

Economic Use of Public Natural Areas

Teachers: This lesson contains four classroom activities with discussion questions related to the AFG video clips about the economic use of public natural areas. These parts may be used individually or together, depending on the needs of your class.

Note: You can access and view the video clips used in this lesson in the Teacher Resources section of the AFG Web site: www.pbs.org/americanfieldguide/teachers

Grade Level: 9-12

Background

In our society, given the density of people and the lifestyles we are used to, it is necessary to utilize many, many natural resources. Often, our current level of use is not sustainable and our consumption of natural resources is causing the degradation of ecosystems around the world. Some environmentalists believe that economic use of public areas should be stopped so that those ecosystems can heal and thrive for future generations. However, completely prohibiting economic activities in natural areas is not possible without enormous economic and social implications. Many of the farmers, ranchers, foresters, fishermen and others who depend on these resources for their livelihoods realize the limited future of traditional methods of resource utilization and are now trying to find a balance between economic productivity of the land and sustainability of ecosystems for the future. In this lesson, students will see footage of efforts being made to find a balance between preservation and utilization and they will examine some of these differences themselves.

Related National Standards

Content Standard F: As a result of activities in grades 9-12, all students should develop understanding of

- Natural Resources
 - Human populations use resources in the environment in order to maintain and improve their existence. Natural resources have been and will continue to be used to maintain human populations
 - The earth does not have infinite resources; increasing human consumption places severe stress on the natural processes that renew some resources, and it depletes those resources that cannot be renewed.
 - Humans use many natural systems as resources. Natural systems have the capacity to reuse waste, but that capacity is limited. Natural systems can change to an extent that exceeds the limits of organisms to adapt naturally or humans to adapt technologically.

- Environmental Quality
 - Many factors influence environmental quality. Factors that students might investigate include population growth, resource use, population distribution, over-consumption, the capacity of technology to solve problems, poverty, the role of economic, political, and religious views, and different ways humans view the earth.

Extension Websites from PBS

- **Newton's Apple – Spotted Owl/Old Growth Forests**
<http://www.pbs.org/ktca/newtons/11/oldgrwth.html>
Learn about the importance of old growth forests to rare species such as the Spotted Owl.
- **Journey to Planet Earth – Land of Plenty, Land of Want**
http://www.pbs.org/teachersource/science_tech/planetearth/landplan.htm
This lesson on sustainable agriculture gives students the opportunity to view farming in four distinctly different countries: Zimbabwe, France, China, and the United States.
- **American Field Guide – Ecotourism in National Parks and Wilderness**
http://www.pbs.org/americanfieldguide/teachers/natl_parks/natl_parks_sum.html
Develop an ecotourism plan for a wild area near you to encourage people to keep wild areas wild!
- **American Field Guide – The Dam Removal Debate on the Elwha River**
http://www.pbs.org/americanfieldguide/teachers/salmon/salmon_sum.html
Construct a solution to the problems of dam removal on small rivers. Learn how difficult it is to find a solution that will keep everyone happy!

Activity 1: Power Plant Controversy**Time Allotted**

20 minutes

Materials

- Butcher Paper

Objectives

- Students will learn some pros and cons of power generation.
- Students will examine their use of resources.
- Students will consider the origin of resources for their consumption.

Teaching Instructions

- Have students make a list describing all the ways they have used power today. You might want to make it a competition to see who can think of the most uses.
- Discuss with the class:
 - How would your day be different without power?
 - Where does power come from in your area?
 - Are there any disadvantages to power generation?
 - How would you feel if a power plant was built within sight of your house?

**Watch the AFG Video Segment "Fluvanna Power Plant"**

Start at the beginning and stop after hearing "you know, you don't usually look at developed areas and see low taxes"

Note: You can access and view the video clips used in this lesson in the Teacher Resources section of the AFG Web site (www.pbs.org/americanfieldguide/teachers).

- Have students write their responses to the following questions:
 - How many of the resources you depend on, such as food, material goods, and power, come from within a mile of your home?
 - Do you think more of them should come from your immediate neighborhood? Why or why not?

Activity 2: Grazing America's Public Lands**Time Allotted**

45 minutes

Materials

Access to Internet or computers or color printouts of the before and after photos from the website listed below

Butcher paper

Objectives

- Students will determine impacts of cattle grazing on ecosystems.
- Students will learn methods of riparian zone repair.
- Students will learn ways ranchers can adjust ranching habits for the benefit of all.

