12

Economics Standard 12.1.4.

Student Workbook

California Education and the Environment Initiative

Private Property and Resource Conservation

California Education and the Environment Initiative

Approved by the California State Board of Education, 2010

The Education and the Environment Curriculum is a cooperative endeavor of the following entities:

California Environmental Protection Agency
California Natural Resources Agency
Office of the Secretary of Education
California State Board of Education
California Department of Education
California Integrated Waste Management Board

Key Leadership for the Education and Environment Initiative:

Linda Adams, Secretary, California Environmental Protection Agency
Patty Zwarts, Deputy Secretary for Policy and Legislation, California Environmental Protection Agency
Andrea Lewis, Assistant Secretary for Education and Quality Programs, California Environmental Protection Agency
Mark Leary, Executive Director, California Integrated Waste Management Board
Mindy Fox, Director, Office of Education and the Environment, California Integrated Waste Management Board

Key Partners:

Special thanks to **Heal the Bay,** sponsor of the EEI law, for their partnership and participation in reviewing portions of the EEI curriculum.

Valuable assistance with maps, photos, videos and design was provided by the **National Geographic Society** under a contract with the State of California.

Office of Education and the Environment
1001 I Street • Sacramento, California 95812 • (916) 341-6769
http://www.calepa.ca.gov/Education/EEI/

© Copyright 2010 by the State of California
All rights reserved.
This publication, or parts thereof, may not be used or reproduced without permission from the Office of Education and the Environment.

These materials may be reproduced by teachers for educational purposes.

Contents

Lesson 1 Rights to a Precious Resource

Key Unit Vocabulary 2

Who Owns the Resources? 3

Lesson 2 The Tragedy of the "Water" Commons

The Water Game 5

Debriefing the Water Game 7

Lesson 3 Applying Utilitarianism to Water Resources

Putting It All Together 9

Lesson 4 Private Property and Conservation

Public Goods, Private Goods: The Question of Conservation 11

Lesson 5 Incentives to Conserve

Conservation Banking Brochure or Web Page Instructions 13

Common property: A good that everyone is free to use.

Conservation: The management, protection, and use of resources and natural systems to meet current and future needs.

Conservation easement: A legal agreement between a landowner and government or land trust, that places development restrictions on a tract of land for conservation purposes.

Conservationist: A person who favors management, protection, and use of resources and natural systems to meet current and future needs.

Cost-benefit analysis: A method for weighing the pros and cons of a decision or action.

Eminent domain: The constitutional right of government to take private property for public use or benefit.

Free enterprise system: An economic system governed by supply and demand.

Incentive: A policy, action, or reward that motivates or inspires a person or entity to take a certain action.

Land trust: A private organization that identifies, protects, and manages land for conservation and for public benefit.

Natural resources: Materials, such as water, minerals, energy, and soil, that people use from nature and natural systems.

Nonrenewable resources: Natural resources that are finite and exhaustible, and are not naturally replenished at a rate comparable to the rate at which they are consumed by humans.

Preservationist: A person who favors protection of undisturbed natural resources by setting them aside and restricting human use.

Prior appropriation: A legal concept, developed in the American West, which states that “first in time is first in line” when it comes to water.

Private property: Land or other resource owned by an individual, group of individuals, or corporation, as opposed to a governmental agency.

Regulation: A specific rule created by a government agency or other legislative authority to implement and enforce laws and policies.

Renewable resources: Natural resources that are replenished at a rate comparable to the rate at which they are consumed.

Restoration: The process of returning something, from a work of art to an ecosystem, to an earlier or better condition. Ecological restoration is usually targeted at ecosystems that have been degraded, transformed, or destroyed as the result of human activities.

Scarcity: The condition wherein there is an insufficient supply or amount of something needed, such as goods or services.

Utilitarianism: The philosophy of utilizing resources for the greatest benefit for the greatest number of people.

Watershed: The land area that drains water into a particular body of water, such as a stream, river, lake, or ocean.

Name: _____

Instructions: Use information from ***California Connections: Who Owns the Water?*** (Student Edition, pages 2–5) to answer the questions below.

1. In the early days of California's statehood, there were two ways of deciding who owns the water. Identify the two approaches used to decide who "owns" the water. (1 point each)

2. Briefly describe each of these approaches to deciding who owns the water and identify the groups who first used and benefited from each model. (2 points each)

3. Answer the following questions about key events in California's water history. (1 point each)

   a. What approach to water rights did gold miners use?

