

terrain for schools

Teacher's Guide

Spring 2001

About the Guide

Please See
Page 2

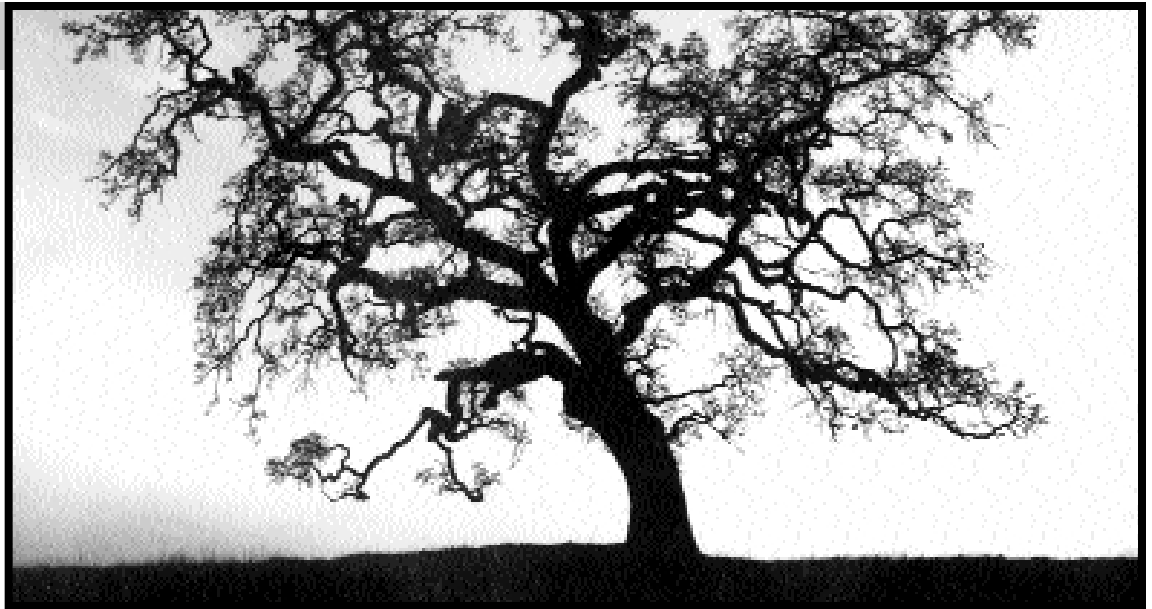


Photo © Todd Pickering

SPECIAL FEATURES

Power Primer • page 2

A reader to help students and teachers better understand California's energy crisis.

Student-Generated Lesson: Fired Up! • page 20

From the students of LEJ (Literacy for Environmental Justice): Students will write advocacy letters and create a game show based on Bayview/Hunter's Point issues.

SCIENCE



The Isle of Tam • page 4

Students will analyze and plot graphs that explore the rise and fall of species diversity.

Simulating the Forest Floor • page 7

Students will calculate runoff rates using a stream table to simulate the forest floor before and after logging.

SOCIAL STUDIES/HISTORY



Corporation as Person • page 9

Students will debate whether corporations should have the same rights as persons, then draft a local ordinance to protect a fictitious town.

Behind the Redwood Curtain • page 11

Students will design an alternative model of watershed management in Northern California.

LANGUAGE ARTS



My Credo • page 14

Students will reflect upon the lives of Henry David Thoreau and David Brower, then write and perform their own creed.

What's in a Name? • page 17

Using Latin roots, students will generate names for schoolyard species, then draft field guide and journal entries.

About the Guide

The Ecology Center welcomes you to **Terrain for Schools**, a unique current events-based curriculum for colleges and high schools. The lessons in this guide address California State Content Standards for grades 9-12 in three categories: science, social studies and language arts.

Overviews and applicable standards are found at the beginning of each lesson. The lessons are designed to be used with articles in the Spring 2001 issue of *Terrain* magazine. Students will read relevant article(s) before delving into activities.

Teachers: Photocopy this material as needed. Loan the guide to fellow teachers. Our goal is to facilitate ecological education in the classroom. We welcome your feedback.

Terrain For Schools Guide, Spring 2001 is a complementary educational guide to *Terrain*, Northern California's Environmental Magazine, which is a publication of the Ecology Center, a non-profit environmental organization serving the Bay Area since 1969.

