappropriate, and frequently illegal pets.

The primary purpose of this activity is for students to be able to distinguish between wildlife and domesticated animals.

Method Students use “charades” to distinguish between wild and domesticated animals.

Materials chalkboard for use by scorekeeper, small pieces of writing paper, container (e.g., box, hat, wastebasket)

Procedure

1. This is charades—with an instructional purpose! In order to begin this activity, first create a space in the classroom that provides room for individual students to act out an animal; and room for the other students to observe the charade and guess which animal is being portrayed.

2. Once the stage and audience areas have been established, each student should take a small piece of paper. On this paper, the student should write **his or her name, the name of the animal the student is going to portray, and whether the animal is domesticated or wild.** (Or, don't have the students identify themselves. Have each student write the name of an animal on a slip of paper, indicate whether it is wild or domesticated, and then take turns randomly selecting and portraying the animals.) These slips of paper should be given to the teacher before the

charades begin.

3. The teacher drops the slips of paper into a container. The charades will be played in the order the teacher pulls the names from the container, or simply by letting the students take turns. The student goes to the area of the room that is the “stage.” A timekeeper (designated from among the students) says, “Begin,” and the student on stage dramatizes the animal chosen. A charade should be guessed by the audience—who may call out their guesses—within a ten-second time limit.

4. Follow the charades with a summary discussion, asking the students to clarify their definitions of **wildlife** and **domesticated animals**. Encourage their identification of the range of forms found in wild and domesticated species. For example, they should recognize that wildlife may be microscopic in size, like an amoeba, or longer than most houses, like some whales. Determining whether an animal is wild or domesticated can sometimes be difficult. Students may recognize that animals in zoos might fit the definition of domesticated animals. Taking lions, for example, you might note two things: most lions are not in zoos, therefore the species is still found most commonly in the wild; and, lions are not commonly bred for special purposes in zoos, nor usually tamed, and thus might fit only one of the three criteria within the definition of domesticated—that of being captive. Raising trout for stocking and food is an example of another confusing issue. Such trout are captive and bred for special purposes. However, most species of trout exist in the wild, and even those captive are not considered tame. In assisting students to establish definitions for what may be considered wild and domesticated species, both lions and trout can be considered wild. However, it is useful and important for the students to consider what appear to be and may be exceptions, as they refine their understanding of distinctions between wild and domesticated animals.

Extensions

1. One or more “animals” which coexist can mime together, representing the animals, their relationships, and the ecosystem within which they live.

2. Classify animals into appropriate and inappropriate pets, with reasons for the classifications.

Evaluation

Define wildlife.

Explain, using examples, how a species can be considered “wild” and “domesticated.”

MUSKOX MANEUVERS

Objectives Students will be able to:
1) evaluate the effectiveness of some adaptations in predator/prey relationships; and 2) describe the importance of predator/prey relationships as limiting factors in wildlife populations.

Method Students simulate muskoxen and wolves in a highly involving game of physical activity.

Background

The muskox is a large, shaggy herbivore called "omingmak" or "the bearded one" by the Eskimos, or Inuit (ee-new-eet), as they prefer to be called. A male muskox may weigh over 600 pounds at maturity, and mature females about 350 pounds. A young muskox may weigh only about 19 pounds at birth. These animals are inhabitants of the arctic regions of Alaska, Greenland, and Canada.

Muskoxen often are found in herds of 20 to 30. Both sexes will vigorously defend the young, usually forming a line or circle around them, facing the threatening predator. Such a circle renders the animals relatively safe against natural predators, particularly wolves.

In this activity, the roles of bulls and cows are differentiated in ways not typical of actual muskoxen. Again, both sexes vigorously defend the young.

The major purpose of this activity is for students to recognize adaptation and limiting factors in a predator/prey relationship.

NOTE: This activity was inspired by a "New Game," and adapted to teach concepts related to wildlife. Although this activity does not illustrate all the complexities of predator/prey relationships, it does illustrate broad concepts.

Materials two different colors of rag "flags;" twelve of one color, three of another

Procedure

NOTE: The following procedures will be based on a group size of 33 students.. The activity will work with as few as 15 students, and the group size can be increased to approximately 50. Simply adjust the categories of muskoxen proportionately (approximately four times as many of both calves and cows as wolves; two times as

many of both calves and cows as bulls; e.g., four calves, four cows, two bulls, one wolf).

1. This is a highly involving activity! It is best done outdoors, in an open, grassy area; however, it is possible to do the activity indoors—even in a classroom—if tables, chairs, and desks can be moved in order to create a large space in which students can do some moving, including "tag-like" running.

2. Once you have established an appropriate physical area for this activity, divide your group of 33 students into four groups, consisting of three wolves, six bulls, 12 cows, and 12 calves. Each will have a distinctive role. Provide each calf with a long, brightly-colored rag "flag." The flag should be affixed to the calf's body in a way that it could—if it were within reach—be removed by a wolf. Back pockets are ideal! Each wolf should also have a rag "flag"—of a different color than those worn by calves. The wolves should also wear their flags in a secure but accessible manner.

3. This activity provides students with an opportunity to experience adaptation behavior of both muskoxen and wolves. Muskoxen, herbivores, often graze peacefully in meadowed areas. While grazing, they spread out. Calves typically do not stray too far from their mothers, but the animals do not always stay clustered...except when predators appear! Begin the activity with the students grazing peacefully as muskoxen, and the wolves out of sight of the herd.

Age: Grades 4—9

Subjects: Science, Physical Education

Skills: analysis, description, discussion, evaluation, generalization, kinesthetic concept development, observation, psychomotor development, small group work

Duration: 20—45 minutes

Group Size: 15—50; procedures above based on 33

Setting: outdoors

Conceptual Framework Reference: III.D., III.D.1., III.D.2., III.E., III.E.1., III.E.2.

