

Black Bear in New Hampshire



CURRICULUM



New Hampshire
Fish and Game Department

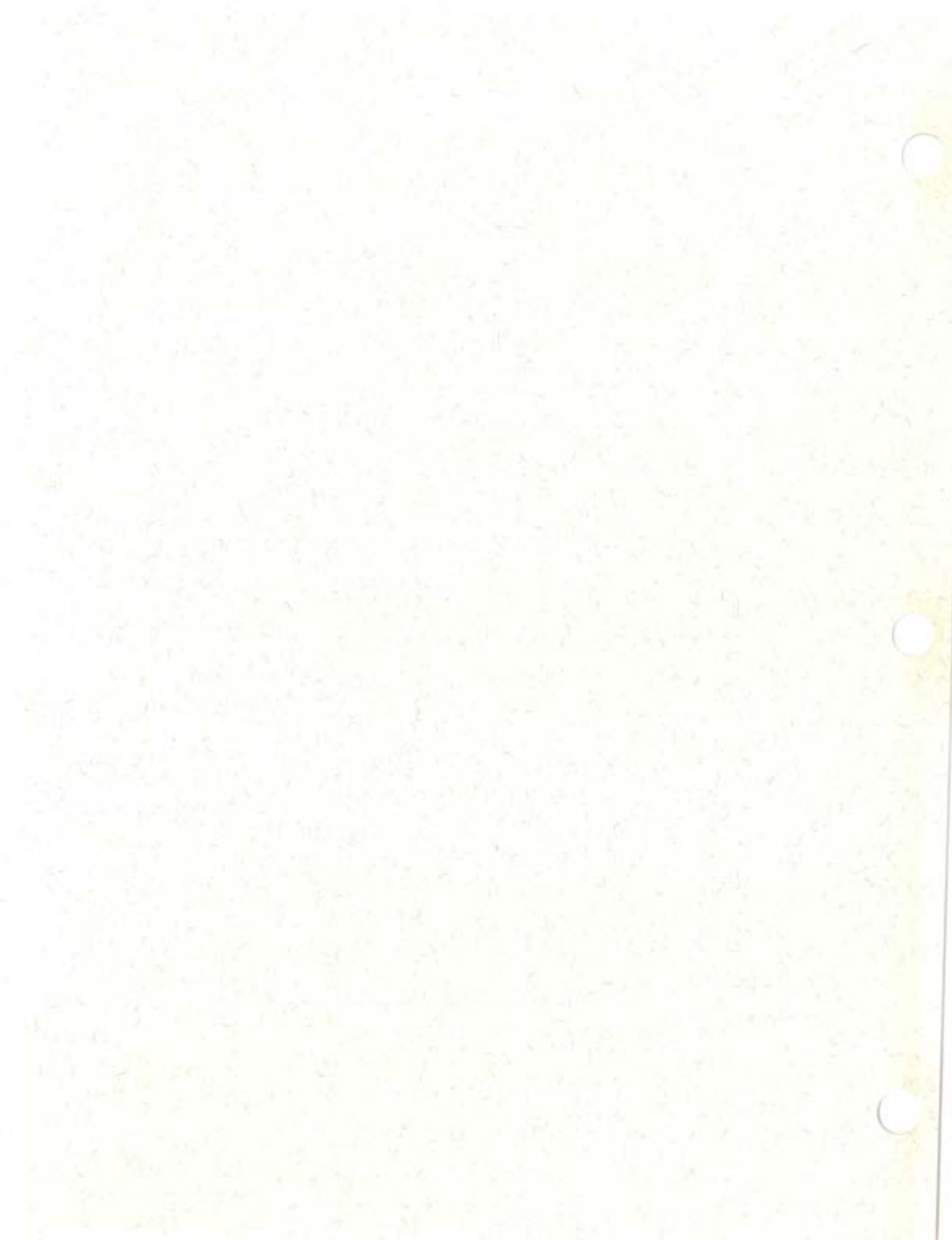


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Introduction

Historically, the irrational fear and lack of understanding of black bears had nearly eradicated the species. In this unit, students will learn more about the natural history of these intelligent and interesting animals and, with this knowledge, learn to live peacefully with them.

The majority of the lessons have a student page, written on the intermediate grade level, that can be duplicated for students. Additional information is included for teachers interested in adapting the material to older or more sophisticated students. Activities follow each of the lessons to reinforce the concepts introduced in the reading. The activities incorporate a variety of skills and are relevant to a number of curriculum areas.

Please feel free to modify these lessons to meet the needs and interests of your class.

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Black Bear Characteristics

Color: Body fur black, brown, blonde. Brown muzzle. White chest patch uncommon. Eyes brown (blue at birth). Skin light gray.

Adult weight: Males – 125 to 500 pounds common, depending upon age, season and food. Females – 90 to 300 pounds common, depending upon age, season and food.

Adult length: 50-80 inches, nose to tail, depending on sex.

Litter size: One litter every other year. Typically three in the East and two in the West.

Birth Month: January

Birth Weight: 1/2 to 1 pound

Weight at one year: 35 pounds to more than 100 pounds, depending upon food supply.

Parental Care: 17 months, ending in June when mothers become ready to mate again.

Age at Production of First Cubs: Two to eight years, depending upon food supply. In New Hampshire the average age is four.

Sex Ratio: Nearly even at birth. Mature bears: one male per two to five females.

Vision: Color vision. Good close-up vision.

Hearing: Exceeds human frequency range and sensitivity.

Smelling: One hundred times more nasal mucosa area than human. Smelling ability extremely good.

Intelligence: One of the more intelligent mammals. Can generalize to the simple concept level. Long term memory excellent. Heaviest brain, relative to body length, of an land carnivore.

Swimming Distance: At least 1.5 miles.

Running Speed: Lean bears may exceed 30 m.p.h..

Daily Activity Period: Crepuscular – typically 1 to 2 hours before sunrise to 1 to 2 hours after sunset.