Project Coordinator

Amy Kiser

Environmental Education Consultant

Blake Brown

Graphic Designer

Edna Cabcaban Moran

Production Artist

Jody Ginsberg

Webmaster

David Ricardo

Ecoliteracy Consultant

Alison Monroe

Terrain Editor

Laird Townsend

Ecology Center Interim Exec. Director

Martin Bourque

Ecology Center Board President

Leona Benton

Advisors: Ted Boggs, Elaine Bond,

Kathryn Dowling, Art Sussman

Thanks to: Joe Eaton, Richard Grossman, Kanchan Haynes, Jeff Kaplan, Tom Killion Akua Jackson, Carl Nasman, Andrea Rich J.A. Savage, Ron Sullivan.

Made possible through the generous support of the Joseph Stanley Leeds Foundation and The San Francisco Foundation.

Address all inquiries to:
Terrain for Schools, Ecology Center
2530 San Pablo Avenue
Berkeley, CA 94702
(510) 548-2220 x232
schools@ecologycenter.org
©Ecology Center

SPECIAL FEATURE

Power Primer

This Year's Energy Crisis

Overview

This reader is intended to help teachers and students better understand California's energy crisis. It may be used to spur discussion and debate in social studies class, or as an addendum to science lessons focusing on electricity. **Reference Terrain Article "Bad Energy,"** pg. 8 and Letter "Solar Water Heated," pg. 6.

This year's energy crisis

Most Northern California households pay for two forms of energy: electricity through wires, and natural gas through pipes, from Pacific Gas & Electric Company (PG&E), a privately-owned utility company. This spring, PG&E customers discovered the price they were charged for natural gas had doubled in a single month. Electricity blackouts had been threatened daily for over a month, and a few actual blackouts occurred, mostly during "peak use" hours in the afternoon and early evening. Blackouts and big bills were a result of an actual energy shortage compounded by changes in the way California's government regulates energy.

Energy shortage: There are reasons to think there is an actual, physical shortage of gas and electricity. 1) In recent years, more people in the Western US have been using more electricity and natural gas than had been predicted. 2) A dry midwinter in the West left little excess hydroelectric power available from big dams in the Northwest. 3) Only four natural gas pipelines bring gas for consumers and electric power producers into the state, and no one plans to build another big one soon. 4) Few new power plants have been built in the last two decades, in part because Southern California Edison (a large utility), pressed the Public Utilities Commission in the early 90's not to approve contracts for small power producers that would compete with it.

Changes in regulation: Until a few years ago, utility companies such as PG&E controlled every aspect of the power grid: they owned the plants that generated power, the large lines that transmitted power and the lines that distributed electricity and gas to consumers' homes and businesses. Because the large utilities had a **monopoly** over generation, transmission and distribution, the government regulated the utilities to keep them from charging whatever they wanted for their products and services. In the mid-90s, **large energy users**, like factories and refineries, saw that electricity was cheaper in other states. They thought they might lower their costs by 20-50% if they could go on the market themselves and make deals directly with **power producers** (generators) and utilities from other states. Power producers and large energy users began to agree that they could benefit from such a situation. In 1996, state regulators decided to allow power producers to compete to sell electricity, using the utilities' power lines just to distribute the product to users. Then-governor Pete Wilson and the State Legislature, voting unanimously, approved a **deregulation** package that made the change permanent.

The 1996 state deregulation law, **AB1890**, froze electricity (but not gas) rates for residents and small businesses at the June '96 level. The laws also directed **ratepayers** (energy consumers) to pay the big utilities' **stranded costs**, investment debts that the

utilities racked up (by building nuclear power plants that needed expensive earthquake retrofits and by purchasing expensive contracts) and hadn't paid off yet. The state asked the utilities to voluntarily sell off most of their power generating plants and arranged for two nonprofit agencies—the ISO (Independent Service Provider) and the PX (Power Exchange)—to work together to control transmission and serve as the middleman, linking energy providers and consumers. Utilities became one of several energy providers consumers could choose from. The great majority of consumers continued to have the utilities buy power for them.

The history of this change highlights two contrasting philosophies of government—free market and regulation. Free market supporters believe that unregulated competition between companies results in better price and service for consumers. However, there are real-world factors that make the situation problematic.

After the utilities sold off their generating plants, the companies who bought them were able to sell the energy back to the utilities at high cost. And when electricity supplies became short, these already high costs became outrageously high—up to 40 times what wholesale electricity cost before this winter. Many believe that when energy supplies first became tight, the energy companies began to hold back on sales in hopes of getting a little better price—a practice called **gaming**. Once energy prices skyrocketed, the utilities began losing billions of dollars, and the energy companies held back sales even more, fearing they would not get paid. The utilities claimed they were going bankrupt, so the state stepped in to buy power and sell it back to the utilities. So far the state has spent \$2.7 billion and is spending \$50 million more each day to keep the lights on.

