Be Bear Aware!

Curriculum Guide

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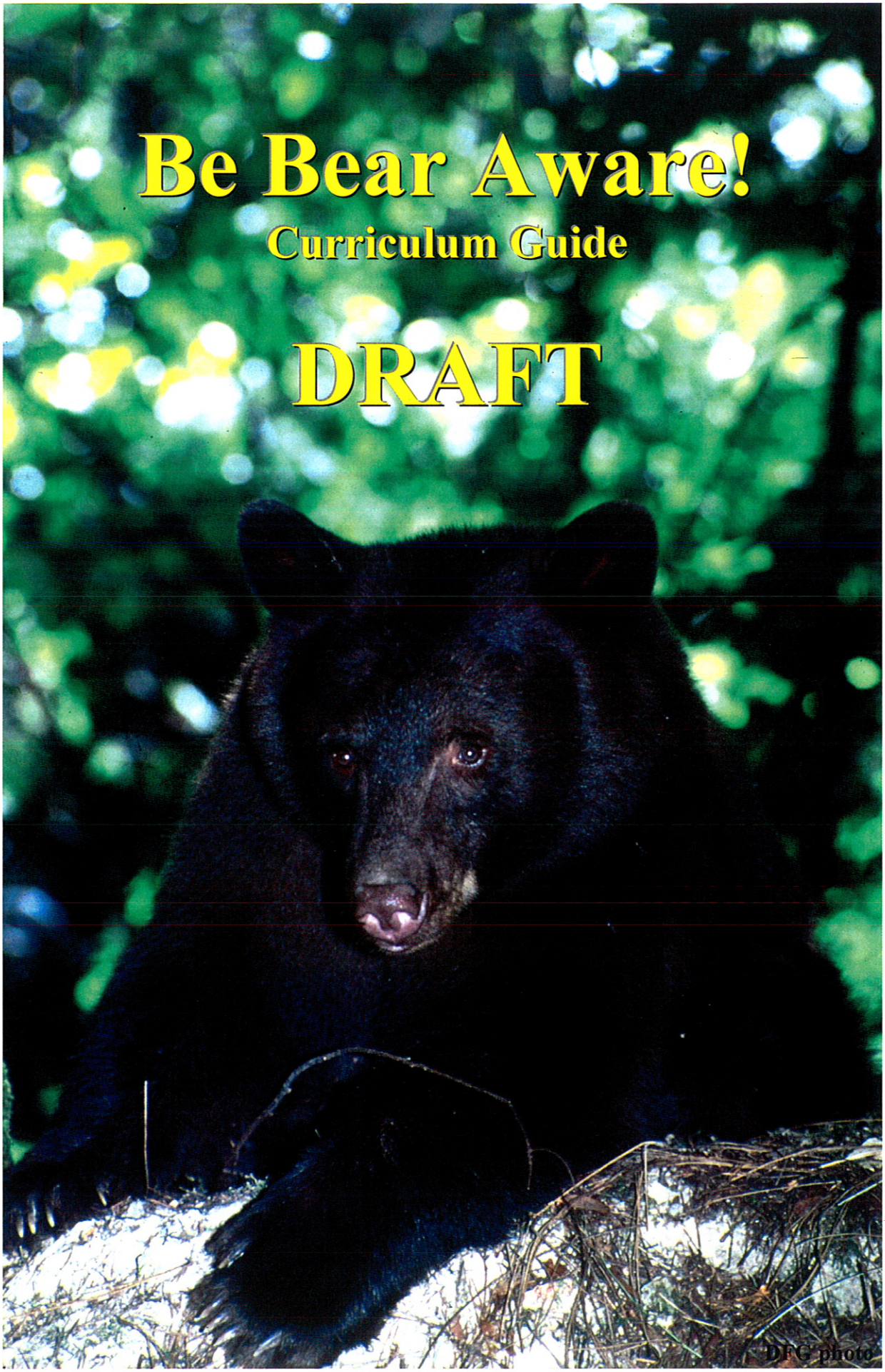


DFG photo

Introduction

American poet Robert Frost wrote:

"The world has room to make a bear feel free."

There are three species of bears that live in North America: brown (grizzly) bears, black bears, and polar bears. There are eight species of bears that live throughout the world (including North America). There are no bears in the Antarctic, Africa, or Australia. The Australia Koala is not a bear, it is a marsupial. How important is it to have bears in our world? Does the world still have room for both people and bears?

Use the activities, background information, and specimens in this Bear Box to create an educational unit about black bears. Each activity describes what a teacher needs to do to get ready for the lesson. The background section provides relevant, current information related to the lessons topic. The procedure outlines step-by-step instructions for successful completion of the lesson.

It is the aim of this curriculum unit to help educators lead students to an awareness of Tahoe Black Bears and their habitat needs. The ultimate goal is to stimulate students and others to change their personal behavior and to take constructive actions to help protect and ensure the future survival of black bears. Human attitudes are affecting the survival of bears throughout the world. A bear cannot change who it is, but we as humans can change our attitudes and actions.

The bear box and the activity guide is a partnership project of the California Department of Fish and Game, Nevada Department of Wildlife, and United States Forest Service Lake Tahoe Basin Unit.

Table of Contents

Introduction 1
Funeral for a Bear 3
Bear Reality 5

Activities

Bearly Growing 7
Tracks and Other Signs 10
You Are What You Eat 16
How Many Bears Can Live In This Forest 19
Ethi-Reasoning 24
Be Bear Aware 28

Appendices

California Bear Flag 33
Grizzly or Black 34
Just For Fun Trivia 35
Glossary 36
Resources 37
Assessment 38

Funeral for a Bear

Jeff Rucks
Colorado Connections
Summer 2001

Photo by DFG Staff

I'm so proud of my neighbors! They didn't panic. They didn't over react. And the bear didn't get hurt. Instead they all responded calmly and appropriately and our bear found his way back to a wilder place, unharmed. But last year was a different story.

Last year a different bear visited our neighborhood and people reacted badly. A flurry of calls to the Division of Wildlife from panicked homeowners resulted in the bear being destroyed.

Why did the two incidents result in such radically different outcomes? The key is in understanding the bear.

When people come to me and say, "I saw a bear! What should I do?" They are always surprised at my response. They expect me to say something like, "Oh my gosh! Call the Division of Wildlife, that bear must be removed!" But instead, I respond by saying, "Wow, that is really cool! Go home, get out your journal, and remember every detail of the experience. Most people will never have the pleasure of seeing a wild bear. You are so lucky!"

Our response to bears has everything to do with the outcome of the experience. Last year the response in my neighborhood was all negative. The bear was the problem and the only solution was to get rid of the bear. This year the bear was the issue and the solution was to inform the neighbors and get rid of all the temptations that will get him into trouble.

As soon as the bear was spotted (tearing apart a bird feeder), the community reacted. We put up signs at the entrances telling people about the bear and instructing them to…

- ✓ Keep their garbage indoors (even the night before garbage day)
- ✓ Take down all bird feeders (especially at night).
- ✓ Clean BBQ grills and store them in the garage.
- ✓ Keep dog and cat food indoors.

Brochures went out explaining how to live in bear country. As a result, people were educated and their response to the bear was calm and reasonable. The bear was a topic of fascination rather than one of fear. When he finally went on his way, you could almost detect an air of disappointment rather than relief.

Last year we killed a bear in my neighborhood because we didn't understand him. This year we celebrate. For two weeks in June, we had a bear share our lives. It was exciting and a little bit scary. But everyone who saw it is richer for the experience.

Bear Reality

Bears inspire the human imagination. They are the center of myths, legends, and art. Curiosity, wonder, fear, and respect are a part of stories told and retold over centuries. In Europe, 10,000 year-old cave drawings of bears can still be seen today. In North America, pictographs dating back 3,000 years illustrate the importance of bears to the native people.

Bears were a part of the real world, the spiritual world, and the celestial world. Both Native Americans and ancient Europeans looked to the heavens and named the same constellations after the bear; "Ursa Major" is Latin for "Great Bear." The seven brightest stars of the Great Bear form the Big Dipper.

History has recorded many attitude changes about bears. The grizzly was characterized in Indian myth and lore as the master forager, plant gatherer, and bestower of the secrets and mysteries of plants, especially those used for healing medicine. However, as Europeans settled North America bears were killed for fear, sport, food, and to protect life and property. Grizzlies were especially threatening to farmers and ranchers trying to protect livestock and livelihood. The black bear was labeled a pest and generally undesirable.

Today, in the lower 48 states, the grizzly population is less than one percent what it was when Lewis and Clark made their trip west 200 years ago. The grizzly's historic range covered much of North America west of the Mississippi River: from the plains westward to California and from central Mexico north through Canada and Alaska. By 1922, the grizzly bear was gone in California (except for on the state flag). However, black bears are now a valued member of the California/Nevada fauna. Biologists closely monitor and manage bear populations.

Bear Facts

Bears are mammals, in the scientific family *Ursidae*, and the order *Carnivora*. There are eight different species of bears in the world. Bears live in a variety of habitats, from the ice fields of the Artic, to the forests and plains of North America, to the subtropical jungles of Asia and South America. There are no bears in Australia, the Antarctic, or Africa. *Ursus americanus* (UR-sus ah-MAIR-ih-kan-uhs), the black bear, is the bear in the Tahoe area.

Black bears vary in color from tan, or brown, to black. Usually they are dark brown with a brown muzzle and sometimes have a small white chest patch. Adult female bears, called **sows**, may weigh between 100-200 pounds. Adult males, called **boars**, are larger and weigh 150-300 pounds. Individual males weighing over 600 pounds have been reported. Baby bears, called **cubs**, are tiny when first born and weigh less than a pound.

Cubs are born around the end of January or the first part of February while the sow is hibernating. Cubs are helpless when they are born. Their eyes are closed, and they are almost naked. They have only a very thin layer of fur on their bodies. Cubs will snuggle close to their mothers' bellies where they will be warm and find milk to drink. When sow and cubs leave their winter den in April or May, the cubs will weigh 5 to 7 pounds.

Bears do not sleep soundly in the winter; their inactivity has been termed "seasonal lethargy." For simplicity, the inactivity of bears during the winter is referred to as hibernation. Once a black bear begins hibernating, it can doze for many months with a body temperature of 88 degrees or higher (within 12 degrees of summer body temperature). Bears can slumber because their warm fur and large body mass allow them to better retain body heat. During hibernation, black bears live off their own fat.

Black bears are very good climbers. If they cannot out-run a predator, they can quickly climb a tree to avoid it. Black bears can run in bursts up to 35 mph and can run up and down hills quickly and easily. Black bears are strong swimmers. Bear teeth are adapted for feeding on both plant and animal matter.

Bear Signs

Black bears have five toes on their front and hind feet, each with a well-developed claw. Their tracks are very distinctive; the hind footprint resembles that of a human. The front foot is short and about 4-5 inches wide. The hind foot is long and narrow, measuring about 7 inches. Claw marks may or may not be visible.

Being aware of tracks, droppings, and other bear signs (claw marks on trees, rotten logs ripped apart, and hair on tree bark from rubbing) will allow you to determine the presence of bears. Adult black bears make a variety of sounds. The most commonly heard sounds are woofing and jaw-popping. The young ones whimper or bawl.

Habitat and Feeding

Forest and mountain areas provide habitat for black bears. Trees provide food, escape from predators, and dens for winter. The grasses, sedges, tubers, and various fruits and berries found in meadows are spring and early summer foods. Black bears eat ants and other insects in summer, but prefer nut crops, especially acorns, and manzanita berries in the fall. Bears have a special tool to help them pick berries–their lips. Bears have prehensile (pre-HEN-sil) lips. This means their lips can bend and grasp. Bears can wrap their lips around berries and pull berries off one by one. As omnivores, they will eat whatever seems edible. Sometimes they even catch and consume young deer fawns or eat dead animals they find.

Bears have an amazing sense of smell. They can probably see as well as humans can and they can see in color. They can see very well at night. A black bear's life is a never-ending search for food. In general, they range from 10 to 250 square miles.