Key Vocabulary: adaptation, predator, prey, defense, limiting factors

4. These are the behaviors each animal should exhibit:

Cows: As soon as grazing begins, the cows should choose a lead cow to watch for predators. The cows should pick a signal the lead cow will use to communicate to the rest of the herd that predators are approaching. When the lead cow signals that predators are near, all the cows move to form a circle around the calves to protect the calves from the wolves. With the calves in the center of a circle, the cows stand with their backs to the calves, facing outward to watch the wolves. The cows can move very little. Mostly, they stay firmly in one place, moving their upper bodies to block the wolves from reaching the calves. The cows cannot touch the wolves with their hands or feet.

Calves: The calves depend totally upon the cows for protection. Each calf is to hold onto a cow with both hands, around the cow's waist, and only follow the cow's lead. Calves cannot influence the cows' movement.

Bulls: The bulls are the active defenders of the cows and the calves. As the predators near, the bulls form a circle around the cows, who in turn are forming a circle around the calves. The bulls form as tight a circle as they can around the cows and calves, never any farther than one step in front of the circle of cows. The bulls can move, however—but only in a clockwise direction around the circle of cows! The bulls do have use of their hands. As the wolves attack the herd, the bulls try to "kill" them by pulling the flag out of their back pocket, or wherever the flag is attached to the wolf. When a bull kills a wolf, the wolf moves off to the side, "dead," but able to watch the remainder of the activity.

Wolves: Wolves begin the activity out of sight of the herd. They try to get as close as possible

to the herd without being detected. Wolves typically work as a unit, so they can attempt a strategy for surprising the herd in order to kill the calves for food. The wolves are mobile, able to move at any time in any direction. They can use any maneuver (except pushing and shoving) to break the herd's defenses. Once a wolf kills a calf—by pulling the calf's flag out of its pocket—temporarily stop the game and move the calf's carcass to the side, where it too can watch the remainder of the activity!

A Note About Sound Effects: This is not a quiet game much of the time. Wolves should be howling, communicating with each other in predetermined ways with signals, and as part of their tactics to startle and confuse the muskoxen. The muskoxen moo loudly.

5. Muskox Maneuvers in Review:

a. Muskox herd grazes quietly. Wolves are out of sight of herd.

b. Wolves move in to attack herd. When lead cow spots wolves, the herd begins defense. A circle is formed, with calves in the center, cows facing out in a circle around the calves, and bulls in an outer circle, also facing the wolves. Each should behave appropriately, as described above.

6. The activity can conclude in several ways. For example:

a. All the wolves could be killed.

b. All the calves could be killed.

c. The wolves could give up in frustration after a period of time with no success in killing a calf.

d. The wolves could kill one or more calves, and the activity conclude at this time, based on the notion that the wolves are going to eat the calf (or calves) and the herd move on.

7. Once the excitement and enthusiasm have peaked—sit down with the students to discuss what happened, and what the activity represents in terms of animal adaptation, predator/prey relationships, and limiting factors. Ask the students to describe and evaluate the predatory behavior of the wolves, and the various defense behaviors of the muskoxen. . . . What would happen if the wolves could not get into the herd? What would happen if the wolves always got into the herd. Ask the students to distinguish between what would be actual, typical behaviors of muskoxen contrasted with their behaviors in this activity.

Extensions

1. A few students can research and report back to the class with more details about the life and times of muskoxen and wolves—acquiring additional information about their survival needs, habitat, and behaviors.
2. Investigate predatory and defense behaviors of different species in different habitats. For example, selected species of plains, forest, desert, and ocean animals can be compared.
3. Plan a class and parent picnic. Let it be a potluck—with an after dinner activity, "Muskox

Maneuvers." It could be good exercise, good fun, and a worthwhile sharing of teaching and learning!

Evaluation

Name a prey species and its predator species. Describe how each is adapted to the other. How does the prey protect itself? How does the predator overcome this protection? Describe the overall effectiveness of each animal's adaptations.

QUICK FROZEN CRITTERS

Objectives

Students will be able to:
1) discuss predator/prey relationships, including adaptations; 2) describe the importance of adaptations in predator/prey relationships; and 3) recognize that limiting factors—including predator/prey relationships—affect wildlife populations.

Method

Students play an active version of "freeze tag."

Background

NOTE:

This activity is best done after one or more that introduces the concepts of "adaptation" and "limiting factors." See the cross references for suggestions.

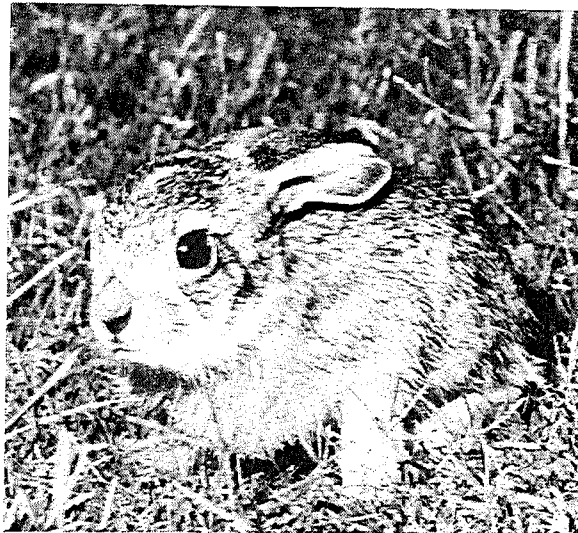
Predator: An animal that kills and eats other animals for food.

Prey: An animal that is killed and eaten by other animals for food.