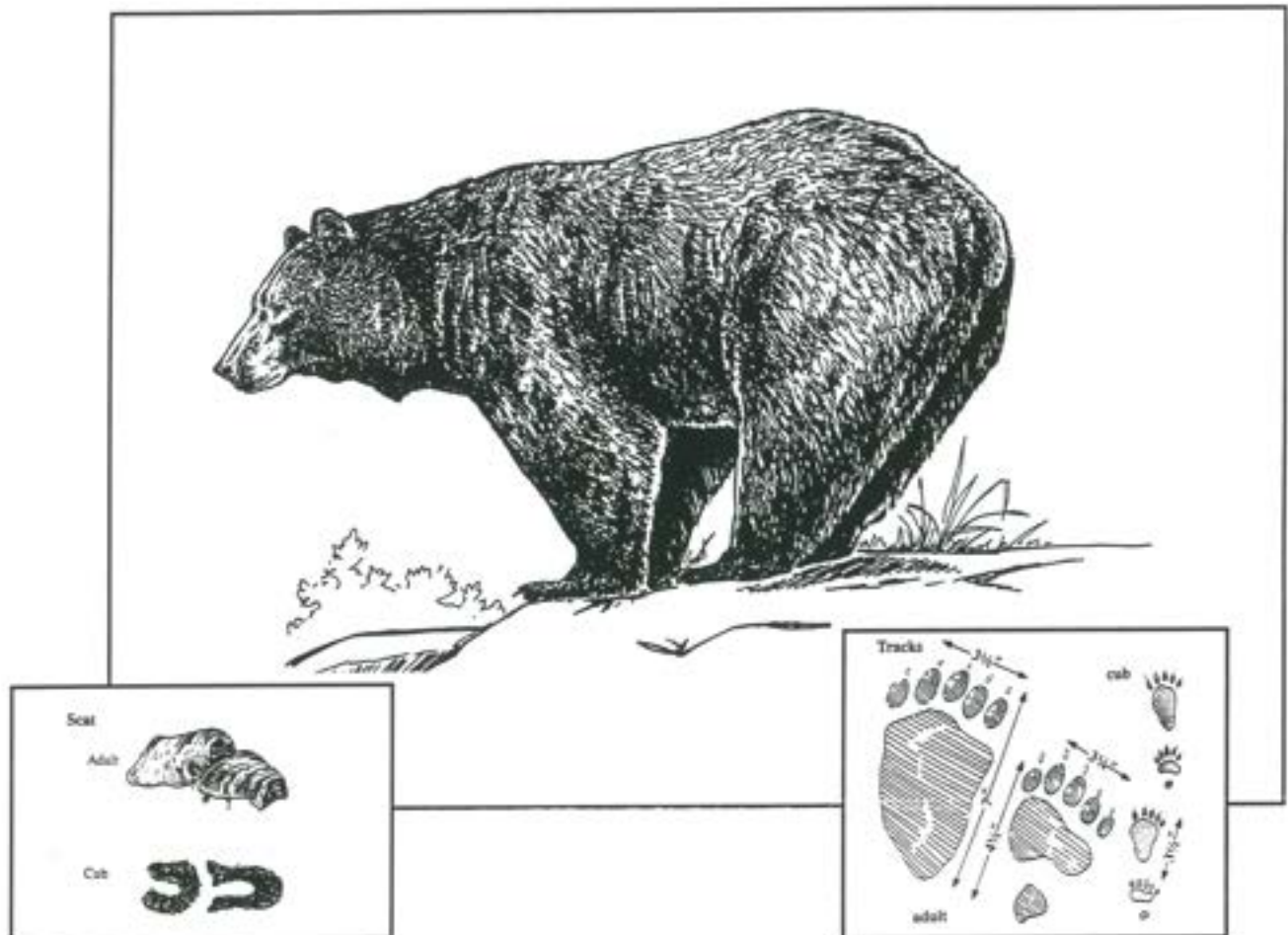
Home Range Diameter: Yearlings – 1-2 miles. Adult females – 2-6 miles. Adult males: 8-15 miles. Excursions to 126 miles recorded.

Preferred Foods: Fruit, nuts, acorns, insects, succulent greens and meat. Less preferred foods may cause weight loss.

Hibernation: 0-7, months depending upon latitude and food supply. In New Hampshire, from late October to late March or early April.

Potential Longevity: 21-33 years or more in captivity. Average five to six years in New Hampshire.

Optimum Habitat: Extensive forests with a variety of fruit and nut-producing trees and shrubs. Small openings promote fruiting of many shrubs. Lowlands and wetlands are important sources of succulent vegetation. Streams and pools are needed for drinking and cooling.



Background Information

The black bear is the largest omnivorous (plant and animal-eating) wild mammal in New Hampshire. Male black bears typically weigh 200 to 250 pounds, while adult females weigh an average of 125 -150 pounds, not much more than most people. Black bears are 5 to 6 feet long and stand almost 3 feet high at the shoulders when on all fours.

Black bears have long muzzles with an almost straight profile compared to grizzly bears, which have a more rounded profile. Black bears have rounded ears, small eyes and a short tail. Their bodies look round and bulky, but black bears are agile. They can run as fast as a horse and are good swimmers and tree climbers.

Black bears have short, sturdy legs. They walk on the soles of their feet and have five toes, just like humans. Their rear paw tracks look like human footprints except for the marks left by their curved, non-retractable claws.

Most Eastern black bears have glossy black fur with a tan muzzle. A white mark, called a blaze, is sometimes present on their chests. In the West, black bears sometimes are different colors, including cinnamon or a bluish-gray phase. The sexes look alike.

Habitat and Range

Black bears live in large tracts of woods, preferring mixed stands of hardwoods and softwoods sprinkled with swamps, rivers, streams or lakes. Natural black bear habitats have thick ground cover and few human visitors.

Originally found throughout North America, the black bear has been eliminated from most of the North Central and Central United States. In New England they are found in Massachusetts, Vermont, Maine, New Hampshire and parts of Connecticut.



Communication

Bears usually do not vocalize, unlike bears in movies with dubbed-in sound tracks. When the need arises, they communicate with grunts, by expelling air in different ways, or with a resonant "voice." Black bears use the same vocalizations and body language toward people that they do toward each other.