Most of the time bears are solitary and secluded. However, as more people live and recreate in bear habitat there are more chances for bears and humans to interact. When a bear roams into a campground or a backyard and finds a virtual buffet, his timid nature disappears.

Compared to food available in the wild, human food and garbage have more calories and may be easier to obtain. These rewards often motivate bears to seek out human food and garbage. Bears easily become dependent on human food and become "habituated" to these food sources. Bears are fast learners and good problem-solvers. Each year, black bears cause hundreds of thousands of dollars of damage to private property. In the majority of these cases, the damage could have been avoided by taking measures to keep bears from becoming habituated to human food sources.

Threats

The black bear's natural enemies include other bears and mountain lions. Other threats are loss of habitat, motor vehicle strikes, illegal killing, and destruction of bears that pose a threat to people, livestock, or property. Humans are responsible for the majority deaths in bear populations.

The California Department of Fish and Game and the Nevada Department of Wildlife do not relocate black bears that cause property damage or threaten public safety. Data shows relocation is ineffective because bears either return to where they had been a problem, die, or become a problem in a new area. Therefore, the only solution for habituated bears is to kill them once they are a public safety risk. People have the responsibility to keep black bears alive by practicing better habits and preventing bears from becoming habituated to human food and garbage.

Information adapted from "The bear facts on black bear biology and ecology" written by Doug Updike, *California Outdoor California*, volume 63 No. 4, July-August 2002

Bearly Growing

Objectives

Students will compare similarities and differences between the growth of black bears and humans.

Method

Students illustrate, compute, and graph differences between people and black bears at various stages of maturity.

California Standards

Language Arts: Listening and Speaking 1.1, 1.2
Science: Life Science 3 a, b, c; Investigation 6 b, c, e

Background

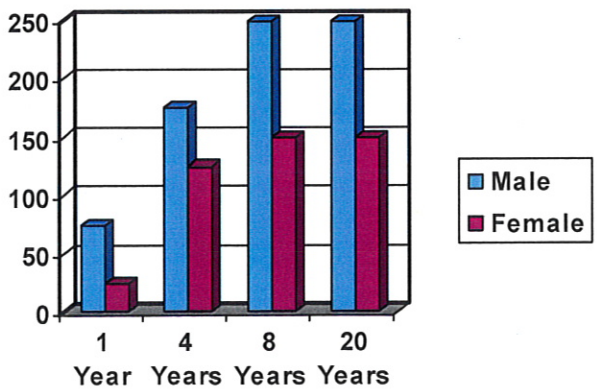
See *Black Bear Biology* on page 9.

Procedure

1. Begin a discussion with the students about black bears. Distribute "Black Bear Biology" and "Compare Yourself to a Black Bear." Have the students use the information on Black Bear Biology to help them complete the chart.
2. Ask students for their ideas about how long sows are pregnant, what bear cubs eat when they are born, how much they might weigh when they are a year old, how many cubs might be born at the same time, how much they weigh when they are full grown, and how long they live.
3. Following the discussion, post the weight and age relationships for black bears or provide a handout.

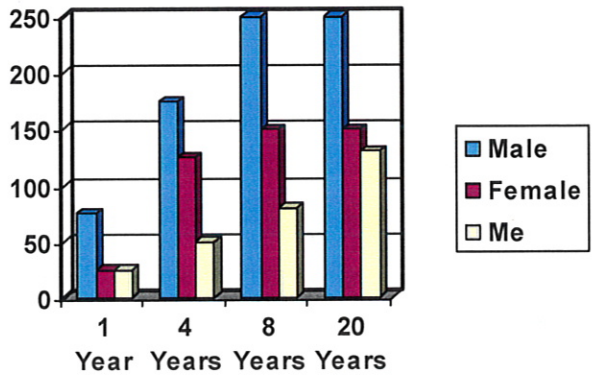
(Data are characteristic of black bears in the southwestern United States. There will be regional variations.)

Age and Weight of Black Bears



4. Ask the students to plot their own weight at the same ages as the black bears shown on the chart. They will be required to estimate for years past their present age. Ask the students to graph both sets of data.

Age and Weight of Black Bear and Student



5. Ask the students to compute the following, and include their results with their graph and drawing:
   a. How much weight did the black bear gain at each interval: from birth to 4 months, 4 months to 1 year, etc.?
   b. How much weight did you gain during the same intervals?
   c. How many times more weight did the bear gain during each period?
6. In discussion, ask the students to comment on the similarities and differences between bears and people.

Extensions

1. Researchers can estimate the weight of a bear by measuring the bear's girth (the distance around a bear's chest). Given the following data, students can measure the girth of a boy's chest and estimate how much he would weight if he were a black bear.

Girth in inches = Pounds	
22	50
30	100
35	150
39	200
45	300
52	400

Have a few boys volunteer to weigh themselves and measure their chest girths. Graph or chart their weights and girths. Graph or chart the weights and girths of black bears. Weigh and measure the girth of older students, teachers, and family members. Graph or chart the results. Possible questions for discussion include:

a. Using the weight and age relationship for black bears, how much does a 4-year-old, a 10-year-old, a 20-year-old bear weigh per inch of girth?

b. How much do various age groups of children weigh per inch of girth of their chest?

c. Are bears or children heavier per inch of chest girth? How about adults compared to bears?

2. Calculate how fast a given bear population, if unchecked by limiting factors, can increase over a specific period of time, assuming that a sow will have two cubs (one of each sex) in her fifth year of life. The total time frame is 10 years, from July 1 to June 30. The initial bear population is one 5-year-old boar and two 6-year-old sows, one with 2 cubs. Graph or chart the results.

Aquatic Extension

Identify various species of aquatic wildlife. Find out the average life span of each organism, how much it weighs at birth, and how much it weighs at maturity.

Evaluation

1. Use the data in Table A to construct a graph that compares the growth of catfish from Lake Erie and the growth of catfish from the Ohio River.

   a. Which catfish grew the most between the ages of 4 and 5 years?

   b. How much larger is the Ohio catfish at 9 years of age than it is at 1 year of age?

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Catfish in Lake Erie and the Ohio River

Table A (size in mm)	1 yr	2 yrs	3 yrs	4 yrs	5 yrs	6 yrs	7 yrs	8 yrs	9 yrs
Lake Erie catfish	69	115	160	205	244	278	305	336	366
Ohio River catfish	56	101	161	227	285	340	386	433	482

Compare Yourself to a Black Bear Answer Key

6 feet
150 to 300 pounds
50 to 70 pounds
8 ounces
1 to 4 cubs
18 months
20 to 25 years

Activity _____ **Black Bear Biology** _____

The black bear (*Ursus americanus*) can be found in the United States, Canada, and Alaska. In the east, the black bear primarily inhabits forests and swamps. In the west, the black bear roams chiefly in mountainous areas.

A black bear's life span averages 20 to 25 years. Longevity and survival of the black bear depend upon the availability of a suitable habitat and its ability to avoid humans. An adult female bear is called a sow. An adult male bear is called a boar. A baby bear is called a cub. When a sow becomes sexually mature between 2 and 3 years old, she is capable of breeding and may have one to four cubs.

The sow has her cub or cubs in the shelter or den where she spends the winter months. On average, a female black bear will have two cubs. The sow does not have a litter every year, but every other year. At birth, a young cub weighs about 8 ounces—about the size of a guinea pig. Bear cubs stay in the den with their mother until they are able to move around very actively, usually until late April or early May.

Bears and humans are classified as mammals, which means that both are warm-blooded, nourish their young with milk, and are covered with varying amounts of hair. Bear cubs and humans survive solely on their mother's milk for the first few months of life. Cubs nurse while in the den and only for a short time after leaving the den in early spring. By the time berries ripen and grasses are plentiful, the cubs have learned to climb and can eat the available food sources. Soon the cubs will need to hunt and gather food for themselves without the help of the sow. At about 18 months of age, the cubs must go out searching for their own home range. The sow will allow the female cubs to stay adjacent to her home range. The male cubs, however, must find territory to claim as their own.

Black bears are omnivores, which means they eat both plant and animal material. In early spring, they tend to eat wetland plants, grasses, insects, and occasionally carrion (dead animal matter) or the protein-rich maggots found near the carrion. In late spring and early summer, bears feed on berries, grubs, and forbs (broad leafed plants). In late summer and early fall, bears feed mostly on nuts and acorns. In the fall season, bears must add much fat to their bodies in order to survive the winter months in their dens. Cub growth will vary throughout the country.

When black bear cubs reach one year of age, the female cubs weigh 30 to 50 pounds and the males weigh 50 to 70 pounds. A mature female bear weighs 100 to 200 pounds, and a male bear weighs 150 to 300 pounds.

(Sources: *Arkansas Black Bear: A Teacher's Guide for Kindergarten Through Sixth Grade*, Arkansas Game and Fish Commission; *WILD About Bear*, ID Dept of Fish and Game; *A Field Guide to the Mammals*, Houghton Mifflin Co., 1980).

Compare Yourself to a Black Bear

The average height of an adult male black bear standing upright:		Your height:	
The weight of an adult male black bear:		Your weight:	
The average weight of a 1-year-old male black bear:		Your weight at 1 year of age:	
The average birth weight of a black bear cub:		Your birth weight:	
The average number of cubs that a black bear has per litter:		Average number of babies your mom had at one time:	
The length of time a cub stays with its mother:		Number of years you probably will stay at home:	
The range of a black bear's life span:		Average person's life span:	

Tracks and Other Signs

Objective

Students will identify common animal tracks and other signs for the black bear.

Method

Students make plaster casts of animal tracks. Students will investigate other signs indicating presence of black bear.

California Standards

Science: Life Science 3 b; Investigation 6 a, c.

Materials

Casting plaster, containers for mixing, spray shellac or plastic, petroleum jelly, milk cartons or plastic 2-liter soda bottles, cardboard, knives, sandpaper, black ink or paint, activity pages, sample kit (with bear scat, claws, and tracks), and (optional) loops of wire

Background

Looking for evidence of wildlife is one method of determining what animal species live in a certain area. Signs of wildlife such as burrows, nests, droppings (scat), or food litter can be seen and identified, but some of the easiest signs to interpret are animal tracks.

Animal tracks can be the basis for several types of investigations. The students can develop an animal species list by the tracks found in the region. Wildlife population estimates can be made by observing the number of tracks found during a specified length of time. Habitat requirements of certain species can be determined by finding their tracks in certain areas and not finding them in others.

Track hunting is an easily acquired skill. Find a spot of level ground with fairly soft, fine, textured soil. Smooth the soil over with your hand; after several days, return to the spot to see what animals have been there. The best places to look for animal life are near water or on well-worn trails. Larger animals will use the more open areas, while a small spot the size of your hand cleared under some bushes will reveal tracks of mice, shrews, and various reptiles.

Tracks can be preserved and collected by making plaster casts. Once the tracks have been observed or preserved, the animal that made them can be identified. For example, all mammals have basically the same foot structure but they use the parts of the foot in different ways. For instance, compare an animal's foot in relation to the human hand. Some animals walk on their hands like raccoons and bears. Others walk or run on their toes like cats and coyotes, while some animals walk on their toenails or hooves like deer and elk.

If students look at a track, they can determine how that animal gets around. With this information, a student can also study what part of the foot the animal walks on, whether claws are present and how many steps are taken in a measured distance.

