



## Dare to Care for a Grizzly Bear

### Lesson Overview

**GRADE LEVEL:** 9-11

**TIME ALLOTMENT:** Three to four 45-minute class periods, with additional time for homework

**OVERVIEW:** Grizzly bears were once scarce in Yellowstone National Park and on their way to extinction. Now, however, America's greatest predator is making a comeback. The story of the grizzly's return is one of the biggest successes in conservation history. The restored presence of the bears has brought visitors and revenue to the park, but it has also brought frustration and destruction to local ranchers, homeowners, and tourists living and working nearby.

Using the NATURE episode "The Good, The Bad and the Grizzly," students will discover how human beings have both saved and harmed a species. Students will investigate how human beings have interacted with and impacted the lives of grizzly bears, sometimes deliberately and sometimes inadvertently. Students will be able to articulate the complex and competing perspectives on how to best handle the burgeoning bear population, and describe the multiple factors contributing to the destabilization of the bear's Yellowstone ecosystem.

The lesson will begin with students participating in an introductory activity, in which they will challenge their notions of what is "good," "bad," "true," and "false" about grizzly bears and animal conservation efforts. Following the activity, students will research the habits and habitats of grizzly bears. Then, utilizing segments from the NATURE episode, students will explore the complex relationships between humans and grizzlies in the Yellowstone ecosystem. Students will then play and refine a classroom-based simulation game illustrating the challenges and obstacles to grizzly life in the national park and the surrounding area. As a culminating activity, students will write a letter to the U.S. Fish and Wildlife Service, either asking for special protection for the Yellowstone grizzly population, or endorsing the bear's de-listing from the Endangered Species Act.

**SUBJECT MATTER:** Living Environment/Biology

### LEARNING OBJECTIVES:

Students will be able to:

- Describe intentional and inadvertent impacts human beings have had on the grizzly bear population in the Yellowstone ecosystem;
- Articulate how the relationship between humans and grizzlies has changed over time;
- Evaluate the complex contemporary relationship between humans and grizzlies, as well as the challenging aspects of wildlife protection programs;



- Identify the grizzly bear's critical food sources in the Yellowstone ecosystem, and the threats posed to these food sources;
- Describe the challenges and obstacles faced by bears in the Yellowstone ecosystem, and refine a simulation game with their knowledge;
- Make an informed decision about whether or not to support the de-listing of grizzly bears from the Endangered Species Act.

## STANDARDS AND CURRICULUM ALIGNMENT

### National Science Standards for Science Content

<http://www.nsta.org/publications/nses.aspx>

CONTENT STANDARDS C; Life Science

As a result of activities in grades 9-12, students should develop understandings of:

- Interdependence of Organisms
- Human beings live within the world's ecosystems. Increasingly, humans modify ecosystems as a result of population growth, technology, and consumption. Human destruction of habitats through direct harvesting, pollution, atmospheric changes, and other factors is threatening current global stability, and if not addressed, ecosystems will be irreversibly affected.

### New York State Regents Core Curriculum Alignments

#### Living Environment Core Curriculum

<http://www.emsc.nysed.gov/ciai/mst/pub/livingen.pdf>

**Standard 4.** Students will understand and apply scientific concepts, principles and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science. This change over time is well-documented by extensive evidence from a wide variety of sources.

**Key Idea 1:** Living Things are both similar to and different from each other and from non-living things.

#### *Performance Indicators*

1.1 Explain how diversity of populations within ecosystems relates to the stability of ecosystems.



1.1a Populations can be categorized by the function they serve. Food webs identify the relationships among producers, consumers, and decomposer carrying out either autotrophic or heterotrophic nutrition.

1.1c In all environments, organisms compete for vital resources. The linked and changing interactions of populations and the environment compose the total ecosystem.

**Key Idea 7:** Describe the range of interrelationships of humans with the living and non-living environment

7.1c Human beings are part of the Earth's ecosystems. Human activities can, deliberately or inadvertently alter the equilibrium in ecosystems. Humans modify ecosystems as a result of population growth, consumption and technology. Human destruction of habitats through direct harvesting, pollution, atmospheric changes, and other factors is threatening current global stability, and if not addressed, ecosystems may be irreversibly affected.

7.2a Human activities that degrade ecosystems result in a loss of diversity of the living and non-living environment. For example, the influence of humans on other organisms occurs through land use and pollution. Land use decreases the space and resources available to other species, and pollution changes the chemical composition of air, soil and water.

## **MEDIA COMPONENTS**

### **Video**

**NATURE**, *The Good, The Bad and the Grizzly*, selected clips:

Clip 1, "Bears' Lunch Counter"

This segment explores how the relationship between humans and grizzly bears has changed over the course of American History, and describes the closing of the Yellowstone garbage dumps in the 1970s.

Clip 2, "This Is Their Land"

This segment examines how the human/grizzly relationship has changed since the closing of the Yellowstone dumps, and the challenges posed to both humans and bears.

Clip 3, "Bears Don't Recognize Boundaries"

This segment focuses on the problems bears are creating on ranch land surrounding Yellowstone National Park.

Clip 4, "Bears in the Schoolyard"



Learn more at [www.pbs.org/nature](http://www.pbs.org/nature).



This segment focuses on the precautions humans must take in the face of a growing grizzly bear population.

Clip 5, "Bear Necessities"

This segment focuses on the four foods most important to grizzly survival, and the threats to each of them.