Teaching Instructions

In this activity, students will make observations about the impacts of cattle on riparian zones in western habitats. These areas have been greatly altered over the last 150 years since European settlers came to this area. In that time, killing of beavers, deforestation, and cattle grazing have had enormous impacts on riparian zones including loss of vegetation, compacted soil, incised banks, and narrower flood plains. Students will learn how one group of ranchers is trying to amend their ranching methods to support both ranching and the environment.

For background information about the controversy between ranchers and environmentalists for the use of public lands, see <http://www.thebeckoning.com/environment/cattle/grazing.html>

- For maximum success, you will want to download photo pairs from either of the following sites to have available on school computers, or print out photos for students to analyze. <http://www.fguardians.org/graphix/nmmap.htm> or http://westernwatersheds.org/archives/photos/before_after/before_after.html
- Be sure to include text, if available, for the students to read as it often includes information about dates and locations.
- Divide the class into pairs and assign each partnership to one of the photo pairs (more if time allows).
- Ask students to analyze the photo pair. They should attempt to find at least five differences between the before and after photos and list these on the butcher paper.
- Have students share their observations with the class.
- Discuss:
 - What common patterns do you see in the pictures?
 - How might cattle contribute to these differences?
 - Are there other explanations for these differences?



Watch the AFG Video Segments “Rangeland Repair – parts 1 and 2”

Note: You can access and view the video clips used in this lesson in the Teacher Resources section of the AFG Web site (www.pbs.org/americanfieldguide/teachers).

Discussion Questions for Video Segments

- What impact has cattle grazing had on riparian (streamside) zones in this area?
- How have private landowners worked with the government to create a compromise acceptable to both?

Activity 3 – Natural Resource Consumption Costs and Benefits**Time Allotted**

At least one 45-minute class period for introduction and research. More time out of class may be needed to complete the assignment.

Materials

Access to Internet and library resources

Objectives

- Students will use AFG video and other resources to research an area of natural resource use.
- Students will understand how they use natural resources in their daily lives.
- Students will learn how natural resource extraction can have an impact on the ecosystem of the area.
- Students will weigh the costs and benefits of using a particular resource.
- Students will apply expository and persuasive writing skills to write a paper on Natural Resource use in our culture.

Teaching Instructions

Students, and indeed most Americans, are typically unaware of the origins of most products they use. Being unaware of the origin, they certainly have little idea of the impact of resource consumption. In our throw-away society, many resources are taken for granted and things are thrown out rather than being reused. With a recent focus on recycling, people are becoming more aware of the problems with garbage disposal. In this activity, students will examine the impacts of resource extraction industries on the environment.

- Assign or let students select topics from the following list:
 - Mining
 - Logging
 - Commercial Fishing
 - Hydroelectric Power Generation
 - Ranching
 - Dry-land farming/ irrigation of deserts
- Students should watch the AFG video clips for more background on their topics. They may also search the AFG video database at www.pbs.org/afg for more videos relevant to their research.
 - Mining – “Mending the Clark Fork” Outdoor Idaho
 - Logging – “Iowa’s Woodlands – Conservation vs. Preservation”
 - Commercial Fishing – “Columbia River Sturgeon”
 - Hydroelectric Power Generation – “The Glen Canyon Dam”
 - Ranching – “Rangeland Repair (parts 1 and 2)”
 - Dry-land farming/ irrigation of deserts – “Snake River Water Management”

- Students should collect other resources from the library and then write a paper as described in the student instructions below.