Procedure

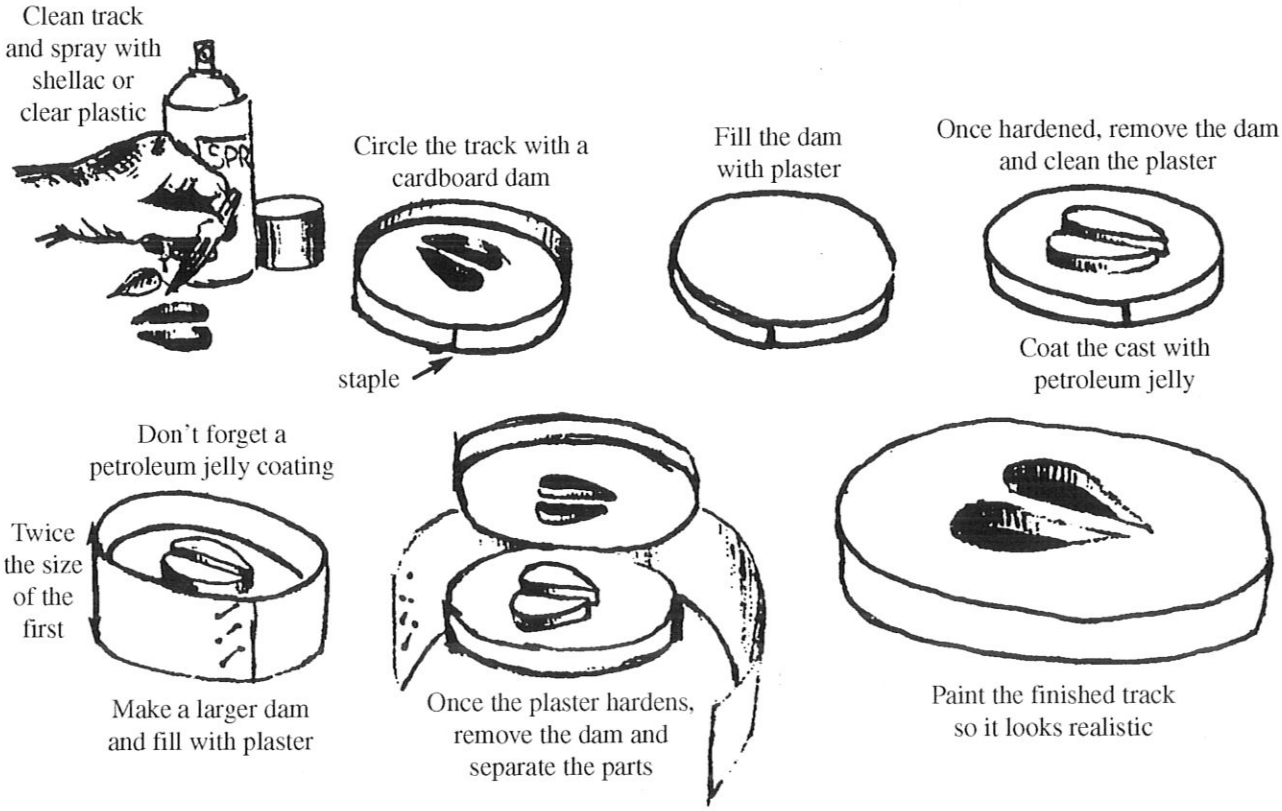
PART A *Looking for a Bear*

1. Discuss how students can determine the presence of a black bear. Other than bear sightings what can students look for to indicate a bear has been in the area.
2. Have students view the pictures of bear signs. Allow students to view the bear claws, scat, and tracks from the kit.

Claw marks are usually found on old or dead trees about 7 to 8 feet off the ground. These marks are too high off the ground for other animals to make and the individual marks are visible. These marks may be a signal to other bears, like marking a territory. Bears also strip tree bark to eat.

Bear scat is included in the sample kit. The size, shape and contents help distinguish bear scat. Bears have a poor digestive system; much of what they eat goes through their digestive track intact. How do you know if this is a recent bear sign? If the scat is fresh, it will be moist. Examination of the scat will provide information about what the bear has been eating.

Rolled rocks, diggings, pulled vegetation, and torn apart logs are signs of bears in search of food. Under rocks and in old logs or stumps bears find insects that are important to their diet. Bears use



their claws to dig for small rodents and plant roots or bulbs.

Tracks of bears have five toes and usually show claws.

PART B ***Preserving Tracks***

1. Take a class or group on a field trip to an area where there will be a variety of signs including tracks: a nearby lake, stream, or wildlife refuge area. NOTE: If a field trip is not possible, use the track prints in the kit. This track print can be imprinted into a box of sand or other loose soil type and filled with plaster.
2. Divide students into small groups to find tracks. Students may look for various animal tracks rather than focusing only on bears. Divide them into groups according to areas where they will look for tracks: one group under bushes, one group at a meadow's edge, one group near a pond's edge. Prepare the students to look carefully and responsibly.
3. Once a track is found, clean it of loose particles of soil, twigs, leaves, and other litter.
4. Spray the track with shellac or plastic sealant from a pressurized can to seal the track.
5. Form a two-inch wide strip of cardboard into a ring surrounding the track. Press the cardboard ring firmly into the ground to give support, leaving at least one inch above ground to mold for the plaster. One of the easiest ways to make the mold is to cut plastic two-liter soda bottles or paper milk cartons in half. Cut the top and bottom from a tuna or cat food can or a plastic margarine tub to make simple round molds. Stapled strips of cardboard in the shape of a circle can also be used.
6. Mix about two cups of plaster in a container, adding water slowly until it is about as thick as heavy cream. Carefully pour the mixture into the mold until the plaster is almost to the top. Allow the plaster to harden at least 15 minutes before lifting it out of the track. If the soil is damp, the plaster may take longer to harden.
7. When the cast is hard, lift it out and remove the ring. Clean the cast by scraping it with a knife blade or toothbrush and wash.
8. To make a reverse image of the track, apply a thin coating of petroleum jelly to the track and surface of the cast. Place the animal cast on a flat surface and surround the cast with a two-inch strip of cardboard as before. The original cast now becomes the mold.
9. Mix the plaster and pour it into the mold, making certain that the top surface of the casting is smooth and level with the mold. If

you plan to use the casting as a wall plaque, place a loop of wire in back of the casting while the plaster is still soft. Allow two hours for the plaster to harden. Discuss different ways of recording animal tracks (photos, drawing, plaster, and so forth).

10. Carefully remove the mold when the plaster is dry. Separate the two layers, and wipe the excess petroleum jelly from the face of the cast and track. Scrape any rough places with a knife blade, or use fine sandpaper to smooth the surface. Wash the completed cast with water.

11. When the cast is thoroughly dry, paint the inside of the track with India ink or black poster paint. Label each cast with the name of the track and the student's name. A coat of clear shellac or clear plastic may be applied to protect and preserve the casting

Extensions

1. In a sandy area, have the students move their bodies in different ways such as walking, running, and jumping. Compare the differences between sets of tracks made by the same student doing each movement. Evaluate how speed, directional changes, and other variations in travel alter the tracks.

2. Write a wildlife story through the use of appropriate tracks. As a variation, make up a "track story" and have others guess what happened in the story.

Evaluation

1. Have the students group the tracks and discuss how characteristics indicate the lifestyle and size of the animal. Students could summarize verbally or in writing their discussion of the tracks and could make predictions for other animals in the same group and in different groups.

2. What is the advantage of using plaster casts versus photography to study and preserve animal tracks?

3. What are the advantages and disadvantages of the plaster medium?

4. Draw and label tracks of animals common to your area.

5. How would the knowledge about animal tracks and tracking help the following people: a biologist studying bears, a wildlife photographer interested in a variety of animals, and a shepherd with a flock of sheep? What kinds of things would they need to know about animal tracks to do their jobs?

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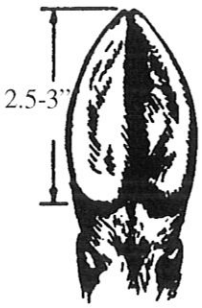
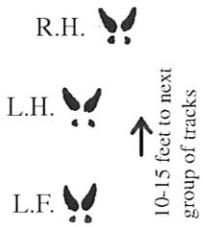
Looking for Tracks

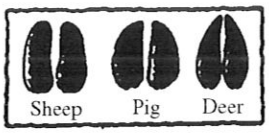
Deer





Above: Bounding
Below: Walking

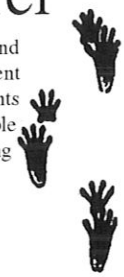
Footprint of running deer showing spread toes and imprint of dewclaws



Grey Squirrel

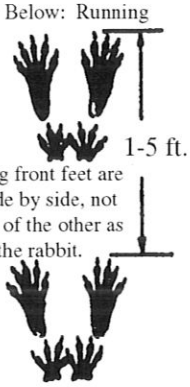
Front Foot

Spacing and arrangement of footprints are variable in walking tracks



Above: Walking
Below: Running

Hind Foot



In Running front feet are placed side by side, not one ahead of the other as with the rabbit.

Black Bear

Right Hind Foot

Claws seldom show in tracks

Right Front Foot

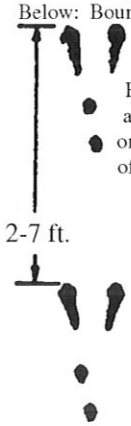
Cottontail Rabbit

Front Foot

Feet heavily furred, toes indistinct in tracks

Hind Foot

Above: Hopping
Below: Bounding



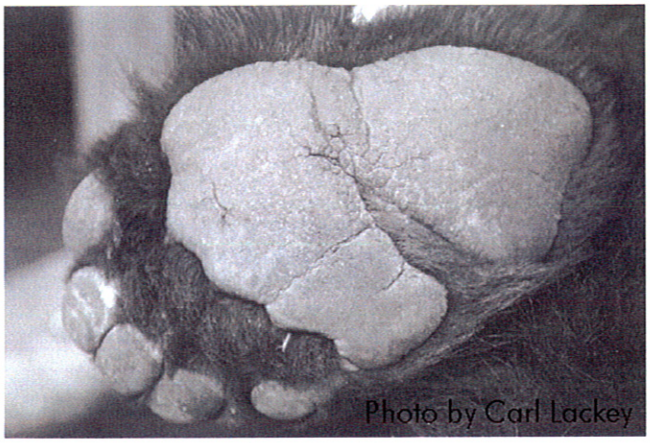
Front feet are placed one in front of the other

Source: J. J. Shomon, reprinted from *Virginia Wildlife Magazine*

Looking for Signs

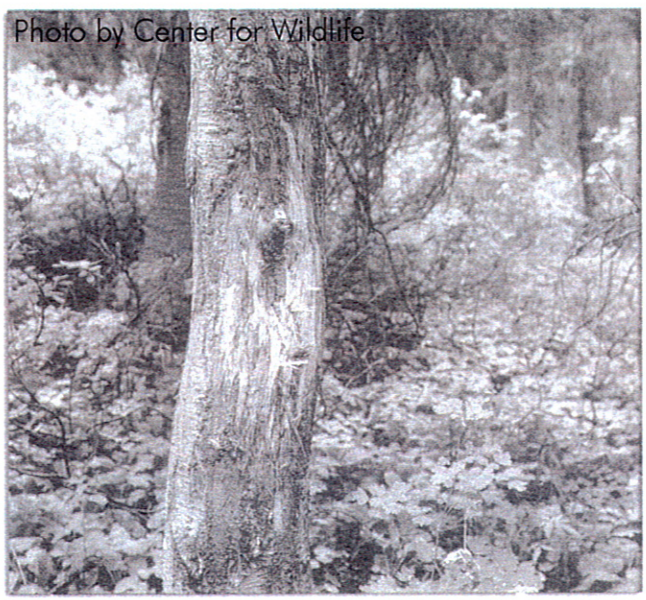
TORN LOGS can mean a bear was looking for high protein grubs and ants, which are important to its diet. Like a dog chews on a bone to get the nutrient rich meat within, a bear will tear apart a log to find these insects.

SCAT from a bear is often larger than most other animals. Bears have poor digestive systems; so much of what they eat comes through intact



Above, hind paw; below, front paw.

CLAW MARKS on a tree approximately 7-8 feet off the ground may have been left by a bear that stripped away bark to eat tree pulp.



BEAR TRAILS may be found on hillsides covered with trees; this is bear habitat.

ROLLED ROCKS may be a sign that a bear was searching for insects underneath. (mmm…protein!).