Clip 6, "To List or Not To List"

This segment focuses on the ongoing debate regarding whether or not grizzlies need special protection for their population.

Access the streaming and downloadable video segments for this lesson at the Video Segments Page (<http://www.pbs.org/wnet/nature/lessons/dare-to-care-for-a-grizzly-bear/video-segments/1823/>).

## WEB SITES

### Windows into Wonderland

<http://www.windowsintowonderland.com/bears/index.htm>

Take your students on an electronic field trip to Yellowstone National Park where they can explore bear ecology, history, and the challenges of bear management.

### Plain Graph Paper PDF Generator

<http://incompetech.com/graphpaper/plain/>

This Web site allows you to create customizable and printable graph paper. You will need the Adobe Acrobat Reader plug-in, available for free download at Adobe (<http://www.adobe.com>), in order to open and print the graph paper you create.

### Yellowstone National Park Official Map

<http://www.nps.gov/yell/planyourvisit/upload/YELLmap1.pdf>

This Web site from the National Park Service provides an 11x17 detailed map of services, facilities, features, and attractions at Yellowstone National Park.



## Cardinal Points of the Compass

<http://www.wavelengthphotography.com.au/Bush&AlpineResources/Technical/CardinalPoints.asp>

This Web site features a depiction of a compass with the cardinal points illustrated.

### MATERIALS

For each student:

- “Dare to Care for A Grizzly Bear” Student Organizer
- Pencil and paper

For each team of 4 students:

- One sheet of graph paper on 11×17 paper, created with the Plain Graph Paper PDF Generator (<http://incompetech.com/graphpaper/plain/>), according to the specifications listed in the “Prep for Teachers” section below.
- One copy of the Yellowstone National Park Official Map (<http://www.nps.gov/yell/planyourvisit/upload/YELLmap1.pdf>) on 11×17 paper or transparency
- One compass, downloaded and printed from Cardinal Points of the Compass (<http://www.wavelengthphotography.com.au/Bush&AlpineResources/Technical/CardinalPoints.asp>)
- One copy of Yellowstone Bear Adventure Game Rules
- One basket, box, or envelope containing the Yellowstone Adventure Bear Scenarios, cut into individual strips.
- One basket, box, or envelope containing the Yellowstone Adventure “Outside the Park” Bear Scenarios, cut into individual strips.
- A minimum of five Teddy Grahams or bear-shaped animal crackers
- Two brightly colored markers in different colors

For the classroom:

- A map of the United States
- Four large signs; one each reading “GOOD,” “BAD,” “TRUE,” and “FALSE”
- “Dare to Care for a Grizzly Bear” Answer Key
- Computers with Internet access
- LCD projector
- Chalkboard or whiteboard
- Additional Teddy Grahams or animal crackers for eating

### PREP FOR TEACHERS



Learn more at [www.pbs.org/nature](http://www.pbs.org/nature).



Prior to teaching this lesson, you will need to:

Preview all of the video clips and Web sites used in the lesson.

Download the video clips used in the lesson to your classroom computer, or prepare to watch them using your classroom's Internet connection.

Bookmark the Web sites used in the lesson on each computer in your classroom. Using a social bookmarking tool such as [del.icio.us](http://del.icio.us) or [diigo.com](http://diigo.com) (or an online bookmarking utility such as [portaportal.com](http://portaportal.com)) will allow you to organize all the links in a central location.

*For the Introductory Activity and Culminating Activity:*

Create signs with the words "GOOD," "BAD," "TRUE," and "FALSE." Put one sign on each wall of your classroom.

Download and print the "Dare to Care for a Grizzly Bear" Student Organizer, the "Dare to Care for a Grizzly Bear" Answer Key and make copies of all for each of your students.

*For the Culminating Activity:*

Download and print the Yellowstone National Park Official Map (<http://www.nps.gov/yell/planyourvisit/upload/YELLmap1.pdf>), and make one copy on 11x17 paper for each group of four students in your classroom. Download and print the Compass Web site (<http://www.wavelengthphotography.com.au/Bush&AlpineResources/Technical/CardinalPoints.asp>) and make one copy of the compass for each group of four students in your classroom.

Visit the Graph Paper Generator [Web site](http://incompetech.com/graphpaper/plain/) (<http://incompetech.com/graphpaper/plain/>), and create graph paper according to the following specifications: PDF document size = 11x17 inches; minimum border = 0.5 inches; grid line weight = 1 point; grid line spacing = 1 line per inch. Download and print the PDF of the graph paper you have created onto 11x17 paper or transparency. Make one copy of the graph paper for each group of four students in your classroom.

Download and print the Yellowstone Adventure "Bear Scenarios," and make one copy for each group of four students in your classroom. Cut each set of Bear Scenarios into a series of strips, with one scenario listed on each strip. Put a complete cut-up set of bear scenarios in a box, envelope, or basket for each group of four students in your classroom.

Download and print the Yellowstone Adventure "Outside the Park" Bear Scenarios, and make one copy for each group of four students in your classroom. Cut each set of "Outside the Park" Bear Scenarios into a series of strips, with one scenario listed on each strip. Put a complete cut-up set of "Outside the Park" bear scenarios in a box, envelope, or basket for each group of four students in your classroom. Each group of



four students should have a set of both the Bear Scenarios and the Outside the Park Bear Scenarios.