   _____

   b. After statehood, how many systems of water laws did California have?

   _____

   c. Which legal structure did the Water Commission Act of 1913 support?

   _____

   d. According to the 1928 amendment to the state constitution, who owns California's water?

   _____

Name: _____

4. Below is a list of natural resources. Some are renewable, others are not. If the resource is publicly owned, write "public" in the space provided. If it is privately owned, write "private." If it can be both, write "both." (1 point each)

   _____a. air

   _____b. oceans

   _____c. lakes

   _____d. oil fields in the United States

   _____e. protected lands

   _____f. wildlife

5. Why isn't California's water owned privately? Why is it considered to be publicly owned? Give two reasons. (1 point each)

   a.

   b.

Name: _____

Welcome

In this game you will play the role of either a farmer or a miner using the water from a local lake. The farmers own plenty of land that they can plant on; the miners own their mines. Everyone shares the water in the lake.

The class will be divided into four teams. Three of the teams represent farmers. (Each team represents one farmer, for a total of three farmers.) One team represents a miner.

Each "farmer" team will start by planting one field of alfalfa (one sheet of paper = one field). Watering an alfalfa crop requires five buckets of water per field (one blue square = one bucket of water).

The team with the most chips at the end of the game will win a prize for each chip they earned.

How to Play

The game will have four rounds. The rounds will proceed as described below:

Round 1

1. Farmer teams take as much water as they need to water their one field of alfalfa. To do this, a representative of your team takes the number of blue squares equal to the number of buckets it needs to water the field. The farmers put the water on their fields by placing the blue squares on a sheet of paper.

2. Each farmer team collects one chip from the teacher, who is playing the role of a consumer buying the crops raised.

3. The water cycle replenishes the water supply in the lake. To show this, each farmer team returns __X__ (as many as the teacher decides) buckets of water (blue squares) to the lake. The squares not returned are out of the game. The teacher collects them.

4. The farmer teams decide whether to expand production. Each farmer team can add up to two fields in each round. You have three choices of what you can plant in additional fields.

Crop	Water Needed	Profit Per Field
Alfalfa	5 buckets per field	1 chip
Wheat	10 buckets per field	2 chips
Cotton	20 buckets per field	4 chips

Name: _____

5. Each farmer team announces to the class how many chips (profits) it has collected in this round and how many fields of what crops they will plant in Round 2. The teacher records these on a chart like the one below. Farmers add a sheet of paper for each new field.

	Round 1 Chips; Fields/Crops	Round 2 Chips; Fields/Crops	Round 3 Chips; Fields/Crops	Round 4 Chips; Fields/Crops
Farmer 1				
Farmer 2				
Farmer 3				
Miner				

Round 2

1. Farmers take the amount of water they need for their fields.

2. Farmers collect chips from the teacher, based on the crops they grew. The "miner" team receives four chips for ore sold on the market (the price of gold went up).

3. The water cycle replenishes the water supply. Farmers return __X__ (as many as the teacher decides) buckets of water to the lake.

4. Farmers decide whether to expand production, by how much, and with what crops.

5. Farmers announce their profits and next planting. The teacher records them.

6. The miner starts to mine gold upstream from a river that feeds the lake. A small amount of mercury from the mining process leaks into the lake. Mark a big P for pollution onto __X__ (as many as the teacher decides) blue squares to show that the water in the lake now has traces of mercury in it.

Round 3

1. Repeat Steps 1, 2, and 3 from Round 2.

2. Notice that there is less water in the lake than there once was. The amount of water decreases, but the salts present in the lake stays the same. So now, there is a larger proportion of salt in the water. Mark a big S for salt on __X__ (as many as the teacher decides) blue squares to show that the water in the lake is getting saltier. The farmers cannot raise any crops with the salty water without damaging their topsoil. The miner continues to mine gold, and more mercury is released into the lake. Mark "P" on 10 more blue squares in the lake.

3. If there is enough "clean" water left in the lake (does not have a "P" or "S"), repeat Steps 4, 5, and 6 from Round 2 to continue play. If there is not enough "clean" water left in the lake, end the game.