Limiting Factors: There are many influences in the life history of any animal. When one of these (e.g., disease, climate, pollution, accidents, shortages of food) exceeds the limits of tolerance of that animal, it becomes a limiting factor. It then drastically affects the well-being of that animal. Predators are limiting factors for prey. Prey are limiting factors for predators.

Animals display a variety of behaviors in predator/prey relationships. These are adaptations to survive.

Some prey behaviors are: signalling to others, flight, posturing in a fighting position, scrambling for cover, and even "freezing" on the spot to escape detection or capture by predators. The kind of behavior exhibited partly depends on how close the predator is when detected by the prey. Each animal has a threshold for threat levels. If a predator is far enough away for the prey to feel some safety, the prey may signal to others that a predator is near. If the predator comes closer, the prey may try to run away. If the predator is too close to make running away feasible, the prey may attempt to scurry to a hiding place. If the predator is so close that none



of these alternatives is available, the prey may freeze in place. The closer the predator comes to the prey animal, the more likely it is that the prey will "freeze" in place. This "freezing" occurs as a kind of physiological shock in the animal. (Shelter or camouflage may also make them invisible to the predator when they freeze.) Too often people who come upon animals quickly and see them immobile infer that the animals are unafraid when, in reality, the animals are "frozen", or, as the adage goes, "frozen stiff." The major purpose of this activity is for students to recognize the importance of adaptations to both predators and prey and to gain insight into limiting factors affecting wildlife populations.

Age: Grades 4—6 (can be modified for younger and older students; simplify the discussion for younger students.)

Subjects: Science, Physical Education (Language Arts optional: See Variations and Extensions.)

Skills: analysis, description, discussion, evaluation, generalization, kinesthetic concept development, observation, psychomotor development

Duration: 20 to 45 minutes

Group Size: best with at least ten students; one "predator" per every four to six "prey."

Setting: indoors or outdoors

Conceptual Framework Reference: III.D., III.D.1., III.D.2., III.E., III.E.1., III.E.2.

Key Vocabulary: predator, prey, adaptation

Materials food tokens (pieces of cardboard), enough for three per student; gym vests or other labelling devices to mark predators; four or five hula hoops to serve as "cover" markers; pencil and paper to record number of captures, if desired

Procedure

1. Select any of the following pairs of animals:

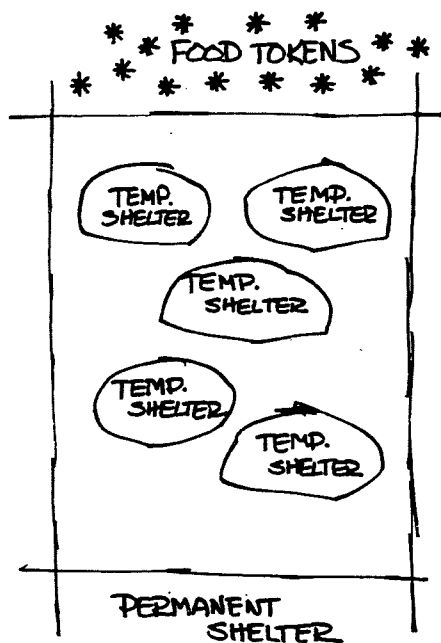
Prey	Predators
cottontails	coyotes
ground squirrels	hawks
deer	cougar
quail	foxes

Identify students as either "predators" or "prey" for a version of "freeze tag"—with approximately one predator per every four to six prey.

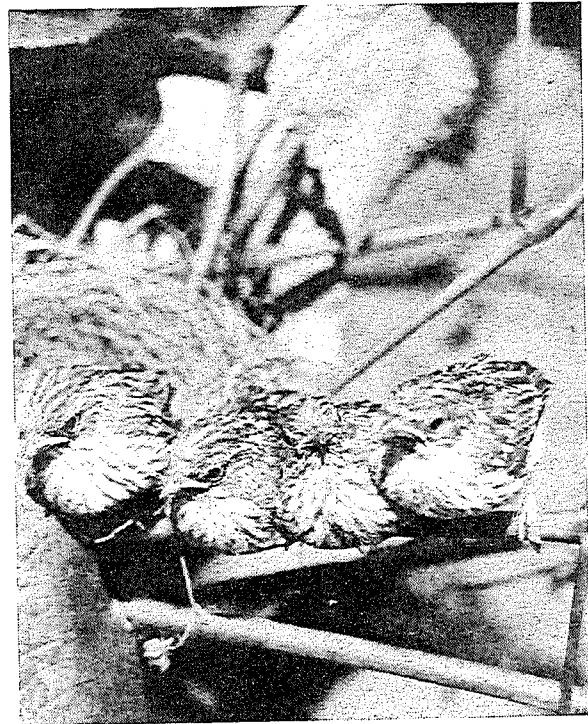
2. Using a gymnasium or playing field, identify one end of the field as the "food source" and the other end as the "shelter."

3. Four to five hula hoops are placed in the open area between the "shelter" and the "food." These represent additional shelter or "cover" for the prey and can be randomly distributed on the field. (If hula hoops are not available, string might be used—or chalk on asphalt.)

4. Food tokens are placed in the "food source" zone on the ground. Allow three food tokens for each prey animal. For example:



5. Predators should be clearly identified. Gym vests or safety patrol vests might be available.



6. Use a whistle or some other pre-arranged signal to start each round. When a round begins, prey start from their "shelter." The task of the prey animals is to move from the primary shelter to the food source, collecting one food token each trip, and returning to the primary shelter. To survive, prey have to obtain three food tokens. Their travel is hazardous, however. They need to be alert to possible predators. If they spot a predator, they can use various appropriate prey behaviors—including warning other prey that a predator is near. Prey have two ways to prevent themselves from being caught by predators; they may "freeze" any time a predator is within five feet of them; or they may run to cover (with at least one foot within one of the hula hoops.) Frozen prey may blink, but otherwise should be basically still without talking.