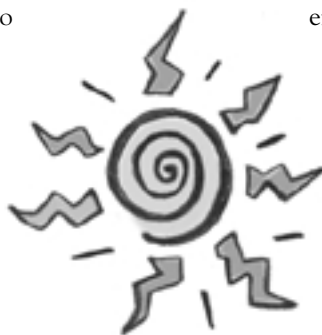
Because electricity can't be stored, and because blackouts are inconvenient in our increasingly computerized society, the ISO was making daily decisions within hours of a blackout, forced to pay the staggering prices the energy companies demanded. If there were no rate freeze, and consumers had to pay these costs themselves, the average consumer would have paid \$600/month this winter for electricity.

Ideally, in a free market, suppliers compete to offer consumers the lowest price. But when shortage threatens, the outcome changes. With the energy market, there are few enough suppliers, and their interests are similar enough, that they can collectively drive up prices for electricity and gas. Thus, power plant owners, (companies like Dynegy, Reliant, Duke Power, and Enron), are making hundreds of millions in profit.

Consumers didn't fight deregulation much, partly because the issues were complicated, partly because a rate freeze seemed to protect them, and partly because they didn't

have the money to fight the wealthy companies that wanted it. A 1998 initiative to partly overturn deregulation failed after foes outspent it in advertising \$30 million to \$1 million. Utilities, energy producers, and big users of energy make significant campaign contributions when politicians run for office. They spend lots of effort studying the market and figuring out what benefits them most. When government tries to regulate them, they fight to get what they want. As yet, ordinary power users, and the nonprofit organizations who represent them, don't seem to have any similar effect on government.

Some new scheme of regulation and state control is on the way, in hopes of fixing these problems before summer. A partial or full state takeover of the utilities is possible; several cities already own and run their own utility companies. Whoever runs or regulates energy companies will have their hands full.



The long-term energy crisis

Building more power plants or allowing power plants to emit more pollution will not solve long-term problems. There is no guarantee that oil and gas sources will last more than a few more decades. Energy generation and use contributes significantly to environmental problems, the most prominent being global warming. To slow the rising temperatures in the atmosphere and the oceans, industrialized societies must quickly reduce, not expand, the use of fossil fuels (oil, natural gas, gasoline and coal). Power plants affect habitat and consume precious water.

Long-term, non-polluting solutions to the crisis include solar heat, solar electricity, wind power, burning plant matter, and rebuilding energy-dependent devices to be more energy-efficient. Nuclear plants emit very little of the gases responsible for global warming. However, nuclear power carries with it the risk of accidents, radioactive waste disposal and terrorist activity, plus the environmental damage of uranium mining. Hydroelectric energy is renewable, but devastates wildlife habitat. The most promising solution is conservation—reducing the amount of energy we use. Consider generating your own solar heat, solar hot water, or solar electricity; getting politically active to restrain the power of big energy corporations; and asking government to help the development of renewable energy and energy conservation technology.

Energy info link: www.energy.ca.gov/education/index.html

Useful visual representation of power grid:
www.caiso.com/aboutus/restructure/index.html

For more info: "Solar Returns," pg. 17, *Terrain*, Winter 2000



Science

The Isle of Tam

CA SCIENCE CONTENT STANDARDS

LIFE SCIENCES GRADES 9-12: 2.b. Students know producers and consumers are related in food chains and food webs and may compete with each other for resources in an ecosystem. 3.b. Students know that in any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all. c. Students know many plants depend on animals for pollination and seed dispersal, and animals depend on plants for food and shelter. INVESTIGATION & EXPERIMENTATION:

1.i. Analyze the locations, sequences or time intervals that are characteristic of natural phenomena (e.g. succession).

Overview

Investigating the unique native ecology of Mt. Tamalpais, students will use graphs to analyze the effects of succession on population. Reference Terrain Article “Tamalpais’ Past,” pg. 27 and “Sudden Oak Death,” pg. 14.

Tamalpais’ Past: Article Synopsis and Questions

Article Synopsis: Mt. Tamalpais is an example of a habitat island, an ecosystem isolated geographically and biologically from surrounding areas. It is isolated for several reasons: less development, more undisturbed habitat, higher elevation, and more moisture than the surrounding area. As the article “Tamalpais’ Past” discusses, Mt. Tam still harbors native species, such as perennial bunch grasses, that have been displaced in the surrounding developed areas of Marin County. Non-native European annual grasses were accidentally introduced and then proceeded to out-compete native California grasses through secondary succession. The native grasses co-evolved with oak trees and other species in several communities: coastal scrub, oak woodlands, redwood forest, and chaparral.

1. List the effects of a couple of introduced species on Mt. Tam. Suggest reasons why an introduced species such as the European annual grasses could out-compete and replace a native species such as bunch grasses.
2. Describe two man-made ecosystem modifications described in the Terrain article.
3. How does a habitat island like Mt. Tamalpais differ from a true island, like the Galapagos?