Name: _____

You participated in a simulation of a scenario called the "Tragedy of the Commons." This scenario suggests that people inevitably deplete resources held as common property because it is not in anyone's interest to conserve them. Take the example of a common grazing pasture. Livestock owners would all benefit from grazing their animals on the common pasture. Each owner would add more of his own animals to the pasture. After all, the food would cost nothing, and the additional animals would increase the owner's income. Because every owner would do the same thing, none would consider how many animals the pasture could actually sustain. After some period of time, the grazing animals would deplete the grass in the pasture.

Instructions: Answer the questions based on your experience in the simulation. (2 points each)

Scarcity

1. If you, as a farmer, had been required to pay for the water in the lake, how would it have affected your choice of what crops to plant?

2. If you, as a miner, had been required to pay for polluting the water in the lake, how would it have affected your choice of whether/how much to mine?

3. How did the water being "free" affect your sense of its abundance or scarcity?

Quantity and Quality

4. How did human behavior affect the quantity of the water?

5. What actions caused the change in quantity?

Name: _____

6. How did changing the quantity of the water affect the quality of the water?

7. How did the miner's behavior affect the quality of the water?

The Tragedy of the Commons

8. "The Tragedy of the Commons" says that if no one owns a resource, that resource will be degraded and depleted. Is that what happened in the simulation? Explain your answer.

9. What outcome would each of these scenarios produce?

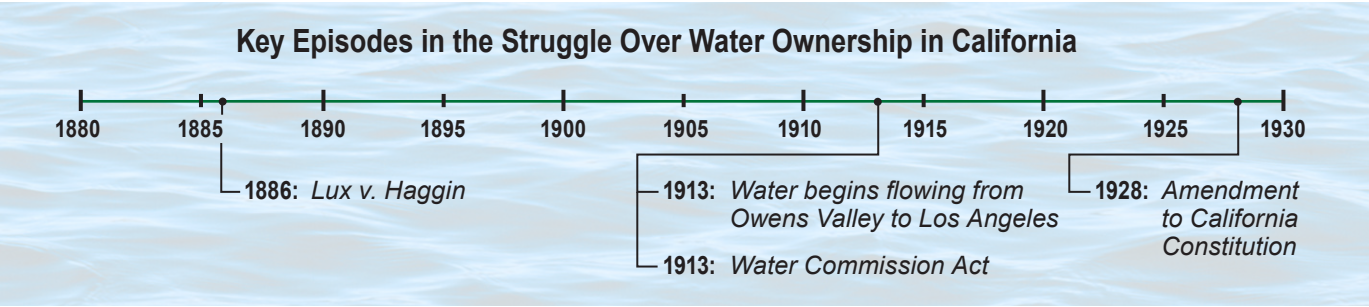
   a. If one farmer had owned the lake:

   b. If all the farmers together owned the lake:

   c. If the miner's actions had been regulated:

   d. If the government regulated the lake:

Name: _____



Instructions: Use information from this lesson to answer the following questions. (4 points each)

1. Describe *Lux v. Haggin* and explain its importance.

2. Describe the Owens Valley Aqueduct and explain its importance.

3. Describe the 1913 Water Commission Act and explain its importance.

Name: _____

4. Describe the 1928 Amendment to the California Constitution and explain its importance.

Instructions: Choose two of the roles from the simulation. Both are living in 1928 and must decide whether to support or oppose the 1928 Amendment to the state Constitution.

5. For each character you choose, state whether they supported the amendment and why. Justify your choices with correct information from the reading. (4 points per role, 8 points total)

Name: _____

Instructions: Use information from today's lesson to answer the following questions. (5 points each)

1. How do land trusts contribute to conserving natural resources?

2. How do land trusts differ from national or state parks?

3. Why might a land trust be a better idea than making all conservation land government property? Give two reasons.

   a.

   b.