7. Predators start the game anywhere in the open area between ends of the field, and thus are randomly distributed between the prey's food and primary shelter. Predators attempt to capture prey to survive, tagging only *moving* (not "frozen") prey. (Optional: Prey can have bandannas in their pockets that the predators have to capture to represent the successful predation.) Predators must each capture two prey in order to survive. Captured prey are taken to the sidelines by the predator who captured them.

8. A time limit of five to seven minutes is suggested for each round of the game. (Captured prey on the sidelines will get restless if rounds are much longer.)

9. Play four rounds, allowing each student to be both prey and predator.

10. Discuss with the students the ways they escaped capture when they were prey. Which ways were easiest? Which were most effective? What means did they use as predators to capture prey? Which ways were best? What did the predators do in response to a prey animal who "froze?" In what ways are adaptations important to both predator and prey? Ask the students to summarize what they have learned about predator/prey relationships. How do predator/prey relationships serve as natural limiting factors affecting wildlife?

NOTE: Establish a ground rule for student behavior: Behave in ways that are not harmful to other students, even when simulating predator behavior; e.g., no full tackles!

Variations and Extensions

1. Play the game for three or four rounds, recording the number of captures each playing period. Have students who are captured become predators, and each predator not getting enough food become a prey animal in the succeeding round. This quickly leads to the concept of dynamic balance as prey and predator populations fluctuate in response to each other.

2. Have the students walk only, or assign different locomotive forms to each animal.

3. Students could select an animal and research its behavior patterns for avoiding detection and capture. Reports or demonstrations of the behavior could be presented to the class.

Evaluation

Pick any predator and prey. Describe each animal's adaptations.

OH DEER!

Objectives Students will be able to: 1) identify and describe food, water, and shelter as three essential components of habitat; 2) describe the importance of good habitat for animals; 3) define "limiting factors" and give examples; and 4) recognize that some fluctuations in wildlife populations are natural as ecological systems undergo a constant change.

Method Students become "deer" and components of habitat in a highly-involving physical activity.

Background A variety of factors affects the ability of wildlife to successfully reproduce and to maintain their populations over time. Disease, predator/prey relationships, varying impacts of weather conditions from season to season (e.g., early freezing, heavy snows, flooding, drought), accidents, environmental pollution, and habitat destruction and degradation are among these factors.

Some naturally-caused as well as culturally-induced limiting factors serve to prevent wildlife populations from reproducing in numbers greater than their habitat can support. An excess of such limiting factors, however, leads to threatening, endangering, and eliminating whole species of animals.

The most fundamental of life's necessities for any animal are food, water, shelter, and space in a suitable arrangement. Without these essential components, animal cannot survive.

This activity is designed for students to learn that:

- a) good habitat is the key to wildlife survival;
- b) a population will continue to increase in size until some limiting factors are imposed;
- c) limiting factors contribute to fluctuations in wildlife populations; and
- d) nature is never in "balance," but is constantly changing.

Wildlife populations are not static. They continuously fluctuate in response to a variety of stimulating and limiting factors. We tend to speak of limiting factors as applying to a single species, although one factor may affect many species. Natural limiting factors, or those modeled after factors in natural systems, tend

to maintain populations of species at levels within predictable ranges. This kind of "balance in nature" is not static, but is more like a teeter-totter than a balance. Some species fluctuate or cycle annually. Quail, for example, may start with a population of 100 pairs in early spring; grow to a population of 1200 birds by late spring; and decline slowly to a winter population of 100 pairs again. This cycle appears to be almost totally controlled by the habitat components of food, water, shelter, and space, which are also limiting factors. Habitat components are the most fundamental and thereby the most critical of limiting factors in most natural settings.

This activity is intended to be a simple but powerful way for students to grasp some basic concepts: that everything in natural systems is interrelated; that populations of organisms are continuously affected by elements of their environment; and that populations of animals do not stay at the same static number year after year in their environment, but rather are continually changing in a process of maintaining dynamic equilibria in natural systems. The major purpose of this activity is for students to understand the importance of suitable habitat as well as factors that may affect wildlife populations in constantly changing ecosystems.

Materials area—either indoors or outdoors—large enough for students to run; e.g., playing field; chalkboard or flip chart; writing materials

Age: Grades 4—12

Subjects: Science, Math, Social Studies, Physical Education

Skills: application, comparing similarities and differences, description, discussion, generalization, graphing, kinesthetic concept development, observation, psychomotor development

Duration: 30—45 minutes

Group size: 15 and larger recommended

Setting: indoors or outdoors; large area for running needed

Conceptual Framework Reference: I.C.2., III.B., III.B.2., III.B.3., III.B.5., III.C., III.C.1., III.C.2., III.E., III.E.1., III.E.2., III.F., III.F.1., III.F.2., III.F.3., III.F.4., III.F.5., IV.C., IV.C.1., IV.C.2.