The most common bear sounds are grunts, which are used in amicable situations, as when vocalizing to play-partners, mates, cubs and occasionally people. The sound most often heard by people is a loud blowing, which means a black bear is nervous or afraid. Campers and hikers hear this when bears retreat or bluff. Three types of bluffs are common, and all include sudden, explosive blowing. The most common is blowing with clacking teeth--the defensive display of a scared bear. Another display is blowing with a short lunge and slapping the ground or an object – an uneasy black bear's ways of saying, "Move back." A more emphatic version is blowing and bluff charging. Any of these blustery displays can occur when a black bear feels crowded but is reluctant to leave food or cubs. However, displays usually end with bears turning and retreating. Research has shown that these displays are not preludes to attacks and that aggressive behavior by people (yelling, waving arms, making short rushes, throwing things to scare the bear) is almost certain to put a bluffing bear in retreat.

The black bear's resonant "voice" is reserved for strong emotions and is seldom used except by cubs. Cubs readily scream in distress, whine when approaching their mother or give a tremulous purr when nursing. Adults and cubs use their "voices" when in pain (bawling), in fear (moaning), in combat (bellowing), or when seriously threatening (deep throated pulsing sound). Unlike cats and dogs, black bears seldom, if ever, growl. Predacious attacks are silent, as is normal feeding.

Bears also communicate by marking trees with their scent. This is usually done by standing on two legs and rubbing the back, shoulders, and especially the back of the head on a tree, telephone pole, or other object. They may bite and claw the trees. Scent reveals individual identity, reproductive status and probably mood. Marking is most frequent by adult males before and during the mating season (in late May and June), but some marking is done by all bears in all seasons of activity. Any bear that passes a marked tree is almost certain to stop and smell it and perhaps add its own scent. It is a misconception that bears show how big they are by reaching as high as they can when marking. Favorite marking places are often human-made signposts, many of which are shorter than the bears.

Hibernation

For the black bear, hibernation is more an adaptation for escaping winter food scarcity than an adaptation for escaping winter cold. Most dens are nearly as cold as the surrounding countryside. Dens may be burrows, caves, hollow trees or simply nests on the ground. Bears gather dead tree bark, leaves, grass and twigs to make insulated beds on which to curl up, leaving only their well-furred backs and sides exposed to the cold. They sleep alone except for mothers with newborn cubs and yearlings. Most bears use a different den each year. In New England most dens are above ground, under a blowdown or brush pile.

Hibernation lasts up to 7 months in the northern regions but is shorter in the south. Male bears that find food year-round in the south may not hibernate at all, but black bears in the north hibernate so deeply that they may be jostled and prodded for several minutes in mid-winter before they react. Undisturbed black bears remain nearly inactive during hibernation, unlike smaller hibernators that raise their body temperatures to summer levels

every few days so they can eat stored food and pass wastes.

To survive long winters without eating, drinking, exercising, or passing wastes, hibernating bears cut their metabolic rates in half. Their sleeping heart rate drops from a summer rate of between 60 and 90 beats per minute to a hibernating rate of between 8 and 40 beats per minute. Rectal temperature drops only slightly, from 99-102 degrees F in summer to 88-98 degrees F during hibernation. Bears can maintain this high body temperature despite their slower metabolism in winter because of their thick fur and reduced blood supplies to their limbs. Only the head and torso are maintained at the high temperatures. Keeping the brain at a high temperature enables bears to maintain brain function for tending newborn cubs and responding to danger.

Less than one percent of black bears die in dens. Their main threats are flooding and predators (wolves, dogs, active bears, and humans). Bears do not usually die of starvation in dens. Most deaths from starvation are before or after hibernation and primarily involve cubs and yearlings. Most parasites of bears are adapted to their host's hibernation cycle and reduce their demands in winter.

Medical researchers are studying black bear hibernation to learn how bears cope with conditions that are problems for people. The findings are aiding studies of human kidney disease, gallstones, obesity, anorexia nervosa, and other problems. Researchers hope that knowledge of bear hibernation may even aid space travel.

Social Behavior

Except for females with their cubs or yearlings, black bears do not den together. They are also solitary foragers under normal circumstances. Black bears are often most active before dawn and after dusk. From June through mid-July, which is their mating season in the northeast, male black bears can be active up to 24 hours a day.

Male black bears are sexually mature when they are 3 years old, but older dominant males do most of the breeding. Male bears breed with many females. Females can breed when they are 4 years old, but only about one-third of the females breed each year. Food availability helps determine whether or not a female will produce a litter of cubs. They breed once every two years.

Unlike most mammals, the implantation of fertilized eggs in a black bear's uterus is delayed for four to five months. If fall foods are scarce and she cannot put on a thick layer of fat the, fertilized eggs will be aborted. Only in years of good fall food supply will the eggs implant and cubs be born. Two or three cubs are born in mid-January, while the female is still in her den and not fully awake. She will nurse and groom them for four months in this semiconscious state.

Cubs are born with their eyes and ears closed and weigh about 10 ounces. After four weeks, their eyes open. When 2 months old, the cubs begin walking. Mother and cubs come out of their den in April; the cubs are then 3 months old.

The cubs spend their first few days close to the den, even though they are already capable of climbing trees to escape danger. Female black bears will defend their cubs. Males do not help care for them, and may even kill and eat the cubs. The cubs remain with

the mother through the spring, summer and fall.

The cubs generally den with their mother for their first winter. They stay together until spring, when their mother is ready to breed again. At this time, the male cubs move away from their mother's home range. They go off alone and fight to establish a hierarchy. Dominant male black bears will defend a mating range which includes the territories of several females. Young males are not allowed to settle within the dominant male's area.

Female cubs, however, remain in their mother's home range, taking over part of her territory. So females in the same area are probably related.

Food Habits

Black bears change their diet seasonally to take advantage of the most abundant foods. They eat plants and animals, relying heavily on their sense of smell and taste to find food.