Succession: Background, Graph and Questions

A complex ecosystem is high in species diversity. A group of organisms occupying a particular area is known as a *community*. Communities and ecosystems evolve in a process known as *succession*. There are two types of succession: **primary** and **secondary**.

Primary succession describes how relatively barren areas (such as sand close to the shore or a recently-created

river sandbar) go through a series of stages during which species take hold. For plants, the first community is called the *pioneer community*: a few hardy, usually light-tolerant plants invade the land and modify the environment. The pioneer community evolves through a series of intermediate communities. The species of each intermediate community modify the environment (e.g. by providing shade or food) in a way that allows newer species to move in and flourish. Years later, anywhere from decades to millennia, a steady state is established. At that point, the community is called a *climax community*, which is in dynamic equilibrium with the environment. Usually, natural climax communities are high in species diversity. Complex ecosystems tend to be more stable than simpler ecosystems when perturbed by outside stresses.

Secondary succession occurs after a climax community is altered by man-made or natural disturbances. A forest or grassland fire, for instance, can kill a significant number of trees and other plants. Although fire initially lowers the number of species, it can serve to clear dense brush, allowing seeds to sprout in previously-covered soil. This creates favorable conditions for light-tolerant plants, and for animal species that prefer a more open habitat. Historically, fires have been a part of the natural growth cycle. In time, the climax community is re-established. Native Americans often used fire as a land management technique which favored certain plants over others.

Human modifications of the environment can produce secondary succession in other ways. For example, clearing a forest for agriculture and planting a monoculture greatly simplifies the food web. A *monoculture* refers to the cultivation of a single plant species, such as wheat or grapevines, over a large area. The introduction of non-native plant species (such as European annual grasses) has historically led to their excessive growth due to lack of natural checks and balances.



"Mount Tamalpais, from
Point San Quentin,"
© Tom Killion

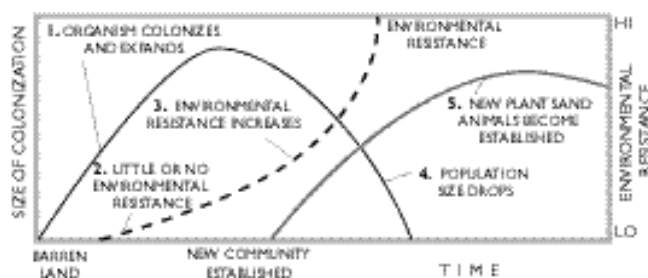
Examples of human influences on ecosystems:

- Introduction of non-native species
- Introduction or elimination of competitors
- Disruption of nutrient cycles (e.g. the phosphorous cycle through irrigation, fertilization)
- Reduction in species numbers or species diversity
- Reduction in habitat area and diversity
- Addition of pesticides, herbicides, fungicides
- Pollution

Human impacts in general tend to simplify ecosystems, and thus create more instability. A monoculture tree farm might be completely decimated by a single bark beetle, because a monoculture offers a predator a virtually unlimited food supply.

1. Refer to the Succession Graph below: Labeled (1.) on the graph is where an organism colonizes barren land and expands. Describe how the population (as shown on the y-axis as size of colonization) of an organism (1.) changes with time. What factors (labeled environmental resistance) can you think of that might prevent its population from expanding indefinitely? What kinds of things might an organism do to alter its environment so that other organisms can take hold?
2. Refer to (5.) on the graph. How does the population graph of the new plants and animals compare to the first colonizing organism (1.)?
3. What is an example of secondary succession on your school grounds or in your neighborhood?

Succession Graph



Oak as Keystone: Background, Graph and Questions

At least 30 species of birds consume acorns. Nearly one-third of the yearly diet of wood ducks, wild turkeys, band-tailed pigeons, and jays is acorns. Acorn woodpeckers rely on them for over half their food. Many insectivore birds, such as bushtits, wrens, and warblers, forage through oak leaves, twigs, and branches to dine on such insects as the California oak moth, 200 kinds of gall wasps, whiteflies, aphids, several kinds of leafhoppers, filbertworm moth, and assorted beetles. Fly-catching birds, such as western kingbirds, Cassin's kingbirds, and black phoebes use the oaks as a launch when they attack airborne prey. Ground-foraging thrushes, thrashers, and towhees scour the leaf litter and understory in pursuit of insects. Woodpeckers, flickers, and creepers probe for insects in the oak's bark. Hawks perch on jutting oak limbs to scan landscape for their prey. Sapsuckers and acorn woodpeckers drill for oak sap. Plain titmice tear apart oak galls (abnormal growths) to consume the insects within. Black-headed grosbeaks and acorn woodpeckers consume oak catkins during spring. During the winter, western bluebirds, phainopeplas, and cedar waxwings eat berries from the mistletoe, a plant that grows high in the oak canopies. The Dusky-footed woodrat and black bear rely upon acorns, as do raccoons, squirrels, gophers, mice, and mule deer. Open oak woodlands also support relatively high densities of lizard- and rodent-eating snakes, including blue and striped racers, gopher snakes, kingsnakes, and rattlesnakes.