Key Vocabulary: habitat, limiting factors, predator, prey, population, balance of nature, ecosystem



Procedure

1. Begin by telling students that they are about to participate in an activity that emphasizes the most essential things that animals need in order to survive. Review the essential components of habitat with the students: food, water, shelter, and space in a suitable arrangement. This activity emphasizes three of those habitat components—food, water, and shelter—but the students should not forget the importance of the animals having sufficient space in which to live, and that all the components have to be in a suitable arrangement or the animals will die.
2. Ask your students to count off in four's. Have all the one's go to one area; all two's, three's, and four's go together to another area. Mark two parallel lines on the ground or floor ten to 20 yards apart. Have the one's line up behind one line; the rest of the students line up behind the other line.
3. The one's become "deer." All deer need good habitat in order to survive. Ask the students what the essential components of habitat are

again: **food, water, shelter, and space in a suitable arrangement.** For the purposes of this activity, we will assume that the deer have enough space in which to live. We are emphasizing food, water, and shelter. The deer (the one's) need to find food, water, and shelter in order to survive. When a deer is looking for **food**, it should clamp its hands over its stomach. When it is looking for **water**, it puts its hands over its mouth. When it is looking for **shelter**, it holds its hands together over its head. A deer can choose to look for any one of its needs during each round or segment of the activity; **the deer cannot, however, change what it is looking for;** e.g., when it sees what is available, during that round. It can change again what it is looking for in the next round, if it survives.

4. The two's, three's, and four's are food, water, and shelter—components of habitat. Each student gets to choose at the beginning of each round which component he or she will be during that round. The students depict which component they are in the same way the deer show what they are looking for; that is, hands on stomach for food, etc.

HOW MANY BEARS CAN LIVE IN THIS FOREST?

Objectives Students will be able to: 1) define a major component of habitat; and 2) identify a limiting factor.

Method Students become "bears" to look for one or more components of habitat during this physically-involving activity.

Background It is recommended that this activity be preceded by one or more activities on adaptation; basic survival needs; components of habitat; crowding; carrying capacity; habitat loss; habitat improvement; herbivores, carnivores, and omnivores; and limiting factors. See the cross references for suggestions. For additional information about black bears, see "Bearly Born."

In this activity, black bears are the focus in order to illustrate the importance of suitable habitat for wildlife. One or more components of habitat—food, water, shelter, and space in a suitable arrangement—are emphasized as one way to convey the concept of "limiting factors."

Black bear habitat limits black bear populations, especially through the influences of shelter, food supply, and the social tolerances or 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 the area. These young bears must keep moving around either until they die or find an area vacated by the death of an adult.

When food supplies are reduced by factors such as climatic fluctuations, competition becomes more intense. Some adult bears might temporarily move to seldom-used areas of their home range, sometimes many miles away. They must live on what food is available in the area. These



individuals may become thin and in poor condition for winter hibernation or, in the case of young bears, be forced from the area by more aggressive adults.

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 the activity. However, by this simple illustration, it is possible for students quickly to grasp the essential nature of the concept of limiting factors.

Age: Grades 3—9 (and older)

Subjects: Science, Social Studies, Mathematics, Physical Education

Skills: analysis, computation, discussion, evaluation, generalization, kinesthetic concept development, listing, observation, psychomotor development

Duration: 20—45 minutes or longer

Group Size: any (adjust number of food squares per size group; less than 80 pounds of food per student)

Setting: outdoors and indoors

Conceptual Framework Reference: III.A.1, III.B., III.B.1., III.B.2., III.B.3., III.D., III.D.1., III.D.2., III.D.3., III.D.4., III.E., III.E.1., III.E.2., III.F., III.F.1., III.F.2., III.F.3., III.F.4., III.F.5.

Key Vocabulary: limiting factors, habitat, shelter, cover

The major purpose of this activity is for students to recognize the importance of suitable habitat. Inadequate food and/or shelter are two examples of what is called a limiting factor—something which affects the survival of an animal or a population of animals.

Materials five colors of construction paper (two to three sheets of each color) or an equal amount of light poster board; one black felt pen; envelopes (one per student); pencils; one blindfold; five sheets green construction paper (for extension).

Procedure

1. Make up a set of 2" x 2" cards. For a classroom of 30 students, make 30 cards of each of five colors to represent food as follows:

orange—nuts (acorns, pecans, walnuts, 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, beaver, muskrats, young deer); mark five pieces M-8; mark 25 pieces M-4.

green—plants (leaves, grasses, herbs); mark five pieces P-20; mark 25 pieces P-10.

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	— 20 pounds	= 25%
	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 Arizona. One similarity among black bears everywhere is that the majority of their diet is normally made up of vegetative material. Keeping these figures in mind, make and distribute the appropriate number of food cards for your size group of students. 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.

If you want, you can also include "water" by making an additional 50 squares 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).

2. In a fairly large open area (e.g., 50' x 50'), scatter the colored pieces of paper.

3. Have each student write his or 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 area.

4. Have the students line up on the starting line, leaving their envelopes between their feet on the ground. Give them the following instructions: "You are now all black bears. All bears are not alike, just as you and I are not exactly alike. Among you is a young male bear who 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 as the crippled bear. He 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. She must hunt blindfolded.) The third special bear is a mother bear with two fairly small cubs. She must gather twice as much food as the other bears. (Assign one student as the mother bear.)"

5. 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, so they should gather different colored squares to represent a variety of food.

6. Students must 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 food as they find it.)

7. When all 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.

8. Explain what the colors and numbers represent. Ask each student to add up the total number of pounds of food he or she gathered—whether it is nuts, meat, insects, berries, or plant materials. Each should write the total weight on the outside of his or her envelope.

4. Direct the students to move as individual "bears" into the area. Each bear must pick up as many of the components of habitat as possible. Some competitive activity is acceptable as long as it is under control. Bears are territorial. Remember that if bears fight, which they seldom do, they can become injured and unable to successfully meet their needs for survival.