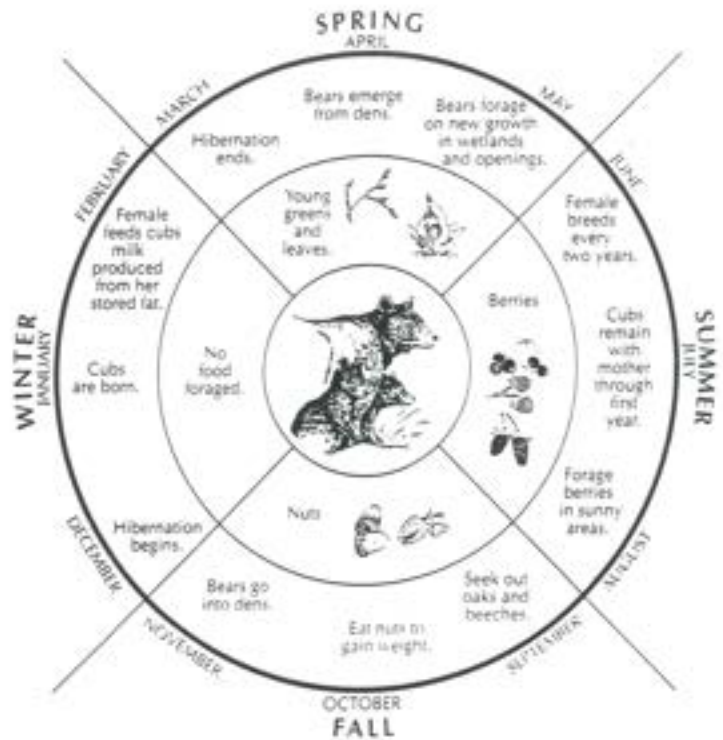
Their simple stomach is too acidic to support the bacteria needed for digestion of cellulose, a major plant carbohydrate. Thus, black bears are restricted to the more digestible parts of plants such as berries, nuts, leaves and buds.

Since they can't easily digest cellulose, grass is not a nutritious food for them but, never-the-less, they may eat substantial amounts when other foods are not available. When they emerge from their dens in the spring, black bear will eat grass because it is one of the first available foods. They also eat plant shoots then. During the summer, they eat large quantities of berries, including cherries and raspberries. Roots, blossoms, colonial insects such as ants and bees, amphibians, reptiles, small mammals and animal carcasses are also typical summer foods.

Although an abundant and diverse food supply is generally available for black bears during the summer, late summer and early fall are critical times for them. They must increase their fat stores in preparation for winter. If food is plentiful during the fall, black bears often delay their winter sleep.

Nuts from hardwoods, such as acorns and beechnuts, are important fall foods. These nuts are collectively known as "mast." Black bears must compete with wild turkeys, ruffed grouse, white-tailed deer and many other wildlife species for mast, but their excellent tree-climbing ability gives them a great advantage.

Unfortunately, these nut crops are not as reliable as the chestnut crop which black bears relied on before the chestnut blight of the 1920's.



In years of poor mast production, bears may begin eating herbs again and often den earlier.

Black bears may eat crops such as corn or apples, bees from commercial hives, garbage or campers' food and sometimes livestock. New Hampshire hunters have found unusual foods in bear stomachs: snails, beaver, onions, suet, mushrooms, chocolate, cookies, pumpkins and feathers.

History and Management

In the past, black bears lived throughout New Hampshire. Bear skins, meat and grease were important foods for the colonists.

As the settlers extended their agricultural lands, they destroyed the bear's habitat. They also offered the Indians bounties for killing black bears, because the bears destroyed their crops and occasionally livestock.

By the end of the 1800s, the black bear was almost eliminated from southern New Hampshire. They were, however, still common in Coos, Carroll and Grafton counties.

Agriculture declined in New Hampshire during the 1900s. Abandoned fields slowly grew into forests. Black bears responded by regaining some of their lost range.

In 1955, the New Hampshire legislature lifted the black bear bounty, which had existed for about 150 years. The black bear was classified as a big game animal in 1983. This was the first step in changing the way black bear populations were managed in New Hampshire.

In the past, hunting regulations were set by the legislature. This system was incompatible with a scientific management program.

The New Hampshire Fish and Game Department gained the authority to regulate the black bear season in 1985. Nearly one-half the state was closed to bear hunting in 1985, in order for a natural range expansion to occur. The success of this closure is evident in more numerous black bear sightings as far south as Hillsboro and Rockingham counties. The management program includes informing and educating people about bear, identification and protection of black bear habitat and a closely regulated hunting season.

Bears and People

OBJECTIVE: Children will be able to name proper camping procedures that minimize bear-people interactions.

MATERIALS LIST: Art supplies and paper.

Black bear are, generally, unaggressive animals. Conflict between people and bears is, more often than not, the result of carelessness or ignorance on the part of humans. It is important to educate children to respect bear and to learn proper precautions when camping to avoid problems with wildlife.

In this activity, children will apply their knowledge and the information they read by drawing contrasting pictures of good and bad camping procedures. An additional or alternative activity would be to simulate a camping experience. Ask the children to find a site that would be good to put up a tent. Where would they cook food? How would they store it? What would they do to avoid attracting bear?

Bears and People

Bears and people can live together peacefully. In fact, seeing a bear from a distance can be an exciting experience. However, remember when you are in the woods, you are in a bear's home. Just as you are respectful at a friend's house, you must act responsibly in bear country. You are living in the bear's backyard. Here are some tips for getting along well with bear.

- **Never get too close to bear and never feed them.** Food for people is not good for bears. Even more importantly, if they begin to connect people with food, they will return for more. This can be dangerous.
- **Stay away from baby bears as well as adult bears.** Remember, mother bear is never far away.
- **Do NOT keep food in your tent.** Bear have a much better sense of smell than we do. Hang food ten feet off the ground from a limb that will not support a bear's weight.
- **Cook away from your tent site.** Don't sleep in your cooking clothes and always wash your dishes after you eat.
- **Put food wrappers and scraps in closed containers in special areas that are marked for trash.** Never bury garbage because bears will be able to find it and dig it up. Burning trash is against the rules in most state parks.
- **Never hike alone.** Always tell an adult where you are going.
- **If you should meet a bear.** Bears don't have good vision and may try to come closer to figure out what you are. Talk in a loud voice and wave your arms slowly so it realizes you are a human. It may answer in bear talk by woofing or huffing. Shout back.