Name: _____

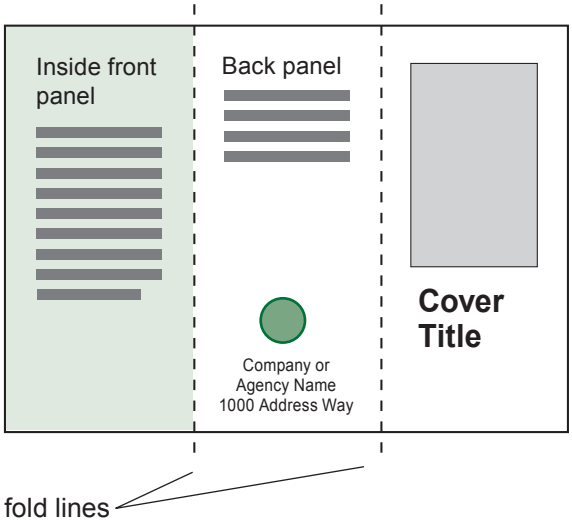
4. You learned that in California history private ownership did not help conserve or preserve the quantity and quality of water. But some private ownership, maintained through land trusts, has conserved or preserved land, vegetation, and wildlife. Why does private ownership through land trusts work to preserve some natural resources, but private ownership of water in California did not work?

5. Explain why land trusts are limited in their ability to conserve and improve natural resources?

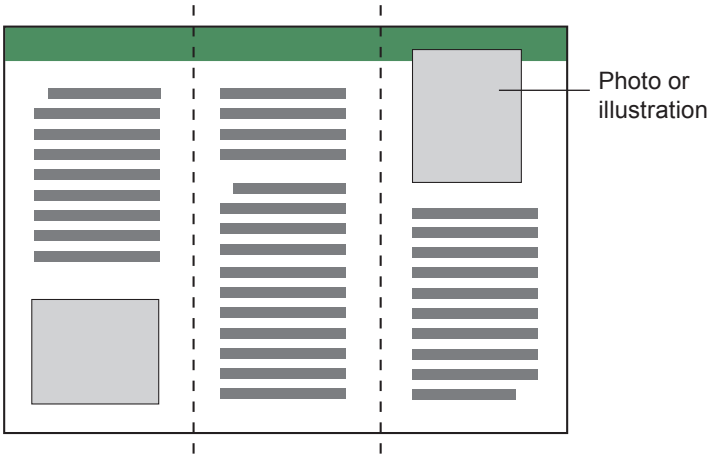
Instructions: Develop a brochure or Web page that "advertises" conservation banks as an incentive for private property owners to conserve natural resources. Your brochure or Web page should encompass the following:

- define conservation banking and explain how it works
- identify advantages to developers of conservation banking
- identify advantages to landowners of conservation banking
- identify advantages to the environment of conservation banking
- present material in a clear and persuasive way

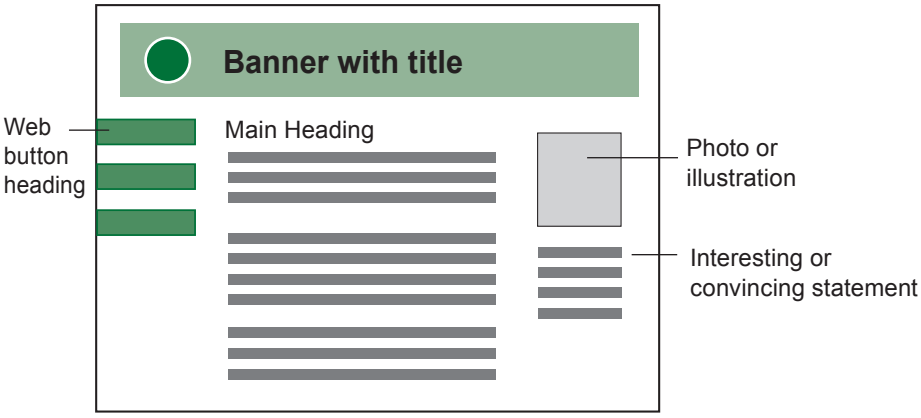
Sample brochure design (outside)



Sample brochure design (inside)



Sample Web page design



Name: _____

Conservation Banking Brochure or Web Page Scoring Tool

Your brochure or Web page will be scored using the following scoring tool:
(30 total points possible)

____ Project defines conservation banking and explains how it works. (5 points)

____ Project identifies advantages to developers of conservation banking. (10 points)

____ Project identifies advantages to landowners of conservation banking. (5 points)

____ Project identifies advantages to the environment of conservation banking. (5 points)

____ Project presents material in a clear and persuasive way. (5 points)

Your brochure or Web page (provide the URL to your teacher) is due on: _____.

California Education and the Environment Initiative

Printed on post-consumer recycled paper