Oak trees are examples of a **keystone species**. A keystone species is a crucial part of a natural ecosystem in that so many other species are dependent upon it. The native oaks of California are under a serious threat from *Phytophthora*, a water mold which is most likely a hybrid or an introduced species (See "Sudden Oak Death: Hope for a Remedy?" pg. 14). Elsewhere, oaks are logged or removed for development.

1. Mt. Tam is safe for now. Describe some of the probable impacts on the Mt. Tam ecosystem if it were to lose most of the oaks.



- On the graph axis provided at right, plot what would likely happen to the number of species over a 50-year period if 85% of the oaks were killed by the *Phytophthora* water mold or otherwise disappeared. Dotted line represents initial number of species. Describe your reasoning and what your graph indicates.
- Draw 2-3 new sets of axes in order to create new graphs. Choose 2-3 of the scenarios below and re-plot their effects on the number of species. Describe your reasoning and what your graphs indicate.
 - Other oak species move in, replacing the native.
 - Original species dependent on the oaks emigrate.
 - Other species better suited to habitat immigrate after oaks die off.
 - Humans develop the area during the next 50 years.



2. The shape is similar, but with a more gradual rise in colonization size followed by longer leveling off period. The time for the rise and fall in (5.) is longer, due perhaps to longer life span of new species, increased environmental resistance, or existing species diversity that might slow their rate of population increase.

3. Examples: Former wetlands are paved over. Weeds spring up between cracks in asphalt. Turf is laid or grass is seeded in a yard. The monoculture replaces native plants. Soon, crabgrass and dandelions move in.

Possible Answers

Tamalpais Questions:

- European annual grasses and star thistle. Both of these non-natives thrive because of few natural checks and balances. Cattle grazing is likely to have favored the annual grasses over perennial species because the former can reseed each year.
- Periodic burning, grazing, fire suppression, introduction of non-native species, farming, and logging.
- Tam is not ecologically isolated; seeds may blow in, animals and plants migrate freely.

Succession Questions:

- The population rises quickly, levels briefly, then declines. Environmental resistance can be: lack or too much nutrients or water; overcrowding; too much or too little shade; changing soil conditions; competition from other species; loss of habitat; pest invasion. An organism can create or alter the soil, crowd out other species, attract pollinators, and provide food or nutrients.

Oak as Keystone Question:

- The animals, insects, and plants reliant on oak habitat would be seriously disrupted. The oak serves as food, shade, protection, habitat, soil stabilizer and modifier. The oak loss could diminish the watershed's ability to collect water. Any species completely dependent on oaks would be the first to die out. Others might relocate and/or modify their diet. Oak woodlands provide partial shade. Animals and plants requiring partial shade would need to find other ways to obtain it. Species would compete to fill the vacant niche: species such as coyote brush might fill the niche close to the coast, while further inland, hardwoods such as bay trees, madrones or manzanitas might fill the niche. Each comes with its own community of dependent species, which would replace the oak communities.

Simulating the Forest Floor: Lab Data Table

MATERIALS	TIME OF WATER DELIVERY (SEC)	TIME ALLOWED FOR RUNOFF (SEC)	VOLUME OF RUNOFF (ML)	RUNOFF RATE [VOLUME ÷ TIME] (ML/SEC)	APPEARANCE OF RUNOFF
Bare surface of cookie sheet (i.e. control)					
Gravel only					
Sand only					
Dry sponge					
Saturated sponge					
Conifer needles					
Conifer needles on top of sand, gravel, or topsoil					



Science

Simulating the Forest Floor

CA SCIENCE CONTENT STANDARDS
EARTH SCIENCE GRADES 9-12: 9.a. Students know the resources of major economic importance in California and their relation to California's geology.
c. Students know the importance of water to society, the origins of California's fresh water, and the relationship between supply and need. INVESTIGATION AND EXPERIMENTATION 9-12: 1.g. Students will recognize the usefulness and limitations of models and theories as scientific representations of reality.

Overview

Using a stream table model, students will determine how trees and groundcover change the rate at which water runs off a forest floor. Reference Terrain Article "Sediment of Corruption," pg. 19.