Activity

Draw a picture of a camper who has not been careful and whose campsite will attract bears. Explain what things are wrong and what things the person should do differently.

Celestial Bear

OBJECTIVE: Children will understand the importance of bear in many cultures by reading two bear myths.

MATERIALS LIST: Star map or the night sky, paper and pencil.

Before reading the text, you may want to explain to students that people from many cultures grouped the stars into constellations and told stories about them. Sometimes the stories were for entertainment purposes but more often had some type of moral. It is interesting that, although the stars do not superficially resemble bears, many very different cultures saw these animals in the sky.

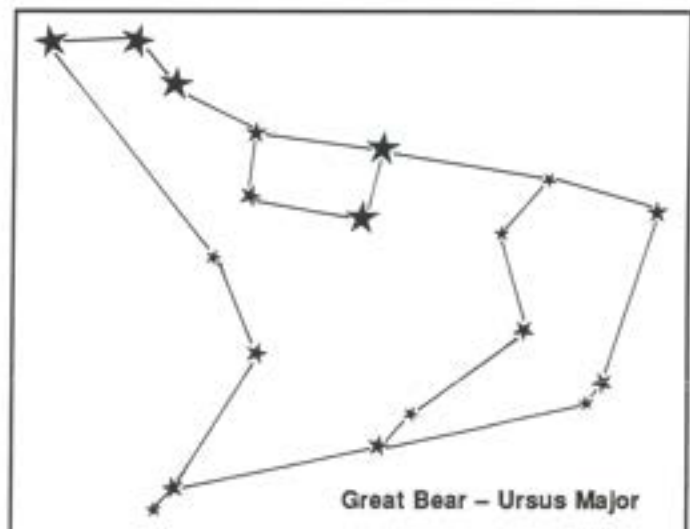
Celestial Bears

People throughout history and from all over the world would gaze into the night skies and see two bears among the stars. Unlike the other constellations, the bear is always visible and never sinks into the horizon. Each culture had their own stories about how they came to live in the night sky.

The Greeks thought the bears were afraid of Orion, the hunter (another constellation), who would pass their way each winter. They told several different stories about bears. In one legend, the bears were immortalized in the stars for having cared for the god, Zeus, when he was a child.

In another story, Zeus fell in love with a beautiful princess named Callisto. Zeus changed Callisto into a bear to protect her from his wife, Hera. One day Callisto's son, Arcas, came across a bear when he was out hunting. The bear stood up on its hind legs. This bear was his own mother who was greeting him. However, Arcas thought the bear was attacking him. He picked up his arrow and was about to kill her. To save Callisto, Zeus changed Arcas into a bear and threw the two of them up into the sky. Hera was jealous. She convinced Poseidon, god of the sea, not to let the bears go down to the sea to rest like the other stars do. That is why this constellation can be seen every season.

The American Indians also saw bears in the sky. The Iroquois, the Housatonic, and other Algonquin tribes thought the three stars that look like a tail were three hunters. One hunter carries a bow and arrow; another, a big pot to cook the bears in; and a third, firewood. They chase the bear through the sky until autumn when they finally shoot them. The bears turn upside down and their blood falls across the forest, turning all the leaves scarlet. The bears, however, live forever. In spring they will turn themselves upright and the eternal hunt begins again.



Activity

Use a star map or find the bears in the night sky. Draw a picture of them and write your own story about how they came to live there.

What's for Dinner?

OBJECTIVE: Students will be able to list a black bear's food preferences.

MATERIALS LIST: None.

According to the research done by collecting scat in northern New Hampshire, a black bear's diet consists of the following: 100% grass in May, 90% grass, 4% fruit, 6% insects in June; 80% grass, 20% fruit in July; 70% fruit, 30% grass in August; 10% grass, 40% fruit, and 50% nuts in September and October. Graphing these percentages may be another optional classroom activity.

Students may also be interested in comparing the scat (the animal's feces) of an omnivorous bear with scat of a herbivore and a strict carnivore. Their food preferences are often very obvious. An animal that is strictly vegetation will have round discrete pellets. Carnivorous scat will have hair and animal bones in it. Scat with berries will be very loose and watery.

Preserving scat is easy. Simply place it between two newspapers and let it dry out. Once dry it is easily handled and does not smell. A good reference for this activity is *A Field Guide to Animal Tracks* by Olaus J. Murie.

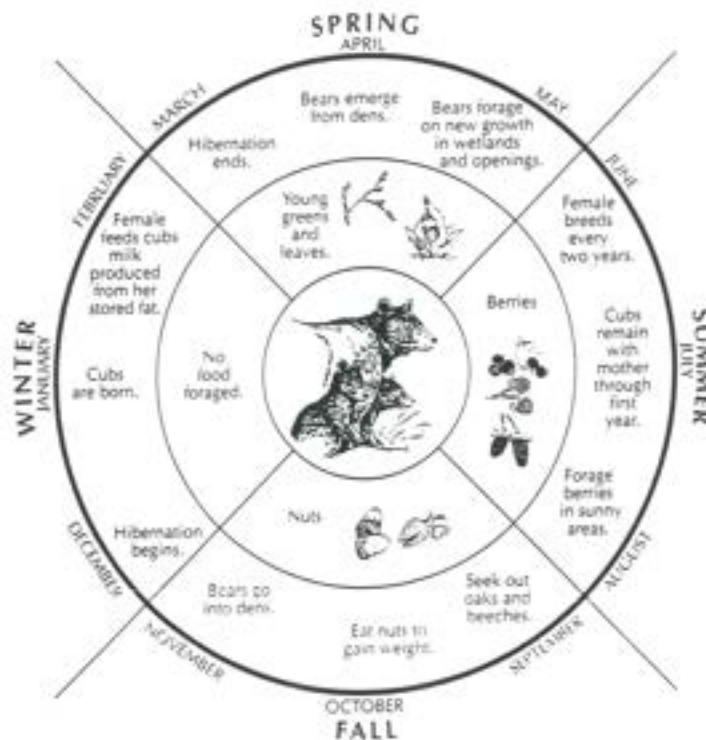
Female bears will mate in spring or early summer. However, like many mammals, a delayed implantation will prevent them from becoming pregnant if they do not have sufficient fat reserves. The embryo will not implant in the uterus wall. This strategy prevents the female from being unduly stressed and regulates bear numbers when food is scarce.