DIGGING for rodents and beehives is an exerting activity for bears to find meat.

DIGGING for bulbs and roots provides carbohydrates and quick energy for a bear. Bulbs are the most nutritious part of a plant and are especially high in nutrients just before the plant blooms.

You Are What You Eat

Objective

Students will identify the eating habits of a mammal using animal skulls and teeth.

Method

Students examine animal skulls and teeth.

California Standards

Language Arts: Reading 2.7; Listening and Speaking 1.6 *Science*: Life Science 2 b, 3 b, c; Investigation 6 a, c

Materials

Time to complete: one 50-minute period, activity pages (one per student), Replica skull from kit

Background

The study of skulls and animals' teeth are an important part of a biologist's work. There are many reasons for close examination of a mammal skull. Biologists learn much about the health, age, and relationships of mammals by studying their skulls. The shape and size are important since the skulls are composed of many separate bones that fit together like pieces in a puzzle and vary according to the animal's particular lifestyle. Biologists look for structures for muscle attachment, openings for nerves and blood vessels, and suture patterns (areas where the skull bones grow together).

However, the teeth have the most to say about a mammal and its lifestyle. Mammals have developed an amazing array of teeth. Each creature has evolved a mouthful of tools best suited to its special life style. Their number is important, but so are their shape and their location in the jaws. Certain types of teeth may be absent in one species, but present in another. All are important indicators of the animal's eating habits and are crucial for identifying the species. There are four basic types of teeth: incisors, canines, premolars, and molars.

Procedure

1. Ask students if they have heard the expression "you are what you eat?" Ask them to relate the statement to the shape and function of an animal's teeth. Discuss their ideas.
2. Provide each student with the activity page. Have students read the information and then label the drawing of the skull.
3. Have students compare the drawing with the replica skull in the kit. Through their examination what information can be determined about the animal? What types of teeth are present in the skull? Is this animal an herbivore, carnivore, or omnivore?

Extension

Have students create a dental formula for the replica skull. Biologists use the number, type, and location of a mammal's teeth to determine a "dental formula." An example of a dental formula for an animal with 50 teeth is:

	I	C	P	M	Total
Upper	10	2	6	8	26
Lower	8	2	6	8	24

The letters refer to the different kinds of teeth: incisors (I), canines (C), premolars, or bicuspids (P), and molars (M). The numbers refer to the total number of teeth of each kind in both the upper and lower jaws.

Evaluation

Have students match the profile of eating habits with the skull drawings on the Review activity sheet.

Activity adapted from "Wild in the Woods," *Virginia Wildlife Newsletter*, November 1998.

Answers to Student Page: A-3, B-5, C-4, D-2, E-1.

You Are What You Eat!

Why do mammals have so many different kinds of teeth? Because the diets of mammals are diverse, and different types of teeth are needed to process the various foods that mammals eat. Animals that feed only on plants are called herbivores (HER-bi-vore). Rabbits and squirrels are herbivores. Animals that feed only on animals are carnivores (KAR-ni-vore). Can you name a carnivore? Mountain lions are carnivores. There are very few true carnivores. Most humans are omnivores (OM-ni-vore). Omnivores eat both plants and animals. Most animals are omnivores. Bears are omnivores. Bears eat mostly plants but they also eat rodents, insects, and sometimes baby deer and fish. They even eat carrion (KAR-e-on); carrion means dead animals.

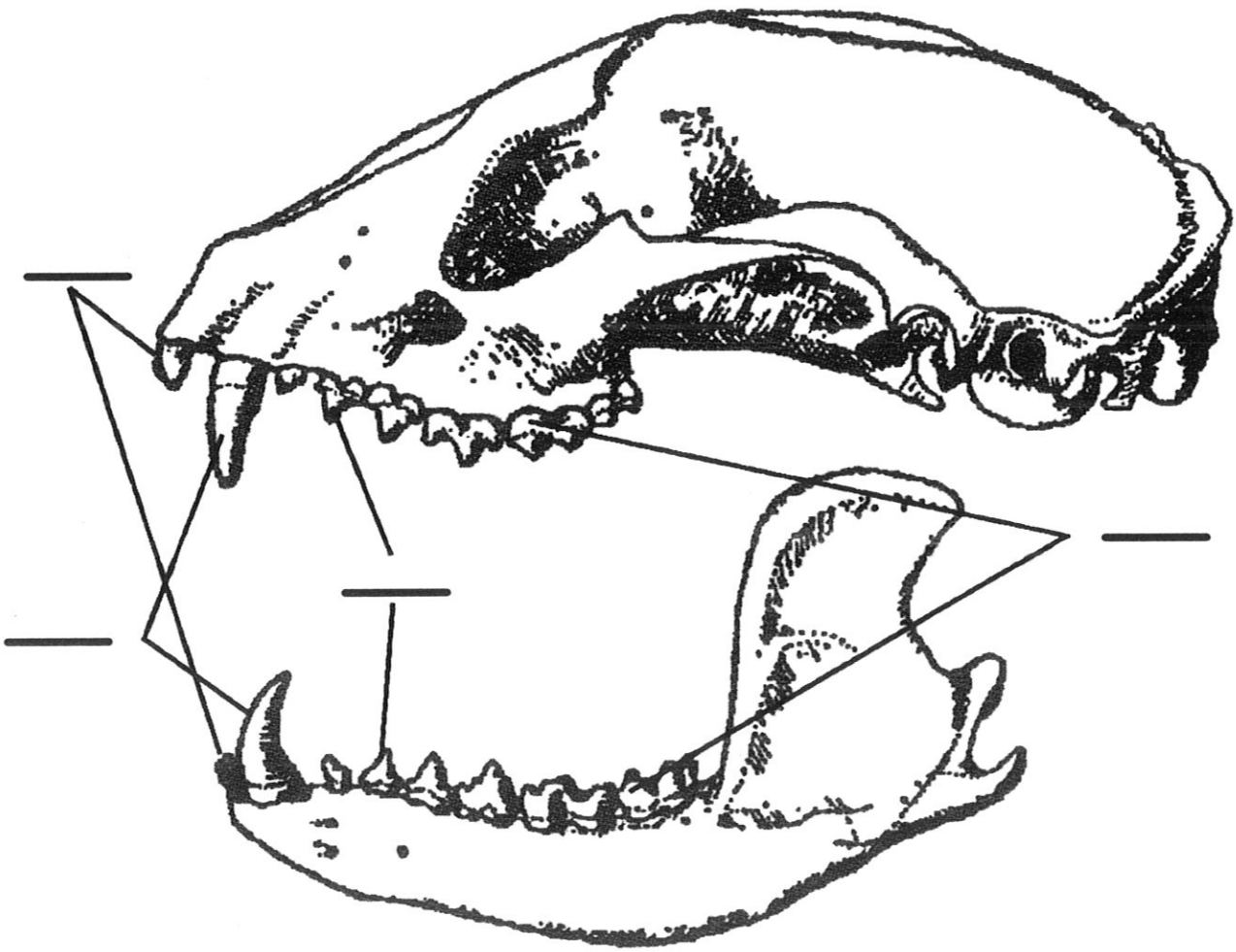
Animals that eat meat will have pointy teeth for ripping and tearing. An animal that eats only plants will have mostly flat teeth for grinding. Animals that eat both kinds of food, meat and plants, have an assorted set of teeth.

Label the skull drawing, as you do compare your own teeth with the drawing.

There are four basic types of teeth: incisors, canines, bicuspids (or premolars), and molars.

1. Incisors are big, flat, wedge-shaped teeth in the front of the jaw; they work much like scissors. The upper and lower teeth fit closely together like two blades and nip out neat bites of food.
2. Canines are on either side of the incisors. They are sharp, pointy teeth sometimes called dog teeth. These are used for gripping, tearing, and chewing meet off a bone.
3. Next are the bicuspids. This word means having two (bi) points (cusps). They are also known as premolars.
4. In the back are the flat molars. Molar means "millstone." Together the bicuspids and molars are the grinding department.

A black bear is an _ _ _ _ _ _ _ _. Can you see why?



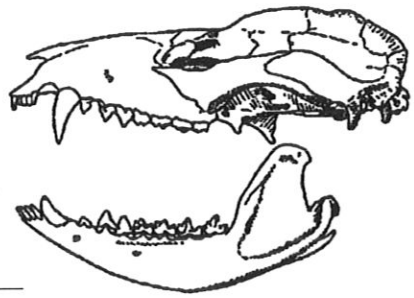
You Are What You Eat!

This review may help you match the eating habit profiles with the five mammal skull drawings.

The teeth have much to say about a mammal and its lifestyle. Herbivores must chew their food well before swallowing, since plant material is difficult to digest. Generally, the premolars and molars are broad and flat for grinding plant material to a pulp. Most herbivores don't have canines because they don't need to grab moving prey. Omnivores eat both plant and animal food; their teeth and other skull characteristics show a combination of herbivore and carnivore features. Omnivores usually have a full set of teeth but their jaws and teeth are generally less specialized than those of carnivores or herbivores. Carnivores usually have a thick, heavy jaw with large surface areas and other features for muscle attachment.

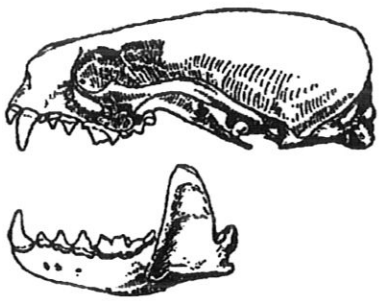
Match the following profiles to the correct skull.

1. DEER are herbivores, feeding on all kinds of vegetation. They are browsers whose molars have a jagged appearance and a well-adapted surface for grinding the tough plant fibers in vegetation.
2. BATS are insectivores, a specialized kind of carnivore that eats insects such as moths, beetles, flies, and mosquitoes. Bats can consume as much as half their own weight in insects in one evening.
3. OPOSSUMS are the only marsupial in North America; the female has a fur-lined pouch called a marsupium in which the young develop. The species was introduced into California and they eat just about anything edible. These omnivores are active at night eating insects, fruit, eggs, nuts, and garbage.
4. RIVER OTTERS are aquatic mammals that live in streams and lakes. They feed on fish, frogs, and crayfish, as well as small birds and mammals. They are carnivores.
5. BEAVERS are herbivores that leave evidence of their presence in the form of tooth-marks on downed logs and branches and on tree stumps chiseled out by their front teeth.



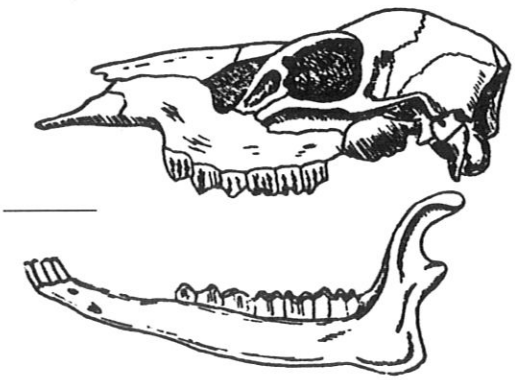
A. _____

B. _____



C. _____

D. _____



E. _____

How Many Bears Can Live in This Forest?

Objectives

Students will 1) define a limiting factor and 2) describe how limiting factors affect animal populations.

Method

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

California Standards

Language Arts: Listening and Speaking 1.1, 1.2
Science: Life Science, 3a, b, c; Investigation 6c.

Materials

Two sheets of red, yellow, green, blue, and orange construction paper or an equal amount of light poster board or colored tokens, one black felt pen, envelopes (one per student), pencils, one blindfold, five sheets green construction paper (for extension)

Background

Black bears are the focus of this activity that illustrates the importance of suitable habitat for wildlife. The activity demonstrates the consequences for a population of bears if one or more habitat component is relatively scarce. When any element or factor in a habitat is inappropriate or exceeds the tolerance range for an animal or population, it directly affects the well-being of the animal(s) and may result in death or population reduction. This factor "limits" the animal or population. Limiting factors may include habitat components such as food, water, shelter, and appropriate space, as well as life history parameters such as disease, predation, and climatic conditions. Limiting factors also may be related to human activity such as development, pollution, and hunting. Populations tend to increase in size until limited by one or more of these factors.