Background

The article, "Sediment of Corruption" describes the impacts of Maxxam, Inc.'s excessive logging on the forests, streams and communities of Northern California. Catastrophic flooding and debris slides are occurring there on a more frequent basis, and this is likely due to increased water and sediment runoff from nearby clearcuts.

It is widely held that removal of a significant amount (greater than 30%) of trees in a forest will result in increased runoff. This occurs primarily as a result of decreasing **evapotranspiration** and decreased interception by the forest's **canopy**. The precipitation that is not transpired or intercepted by the trees will run off and enter streams, or infiltrate and enter the groundwater.

Another factor affecting runoff is **soil compaction** due to logging operations and road building. Soil compaction decreases the space between soil particles. This reduces the amount of water that can pass through the ground, thereby increasing the amount that runs off the top. Roads increase **peak flow** by intercepting the water that is shallowly running under the surface of the ground. A vertical cut along a hillside (such as a road) disrupts the shallow subsurface flow of water by draining it during rainy weather.

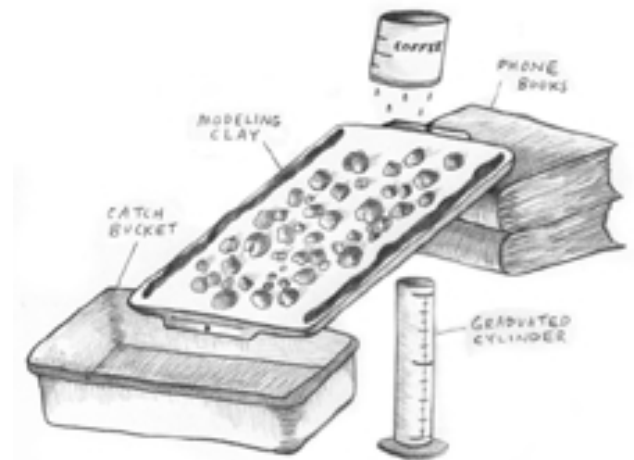
source: www.pacrivers.org/Publications/sierrathinning.html

Terms

Canopy: the uppermost layer in a forest, consisting of the crowns of trees.

Evapotranspiration: the loss of water to the atmosphere through its evaporation from the soil and by the transpiration of plants growing on land.

Peak flow: the maximum instantaneous discharge of a stream or river at a given location. It usually occurs during or shortly after a rain.



Lab Activity

Students will construct a model of a sloped forest terrain with the following materials, then calculate runoff rates.

Materials:

- cookie sheet, plexiglass plate or 2' X 4" piece of plywood for the stream table
- 3 or 4 books or phonebooks
- 4-8 small, rectangular household sponges
- watering can or coffee can with lid and holes poked at one end
- plastic catch bucket
- approximately 1 gallon each of: sand, silt, gravel, clay (or as much of these as you can obtain)
- redwood, pine, or fir needles; moss; topsoil (if available), enough to cover top of cookie sheet
- modeling clay (2 or 3 sticks)
- graduated cylinder or other volumetric container
- stopwatch

Procedure:

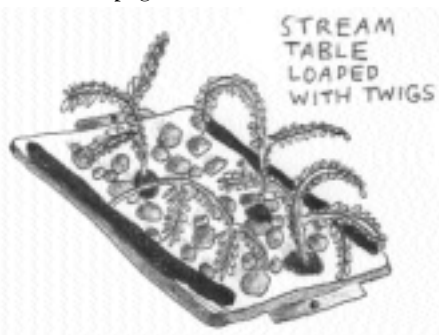
1. Place 1 or 2 books under one end of the cookie sheet, plexiglass plate or plywood to create a small, sloped stream table. Create a border of modeling clay along both sides of the stream table so water won't run off the sides.
2. Cover the stream table with about a 1" thick layer of gravel.



3. Position the catch bucket at one end of the stream table to collect the water that will run off the table during step 5.
4. Cover the punctured end of the coffee can with the lid and fill the coffee can with water.
5. Position the coffee can over the gravel at a predetermined spot and release the water. **Make sure that the amount of water delivered or the delivery time is consistent for each run.**
6. Collect the water at the bottom of the stream table using the catch bucket for the predetermined time. Record the runoff time (i.e., the amount of time allowed for runoff) in the data table below, along with your observations regarding the appearance of the runoff.
7. Transfer water in the catch bucket to the graduated cylinder. Record the volume of the water runoff in the data table (page 6).
8. Repeat steps 2–7 using different coverings.

Suggestions:

 - Place conifer needles on top of gravel.
 - Use 1" sand covering.
 - Place sponges on part of the stream table and cover all of it with silt or clay.
 - Place sticks vertically into modeling clay, sand, topsoil, etc. to simulate trees.
 - Add other combinations of materials to the stream table.
9. Calculate the runoff rates for each stream table surface and enter values (ml/sec) into column 5 of the data table (page 6).