## INTRODUCTORY ACTIVITY

1) Ask your students to think about the interactions that human beings have with their environment and, consequently, the organisms in that environment. Is it possible for human beings to have negative or detrimental effects on their environment and the organisms in it? *(Most students will respond that definitely, yes, human beings can and do sometimes have a negative impact on the environment and the organisms in it.)* Ask your students if they can think of any specific examples where humans have had a negative impact on the environment and individual organisms. *(Student answers will vary.)* Ask your students if it is possible for human beings to have positive or beneficial effects on their environment and the organisms in it. *(Students may be more tentative, but should recognize that human beings can have a positive impact on the environment and specific organisms).* Ask your students if they can think of any specific examples where humans have had a positive impact on the environment and individual organisms. *(Student answers will vary.)* Ask your students whether they think the impact-positive or negative-that human beings have on the environment and the organisms in it is always intentional or purposeful? Why or why not? *(Student answers will vary.)*

2) Explain to your students that for the next few class periods, they will be examining the results of interaction between human beings and grizzly bears in the area surrounding Yellowstone National Park. The tumultuous history of the relationship between bears and humans in the area provides numerous examples of both the positive and negative impact humans can have on the environment and the organisms in it.

3) Ask your students if they know where Yellowstone National Park is. If your students do not know, tell them that the Park is located in the western part of the United States. Most of the park is in the state of Wyoming, but portions of it are in Montana and Idaho. Ask a student to identify the location of Yellowstone National Park on the map of the United States.

4) Tell your students that before you begin examining the complicated relationship between humans and grizzlies bears, you'd like to assess their knowledge, preconceptions, and understanding of certain aspects of human/grizzly interaction. Point out the signs you've taped to the walls of your classroom reading "GOOD," "BAD," "TRUE," and "FALSE." Explain to your students that you will be reading a series of statements to them, and it will be their responsibility to move to the sign that most closely reflects their understanding or opinion. Tell your students that for some of the statements, there may not be a single "correct" answer.

5) Read your students the following statements. After each statement, give your students time to move towards the sign that most closely aligns with their understanding or opinion. Record your students' responses to each statement, and the number of students that take each position in the room.

- TRUE OR FALSE: Grizzly bears live across all northern areas of North America.



- Grizzly bear populations, which were once headed towards extinction, are making a comeback. Is this GOOD or BAD?
- TRUE OR FALSE: Grizzly bears are exclusively meat-eating carnivores.
- For a long time, grizzly bears were protected by the Endangered Species Act. Is this GOOD or BAD?
- TRUE OR FALSE: Grizzly bears pose a serious risk to the safety of humans in and around Yellowstone National Park.
- Grizzly bears attract tourists and visitors to areas like Yellowstone National Park. Is this GOOD or BAD?
- TRUE OR FALSE: Grizzly bears destroy multiple thousands of dollars in human property each year.
- Grizzly bears can now be found outside of protected lands like National Parks. Is this GOOD or BAD?
- TRUE OR FALSE: Humans' behavior towards grizzly bears has significantly changed in the last fifty years.
- Grizzly bears sometimes consume humans' garbage. Is this GOOD or BAD?
- TRUE OR FALSE: Climate change will potentially have a catastrophic effect on grizzly bears.
- Grizzly bears kill livestock owned by humans when it lies in their range or territory. Is this GOOD or BAD?

After your students have responded to all of the questions, explain to them that you will revisit this exercise at the end of the lesson, to see if their ideas or opinions have shifted or changed at all as a result of the activities presented in the lesson.

6) Tell your students that as a class, they need to begin developing a basic understanding of grizzly bear biology. Distribute the "Dare to Care for a Grizzly Bear" organizer to your students. Ask your students to log on to the Windows into Wonderland Web site (<http://www.windowstowonderland.com/bears/index.htm>). Provide your students with a FOCUS FOR MEDIA INTERACTION, asking them to explore Part 1 of the Electronic Field Trip, which focuses on Bear Ecology, and complete the information on the "Dare to Care for a Grizzly Bear" organizer while examining the site. Give your students 15-20 minutes to complete this task.

7) Review the "Dare to Care for a Grizzly Bear" organizer with your students using the Answer Key. What did your students learn about grizzly bears from the Web site? What surprised them or intrigued them? (*Student answers will vary.*)



8) Collect and review the “Dare to Care for a Grizzly Bear” organizer for assessment purposes; re-distribute the organizers prior to proceeding into the Learning Activity.

## LEARNING ACTIVITY

1) Explain to your students that you will now begin examining the complex relationships between humans and bears in the Yellowstone ecosystem. In order to understand the way things currently are between grizzlies and humans, it’s necessary to understand what has happened in the past. Explain to your students that a major turning point came in 1972, when the Park changed a policy and closed something down. Divide the class in half. Provide your students with a FOCUS FOR MEDIA INTERACTION, asking one half of the class to be prepared to describe the human/grizzly relationship prior to 1972, and the other half of the class to be prepared to describe the human/grizzly relationship after 1972. PLAY Clip 1, “Bears’ Lunch Counter.” (Access the video segments for this lesson at the Video Segments Page, <http://www.pbs.org/wnet/nature/lessons/dare-to-care-for-a-grizzly-bear/video-segments/1823/>). Check for comprehension, and ask one half of the class to describe what the human/grizzly relationship was like prior to 1972. *(Students should describe that grizzlies once ranged over a large portion of the western North America, but they were hunted almost to the point of extinction as Americans tamed the West; grizzlies are now largely found only in Yellowstone National Park and Glacier National Park; grizzlies were seen as “entertainment” in the Park, and were purposefully displayed feeding on garbage.)*