The black bear habitat limits black bear populations, especially through the influences of shelter, food supply, and social tolerances or territoriality of the species. Shelter or cover is a prime factor. Black bears need cover for feeding, hiding, bedding, traveling, raising cubs, and 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 until they 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 possible conditions are not covered by the design of the activity. However, by this simple illustration it is possible for students to quickly grasp the essential nature of the concept of limiting factors: habitat components affecting the survival of an animal or restricting the number or range of an animal population.

Procedure

1. Make a set of 2" x 2" cards from the colored construction paper. Use the Habitat Cards chart to determine how many cards of each color to make and what to write on each one. As shown in the chart, the color of the card determines the type of food it represents:

orange=nuts (acorns, pecans, walnuts, hickory nuts)
blue=berries and fruit (blackberries, elderberries, raspberries, wild cherries)
yellow=insects (grub worms, larvae, ants, termites)
red=meat (mice, rodents, peccaries, beaver, muskrats, young deer)
green=plants (leaves, grasses, herbs)

   The number on each card represents the number of pounds of food. For example, a card with the label M-4 represents four pounds of meat.

2. The following estimates of total pounds of food needed for one bear in 10 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%

HABITAT CARDS			Number of students in group						
Paper Color	**Label**	**Represents**	**10-15**	**16-20**	**21-25**	**26-30**	**31-35**	**36-40**	**41-45**
Orange	N-20	Nuts, 20 lbs	2	3	3	4	5	6	7
Orange	N-10	Nuts, 10 lbs	8	13	17	21	25	29	33
Blue	B-20	Berries, 20 lbs	2	3	3	4	5	6	7
Blue	B-10	Berries, 10 lbs	8	13	17	21	25	29	33
Yellow	I-12	Insects, 12 lbs	2	3	3	4	5	6	7
Yellow	I-6	Insects, 6 lbs	8	13	17	21	25	29	33
Red	M-8	Meat, 8 lbs	2	3	3	4	5	6	7
Red	M-4	Meat, 4 lbs	8	13	17	21	25	29	33
Green	P-20	Plants, 20 lbs	2	3	3	4	5	6	7
Green	P-10	Plants, 10 lbs	8	13	17	21	25	29	33

NOTE: These figures represent the food of a typical black bear in Arizona. 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.

If the table is followed when making the food cards, 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.

3. It is also possible to include water as a habitat component by making additional squares from light blue paper. To calculate how many water cards to make, multiply the number of students by 1.25 (round to the nearest whole number). For example, for a group of 20 students, make 20 x 1.25 = 25 water cards. Divide the water squares into five equal piles (or roughly equal) and mark each group with the one of following letters: R, L, ST, SP, and M. These letters represent all the places where a bear could find water: rivers, lakes, streams, springs, and marshes.

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

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 and the students should gather different colored squares to represent a variety of food.

6. Have each student write their 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.

7. Have students line up on the starting line, leaving their envelopes between their feet on the ground. Give them the following instructions:

   "You are now 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 injured 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. He or she must hunt blind-folded.) *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.)

8. 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.)

9. 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.

10. Explain what the colors and number represent. Each color is a kind of food and the number represent the number of pounds of food eaten. Ask each student to add up the total number of pounds of food they gathered, whether it is nuts, meat, insects, berries, or plant material. Have each student write the total weight on the outside of their envelope.

11. Using a chalkboard, list "blind," "injured," and "mother." Ask the blind bear how much food she acquired. Write the amount after the word "blind." Ask the injured bear and the mother bear how much they acquired 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, perhaps in 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.)

12. If the water squares are included, each student should have picked up at least one square representing a water source or they do not survive. Water can be a limiting factor and is an essential component of habitat.

13. Ask each student to record how many pounds of each of the five categories of food they gathered. Next, ask each student to convert these numbers into percentages of the total poundage of food each gathered. Provide the students with the background information about black bears so that they can compare their percentages with what are typical percentages eaten by black bears in Arizona. Ask students to guess how healthy they would be if they were a bear. How do the bears' requirements for a diet seem to compare with the needs of humans for a balanced and nutritious diet?

14. 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 so many 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?

15. Ask the students to determine the amount of food tokens that must be added in order to support all of the bears in this activity. If sufficient food were available for all the bears would the population likely increase the following year? Have the students support their answers. Other than food, what factors, natural or human-related, might also limit the growth of the bear population? How would each of these factors affect the bear population? Could the bear population increase indefinitely if unlimited food were available? Why or why not?

16. Based on their discussion, ask the students to try to define the term limiting factor. Have them suggest examples of limiting factors, human and natural, that would be likely to actually influence the survival of other animals and their populations.

Extensions

1. Cut five different colors of paper or poster board into 2" x 2" squares. Make five squares per student. For example, with a class of 30 students, you would make 150 squares. Divide all the squares into five equal piles and mark the cards in each pile with one of these letters: B, T, D, H, and F. These represent B=bedding sites, T=travel ways, D=dens, H=hiding cover, and F=feeding sites. For purposes of this activity, components of shelter 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.
Travel Ways=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 on top of the ground 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 predators and other bears by hiding in thick cover or by climbing trees.
Feeding Sites=Bears often will 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 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.

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 predict what the letters on one of the colors represent. Give them a 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 acquired at lease 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.

6. 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. Ask students why a den is important. (The bear could live from April through October but would not have secure place to hibernate and might not survive the winter.) Ask the students what would happen if a bear did not have travel ways? (Without travel ways, home ranges become fragmented and bears are not able to reach needed food, water, or shelter. Without suitable habitat, bears move into marginal habitats and get into trouble with people.)

7. 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.) Could food be a limiting factor for bears? (Yes, however bears are omnivores and can utilize many sources of food.)

8. Ask the students to summarize what they have learned about the importance of suitable habitat for a bear's survival. How are the needs of Bear Habitat similar to and different from the needs of other animals?

Evaluation

1. Define limiting factor.

   a. Describe some of the factors that may limit the survival of an animal.

   b. What might be the consequences to the individual animal and to its population if one of these limiting factors was no longer limiting?

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Garbage Bears, Oh My!

Due to a need to educate people about keeping bears out of garbage, wildlife education staff in Alaska created an extension to the favorite activity about carrying capacity "How Many Bears Can Live in the Forest?" The extension has been tested on both 5th and 6th grade students, as well as a group of teachers in a Project WILD workshop. Participants in both cases were very enthusiastic and interested. The extension does not alter or reduce the importance of the main concepts originally covered in the activity.

In the extension, garbage cards are added to the pile of food cards. These cards are labeled G50 and are a bright color. Just as with the other types of bear food, participants are not told that the G50 cards represent garbage.

After the students have gathered all the food cards, and before they count out their food, they are instructed to remove the G50 cards and set them aside until later. Students are still not told the meaning of the cards. After they have learned about the diet of the bears and discussed carrying capacity in more detail etc, they are instructed to count up their G50 cards.

The G50 cards represent garbage. As opportunistic feeders, the bears (participants) do not know that garbage is not good for them. They just seek it out like any other food. However, once they learn that they can get easy food from garbage, they keep returning and become a human-food conditioned bear. Human-food conditioned bears often become bold around humans and cause problems.

Bears (participants) who collected three or more garbage cards are told they were killed in defense of life and property (DLP) by a nervous home owner, the Department of Fish and Game, or a state trooper. This news is met with great disappointment amongst the students, who thought they collected enough food to make it through the winter, but learned they actually were shot in defense of life and property.

In a recent teachers' workshop, the teacher who was the sow with two cubs who needed to collect twice as much food as everyone else thought she was scoring big by collecting five G50 cards. She actually selected these cards over the other food cards having less pound value, as she thought the G50 cards were an easy way to collect her required winter food. Upon realizing on her own what the G50 cards signified, she exclaimed in horror, "I was a garbage bear! I got shot didn't I?" This teacher lives in a community where about 19 bears have been killed in the past two years over defense of life and property, so the lesson was particularly pertinent.

Three other participants in the group of 12 collected just two G50 cards. One participant suggested, "Time to put up an electric fence!" to prevent the three potential garbage bears from getting shot.

Extension written by Lilly Goodman, a Wildlife Education Specialist from the Alaska Department of Fish and Game.

Ethi-Reasoning

Objectives

Students will (1) examine their own values and beliefs related to wildlife and other elements of the environment, (2) listen to and respect the rights of others to maintain different values and beliefs, and (3) evaluate possible actions they might take that have an effect on wildlife and the environment.

Method

Students read, discuss, make assessments, and write about hypothetical dilemmas concerning wildlife, natural resources, or both.

Correlations

Language Arts: Reading 2.4; Listening and Speaking 1.1; Speaking 2.1 a *History*: 4.5-4 *Science*: Life Science 3 a, b, c; Investigation 6 a, c

Materials

One set of Dilemma Cards for each group of students

Background

This activity is designed to give students the opportunity to examine their own values and beliefs relating to wildlife and other elements of the environment. It is not the intent of this activity to prescribe "right" and "wrong" answers for the students. One exception is in the areas where information about laws is conveyed.

Variation in laws from state to state affect wildlife and the environment. Each state has an official public agency that is legally responsible for managing the wildlife within the state. This agency can be contacted in your state to request general information about laws that affect most wildlife in your area. For example, it is legal to hunt and fish for some animals in all states. However, which animals can be hunted and under what conditions are specified by laws and regulations for which the state wildlife agency is responsible. There are also federal regulations that affect wildlife. The U.S. Fish and Wildlife Service can be contacted for information about such laws. For example, federal law protects all birds of prey (eagles, hawks, and owls) from being hunted or any intentional cause of death, injury, or harassment. All threatened and endangered species are protected by law. It is against the law to intentionally harm songbirds. It is generally illegal to possess birds' nests, eggs, and feathers, even those found lying on the ground. It is often against the law to pick up the carcass of an animal that has been killed by a vehicle along the highway or road. Instead, local wildlife authorities should be notified. In many cases, it is against the law to take an injured wild animal home to care for it. For example, birds of prey cannot be cared for by private citizens unless those citizens have a permit to do so. There are many laws, and they are complex. Again, it is useful and important to contact local authorities about the laws protecting and affecting wildlife in your area.

Whether right or wrong, questions of law can be separated from questions of ethics. On a personal level, an individual's choice of values and behaviors may be described as a code of ethics. Hunting, for example, is controversial for some people from an ethical point of view. Some people say that although hunting is legal, it is unethical because a human being is taking the life of a wild animal. Others believe hunting to be a responsible and ethical form of recreation, acquiring food, or controlling an animal population. These differences of belief may be sincerely held. Whether or not a person chooses to hunt is a personal choice dictated by one's personal ethics. Conflicts arise, however, when a person motivated by one set of ethics tries to force his or her ethics on others (i.e. arguments, harassment, or legislative action).

Procedure

Before the Activity

Educators will need to copy and cut out the Dilemma Cards. Other dilemmas could be written that are more specific to regional issues. Students could also be involved in the process of creating the dilemma cards, with each student responsible for one card. Dilemmas can be left entirely open-ended, with no options suggested.

1. Divide the class into groups of four and give each group a stack of Dilemma Cards. Place them face down at the center of the group.
2. The first student draws a card from the top of the stack. The student studies the situation, decides what he or she should do, and formulates a response.
3. When the students are ready, typically in less than 2 minutes, they each read the situation and options aloud to the rest of the group. Then, they give their decision and describe the reasoning involved. In turn, the other members of the group are invited to comment on the dilemma and what they would do in the situation. Discuss each dilemma for about 5 minutes. Make sure the person whose dilemma is being discussed has an opportunity to ask questions of the other members of the group and to offer clarification about his or her decision. Discussion gives the students experience in having ideas examined by peers and is intended to remind the students of the need to take personal responsibility for decision making. It is not necessary, and may not be desirable, for the students to reach a consensus; there are legitimately ranging views of the most appropriate and responsible actions to take in many situations. The purpose is to provide students with an opportunity to examine, express, clarify, and take responsibility for their reasoning.
4. Return the card to the bottom of the stack, and have the next student select a card from the top of the stack. Continue this process until all students have had the opportunity to express their decision and rationale about a dilemma.