Data Table, Observations & Questions (see Data Table, page 6)

Data Table Questions:

1. What was the runoff rate for the empty stream table (baseline rate)?
2. Which type of surface had the fastest runoff rate? Which had the slowest?

3. How does the *runoff rate* (volume divided by time) compare for the dry sponge vs. the wet sponge? Compare the sponge model to runoff rates with wet soils and dry soils.
4. Did the appearance of runoff differ for sand, gravel, or topsoil when conifer needles were placed on top?
5. Explain the effects of the different materials upon runoff, and how this model compares to the stream siltation problems described in the article.
6. What are the limitations of this stream table model in showing runoff compared to an actual forest?

Watershed Questions

Consider the following scenarios. Describe the consequences to the watershed, which includes both flora and fauna.

1. Rain falls on an area of a healthy forest. List as many places you can think of where the rain might go. Now, imagine that area is clearcut. Explain some differences in what happens to the rain and why.
2. Herbicide is sprayed on the clearcut immediately after a logging operation. The herbicide is relatively non-toxic to humans, but is very water soluble* and can kill certain fish and many aquatic insects. The spray zone is several hundred feet from the nearest creek. The water table is 7 feet below ground level, and there are two drinking water wells about a mile away. List different fates for the herbicide, and the impacts on the watershed.

** water soluble= dissolvable in water. Note: even if original herbicide is not soluble (and therefore mobile) its breakdown products might be.*
3. A bike and hiking trail is opened in a previously untrammled wilderness. Explain the effects this would have on the watershed.

Possible Watershed Answers

1. Evapotranspiration decreases, runoff increases; water levels in the river increase; siltation increases.
2. Large fish and algae kills occur after rainfall if significant amounts of herbicide enter the stream. (To delve deeper into what happens when a water-soluble contaminant enters the soil and groundwater, refer to Contamination Plume lesson, TfS Fall 2000 guide.)
3. Increased erosion and sedimentation, soil compaction, fragmentation of habitat, spooking of fauna, etc.



Social Studies

Corporation as Person

CA SOCIAL SCIENCE CONTENT STANDARDS

U.S. HISTORY AND GEOGRAPHY, GRADE 11: *Continuity and change in the 20th century: 5. Students will discuss corporate mergers that produced trusts and cartels, the economic and political policies of industrial leaders.*

12.5 *Students will summarize landmark U.S. Supreme Court interpretations of the Constitution and its amendments. 1. Students will understand the changing interpretations of the Bill of Rights over time, including interpretations of the basic freedoms articulated in the First Amendment and the due process and equal-protection-of-the-law clauses of the 14th Amendment.*

Overview

Students will perform a mock retrial of the Supreme Court cases of the late 1800's that gave corporations the rights of "natural persons." Students will also draft a local ordinance, limiting the power of corporations in a fictitious town.

Reference Terrain Article "By the People," pg. 23.

What is a Corporation?

There are three main forms of for-profit businesses: sole proprietorships, partnerships, and corporations. People apply to become incorporated so that, among other things, they may raise large sums of money by issuing stock. To become a corporation, people must apply for a **charter**, which is a legal agreement the business enters into with a particular state. Through the charter, a state gives the corporation special privileges not possessed by other businesses. In return, the state holds the power to change or revoke the charter.

A distinguishing characteristic of modern corporations is **limited liability**. With sole proprietorships and partnerships, the person(s) who own the company are responsible (liable) for paying off the debt that the company incurs and/or the harm it causes. Therefore, the assets (money, property) of the individual owners can be taken by creditors to pay off the debts of the business. If a corporation faces any financial claim against it, (like unpaid debts or pollution damage), the owners (i.e. those who own stock) are protected from having their assets taken. When a corporation is brought before a regulatory body (such as the Environmental Protection Agency) or sued in court by a person, the worst consequence tends to be a fine. Often, those fines, plus lawyer's fees and public relations expenditures, are tax deductible.

It was not always this way. During the early 1800's, boards of directors and stockholders were held personally liable for all harms and debts. "The **limited liability** corporation, as we know it today, did not exist," writes Richard Grossman, co-director of Program on Corporations, Law and Democracy. Furthermore, in many states, corporations were forbidden to own other corporations, donate to political candidates or charitable organizations, and own any land or property beyond what was necessary for the carrying out of the duties described in their charter. Much has changed.

Corporations Given the Rights of Natural Persons

The 14th Amendment was passed to protect the rights of former slaves after the Civil War. However, that very amendment became the favorite tool of lawyers seeking to establish corporations as "natural persons," assuring them the human rights of due process, equal protection, freedom of speech, and protection against unreasonable search and seizure.