5. When the students have picked up all of the squares of paper in the area, have them return to the classroom or be seated in any comfortable area. Ask the students to separate their squares of paper into piles according to the letter on each. Using a chalkboard or large pad for a visual reference, ask the students to guess what the letters on the green cards represent—giving them the clue that each is an element of cover or shelter for a black bear. What kinds of shelter would a bear need? What do these initials represent? Record how many bears got at least one of each kind of shelter. How many got only four kinds? Three? Two? How many got only one kind of shelter? For the purposes of this activity, only those bears with at least one of each kind of necessary shelter can survive through one year. Ask students what would happen if a bear has all types of shelter except a den? (The bear could live from April through October, but would not have a secure place to hibernate and might not survive the winter.) Ask the students what would happen if a bear did not have travelways? (Without travelways, home ranges become fragmented and bears are not able to reach needed food, water, or other shelter.) Suggesting that the students need one of each kind of shelter represents the importance of appropriate shelter as a necessary component of an animal's habitat. Shelter is a very important part of a bear's habitat. A bear needs shelter in which to search for food and water. Bears also need shelter for traveling through their home range; and shelter for bedding, hiding, and denning. In this activity, how many bears survived? What was a "limiting factor" for this population of bears? (Shelter.) What other things possibly could become limiting factors? (Water and space, or territory, are two examples.) Would food be a limiting factor for bears? (Yes, however bears are omnivores and can utilize many sources of food.)

6. Ask the students to summarize what they have learned about the importance of suitable habitat for bears' survival. How is this similar and different to the needs of other animals?

Evaluation

Define "limiting factor." Describe some of the factors which may limit the survival of an animal that lives in your area.

9. Using a chalkboard, list "blind," "crippled," and "mother." Ask the blind bear how much food she got. Write the amount after the word "blind." Ask the crippled bear and the mother bear how much they got and record the information. Ask each of the other students to tell how much food they found; record each response on the chalkboard. Tell the students each bear needs 80 pounds to survive. Which bears survived? Is there enough to feed all the bears? How many pounds did the blind bear collect? Will she 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, and 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 a continued bear population. She can have more cubs in her life; only one needs to survive in order for the population to remain static.)

10: If you included the water squares, each student should have picked up at least one square representing a water source, or he or she 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 of food he or she gathered. Ask each student next 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 that they can compare their percentages with what are typical percentages eaten by black bears in Arizona. Ask each student to attempt to guess how healthy their bear would be. How do the bears' requirements for a diet seem to compare with the needs of humans for a balanced and nutritious diet?

12. Ask the 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 in a ten day period. How many bears could the habitat support? Why then did only _____ bears survive when your class did this activity? Is that 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 bears and populations of bears in an area?

Extensions

1. Cut the paper or posterboard into 2" x 2" squares. For a class of 30 students, make 150 squares. Make five piles of 30 squares each. Mark each set of 30 cards with one of these letters: B, T, D, H, and F. These represent B = bedding sites, T = travelways, D = dens, H = hiding cover, and F = feeding sites. For purposes of this activity, these are defined as follows:

Bedding Sites—Black bears are usually active in early morning and late evening, and bedded most of the rest of the day and night. Bedding sites are usually in areas of dense vegetation, steep topography, and/or large trees where the bears feel secure.

Travelways—Bears require corridors of cover (made up of thick vegetation and/or steep topography) to enable them to travel between areas of food, water, and shelter within their home range.

Dens—Black bears use dens as shelter for hibernation from November to April in each year. Bears have been found denning in hollow logs, caves, holes dug into hillsides, under buildings, and even in culvert pipes. Bears often prepare and may use more than one den, and may change dens during the winter because of disturbance or if the den leaks. Bears seldom re-use dens from one year to the next.

Hiding Cover—Black bears evolved as animals that escape danger from predators and other bears by hiding in thick cover.

Feeding Sites—Bears will often use areas with less cover than hiding areas or bedding sites for feeding. Feeding sites are, however, often found close to thick hiding cover to allow the bear to quickly escape danger if necessary.

NOTE: This information is based on actual research data from a study in Arizona. These components of shelter may vary slightly in different parts of North America.

2. In a fairly large open area (e.g., 50' x 50'), scatter the colored pieces of paper.

3. Have the students line up along one side of the area. Tell them that they are to become "bears" for the purposes of this activity. Review the concept of habitat—that a bear would need shelter, food, water, and space in a suitable arrangement in order to survive. Do not tell the students what the letters on the squares of paper represent. Tell them only that they represent one element or component of bear habitat.

HABITAT LAP SIT

Objectives Students will be able to: 1) identify the components of habitat; 2) recognize how humans and other animals depend upon habitat; and 3) interpret the significance of loss or change in habitat in terms of people and wildlife.

Method Students physically form an interconnected circle to demonstrate components of habitat.

Background See "The Beautiful Basics," "Everybody Needs A Home," "What's That, Habitat?," "Habittracks," and "Habitat Rummy" for activities with similar purposes. People and other animals share some basic needs. Every animal needs a place in which to live. The environment in which an animal lives is called "habitat." An animal's habitat includes **food, water, shelter, and adequate space** in an **arrangement** appropriate to the animal's needs.

If any of these components of habitat are missing or are affected significantly so that the arrangement for the individual animal or population of animals is no longer suitable, there will be an impact. The impact will not necessarily be catastrophic, but can be. There are a great many additional limiting factors beyond those of suitable food, water, shelter, and space. For example, disease, predation, pollution, accidents, and climatic conditions are among other factors which can have impact.

All things are interrelated. When we look at a biological community, we find interrelationships and interdependencies between plants and plants, plants and animals, as well as animals and animals. These interrelationships and interdependencies are important.

The major purpose of this activity is for students to become familiar with the **components of habitat**, and to recognize that it is not sufficient for there to be **food, water, shelter, and space** in order for animals to survive—those components of habitat must be in a suitable **arrangement**.