Ask the other half of the class to describe what happened after 1972. *(Students should describe that Yellowstone became something of an amusement park, and to restore its wildness, the dumps were closed. Bears became aggressive, and many were killed when they invaded camp sites. In 1975, the grizzly was listed on the Endangered Species Act, and essentially given a preserve to help them build the population. The grizzlies had to re-adapt to hunting, and began with elk. Gradually, year by year, the grizzly population built itself up.)*

2) Ask your students to predict how they think humans have adapted to the growing bear population in Yellowstone. What potential problems might humans face as the bear population increases in the park? *(Accept all student answers.)* Provide your students with a FOCUS FOR MEDIA INTERACTION, asking them to check their predictions against the video segment, and determine what humans’ relationship with the grizzlies in Yellowstone is like now. PLAY Clip 2, “This Is Their Land.” (Access the video segments for this lesson at the Video Segments Page, <http://www.pbs.org/wnet/nature/lessons/dare-to-care-for-a-grizzly-bear/video-segments/1823/>) Check for comprehension, and ask your students if any of their predictions were correct. *(Student answers will vary.)* Ask your students what the relationship between humans and bears in the park is like now. *(Answers should include that bears are a major attraction in the park, sometimes causing “bear jams” of tourists who want to see them; people sometimes get too close to bears and have to be reprimanded; rangers have to “take care” of tourists; humans have had to design special bear-proof garbage cans.)* Ask your students why keeping bears out of garbage is essential to bear survival. *(If bears get used to eating garbage, they will stop hunting for wildlife, and can potentially become “problem bears” that have to be relocated or*



*destroyed.)* What will happen to a bear that comes back to a campground too often? (*It will be killed.*)

3) Explain to your students that the bear population has come back significantly enough that bears are not only found inside Yellowstone, but in the surrounding areas as well. Provide your students with a FOCUS FOR MEDIA INTERACTION, asking them how “problem” bears are dealt with outside the Park. PLAY Clip 3, “Bears Don’t Recognize Boundaries.” (Access the video segments for this lesson at the Video Segments Page, <http://www.pbs.org/wnet/nature/lessons/dare-to-care-for-a-grizzly-bear/video-segments/1823/>) Check for comprehension, and ask your students how problem bears are dealt with outside the park. (*Under the Endangered Species Act, they were collared and released.*) Why was this problem for ranchers in the area? (*Bears were killing livestock.*) Explain to your students that cattle and horses can cost hundreds or thousands of dollars a piece, so a grizzly killing 100 head of cattle represents a significant loss of income for the rancher. Ask your students if they think ranchers should be allowed to kill problem bears. (*Student responses will vary.*) Ask your students if they think the rancher responded appropriately by moving his cattle. (*Student answers will vary.*)

4) Tell your students that ranchers are not the only people having problems with the bears. Provide your students with a FOCUS FOR MEDIA INTERACTION, and ask them to identify how other people are impacted by the bear population, and whether or not they feel the people featured in the video are responding appropriately. PLAY Clip 4, “Bears in the Schoolyard.” (Access the video segments for this lesson at the Video Segments Page, <http://www.pbs.org/wnet/nature/lessons/dare-to-care-for-a-grizzly-bear/video-segments/1823/>) Check for comprehension, and ask your students how people other than ranchers are being impacted by the bear population. (*Home owners and restaurant owners have bears invading their garbage containers and making “surprise visits,” schools have had to erect fences to keep bears out of the schoolyard and away from children, some people feed bears and the bears have to be killed.*) Ask your students if they think the people featured in the video are responding appropriately. Should the school build a fence, or cut down the apple trees? Should kids have to worry about being eaten by a bear on the playground? Should the restaurant owners have to invest in bear proof dumpsters? Who’s at fault. . .the bears or the humans? (*Student responses will vary, play “devil’s advocate” and encourage students to consider multiple perspectives.*)

5) Ask your students if they can recall from the “Windows into Wonderland” Web site what foods grizzlies eat in the wild, when they are away from temptations like garbage, cattle, and apples. (*Students can consult their “Dare to Care for a Grizzly Bear” organizer; grizzly foods in the wild include: grasses, berries, roots, bird eggs, insects, elk calves, fish, bison, cutthroat trout, ants, small rodents, moths, and whitebark pine nuts.*)

6) Explain to your students that scientists have determined there are four foods most important to the survival of Yellowstone’s grizzly bears. Unfortunately, the future of these four critical foods is in jeopardy. Provide your students with a FOCUS FOR MEDIA INTERACTION, and asking them to watch the video segment and determine what the four critical foods are and what threats they face. They will most likely want to take



notes. PLAY Clip 5, “Bear Necessities.” (Access the video segments for this lesson at the Video Segments Page, <http://www.pbs.org/wnet/nature/lessons/dare-to-care-for-a-grizzly-bear/video-segments/1823/>) Check for comprehension, and ask your students what the four foods most critical to the bears’ survival are. (*The four foods are 1. Meat, in the form of bison, 2. Cutthroat trout, 3. Moths, and 4. Whitebark pine seeds.*) Write these four foods on the board. Ask your students what threatens the meat supply? (*Bison are threatened by a disease called Brucellosis, which may force officials to thin the bison herd.*) Ask your students what threatens the cutthroat trout? (*An introduced trout from the Great Lakes that is serving as a predator of the cutthroat.*) Ask your students what threatens the moths? (*Pesticides and the warming trend at high altitudes.*) Ask your students what threatens the whitebark pine seeds? (*A disease called blister rust.*) List the threats to each of the four foods on the board as well.