What's for Dinner?

It is dusk and a black bear, a beaver, and a bobcat decide to search for their evening meal. One of them finds some blueberries to eat. Can you guess who? If you thought it was a black bear, you were right.

You may be surprised to learn that bears eat more plants than do other animals. Their favorite foods are acorns, beechnuts, insects (because of their high protein content) and fruit, such as blueberries and raspberries. The bear will also eat young green plants that have not yet flowered or have just sprouted. This food is particularly important to bears in the spring after they wake up from hibernation. Bears will go to the edge of ponds and lakes where the first green growth occurs. This is one reason wetlands should be protected. They are essential sources of food.

It is unusual for a bear to hunt other large mammals. However, they occasionally kill a newborn moose or deer. Most of their meat comes from animals that already have died.



Activity

The bear's diet changes from month to month, because different foods are available at different times. See if you can guess what a bear eats during each month.

1. During May a bear wakes up after hibernating. It has eaten either very little during the winter or nothing at all. Its stomach hasn't quite adjusted to food and it will not eat immediately. Its first meal will probably be _____.
2. It is June and the weather is getting warmer. A greater variety of food will be available this month than last. What other foods will it eat?

3. July has come. Think about how it differs from June. What supply of food will increase? _____
4. August is here and its harvest time for what food? The bear will mostly eat what? _____
6. During September and October the bears work hard to put on weight for the long winter months ahead. A new food will become available. Can you guess what it is? _____

Bear Math

If female bears do not find enough food in the fall, they will not have young during the winter. In New Hampshire, the most important food for them is beechnuts. Unfortunately, beech trees only produce nuts abundantly every other year. Therefore, more cubs are born during the years when there is a good supply of nuts.

How many cubs can a mother have during a lifetime? She will not have cubs until she is around three years old. Bears' average life span is from three to six years and they only have cubs every other year. Generally, they bear two young but sometimes they have up to four. What is the most cubs a mother can have in her lifetime? What is the least?

Home Range

OBJECTIVE: Children will recognize the bear's need for open land

MATERIALS LIST: None.

The disappearance of suitable habitat because of human interests has caused a decline in black bear population. To stimulate discussion on this issue, have the children role play different viewpoints. For example, how would a bee keeper feel about having bear near him or her. Contrast this viewpoint with that of a nature lover. What compromises could be reached?

Home Range

During the first year, bear cubs will stay with their mother. She will teach them how to find food and survive in the wild. During their first winter, they will stay with her. When she mates again the next spring, she will make them go out on their own.

Bears generally prefer to live alone. Female bear often find new homes within their mother's territory. Male bears wander greater distances and live much farther away (up to 15 miles). How many bears there are in an area depends on how much food or water is available. Bears need lots of space with different kinds of plants. They need trees with nuts, and open areas in the forest where berry bushes can grow. They need to be near ponds and lakes for drinking and cooling off during hot days. They also need places where the plant and tree growth is thick so they can hide or escape when there is danger.

Activity

Look at the range map of New Hampshire. In which counties are bear seen the most? Why?

Bears are often more tolerant of us than we are of them. People have different opinions of whether bears should live near them. What do you think?



Hibernation

OBJECTIVE: Children will be able to state the physiological differences between bears and true hibernators.

MATERIAL LIST: Natural area (activity 1); Thermometer, pen, paper (activity 2).

By lowering their temperature, breathing rate and heart beat, deep hibernators (woodchuck and bats in New Hampshire) save energy. Bears are not true hibernators, which is a mystery to scientists. They don't lose lean body mass or muscle tissue because, unlike other animals, they are able to recycle their nitrogenous wastes and do not urinate or defecate while denned.

Hibernation has interesting implications for medical research. Understanding bear's physiology may help kidney patients use dialysis less often. Cardiologists are investigating why bears can gain so much fat without risk of cardiovascular disease. Other doctors are interested in finding out why bears muscles don't atrophy after months of inactivity. This knowledge may help bedridden patients.

Have children find an appropriate site for a den. We often stereotype bears as living in caves. However, a much smaller site is more practical since it would be warmer.



Hibernation

Because there is not a lot of food available during the winter, some animals will hibernate. Hibernation is almost like a deep sleep. An animal's temperature is just above freezing, and their heart rate and breathing slow down. Even if you handle them, they will not stir.

Scientists don't consider bears to be true hibernators because they wake up if disturbed. And, unlike other deep hibernators, their temperature, heart rate, and breathing change only slightly. Their heart rate is only half as fast as normal and their body temperature is about 7 or 8 degrees less.

The bear's deep winter hibernation lasts 3 to 5 months. They spend their summer and fall months putting on weight. During the winter they don't eat, drink, or go to the bathroom. Many scientists believe the amount of fat they have determines when they enter their dens. If they are too thin, they will stay active longer and search for food.

A variety of sites can be chosen for a den. It can be under a fallen tree, in brush piles or the bears can dig a den in the ground. The average size of a den is 5-1/2 feet long and 2 feet high. Generally, bears do not reuse the same den each winter. Bears do not use caves for dens.

Mother bear will give birth to cubs in January or February, after being pregnant for seven months. The cubs are only approximately 8 inches long. They are blind and toothless. The mother will wake up during the birth to lick the cubs and chew through the umbilical cord. The umbilical cord is what connects the mother with the baby in the womb. The first time a bear has cubs, when she is about three years old, she usually has only one. After that, she can have twins or occasionally even triplets.

In spring when they wake up, bears don't eat or drink. They are only active for about a half-hour. When they begin eating again, their first meals are twigs, grasses, and ants. It takes about three days before they return to their old eating habits.

Activity 1

Go to a natural area and find a place that would make a good den for a black bear. Tell why you made your choice.

People often think of bears in much larger areas. Why would a smaller den be better?

Activity 2

Take your temperature at rest, then jog in place for two minutes and take it again. Repeat the activity and count your heart beat when you are still. Take it again when you are active. Compare the results with the bear during hibernation, and when it is active. Graph your answers.