Evaluation

Choose a dilemma and:

- Write a short paragraph on the positive and negative effects of all the options listed for that dilemma.
- Indicate what additional information, if any, is needed to make a responsible and informed decision.
- Give two opposing and convincing arguments on how to respond to this dilemma.
- Identify what response is the most responsible; explain your reasoning.
- Explain how someone else could reach a different, yet valid opinion with the same information.

Activity adapted from *Project WILD K-12 Curriculum and Activity Guide*, copyright Council for Environmental Education. For more information about Project WILD or other CEE materials contact Bobbie Winn at the California Department of Fish and Game (888) 945-3334 or bwinn@dfg.ca.gov. Also, contact Adrienne Forbes at the Nevada Department of Wildlife (775) 334-3808 or aforbes@ndow.org. Dilemma Cards adapted from *The Florida Black Bear Curriculum Guide*, copyright Defenders of Wildlife and the Florida Fish and Wildlife Conservation Commission.

Dilemma Card #1

Near your neighborhood is a large tract of wooded land. This land provides habitat for bears and many other types of wildlife. Your growing town has so many families with children that building a new, state of the art Sports Park for the community has been proposed. The park would contain playing fields, a playground for kids, and a water park. To build this new recreation area for the people of the community, the large wooded tract of land would have to be cleared. This would mean a large loss of wildlife habitat. Would you…

a) Be in favor of the building of the Sports Park?
b) Look for a different way to meet the needs of the people in your community and meet the needs of the wildlife?
c) Tell everyone that there is really no need of the Sports Park. There are already many things to do like hiking and fishing?
d) Do something else?

Dilemma Card #2

It is dark and you and your family are driving home. As you come around the curve in the road, a large black shape runs out into the road. Your family's car hits the animal. You realize that it is a black bear. The bear is now lying by the side of the road. Would you…

a) Keep on going and hope no one saw what happened?
b) Tell your parents to stop and check to see if the bear is still alive?
c) Call the police to report the accident and ask for help for the bear?
d) Make and anonymous call to a Game Warden letting them know where the bear is located?
e) Do something else?

Dilemma Card #3

Your class is on a field trip to the zoo. Although you know that feeding of the animals by zoo visitors is prohibited, some of your friends are feeding marshmallows to the bears. Would you…

a) Tell them that feeding marshmallows may harm the bears and ask them to stop?
b) Report their behavior to the nearest zoo keeper?
c) Ask the teacher to ask them to stop?
d) Do nothing?
e) Do something else?

Dilemma Card #4

Several people in your neighborhood have reported sightings of bears in the woods around your town. People like to watch the bears so they decide to set up a bear feeding area so they can watch the bears feed at night. They decide to gather all the food garbage and leave it out in an open area on the edge of the woods. Would you…

a) Come to watch the bears regularly and even take pictures?
b) Call a Game Warden or Wildlife Biologists and ask them to talk your neighbors out of the idea of a bear feeding station?
c) Educate people in your neighborhood about the dangers to both bears and humans when bears begin to depend on people for food?
d) Try to set up your own bear feeding station in your own backyard?
e) Do something else?

NOTE: It is illegal in California and strongly discouraged in Nevada to feed bears. Many communities have ordinances penalizing those who feed wild animals.

Dilemma Card #5

You are on a picnic with your family and you see another family leaving to go home without picking up their own trash. It is clear the other family is going to leave litter all around. Would you…

a) Move quickly and ask them to pick up their trash before leaving?
b) Wait for them to leave and pick up the trash for them?
c) Do nothing?
d) Do something else?

Dilemma Card #6

Your backyard is surrounded by woods. One day when you and your friends are playing in your backyard, you hear a funny sound coming from a pine tree. You look at the tree and see a small black bear up in the tree. Would you…

a) Throw rocks at the bear to try to get it to come down?
b) Try to climb up into the tree to play with the bear?
c) Call a television station and report the bear so you and your friends can be on the local news?
d) Leave the bear alone and call a Game Warden or Wildlife Biologist to assist you.
e) Do something else?

Dilemma Card #7

You and your family decide to go to a nearby state park for a bike ride. As you are riding down the bike trail you hear a rustling in the bushes next to the trail. Suddenly, a mother black bear and her cub walk out of the bushes onto the bike path. Would you…

a) Try to pet the cute baby bear cub?
b) Scream and try to ride your bike in the other direction?
c) Stop and stand very still and let the mother bear and her cub cross the path?
d) Try to keep on riding toward the bear and her cub?
e) Do something else?

Dilemma Card #8

You live in a rural area and your family has a small barn with chickens, turkeys, goats and rabbits. One night, you are awakened by the noise of something raiding the animal food bins in your barn. You investigate and see that a black bear is raiding the grain and corn stored in the barn. Would you…

a) Call a Game Warden to come and remove the bear?
b) Ask your parents to shoot the bear?
c) Try to make loud noises to scare the bear away and secure food in a bear-proof container?
d) Set a trap to catch the bear alive and then get help to take it somewhere else to release it?
e) Do something else?

Dilemma Card #9

You and your family take a summer camping trip. There are signs posted in the campgrounds warning campers that black bears are in the area. Barbequed hamburgers are prepared for dinner. After eating, you are all tired, and your mom decides to leave the dinner dishes out on the table and clean them up in the morning. Would you…

a) Pick up the leftover food and any food trash and hang it from a tree far away from your campsite?
b) Tell your mom about the dangers of leaving food out in a campsite in bear country and offer to clean up the dishes yourself?
c) Go to bed because you are really tired too?
d) Find a forest ranger and ask them to talk to your parents about the importance of keeping a clean campsite in bear country?
e) Do something else?

Dilemma Card #10

You and your friends are out walking in the woods near your house. You come upon a small black bear cub. There is no sign of the cub's mother. Would you…

a) Leave the cub where it is?
b) Move the cub to a sheltered area?
c) Take the cub home?
d) Do something else?

Be Bear Aware

Objectives

Students will identify ways to avoid unwanted or unsafe encounters with bears. Students will teach others how to help bears from becoming a problem in the neighborhood, at home, or at a campsite.

Method

Students will conduct a classroom Bear Aware Campaign by creating posters, news stories, and conducting a neighborhood survey.

California Standards

Science: Life Science 3b, c; Investigations 6a, b
Language Arts: Writing 1.1, 1.2, 1.3, 1.5, 1.6, 1.7, 1.8, 2.3; Written and Oral 1.0, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7

Materials

Writing materials, poster materials, classroom bulletin board, copies of activity pages

Background

As residents of the Tahoe area, we have a responsibility for keeping our wildlife wild. Conflicts between humans and bears are most often created by people. People have a responsibility to wildlife whose habitat they are sharing. The best way to avoid conflict with bears is to prevent it. The prevention of nuisance bears relies on actions taken by every person in bear country. To control the situation, it is necessary to take personal responsibility to reduce conflicts and prevent the loss of property and possible harm.

There are benefits to living in harmony with bears. The bear's presence in nature indicates the good health of our natural environment. Natural areas that support bears are home for many other animal species. Steps taken to prevent bears from becoming nuisance animals also prevent other species from becoming problems (such as raccoons, skunks, fox, opossums, mice, and rats), and thereby decreases human and pet exposure to diseases (e.g. rabies) and property damage.

Procedure

1. Define the term "nuisance" bear. A "nuisance" bear is one that has become habituated to human sources of food; these bears also become conditioned to human presence resulting in bold behavior. Nuisance bears get into all kinds of trouble from raiding garbage cans and eating pet food to occasionally killing livestock and causing property damage. Nuisance bears are created by common mistakes that homeowners, campers, and hikers innocently or unknowing make. Feeding bears either by accident or on purpose is the number one source of the problem.
2. Explain that the class will create a "Be Bear Aware" Campaign. Students will make posters, write news stories and conduct a neighborhood survey to evaluate how well people are prepared for preventing bear encounters and will document areas that need attention.
3. Discuss the idea that bears do not know public land boundaries and roam throughout forests. Bears are attracted to residential areas and camp sites because they are attracted to many different foods such as garbage, bird seed, squirrel feed, pet food, compost piles, and greasy barbecue grills. Once a bear finds something it likes, it may return to the same area several times (even after food is removed) or search around the general area for similar foods. Some bears become used to people and may even appear tame. However, bears are wild animals and are unpredictable. Noise such as shouting, clapping, or a horn blast may scare off a bear. Installing motion sensitive lights outside the house may also help. A bear should not be teased if it fails to respond to efforts to frighten it. These methods are only temporary solutions. The best solution is prevention, keeping areas clean, and to stop leaving food out for bears.
4. Review "Avoiding Bear Problems." Explain that each student will create public service posters from the list on "Avoiding Bear Problems."

5. Have students share their posters with the class. Discuss the student's message.
6. Have each student write a news story with the idea from their poster. The message will instruct others how to "Be Bear Aware" and how to avoid having problems with bears.
7. Create a classroom bulletin board with the posters and news stories.
8. Give each student a copy of the *Be Bear Aware* neighborhood survey. Ask students to view their neighborhood and complete the survey. The survey will indicate areas that need improvement as well as the areas that demonstrate responsible human action. Instruct students to bring the completed survey scorecard back to class.

   NOTE: Use this exercise to demonstrate the skills of observations and inferences. Students observe examples of human behaviors and then make inferences about the results of this behavior. For example, observed garbage in yard infers bear visit and destruction.
9. Have students share the results of their neighborhood survey. How can students help inform others to be bear aware? Ask students for suggestions on how to promote safety for people and safety for bears. Encourage students to share the information they have learned about bears with others (kids and adults). Remind them that they can make a difference by reporting problems to wildlife agencies, educating their parents and friends about ways to avoid having problems with bears. NOTE: Door hangers are a good non-invasive method to share information and call attention to possible problems. Computer generated door hangers can be created by students.
10. Provide each student with a copy of the pledge certificate. Instruct students to decorate the certificate, write their pledge actions, sign, and date. The certificates may be taken home and placed in a prominent place.

Extensions

1. Student may create a community Be Bear Aware Newsletter using the art work and written information they have done. Use information from other activities in this unit to develop an educational tool to share what they have learned with other students and adults.
2. Have the students write and produce a play about the best solutions to prevent bear problems or about correct behavior if they encounter a bear. The play may be presented for parents as well as the student body.

Evaluation

1. Have students complete this sentence "If you really care, don't _____ the bears!
2. Have students explain five things that can be done to prevent bear problems.
3. Have students write and explain two things they should do if they encounter a bear.

Activity written by Bobbie Winn, California Department of Fish and Game.