7) Ask your students which of the foods are threatened due to human activity. (*Students answers will vary; students should definitely identify the trout and the moths.*) Ask your students what impact the deterioration of these food sources could have on the bears? (*It could bring the bears into more contact with humans, which would cause problems; the bears may not reproduce as much, limiting populations.*) Reinforce to your students that while the bear population is climbing, and people in the area are having more and more problems with bears, the issues with the bears’ food sources poses a long-term threat to the bears’ survival. Remind your students that the grizzly received protection from the Endangered Species Act. Ask your students if they think the bear should remain protected, or if it should be “de-listed” since the population has rebounded. (*Student answers will vary.*) Ask your students who they think might want the bears to be de-listed. (*Ranchers, farmers, hunters, and other people living in bear country who have had negative experiences with bears.*) Ask your students who they think might want the bear to stay protected as an endangered species. (*Student answers will vary, but may include scientists, conservationists, tourists, etc.*)

8) Explain to your students that there are proponents on both sides of the issue, and that it’s very difficult to determine which side is “right.” Provide your students with a FOCUS FOR MEDIA INTERACTION, asking them to identify a) why some scientists feel that the increasing problems between bears and humans are a “success,” and b) why others feel that de-listing the bears would be catastrophic. PLAY Clip 6, “To List or Not to List” for your students. (Access the video segments for this lesson at the Video Segments Page, <http://www.pbs.org/wnet/nature/lessons/dare-to-care-for-a-grizzly-bear/video-segments/1823/>) Check for comprehension, and ask your students why some scientists feel that the increasing problems between bears and humans are a “success.” (*The escalating problems between bears and humans show that the population has stabilized; efforts can now turn from “saving” the bears to “conserving” the bears.*) Ask your students why other people feel that delisting the bears would be catastrophic. (*It would allow for all kinds of development and building in bear country, substantially decrease the bears’ environment.*) Ask your students if-given all they know about the human-bear problems, the long-term problems with food sources, and the potential consequences of removing protections for the bears-they think the bears should be de-listed or remain protected by the Endangered Species Act. (*Student answers will vary.*)

### CULMINATING ACTIVITY



- 1) Explain to students that they will now be playing a “Yellowstone Bear Adventure Game,” which will simulate some of scenarios, obstacles, and perils facing grizzly bears in the Yellowstone ecosystem. Their goal will be to play the game, and then make changes and adjustments to it based on their knowledge of grizzlies.
- 2) Divide your students into groups of four. Give each group of students:
  - One 11×17 Yellowstone National Park Official Map (<http://www.nps.gov/yell/planyourvisit/upload/YELLmap1.pdf>)
  - One 11×17 sheet of graph paper (either printed on transparency or regular paper according to the specifications described in the “Prep for Teachers” section at the beginning of this lesson)
  - One copy of the “Yellowstone Bear Adventure” game rules
  - One box, basket, or envelope of Bear Scenarios
  - A second box, basket, or envelope of “Outside the Park” Bear Scenarios
  - One compass printout, printed from Cardinal Points of the Compass (<http://www.wavelengthphotography.com.au/Bush&AlpineResources/Technical/CardinalPoints.asp>)
  - A minimum of five Teddy Grahams or bear-shaped animal crackers (feel free to give them more for eating)
  - Two brightly colored markers of different colors
- 3) Ask a student in each group to use one marker to trace a small part of the border of Yellowstone National Park from near Pyramid Peak (northwest of the East Entrance), to Parker Peak, located under the label “Shoshone National Forest.” The student should then use the other colored marker to outline the rest of the border of Yellowstone National Park.
- 4) Ask each team of students to lay the sheet of graph paper over the Yellowstone National Park map. If you have made the graph paper on transparency, they will be able to clearly see the park. If you did not make the graph paper on transparency, they should be able to see the park border outlines made with the markers through the graph paper.
- 5) Distribute five Teddy Grahams or bear-shaped animal crackers to each team. Tell the students that they will be using them in the game. Students should place one cracker or cookie on a single square of the graph paper outside the park and between Pyramid Peak and Parker Peak. Students should then each take one of the four remaining crackers or cookies and “customize” them by nibbling off a distinguishing feature or by marking it with a pen or pencil. Tell students not to eat these bears.
- 6) Review the “Yellowstone Bear Adventure” game rules with your students. Ask students to place all bears in their group in the graph paper square located over the Bechler Ranger Station, in the southwest corner of the park.
- 7) Explain to students that they are all “problem bears” who have shown up at Yellowstone campgrounds on multiple occasions, and they have been removed to a far corner of the park in an effort to keep them away from visitors. Ask the students to imagine that they were inadvertently separated from their cub during the relocation, and



it is now their goal to be the first bear to exit the park and enter the Shoshone National Forest. They must exit the park along the park border from Pyramid Peak to Parker Peak, which is outlined on their map, in order to reach the cub, which is represented by the fifth cookie or cracker.