HIBERNATION				
SPECIES	NORMAL		IN HIBERNATION	
	body temperature	heartbeats per minute	body temperature	heartbeats per minute
hamster	35°C	200-400	6°C	4-12
brown bat	40°C	400-700	2°C	7-10
ground squirrel	39°C	200-400	4°C	2-10
woodchuck	39°C	80-120	16°C	3-10

Which Bear is Which?

OBJECTIVE: Through their reading, students will be able to distinguish true bears from koalas and panda bears. In addition, by creating a dichotomous key, they will begin to understand how scientists organize information.

MATERIAL LIST: Field Guides (optional).

Activity

Common names of animals are often confusing. In this article children will learn the differences and similarities between animals that we commonly group together as bears. The exercise that follows requires them to use this information to complete a key.

Older children may enjoy making a dichotomous key of their own. Dichotomous keys ask questions in pairs. Begin by creating a list of each animal's characteristics, and isolating distinguishing traits for each species. Students may wish to consult field guides to understand the different ways a species may be classified, or look to several guides to contrast the way very different organisms are grouped. For example, they may want to compare a mushroom to an insect, or a tree to a mammal, and look at the distinguishing traits of each that are used for keying them out.

The most commonly used field guides are the Audubon and the Peterson series. The Audubon books tend to be less systematic and group species by more general characteristics. They also use photos, where as the Peterson uses sketches. The Peterson guides are more scientific and have more elaborate keys, but are not as easy to use. The best book for wildflowers is *Newcomb's Guide to Wildflowers*. However, it too only has sketches and may be more appropriate for older children.

As an extension activity, an explanation of scientific names is included. As an example, interesting discussion can be centered on why grizzlies, whose Latin name is *Ursus horribilis*, are considered "horrible bears." The grizzlies are more aggressive than black bears and there have been a few incidents of people being hurt or killed by them. However, they don't attack unless they are provoked or feel threatened. Is the scientific name justified?

Which Bear is Which?

Did you know that koalas and pandas are not really bears? Koalas are closely related to kangaroos and opossums. You may see a koala living in a zoo in the United States. However, their real home is in Australia. Males are about 32 inches and females 28 inches long. They have a soft, wooly, gray coat and a flat nose. They are excellent climbers and spend most of their time living in trees. They eat only the leaves and soft bark of the eucalyptus tree. Just like kangaroos, they carry their young in a pouch. Usually, they have only one baby. After about seven months, the young will leave the pouch and begin to explore their environment. However, at the first sign of danger the baby climbs on its mother's back. Koalas, like kangaroos and opossums, are marsupials (animals that bear their young in a pouch).



The giant panda lives in China. This large animal weighs between 165 and 242 pounds and is between 5 and 6 feet long. Panda's ears, nose and limbs are black and the rest of their body is white. They have a large head and body, but short legs. They can climb, but prefer to live on the ground.

Giant pandas eat mainly bamboo. Sometimes they will eat small animals if they catch them. Since bamboo is plentiful and green in winter, they do not need to hibernate like true bears. Pandas must feed on about 33 pounds of leaves and stems a day. To eat that much food, they will spend 16 to 24 hours a day feeding.



If a panda has more than one cub, she sometimes doesn't take care of both of them, leaving one to die. At birth, a cub weighs only between three and five ounces. It is born blind and hairless. The mother will hold it with one paw and press it closely to her chest. If she holds it too tightly the cub will make a loud squeaky noise to remind her to be more careful. The cub develops

quickly. It will open its eyes at 45 days and take its first steps at 75 days. By five months it will weigh 22 pounds.

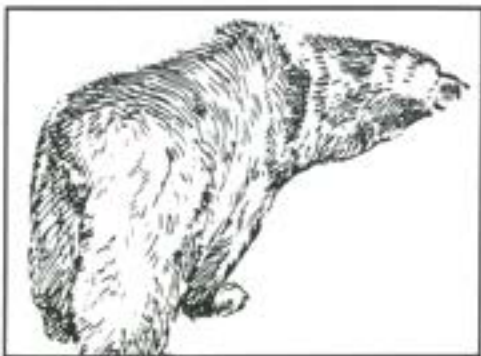
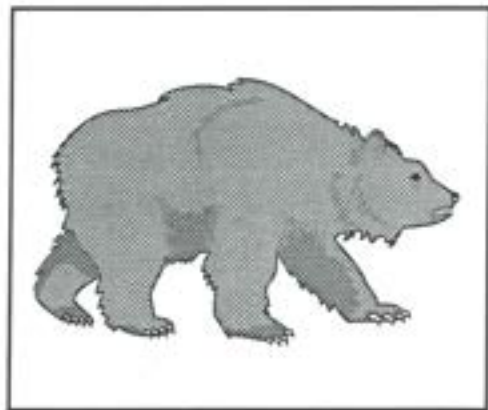
In the United States there are three species of true bear: the grizzly, the black, and the polar bear. Both live alone when they are adults and hibernate in winter. Grizzlies and black bear are omnivorous, which means they eat both plants and animals.



The black bear lives in the United States and Canada, and is the only species that lives in New Hampshire. Despite its name, black bears are not always black. They can be brown or even gray. Sometimes they have a white mark called a blaze on their chest. They can range in size from 4 to 6 feet long. Females can weigh 125 to 160 pounds and males from 200 to 350

pounds. Their ears are more pointed than grizzlies. Usually, they only have two cubs, but can have as many as four. Cubs begin to explore the outside world when they are only about three months old. They stay with their mother until they are two years old. She teaches them how to find food.

The grizzly bear looks a lot like the black bear. However, it is larger and has a hump on its shoulder. The face also looks wider from the side. Because of its large size, it eats up to 35 pounds of food a day. It lives out west in Wyoming, Montana, Northwest Canada and Alaska. An adult is between 7 and 10 feet long.



Polar bears live in the Arctic and are true bears, just like the black and the grizzly bear. They are all white, have very small, rounded ears, and a long neck. Their fur is a shiny yellow-white. It is specially designed to keep the bears from getting wet and from losing heat. Because polar bears spend a lot of time in water, their claws are curved and their feet are webbed.