AVOIDING BEAR PROBLEMS

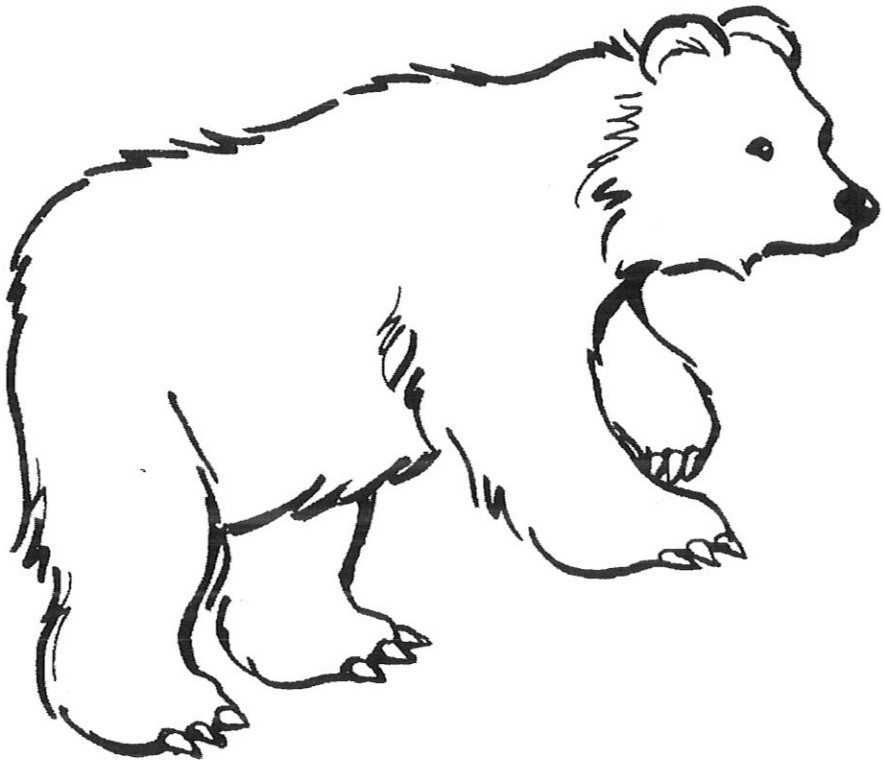
- Never approach a bear. Bears are wild animals and can be dangerous.
- Never feed a bear. Feeding a bear brings both you and the bear into harms way.
- Don't leave food out, unclean BBQ grills, pet food, or garbage etc…this can attract bears.
- Keep pet foods in a secure indoor area, even at night. Feed pets inside.
- Only put bird feeders outside November through March and always hang feeders so they are inaccessible to bears.
- Store garbage in a secure indoor area until pick-up day.
- Don't overfill garbage cans. Wait to put trash out until collection day.
- Install bear-proof garbage cans and bear-proof community dumpsters.
- Do not compost meat products or sweet scraps.
- Keep garbage cans clean and deodorize them with bleach or ammonia.
- Harvest fruit off trees as soon as it is ripe and promptly collect fruit that falls.
- Securely block access to potential hibernation sites such as crawl spaces under decks and buildings.
- Do not leave trash, groceries, or animal feed in your car.
- Don't leave any scented products outside, even non-food items such as suntan lotion, insect repellent, soap, or candles.
- Keep doors and windows closed and locked. Scents can lure bears inside.
- While camping, keep campsite clean, remove trash, and clean up immediately after meals.
- Clean BBQ grills after use.

Activity _____

Neighborhood Survey

Observe conditions in your neighborhood and help prevent possible bear problems. Observations should be made as you walk around or play. DO NOT go door to door. Check areas that need improvement and areas that show responsible action.

	Yes	No	
1.	____	____	Pet foods are kept indoors and pets fed inside.
2.	____	____	Bird feeders are outside only November through March.
3.	____	____	Garbage is stored in a secure indoor area until pick-up day.
4.	____	____	There are no overfilled garbage cans. Trash is put out only on collection day.
5.	____	____	Bear-proof garbage cans and community dumpsters are installed.
6.	____	____	Fruit is harvested as soon as it is ripe and fallen fruit is promptly collected.
7.	____	____	Access to potential hibernation site is securely blocked.
8.	____	____	No trash, groceries, or animal feed is left in cars.
9.	____	____	No scented products are left outside (i.e. suntan lotion, insect repellent, soap, or candles).
10.	____	____	BBQ grills are cleaned after use.



I Care for Tahoe's Bear!

This is how I will help the Tahoe Black Bear:

_____

_____

_____

_____

_____

_____ _____

Name Date

California Bear Flag: Symbol of Strength

The original Bear Flag was made in the Sonoma barracks on June 14 or 15, 1846. The flag consisted of a three by five foot section of unbleached cotton upon which were drawn a red star and a rough representation of a grizzly bear as an emblem of strength. In blackberry juice were painted the words, "California Republic." A piece of red flannel was sewn onto the bottom to produce a red stripe. The Bear Flag flew over Sonoma for nearly a month until it was replaced on July 9, 1846 by the Stars and Stripes. Other Bear Flags, four or more of them, were made between June 15 and July 9 for use at Bodega Bay and elsewhere.

> *"At a company meeting it was determined that we should raise a flag, and that it should be a bear en passant [French: 'in passing'], with one star. One of the ladies at the garrison gave us a piece of brown domestic, and Mrs. Captain John Sears gave us some strips of red flannel about 4 inches wide. The domestic was new, but the flannel was said to have been part of a petticoat worn by Mrs. Sears across the mountains...I took a pen, and with ink drew the outline of the bear and star upon the white cloth. Linseed oil and Venetian red were found in the garrison, and I painted the bear and star...Underneath the bear and star were printed with a pen the words 'California Republic' in Roman letters. In painting the words I first lined out the letters with a pen, leaving out the letter 'i' and putting 'c' where 'i' should have been, and afterwards the 'i' over the 'c.' It was made with ink, and we had nothing to remove the marks."*
>
> *-William L. "Bill" Todd, artist of original Bear Flag*

When the original Bear Flag was lowered at Sonoma July 9, it was given as a memento to one of the sons of Captain Montgomery of the U.S.S. Portsmouth, then at anchor in San Francisco Bay. Montgomery took the flag to Washington, D.C., where it was placed in the archives of the Naval Department. In 1855, at the request of California's Congressional delegation, the flag was returned to California for permanent display in the San Francisco headquarters of the Society of California Pioneers. This original flag was subsequently destroyed in the San Francisco earthquake and fire of 1906. A copy of the flag stands on display at the Sonoma Historic Park in Sonoma, California.

Historic California Bear Flag as photographed in 1890. Courtesy of The Virtual Museum of the City of San Francisco, www.sfmuseum.org.

Official California State Flag. Various bear images graced the California flag until 1953, when Don G. Kelley, the founding editor and art director of the magazine *Pacific Discovery*, was commissioned to design the official state flag.

Resources

"*California's Emblem: The Grizzly Bear*," by Tracy L. Storer. *Discovering California*, a selection of articles from *Pacific Discovery Magazine*, California Academy of Sciences, San Francisco, 1983.

California Conquered. Neal Harlow, 1982. University of California Press, Berkeley.

Vallejo and the Four Flags: The True Story of Early California. Esther J. Comstock, 1979. Comstock Bonanza Press, Grass Valley, California.

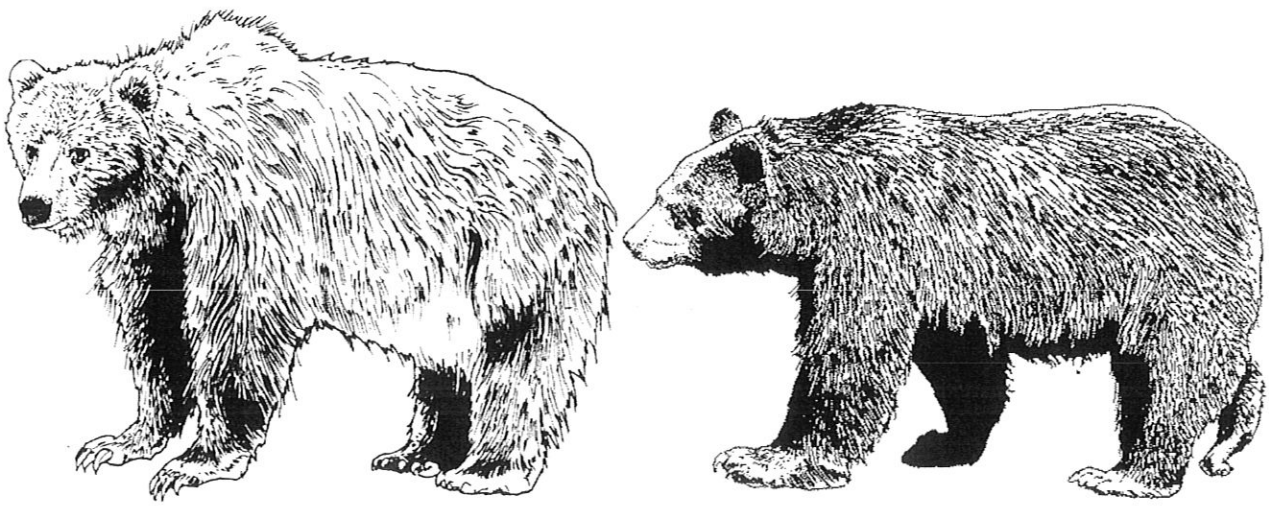
Pioneers of California: True Stories of Early Settlers in the Golden State. Donovan Lewis, 1993. Scottwall Associates, San Francisco.

Article courtesy of Sonoma State Historic Park, State of California Department of Parks and Recreation.

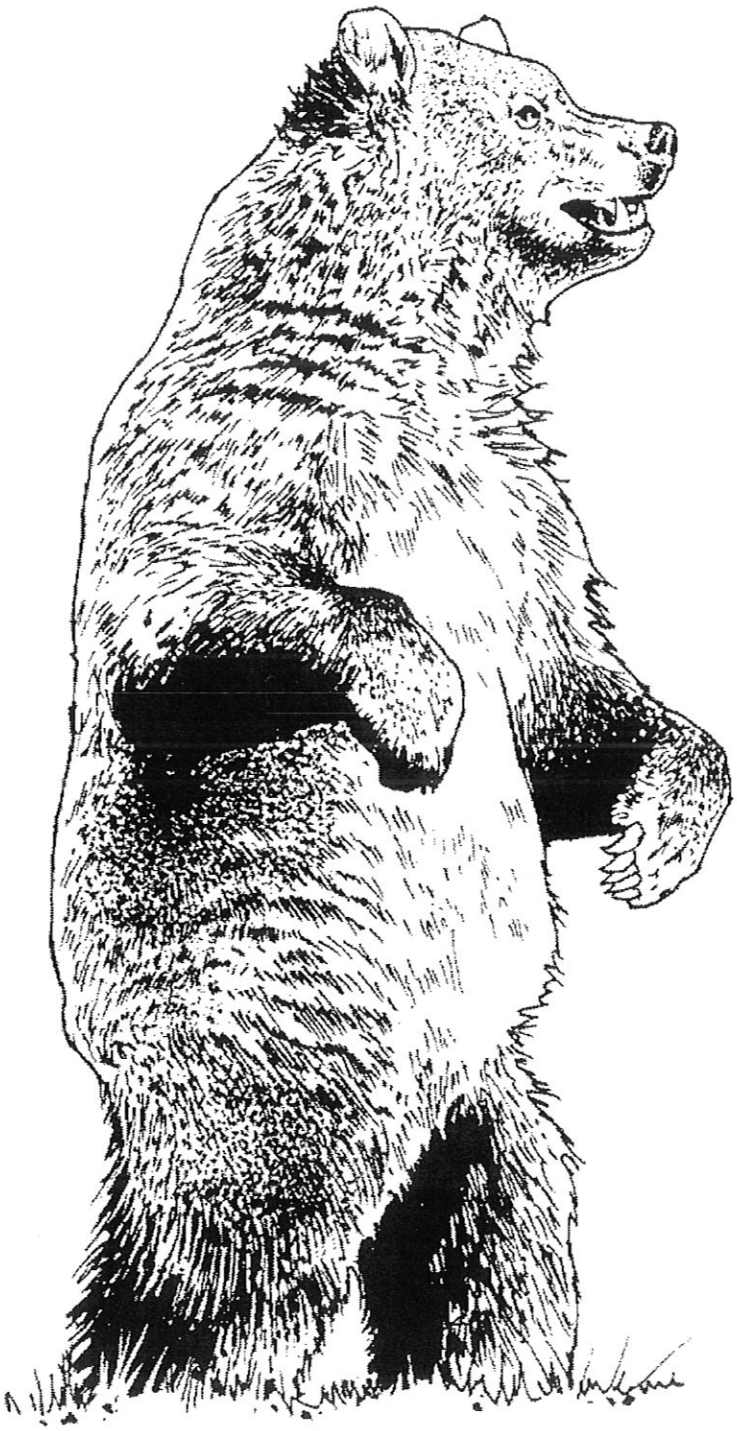
Grizzly or Black?