NOTE: This activity was inspired by a "New Game," and adapted to teach concepts related to wildlife.

Materials none needed

Procedure

1. This activity takes very little time—but has a lot of impact! Ask the students to number off from "one" to "four." All the "ones" go to one corner of the room, the "twos" to another, etc.
2. As the students move to their corners, clear a space in the center of the room. Better still, go outside to a clear, grassy area. The "ones" should sit or stand together, "twos" together, etc.
3. Assign each group a concept as follows: "ones" = food, "twos" = water, "threes" = shelter, "fours" = space.
4. Now, it's time to form a circle! This is done by building the circle in chains of food, water, shelter, and space. A student from each of the four groups walks toward the cleared area. The four students stand next to each other, facing in toward what will be the center of the circle. Four more students—one from each group—join the circle. Keep adding to the circle in sets of four until all the students are in the circle.
5. All students should now be standing shoulder to shoulder, facing the center of the circle.
6. Ask the students to turn toward their **right**, at the same time taking one step toward the center of the circle. They should be standing close together, with each student looking at the back of the head of the student in front of him or her.
7. Don't panic—this **will** work! **Ask everyone to listen carefully.** Everyone should place their hands on the waist of the person in front of them. At the count of three, you want the students to **sit down . . . on the knees of the person behind them**, keeping their own knees together to support the person in front of them.

Age: Grades 4—9 (also younger and older)

Subjects: Science, Physical Education

Skills: discussion, generalization, kinesthetic concept development, small group work

Duration: 20 minutes

Group Size: 15 to 45 students

Setting: outdoors preferred; indoors possible

Conceptual Framework Reference: I.A., I.A.2., I.A.4., I.C., I.C.1., I.C.2., I.C.3., I.C.4., I.D., III.B.

Key Vocabulary: habitat, food, water, shelter, space, arrangement

You then say, "Food, water, shelter, and space—in the proper **arrangement** (represented by the students' intact, "lap-sit" circle)—are what is needed to have a suitable (good) habitat."

8. The students at this point may either fall or sit down. When their laughter has subsided, talk with them about the necessary components of suitable habitat for people and wildlife.

9. After the students understand the major point—that food, water, shelter, and space are necessary for any animal's survival, and in their appropriate arrangement comprise a suitable habitat—let the students try the circle activity again! This time ask them to hold their lap sit posture. As the students lap-sit—still representing food, water, shelter, and space in their appropriate arrangement—identify a student who represents "water." Then say, "It is a drought year. The water supply is reduced by the drought conditions." At this point, have the student who was identified as representing "water" remove himself or herself from the lap-sit circle—and watch the circle collapse, or at least suffer some disruption in arrangement. You could try this in several ways—removing one or more students from the circle. Conditions could vary: pollution of water supply, urban sprawl limiting availability of all components, soil erosion impacting food and water supplies, etc. Since animals' habitat needs depend upon food, water, shelter, and space, in their appropriate arrangement, "removal" of any will have an impact.

10. Ask the students to talk about what this activity means to them. Ask the students to summarize the main ideas they have learned. They could include: a) food, water, shelter, and space, in their appropriate arrangement, can be called habitat; b) humans and other animals depend upon habitat; c) loss of any of these elements of habitat will have impact on the animals living there; and d) the components of habitat must be in an arrangement suitable to the needs of the individual animals or populations of animals in order for the animals to survive.

Variation

Have students form a circle, holding hands. Walk around the circle, first naming one student as an animal of a particular ecosystem. Name the next four students in the circle as food, water, shelter, and space for that animal. Repeat the process until all the students are involved. Any "extras" can be identified as elements of habitat, e.g., resulting from a particularly good year for habitat needs for the last animal named. When all of the students have been designated as an animal or as components of an animal's habitat, comment on the fact that they are holding hands. This represents the idea that all things in an ecosystem are interrelated. Briefly discuss the idea of interrelationships. Then move the students into position to do the "lap sit" described in the Procedure above. Remind the students that they noticed all elements of the ecosystem were interrelated when they were holding hands. Now they are going to find out that they all are dependent upon one another as well. Do the "lap sit." Discuss interrelationships and interdependencies in ecological systems.

Evaluation

What are the five essential components of habitat?

Explain how the arrangement of food, water, shelter, and space is important to humans and other animals.

What would probably have the greater long-term impact on the wildlife living on a farm in Iowa? A severe winter which killed many animals or the development of part of the farm into a commercial shopping center?

MICROTREK SCAVENGER HUNT

Objectives Students will be able to: 1) state that humans and wildlife share environments; 2) demonstrate that humans do not have exclusive use of environments; and 3) generalize that wildlife can be all around us even if we do not actually see or hear it.

Method Students go outside on a "scavenger hunt" for wildlife.

Background See "Wildlife Is Everywhere." The major purpose of this activity is for students to understand that people and wildlife do share environments. By investigating microenvironments or microhabitats, the students should be encouraged to generalize from the information they acquire to the whole of the planet, coming to the understanding in general terms that wildlife exists in all areas of the planet, in some form. In the deserts of the southern hemisphere, the oceans, tropical jungles, and cities of the earth; from the Antarctic snow fields to the glaciers of the Arctic region, wildlife exists in a variety of forms.

Materials hand lens, digging tool, pencil and mimeographed instruction sheet for each group of two to five students

Procedure

1. This is a wildlife scavenger hunt! The students will be given a list of things to find, and then will go outside and find different kinds of evidence that wildlife exists—even at school! (This activity can be done almost anywhere, with supervision,—from city centers to parks to outdoor education sites. It is especially effective where students would not expect to find much wildlife.)