Activity 1 (for younger children)

Field Guides are books that help people figure out the names of plants and animals. They often have keys. Keys are made up of a series of sentences that describe an animal or plant. Usually, the sentences are in pairs. Make a key of your own by filling in the blanks, using the information you have just read. After you have finished, try using the key to name an animal in one of the pictures. Read the sentences in order until you come to the one that describes the picture you have chosen.

1. Animal is black and white. It is a _____.
 Animal is not black and white. *Go to number 2.*

2. Animal has a flat nose and a gray, wooly coat. It is a _____.
 Animal does not have a flat nose and a gray, wooly coat. *Go to number 3.*

3. Animal has pointed ears. It is a _____.
 Animal does not have pointed ears. *Go to number 4.*

4. Animal has a hump on its shoulder. It is a _____.
 Animal does not have a hump on its shoulder. *Go to number 5.*

5. Animal has yellow-white shiny fur. It is a _____.

Activity 2 (for older children)

The common names of animals can fool us. All animals have scientific names that come from Latin. Scientists from every country, even though they speak different languages, will use the same scientific names. The first word is the genus, which is like a family name. For example you and your brothers and sisters have the same last name because you are all related. Likewise, all true bears belong to the same family and are called *Ursus*. To tell you apart from your brothers and sisters you also have a first name. First names are species names. This word describes the animal and is a way to tell apart animals that are related. For example, the black bear is *Ursus americanus*, which means "American bear." The black bear's relative, the grizzly, is also *Ursus*. However, its full name is *Ursus horribilis* or "horrible bear." We know that although they are related, they are not the same bear because their names are different.

What names would you give the bears? Humans are *Homo sapiens*. What do you think this name means?

Everyday Bears

OBJECTIVE: After examining examples of the way bears are depicted in popular culture, students will be able to compose a list separating facts from stereotypes of bear behavior.

MATERIALS LIST: Paper and pen, examples of toy and cartoon bears etc. brought in by students.

Because of the way bears are portrayed in the media, many people regard them as either ferocious and bloodthirsty, or as cute and cuddly.

Neither view is correct and both are detrimental to the bears' safety.

Bears do not attack unless provoked. However, they are wild animals. They cannot be petted, played with, or teased like the family dog. Careless behavior on the part of humans is the major cause of conflict between bears and people.

Ask your students to bring in pictures of bears from advertisements in newspapers and magazines, as well as popular bears such as Care Bears, Paddington Bear, Yogi Bear, etc.

In one column, ask the children to list the characteristics of each example. In the other, write whether or not the portrayal of bears is accurate. It would be interesting to do this activity at the beginning of the unit and then again at the end to see if their responses have changed.

Everyday Bears

For the American Indians, the bear was a symbol of great physical and spiritual power. The bear's strength could be given to people through dreams or from medicine made from bear body parts.

The American Indians believed that bears offered themselves as food. In turn, the Indians would perform special ceremonies that would ensure that there would be future generations of bears. As a sign of thanks and respect, the Indians would hang the bear's bones in trees to protect them from being eaten by dogs. They also portrayed them in their artwork.

The Europeans who settled in this colony had a very different attitude. For them the bear was a symbol of the wildness and terror experienced while settling the frontier. Over the years, bears have been portrayed in toys, cartoons and other places, either as fierce and bloodthirsty or as gentle and cuddly.

A Bear in the Woods

OBJECTIVES: Students will be able to recognize the presence of bears in the woods.

MATERIALS: Art supplies for constructing mural; large sheets of paper paint, etc.

Often you can detect the presence of animals even when you don't see them. In the children's reading, signs of bears are described.

Activity 1

Create a mural depicting black bear habitat and signs of its presence. Don't forget to include food and water sources and perhaps the tracks of other animals living in the same area.

Activity 2

Take the children outside and look for signs of black bear. If possible, compare an area that is inhabited by bear with one that is not.

A Bear in the Woods

Bears are shy animals that avoid human beings. Although you may not see a black bear in the woods, you can find signs of its presence. Some examples are scat (animal droppings), tracks, and marked trees.

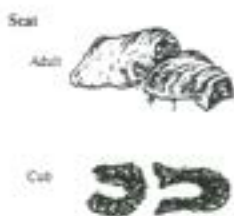
Because of their large size, bear tracks are unmistakable. They are 3-1/2 inches wide and 7 inches long. The "big" toe is the outer one, not the inner one, as it is on humans. Since only black bears live in New Hampshire, you will not find tracks of grizzly bears.

Bears sometimes make deep scratch marks in trees. They have five claw marks for each foot, and they create a pattern 3-1/2 to 4-1/2 inches wide. They are about 4 to 6 feet from the ground. No one knows the purpose of the marks. Perhaps these "bear trees" are used in courting or as a way of marking their territory. Sometimes they rub against the tree, leaving bits of fur. In other cases bears leave claw marks on beech trees they have climbed to get to the nuts. Sometimes you can see where they have created a nest-like area to sit in while they eat.

Scat looks different, depending upon what the bear had for its last meal. If it has eaten mainly berries, it is very watery. Sometimes ants or wood debris are mixed in. If the bear ate an animal, the scat should be mostly hair.

Insects and berries are part of a bear's diet. Therefore, you may find an open yellow jacket nest or pulled apart rotten log in the woods left by the bear.

Bears leave behind sign wherever they go. Tracks near dumpsters, damaged beehives or broken bird feeders can be evidence that bear have been there.



A Bear's Nose Knows

OBJECTIVE: From experiencing the world from a bear's perspective, students will recognize that bears rely more heavily on their sense of smell than sight.

MATERIAL LIST: Rope, jars with scents.

Activity

Try to simulate a bear's perception of the world by creating a special walk for the children. Blindfold them and hang a rope along the path as a guide. Make sure there are no tree stumps, rocks or other objects they might stumble over. Periodically, place containers with familiar scents along the way for the children to smell. If possible, use fragrances from the outdoors. At the end of their walk, ask the children to pretend they are a bear and write a story about their experience.

Variation – Take your children for a sensory walk. See how many smells they can detect in the woods.

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