Assessment

Trait	Excellent	Good	Needs Work
Focus (thesis)	Thesis statement is evident and point of view is consistent throughout. Points: 15	Thesis statement is unoriginal, but clearly stated; inconsistent point of view. Points: 6	What is your thesis statement and point of view? Points: 2
Relevant information	Provides thorough supportive detail that develops the main points, information is accurate and easily understood. Points: 20	Provides some supportive detail that develops the main points; some information is inaccurate or not easily understood. Points: 13	Lacks sufficient supportive detail to develop the main points; details are too general. Points: 5
Organization	Very well organized and focused; uses effective leads and conclusions; structure reinforces tone and content. Points: 15	Opening and ending weak, stays on topic, some focus Points: 10	Lack of development, sometime digresses, has little or not organization or paragraphing. Points: 5
Sentence Structure	Sentences are complex and employ a variety of writing techniques Points: 10	A few sentences are complex. Points: 7	Simple sentence structure. Points: 2
Relates resource consumption to own life	Direct links are made clearly and in a meaningful way Points: 10	Some connection is made. Points: 7	Attempt is made to connect, but is unclear. Points: 2
Pros and Cons of use explained	Multiple examples of the benefits to society and the costs to the environment are explained. Points: 10	Some examples of costs and benefits are explained. Points: 7	Costs and benefits are listed, not explained, or contains very few, weakly developed examples. Points: 2
Explains methods for mitigation	Clearly explained and linked to costs described Points: 10	Not clearly linked to the costs described above. Points: 7	Unclear or unrelated. Points: 2
Opinion	Takes a stance, with reasons solidly supported by evidence cited in the paper Points: 10	Takes a clear stance, more supporting evidence is needed. Points: 7	Stance not clear or unrelated. Points: 2

Activity 4: An Ecological Footprint**Time Allotted**

One 45-minute class period

Materials

Computer workstations for students

Objectives

- Students will calculate the amount of land required to sustain their lifestyles.
- Students will understand how natural resources are being used to support them.
- Students will examine their habits to understand how they might reduce their dependence on natural resources.

Teaching Instructions

- Ask students the following questions:
 - How many think clear cutting of forests is a good practice?
 - How many think allowing cattle to degrade rangelands is sustainable?
 - How many of you would like to have a power plant built in your neighborhood?
- Then ask the following:
 - How many have eaten beef or milk products in the last week?
 - How many have used power in the last week?
 - How many have wood products in their home?
- It takes a certain amount of land to sustain each of us, and as human's we have to depend on the Earth's resources to survive. As American's, our style of living requires more land than the average, say, Chinese. To understand how much land it takes to support an individual, try one of these ecological footprint calculators. Then think about how the resources you are using might impact the ecosystem.
 - Redefining Progress – Ecological Footprint Calculator
<http://www.lead.org/leadnet/footprint/intro.htm>
 - Footprint Estimation Form
<http://www.esb.utexas.edu/dnrnm/EcoFtPrnt/Calculate.htm>
- Discuss the results of the footprint calculations. Ask the following questions:
 - Were there any parameters in the calculator that surprised you?
 - Do you have any regular habits that help reduce the size of your footprint compared to your classmates?
 - What might you do to reduce the size of your footprint?
 - Are you willing to do any of these things?
 - Is it right that we use public land to support the habits of private citizens?
 - What do you think would happen if people were forced to reduce the size of their footprints?

Natural Resource Consumption Research Project Student Instructions

Background

This morning, you probably got out of a bed made of fibers, wood, and metal; put on clothes and shoes made of plant fibers, rubber, and maybe leather; ate breakfast of perhaps grain, fruit and milk; rode in a car made of metal and powered by gas; and arrived in a school built of stone, metal, concrete and many other materials. Your home and school use power from coal, nuclear, or hydroelectric power plants. Everything you do, and every move you make, is dependent on natural resources in some way.

In this project, you are going to research the impact of using a natural resource on the environment. You will use multiple resources including the Internet, American Field Guide video, and traditional research methods to gain information that will help you learn more about the environmental impact of natural resource use. While doing your research, think about other possibilities. Can we do without products produced by this resource? If not, are there ways that the environmental impact can be mitigated?

Instructions

- Step 1: Once you know your topic, start to do research. Use the www.pbs.org/afg website to find video footage showing some of the impacts related to your topic. Your teacher may have some video links for you to start with. Use the Internet and your library to find at least two other resources on your topic.
- Step 2: Consider the costs and benefits of using this resource. Make a chart like the following and consider what do we have to gain from your resource (e.g. food, clothes, etc.) and what are we losing by continuing to use this resource:

Costs	Benefits

- Step 3: Write a three-page paper explaining the following
 - How you use this resource in your life
 - Costs and benefits of consumption of this resource
 - Methods that can be used to lessen the problems associated with resource extraction
 - Your opinion: Is using this resource worth the cost to the environment (are you willing to do without it)?