2. Divide the students into groups of two to five. Provide each group with a small hand lens, small digging tool, pencil, and instruction sheet. The instruction sheet could look something like the following:



Age: Grades 4—6 (and older)
Subjects: Science, Language Arts, Social Studies
Skills: analysis, application, classification, description, discussion, generalization, listing, observation, problem solving, reading, small group work, writing
Duration: 30 minutes to two hours
Group Size: small groups working simultaneously; any number
Setting: outdoors and indoors
Conceptual Framework Reference: I.B., I.B.1., I.B.2., I.B.3., I.B.4.
Key Vocabulary: evidence, environments, wildlife

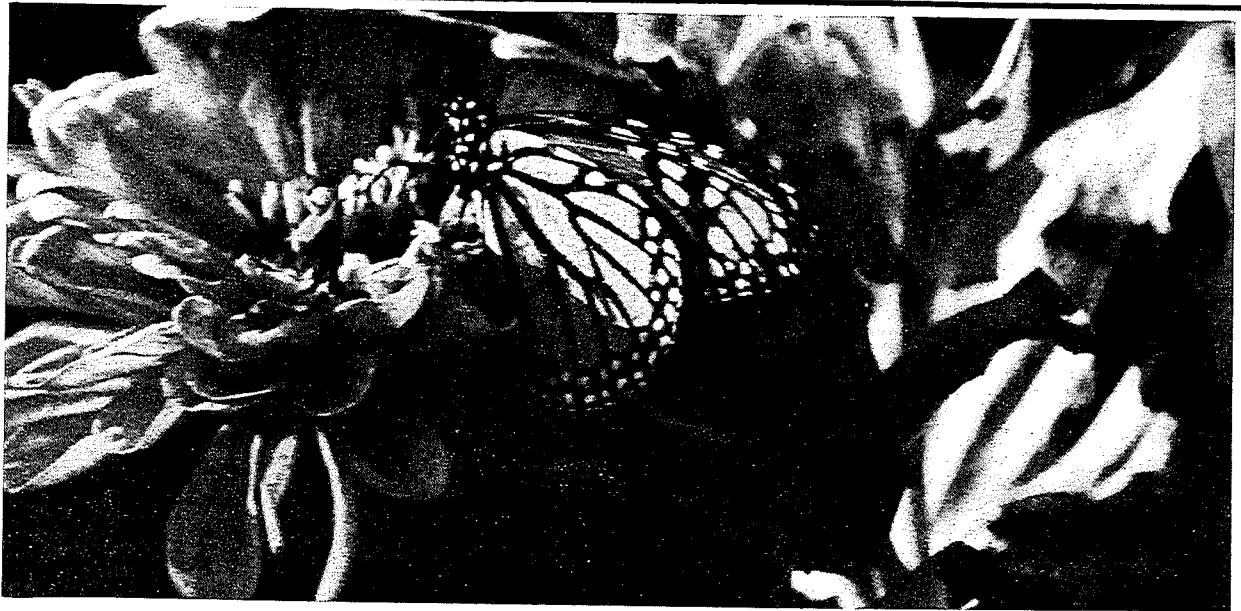
WILDLIFE SCAVENGER HUNT

This is a scavenger hunt to look for evidence of wildlife!

CAUTION: Be careful not to kill any animals or damage their homes!

Find evidence that:

1. Humans and wildlife share environments.
2. Humans and wildlife must adjust to their environment, move to a more suitable environment, or perish.
3. Wildlife is all around us, even if we don't see or hear it.
4. Wildlife ranges from small in size, to very big.
5. People and wildlife experience some of the same problems.
6. People and wildlife both need a place to live.



3. Establish a length of time the students may be outside. This depends on how many things they are asked to look for. Go outside with them to supervise. You can use 15-minute blocks of time, with 15 minutes for every one or two things the students are looking for. For example, the six-item scavenger hunt used in the sample given in this activity could take anywhere from 15 to 45 minutes for the students to find their evidence. You could ask all of the students to find evidence for all of the items. Or, especially with younger students, you could assign each group just one of the things to find. Every group should return with some evidence. Evidence can be such things as small drawings on the mimeographed sheet or on extra paper the students take along. It can be word descriptions of what they see. It can be small samples they bring back to class, if they can bring samples without doing significant damage to the environment. You should provide paper sacks for evidence if they are going to bring things back.

4. Before sending the students outside, make sure the instructions are clear. Talk with the students about what wildlife is, contrasted with other animals like pets. Go through the list of things they are "scavenging" for, to make sure they have an understanding of what they will be looking for. Don't be too specific with your examples. (The most creative and conceptually solid solutions often come up in the face of ambiguity. The students are apt to find delightfully inventive and appropriate evidence, if allowed to be responsibly resourceful!) With the time limits established, open the door and begin "trekking."

5. At the end of the designated time period,

everyone should meet back at the classroom. Ask each of the groups to report on what they found.

6. What are some of the most interesting things the students felt they learned? Encourage the students to come to the generalizations that people and wildlife share environments, that wildlife is all around us, and in fact that wildlife in some form is in areas all over the planet.

Extensions

1. Creative writing!
2. Classify the types of wildlife found.
3. Tally the types of wildlife found, and the numbers of each kind of wildlife. (You can develop this tally into a pyramid of numbers to demonstrate that such a concept is real.)
4. Do microscope work with some of the samples found; for example, the underside of leaves with insect eggs, soil with a lot of plant matter, water, larvae, the inside of insect galls, bark, and a hollow plant stem.
5. See "Wild Words" and add drawings and descriptions to personal journals!

Evaluation

Name three things you saw, heard, or smelled which showed you that wildlife lives in the school area.

Name at least five different kinds of wildlife from five different areas on the earth.

In which areas on earth would you not be able to find any animals?