8) Ask each group to select one student to go first. On each student's turn, the student should pull a single "Bear Scenario" out of the box, basket, or envelope, read it aloud, and move according to the directions it provides. Tell students that if their bear moves beyond the borders of the park, on their next turn, they should pull an "Outside the Park" scenario from the second box.

9) Remind students to put their printed out compass next to the Yellowstone Map, and position the compass so its "north" direction aligns with the compass on the lower right hand corner of the map.

10) As students play the game, ask each team to track and sort whether the obstacles and perils their bears face are related to 1) human interaction and/or interference, 2) environmental factors, 3) food supply, or 4) a combination of multiple factors. Students should continue taking turns until either a bear exits the park between Pyramid Peak and Parker Peak and wins the game by reaching the cub, or all bears are captured or killed. If a group runs out of "Bear Scenarios" while playing, they can return the used scenarios to the box, basket, or envelope.

11) After students finish playing one round of the game, ask the class about the obstacles and perils they encountered. Which were due to human interaction and/or interference? Which were related to food supply? Which were due to environmental factors? Which were due to a combination of multiple factors? (*Student answers will vary based on gameplay experiences.*) List the obstacles the students faced on the board.

12) Reviewing students' gameplay experiences, ask students if there are any other scenarios (for either inside or outside the park) that they would add to the game, based on the knowledge and information they have obtained throughout the lesson. If time permits, ask each group to add the new scenarios to their game set and play a second round of the game.

13) Tell your students that you will now repeat the "GOOD/BAD/TRUE/FALSE" game from the beginning of the lesson. Tell your students that you will repeat the statements you said earlier in the lesson; after each statement, students should move towards the sign that most closely aligns with their *current* understanding or opinion (they don't have to recreate their earlier positions, if their understanding or opinion is changed). Compare your students' responses to each statement with their positions and opinions at the beginning of the lesson.

- TRUE OR FALSE: Grizzly bears live across all northern areas of North America.
- Grizzly bear populations, which were once headed towards extinction, are making a comeback. Is this GOOD or BAD?



- TRUE OR FALSE: Grizzly bears are exclusively meat-eating carnivores.
- For a long time, grizzly bears were protected by the Endangered Species Act. Is this GOOD or BAD?
- TRUE OR FALSE: Grizzly bears pose a serious risk to the safety of humans in and around Yellowstone National Park.
- Grizzly bears attract tourists and visitors to areas like Yellowstone National Park. Is this GOOD or BAD?
- TRUE OR FALSE: Grizzly bears destroy multiple thousands of dollars in human property each year.
- Grizzly bears can now be found outside of protected lands like National Parks. Is this GOOD or BAD?
- TRUE OR FALSE: Humans' behavior towards grizzly bears has significantly changed in the last fifty years.
- Grizzly bears sometimes consume humans' garbage. Is this GOOD or BAD?
- TRUE OR FALSE: Climate change will potentially have a catastrophic effect on grizzly bears.
- Grizzly bears kill livestock owned by humans when it lies in their range or territory. Is this GOOD or BAD?

14) Explain to your students that in March 2007, the U.S. Fish and Wildlife Service delisted the Yellowstone grizzly population from the Endangered Species Act, effectively removing special protection for grizzlies in the Yellowstone National Park ([http://en.wikipedia.org/wiki/Yellowstone\\_National\\_Park](http://en.wikipedia.org/wiki/Yellowstone_National_Park)) area. The de-listing may lead to more human development in bear country, lifting of hunting restrictions, and expanded rights for ranchers. Though the bears still have protection within the park, numerous groups are petitioning to have the grizzlies re-listed as an endangered species.

15) Ask your students to consider, based on the information they have obtained throughout the lesson, whether or not they think the grizzlies of the western United States should be relisted and given special protection by the US government. What challenges do the bears face? What risks do human beings face in grizzly country? As homework, ask your students to write a hypothetical letter to the Fish and Wildlife Service either petitioning to give the bears protected status OR reasoning why the grizzly should not be given special protection. Re-assure your students that the grizzly issue is complicated, and there is no definitive "right" or "wrong" answer. In their letters, they should cite a minimum of three examples of supporting evidence from the video segments, Web sites, or game simulation to support their position.



## **CROSS-CURRICULAR EXTENSIONS**

### **SOCIAL STUDIES**

Research the history of Yellowstone National Park and the development of National Parks in the United States. How has the park system-and its relationship to wildlife—changed over its history?

Track the decreasing range and distribution of grizzly bears in North America over the course of the 19<sup>th</sup>, 20<sup>th</sup>, and 21<sup>st</sup> centuries.

Research and describe interactions between early American settlers and explorers, such as the Lewis and Clark expedition, and grizzly bears.

### **LANGUAGE ARTS**

Examine how grizzly bears are represented in the mythology and folklore of various American Indian cultures.

### **SCIENCE**

Research and identify strategies and products to insure human safety in bear country. Examine what the science is behind these strategies and products.

### **MATH**

Research, write and develop grade level appropriate word problems based on grizzly bear biology. Possible topics for mathematical exploration include daily calorie consumption, range, and size.

## **COMMUNITY CONNECTIONS**

Invite a representative of your local fish and wildlife service to your classroom to discuss local animals that cause problems in human communities. What tactics and strategies are used to deal with these difficult interactions?

Visit a nearby state or national park to discuss local wildlife and ranger strategies for keeping human visitors and animals safe.

Research threatened and/or endangered plants or animals in your area, and efforts underway to protect and preserve them.