There are four main physical differences between black and grizzly bears: body shape, face, claws, and tooth length. The first three characteristics can be observed from a distance. The fourth requires close investigation.

- Adult grizzlies generally have a hump between their front shoulders, black bears do not. When walking on all fours, the highest point of a black bear's body is its rump; on a grizzly, the highest point is between the front shoulders.
- Adult grizzlies have a dished face profile. Adult black bears have a straight face profile, sometimes called a Roman nose.
- The claws on the front foot of an adult grizzly are 2 to 4 inches long and make excellent digging tools. They are rarely less than 1-3/4 inches long. The claws on black bears are seldom longer than 1-1/2 inches. The shorter claws make for better climbing, but they are not as efficient as a grizzly's for digging.
- The last major difference between the two bear species lies in the mouth, though it's a spot few people want to inspect. A black bear's last upper molar measures less than 1-1/8 inches long, whereas the same tooth in a grizzly's mouth is longer than 1-1/8 inches.



Just for Fun Trivia



Did you know?

- Polar bears can smell carrion 20 miles away and a seal den covered with snow.
- In the Himalayan language the word for "bamboo eater" is panda.
- The dexterous American black bear can open door latches and screw-top jars.
- Bears can detect human scent fourteen hours after a person passed along a trail.
- Polar bears use their slightly webbed front paws to swim 50 miles without rest.
- In preparation for hibernation brown bears gain as much as 3.3 pounds of fat a day.
- A koala is a marsupial, not a bear.
- The sloth bear can be heard 200 yards or more as it vacuums termites and ants with its specialized snout.

Great Bear Almanac, Gary Brown, 1993.

Glossary

attitude: A positive or negative feeling about something.

boar: An adult male bear.

carnivore: A flesh-eating animal.

carrying capacity: The largest number of organisms of a given species that an area of habitat can support on a year-round basis.

community: All the people living in the same place; A neighborhood; All the living things in any one place.

conservation: The care, wise use, and management of natural resources in order to prevent depletion.

cub: A young animal, like a bear or panther, that is less than one year old.

ecosystem: A community of living things together with its physical environment considered as a unit; A community of animals, plants, and bacteria interacting with each other and with their non-living chemical and physical surroundings.

endangered: A species that is in danger of becoming extinct throughout its natural range.

extinct: A species of animals or plants whose members have completely disappeared.

food chain: A group of animals and plants in a community through which energy flows in the form of food.

foraging: A type of feeding behavior whereby an animal meanders through an area and feeds on appropriate food items as it comes across them.

genus: A group of species with common characteristics; In taxonomy, the group that follows a family and precedes a species.

habitat: A natural area that provides the basic requirements an organism needs to survive including food, water, shelter, and space.

habitat fragmentation: The process of breaking larger areas of habitat into smaller pieces, often as a result of human development activities such as road building and urbanization.

habitat loss: The permanent alteration or conversion of natural habitat for human use.

herbivore: An animal whose diet consists primarily of plant matter, such as a rabbit, a deer, or a mouse.

hibernation: The state of being inactive during a winter so that most or all of an animal's life processes are slowed down or suspended.

hind: The back or rear.

limiting factor: Factors such as food, water, shelter, and space that determine the maximum number of organisms that can survive in a given habitat.

litter: The young animals produced by one mother at one time.

marginal habitat: A habitat that provides minimal or less than ideal amounts of food, water, shelter, space, and other habitat requirements for a particular species.

mortality: Death.

nourish: To grow; to keep alive and well with food.

nuisance: Causing trouble, annoyance or danger.

omnivore: An animal whose diet consists of a mixture of plant and animal matter (meat).

poaching: Killing game animals illegally.

predator: An animal that lives by preying on other animals.

preserve: To protect or save.

protein: One of the substances containing nitrogen; A necessary part of the cells of plant and animals; Contained in foods such as meat, milk, cheese, eggs, insects, and beans.

range: An area where an animal frequents, including the extreme limits of this area.

scavengers: Animals that feed on dead or decaying matter.

sow: An adult female bear.

species: A group of organisms that can breed and produce fertile offspring; a group of related living things that have certain common characteristics.

survive: To continue to exist or live; to remain.

territory: A land or region; An area that an animal lives, roams, and protects from others.

threatened species: A species that is likely to become endangered in the near future

Bear Resources for Teachers and Students

Bears. Helen Gilks and Andrew Bale, 1993. Ticknor & Fields, New York. A clear, concise text and beautifully detailed full-color illustrations make this an inviting and informative introduction to how the eight species of bear live, and to the complex relationships between bears and people. Grade 4 and up.

Sierra Club Wildlife Library: Bears. Ian Stirling, 1992. Sierra Club Books for Children, San Francisco. Young readers are introduced to the eight species of bears: their origins and evolution, where they live, what they eat, how they rear their young, and how they communicate. The book also looks at how humans affect bears' natural habitats and how scientists study these magnificent creatures to understand them and help provide for their survival. NSTA/CBC Outstanding Science Trade Book for Children. Grade 4 and up.

Bears: Their Life and Behavior. Photographs by Art Wolfe, text by William Ashworth, 1992. Crown Publishers, Inc., New York. A photographic study of the North American species of bears in their natural habitats.

Looking at Bears. Dorothy Hinshaw Patent, 1994. Holiday House, New York. Simple explanations of bear natural history. Grades 4 and up.

Zoobooks: Bears. John Bonnett Wexo, 1987. Wildlife Education, Ltd., San Diego. Descriptions, illustrations, and range maps. Grade 4 and up.

The Great Bear Almanac. Gary Brown, 1993. Lyons & Birford, Publishers, NY. With chapters on bear anatomy and physiology, behavior, and the conflicts that arise when humans meet bears, this captivating almanac collects virtually all that is known about the world's eight species. Coupling an easily accessible voice with a wealth of charts, statistics, illustrations, and photographs, author Gary Brown has created the factual compendium of bear knowledge, sure to satisfy the amateur naturalist and the bear specialist alike. Brown was Chief Ranger at Yellowstone, Denali, and Rocky Mountain National Parks, and Bear Management Specialist at Yellowstone.

Student Reading

The following fiction, non-fiction, picture books, and chapter books may contain realistic interpretations of life histories, bear/human interactions, and behaviors of black bears.

Ahlstrom, M., 1985. *The Black Bear*, Crestwood House, Mankato, MN.

Alborough, J., 1995. *It's The Bear*. Candlewick Press, Boston.

Bailey, B., 1975. *Wonders of the World of Bears*. Dodd, Mead, New York.

Brenner, B. and Garelick, M., 1989. *Two Orphan Cubs*. Walker, New York.

Bullaty, S. and Lomeo, A., 1983. *The Baby Bears*. Golden Press, New York.

Charman, A., 1983. *The Book of Bears*. Gallery Books, New York.

Crewe, S. and Morton, R., 1997. *The Bear*, Raintree Steck-Vaughn, Austin.

Eberle, I., 1966. *Bears Live Here*. Doubleday, New York.

Fair, J., 1991. *Black Bears: Black Bear Magic for Kids*. Gareth Stevens Children's Books, Milwaukee.

Ford, B., 1981. *Black Bear: The Spirit of the Wilderness*. Houghton Mifflin, Boston.

Freschet, B., 1977. *Little Black Bear Baby*. Putnam, New York.

George, J.C., 1967. *The Moon of the Bears*. Thomas Y. Crowell, New York, NY.

Helmer, D.S., 1997. *Black Bears*. The Rosen Publishing Groups' Power Kids Press, New York.

Karpfinger, B. et al, 1992. *The Wonder of Black Bears*. Gareth Stevens Publishing, Milwaukee.

Kratt, M. and Kratt, C., 1997. *Kratt's Creatures: Where're the Bears?* Scholastic, New York.

Laycock, G., 1967. *Big Nick: The Story of a Remarkable Black Bear*. Norton, New York.

Liers, E., 1962. *A Black Bear's Story*. Viking, New York.

McCloskey, R., 1948. *Blueberries for Sal*. Viking Penguin, New York.

McClung, R.M., 1956. *Major, The Story of a Black Bear*. W. Morrow, New York.

Murphy, J. and Greene, J., 1993. *Backyard Bear*. Scholastic, Inc., New York.

Pfeffer, P., 1985. *Bears, Big and Little*. Young Discovery Library, New York.

Pringle, L., 1989. *Bearman: Exploring the World of Black Bears*. Scribner, New York.

Shepard, P. and Sanders, B., 1985. *The Sacred Paw*. Viking Press, New York.

Van Wormer, J., 1974. *The Black Bear Book*. Caxton Printers, Caldwell, ID.

Ward, L., 1952. *The Biggest Bear*. Houghton Mifflin, Boston.

Whitehead, R., 1966. *The First Book of Bears*. Franklin Watts, New York.

Black Bear

Name_____ Number of correct answers_____

Circle one: Pre Assessment Post Assessment

Write the letter of the correct answer in the blank.

1. Black bears are_____.
   a. carnivores
   b. herbivores
   c. insectivores
   d. omnivores

2. An area that provides an animal with the basic requirements it needs to survive is called a(n) _____.
   a. ecosystem
   b. habitat
   c. life zone
   d. niche

3. The life span of a black bear is _____.
   a. 10 to 15 years
   b. 20 to 25 years
   c. 25 to 30 years
   d. 30 to 35 years

4. To protect yourself from a bear while camping and hiking, you should _____.
   a. wash your dishes properly
   b. pick up and properly store all trash and food scraps
   c. hang your food out of reach
   d. travel in groups
   e. all of the above

5. Scientists can study bears without actually seeing them by examining _____.
   a. scat
   b. tree scrapings
   c. tracks
   d. all of the above

Circle the correct true or false answer.

6. Bear cubs are usually born in June. T F

7. Black bear females can have between one and four cubs. T F

8. Bears have a remarkable sense of smell. T F

9. Bears use the flat back teeth, called molars, to chew and grind plant material. T F

10. Black bear tracks show five toes and may not show the claws. T F

Assessment _____

Fill in the blank.

11. A baby black bear is called a _____.

12. An adult female black bear is called a _____.

13. An adult male black bear is called a _____.

14. Examples of limiting factors are food, water, shelter, and _____.

15. Two examples of foods eaten by black bears are _____and _____.

Short answer: write answers in the space or on the back of the page.

16. What happens if the number of bears in an area is greater than the "carrying capacity" of the area?

17. Explain the term "limiting factor" and how it influences the bear population.

18. Name two ways to bear-proof your home.

19. As the number of people living and visiting the Tahoe area increases, what happens to bears in the area?

20. Why do you think it is illegal in California and strongly discouraged in Nevada to feed bears?

Answer Key

1. d
2. b
3. b
4. e
5. d
6. F (January/February)
7. T
8. T
9. T
10. T
11. cub
12. sow
13. boar
14. space
15. plants, berries, nuts, insects, meat
16. When the number of animals is greater than the carrying capacity, there are not enough resources available for all the individuals to survive. As a result, individuals either must leave the area or die.
17. Limiting factors are resources like food, water, shelter and space that determine the maximum number of animals that can survive in a habitat.
18. Put out trash only on collection day, keep garbage cans clean and deodorized, harvest fruit, clean barbecue grills, feed pets inside, block hibernation sites, keep doors and windows closed and locked, use bird feeders only November through March, do not leave scented products outside, do not leave trash, groceries, or animal feed in your car.
19. As human population increases the amount of habitat available for bears decreases; as a result there are more bear/ human encounters.
20. Once bears associate humans with a source for food, the bears will seek human foods and create human-bear conflicts. A bear's behavior will not stop voluntarily and it may be killed because of these conflicts (i.e., property damage or collisions with vehicles).