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### Dare to Care for a Grizzly Bear Student Organizer

Log on to the "Windows into Wonderland" Web site at, <http://www.windowsintowonderland.com/bears/index.htm>. Explore Part 1 of the Electronic Field Trip, which focuses on Bear Ecology, and complete the information and questions below.

Name the foods grizzly bears eat.

What is a grizzly bear's "yearly schedule"? What do they do during the different months and seasons?

What happens during grizzly hibernation?

What is the typical "home range" of a male and female grizzly?

How long do grizzly cubs stay with their mother? When do they leave her?

Name some differences between grizzly bears and black bears.

How long do grizzlies typically live?

What is the average weight of a male and female grizzly bear?



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## Yellowstone Bear Adventure GAME RULES

*You will now be playing a “Yellowstone Bear Adventure Game,” which will simulate some of scenarios, obstacles, and perils facing grizzly bears in the Yellowstone ecosystem. Your goal is to play the game, and then make changes and adjustments to it based on your knowledge of grizzlies.*

### GAME MATERIALS

You should be in a group of four students. Your group should have the following materials:

- \_\_\_ one 11x17 map of Yellowstone National Park
- \_\_\_ one 11x17 sheet of graph paper
- \_\_\_ these game rules
- \_\_\_ one box, basket, or envelope of Bear Scenarios
- \_\_\_ a second box, basket, or envelope of “Outside the Park” Bear Scenarios
- \_\_\_ one compass print out
- \_\_\_ a minimum of five Teddy Grahams or bear-shaped animal crackers
- \_\_\_ two brightly colored markers of different colors

### SET-UP AND PREPARATION

Before playing the game, use one marker to trace a small part of the border of Yellowstone National Park from near Pyramid Peak (northwest of the East Entrance), to Parker Peak, located under the label “Shoshone National Forest.” Then, use the other colored marker to outline the rest of the border of Yellowstone National Park.

Lay the sheet of graph paper over the Yellowstone National Park map. If the graph paper is on transparency, you will be able to clearly see the park. If the graph paper is not on transparency, you should be able to see the park border outlines made with the markers through the graph paper.

Have everyone in your group take a Teddy Graham or animal cracker. Place the leftover Teddy Graham or animal cracker on a single square of the graph paper outside the park, between Pyramid Peak and Parker Peak. Then, everyone in your group should “customize” their bears by nibbling off a distinguishing feature or by marking it with a pen or pencil. Don’t eat the bears; they are your playing pieces.

Write the word “START” on the square of graph paper over the Bechler Ranger Station, in the southwest corner of the park. Have everyone in your group put their bears on this square.

Put the compass print out next to the Yellowstone Map, and position the compass so its “north” direction aligns with the compass on the lower right hand corner of the map. You will consult the compass when moving your playing pieces.



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### GAME PLAY

Everyone in your group is a “problem bear” that has shown up at Yellowstone campgrounds on multiple occasions. You have been removed to a far corner of the park in an effort to keep you away from visitors.

Imagine that you were inadvertently separated from your cub during the relocation, and it is now your goal to be the first bear to exit the park and enter the Shoshone National Forest. You must exit the park along the park border from Pyramid Peak to Parker Peak, which is outlined on the map in order to reach the cub which is represented by the fifth cookie or cracker.

Select one person in your group to go first. On your turn, pull a single “Bear Scenario” out of the box, basket, or envelope, read it aloud, and move according to the directions and instructions it provides.

IF YOUR BEAR MOVES BEYOND THE BORDERS OF THE PARK, on your next turn, pull an “Outside the Park” Bear Scenario from the second box.

As you play the game, track and sort whether the obstacles and perils your bears face are related to 1) human interaction and/or interference, 2) environmental factors, 3) food supply, or 4) a combination of multiple factors.

The class will discuss what happened to the bears after everyone has completed one round of the game, so be sure to keep track of what happens to the bears in your group.

Continue taking turns until a bear exits the park between Pyramid Peak and Parker Peak and wins the game by reaching the cub, or until all bears are captured or killed.

If your group runs out of “Bear Scenarios” while playing, return the used scenarios to the box, basket, or envelope, and continue pulling from it.



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### Yellowstone Adventure Bear Scenarios

Unsecured garbage cans are plentiful in and around the park. Go two spaces in any direction you prefer.

Garbage cans are secured throughout the park. Spend one turn trying to tear the cans open and stay where you are.

Introduced species of fish are killing cutthroat trout in Yellowstone's streams. Move two spaces north.

Native fish are plentiful in streams inside and outside the park. Move three spaces in the direction you want to go.

The moth population has increased. Move two spaces in whatever direction you prefer.

The moth population has decreased. Go one space WEST.

Bumper crops of apples and other foods are grown outside the park. Go one space SOUTH or one space WEST.

Disease reduces bison herds in the park. Go two spaces NORTH.

Bison herds thrive in the park. Move two spaces in your preferred direction.

Cutthroat trout are plentiful in the park. Stay where you are to go fishing.

Introduced lake trout ravage cutthroat trout in the park. Lose a turn.

Resort owners expand the size of their resorts due to increased public demand. Go two spaces NORTH.

A land developer builds a new lodge on the western park border. Go two spaces EAST.



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Hunting enthusiasts rally to take the grizzly off the endangered species list. Go one space WEST.

Ranchers pasture livestock closer to the park. Go one space WEST.

A forest fire destroys foraging grounds in the park. Go three spaces NORTH.

Warmer temperatures destroy the environment of moths. Go three spaces NORTH.

A particularly cold winter has thinned the Yellowstone buffalo herds. Go one space SOUTH.

Wolves have been reintroduced to Yellowstone and are competing for food. Go one space SOUTH and one space WEST.

A snowy winter keeps tourists out of the park longer. Go one space in your preferred direction.

A heavy spring rain brings new undergrowth to the forest. Go two spaces EAST.

A rainy summer prevents forest fires. Go two spaces EAST.

After “exploring” some campgrounds, you are identified as a “problem bear.” Rangers tranquilize you and you are moved back to START.

Climate change melts snowpack in the moth environment. Go NORTH two spaces.

You are relocated after being found on someone’s porch. Go back to START.

You kill two cows, and a massive hunt is undertaken. Lose one turn.

Environmentalists rally to protect your endangered status. ALL BEARS move one space in their preferred directions.

Campers forget to stow their food at night. Move one space EAST.



Learn more at [www.pbs.org/nature](http://www.pbs.org/nature).



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After bear sighting by tourists, rangers restrict access to the area where you are. Move two spaces EAST.

Firefighters extinguish a wildfire accidentally started by tourists. Move one space in your preferred direction.

Rangers limit fishing permits, leaving more fish for you! Move one space in your preferred direction.

PBS filmmakers shoot documentary about the bears' plight in the park. Move one space EAST.



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**Yellowstone Adventure**  
**“OUTSIDE THE PARK” Bear Scenarios**

You are a “problem bear” and you are shot by local game wardens. GAME OVER.

You get hit by a pick-up truck on a non-park road. GAME OVER.

Try to climb playground fence. Lose two turns.

You are caught in a trap. Lose one turn.

Park rangers retrieve you and take you back to START.

Park rangers retrieve you and take you back to START.

Park rangers retrieve you and take you back to START.

Chase a renegade bison back to the park. Go back to START.

Run away from wolf pack. Re-enter park at closest space to where you now are.

Follow stream back into park. Re-enter park at closest space to where you now are.



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### Dare to Care for a Grizzly Bear Answer Key

Log on to the “Windows into Wonderland” Web site at, <http://www.windowsintowonderland.com/bears/index.htm>. Explore Part 1 of the Electronic Field Trip, which focuses on Bear Ecology, and complete the information and questions below.

Student answers include:

#### **Name the foods grizzly bears eat.**

Naturalist John Muir said “almost everything is food except granite;” grasses, sages, berries, and roots; human food and garbage; tree cambium, bird eggs, nuts, insects, elk calves, fish, elk and bison carcasses; cutthroat trout; roots, ants, rodents (such as pocket gophers), cutworm moths, and whitebark pine nuts.

#### **What is a grizzly bear’s “yearly schedule”? What do they do during the different months and seasons?**

From September through October, grizzlies go to high elevations to eat pine nuts found in the cones of the whitebark pine tree. By late fall, bears in Yellowstone are finding or digging their winter homes.

From November through March, grizzlies hibernate in their dens.

Cubs are born during hibernation in January or February.

From May to early July is mating season.

#### **What happens during grizzly hibernation?**

During the months of hibernation bears do not eat or drink and do not expel body waste. They experience a drop in their metabolism, a reduction in body temperature, and a slowing of both their respiration and circulation. A bear’s heart rate will drop to 12 beats per minute, and its body temperature will lower to 94 degrees from a normal temperature of 100-101 degrees. These hibernation-related changes are less extreme in bears than in some other animals such as marmots or ground squirrels. Grizzlies can be easily aroused from hibernation and sometimes leave their dens during the winter. Adult males den alone, although there have been reports of newly independent sub-adult siblings sharing a den for the winter. Also, grizzly cubs are born during their mother’s hibernation period. The mother becomes semiconscious during the birth, but after delivery she continues to sleep for another two months.

#### **What is the typical “home range” of a male and female grizzly?**

The male grizzly has a home range between 813 to 2,075 square miles, while female grizzlies cover 309 to 537 square miles.



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**How long do grizzly cubs stay with their mother? When do they leave her?**

Grizzly cubs may stay with their mother for as long as 3.5 years but usually separate at 2.5. When the female grizzly is ready to mate again, she will drive her cubs away. This usually happens during the cubs' second summer.

**Name some differences between grizzly bears and black bears.**

Black bear cubs separate from their mothers earlier.

An adult grizzly has a hump of muscle mass between its front shoulders, which is the highest part on its body when it is walking on all fours. Black bears do not have this hump, so if you see a bear on all fours and its rump is the highest point on its body, you are looking at a black bear. Also, the faces of adult grizzlies have a dished profile, while those of adult black bears have straight profiles.

A black bear's claws are shorter, stretching about 1.5 inches long, while the claws on the front foot of an adult grizzly are two to four inches long.

A black bear's last upper molar is less than 1 1/8 inches long. The same tooth in a grizzly's mouth is greater than 1 1/8 inches long.

Grizzlies can be twice as large as black bears of the same age and sex.

**How long do grizzlies typically live?**

Grizzly bears usually live between 12 and 20 years, though some grizzlies survive into their late twenties.

**What is the average weight of a male and female grizzly bear?**

Males weigh between 300-700 pounds, and females weigh between 200-400 pounds.