The dominant large-scale industry after the Civil War was the railroad. In the late 1800's, Southern Pacific Railroad Corp. brought cases against San Mateo and Santa Clara counties. To avoid the tax rules the State of California imposed upon corporations, they claimed that distinguishing between a human being and a corporation was a violation of the railroad's civil rights. S.W. Sanderson, the lawyer representing Southern Pacific, argued in *San Mateo vs. Southern Pacific Railroad* that corporations are made of individual stockholders who choose to pool their money. Therefore, if you tax those stockholders as an incorporated body differently than you tax them as individuals, you are being unfair.

D.M. Delmas, representing the State of California in *San Mateo vs. Southern Pacific Railroad*, argued that corporations are not "persons" as expressed in the 14th Amendment. Delmas argued that there was a distinction between artificial and natural persons: "Natural persons are such as the god of nature formed us. Artificial are such as are created and devised by human laws for the purposes of society and government." As such, Delmas said, corporations "cannot enjoy all the rights of (natural persons) or be governed by the same laws." Furthermore, corporations are given special privileges such as **limited liability**, **perpetual existence**, and, in some cases, **eminent domain**: the right to take property from an owner for a specific purpose, like laying down a highway or a canal. That means corporations cannot expect to be treated as natural persons who don't have those privileges. In other words, they can't have it both ways. "I cannot conceive the reasoning by which a



corporation is treated as a *unit* for the purpose of absorbing privileges... but must be looked upon as *disintegrated into its component parts* for the purpose of bearing burdens.” (*italics added*) He added that it would be ludicrous to imagine corporations having certain rights that natural persons have – like the right to get married.

But the railroad prevailed. Starting almost immediately, corporations made use of their new rights. For example, they cited due process to fend off the taxation policies that states had traditionally used to keep corporations in check. Much later, freedom of speech was interpreted to allow campaign donations as a form of speech.

Historical note: In the same year they extended the 14th Amendment to corporations, the Supreme Court overturned a major civil rights act. Throughout the U.S., the civil rights of African-Americans were being scaled back in other courts, paving the way for segregation. In 1938, Justice Hugo Black remarked that of the cases in which the Supreme Court applied the 14th Amendment during the first 50 years after *Santa Clara vs. Southern Pacific*, “less than one-half of 1% invoked it in protection of the Negro race, and more than 50% asked that its benefits be extended to corporations.”

Activity A: Personhood Debate

Revisit the issue the railroad cases settled: Should a corporation be given the same rights as a natural person? Divide the class in half. The affirmative side: Research and formulate arguments for giving corporations the same rights as natural persons. The negative side: Research and formulate arguments against giving corporations the same rights as natural persons. Have a copy of the Bill of Rights and the 14th Amendment on hand.

Debate Format: One debate round consists of an affirmative-side team of three debating a negative-side team of three. Students not debating will serve as judges. Verdict will be determined by the most persuasive argument, not by which side of the issue students personally favor.

- Affirmative team presents opening speech.
- Negative team presents opening speech.
- Affirmative team rebuts negative team’s points.
- Negative team rebuts affirmative team’s points.
- Negative team presents closing speech.
- Affirmative team presents closing speech.

Questions for before and/or after the debate:

1. One source in the article refers to “the dignity and wealth of every person.” What do corporations have in common with natural persons? How do they differ?
2. If corporations have more rights and privileges than a person, how does this give corporations a distinct advantage over natural persons?

3. In the U.S. we are told that we live in a democracy. If we spent the majority of our time working within a corporation, would we be spending that time in a democracy?
4. What do you feel are the appropriate roles for the government and corporations? Do their roles overlap? Who controls whom in theory and in practice?

Activity B: Draft an Ordinance

Background: Originally, a corporation was considered subordinate to the community. “Corporations are all set up by states to serve a ‘public need’ and act ‘in the public interest,’” says corporate anthropologist Jane Anne Morris. “This is a long-established doctrine. A business is presumed to be incorporated for the benefit of the public.”

Until the 1900’s, states frequently revoked (took away) the charters of law-breaking corporations; the corporations were permanently dissolved, not just fined and allowed to continue breaking the law indefinitely. States still have the authority to revoke and amend corporate charters, although they seldom do.

Premise: Students live in Community X, where a corporately-owned medical waste incinerator has been causing concern. Foul odors permeate nearby neighborhoods, and toxic chemicals hazardous to pregnant women have been detected in the air at levels high above what the company reports. Employees, wearing no protective clothing, have been seen dumping ash into outside bins. The ash blows onto the workers and into the neighborhood. Visitors to the site witnessed a storage container leaking medical waste. The incinerator has already been cited for over one hundred safety and health violations for which they have paid a total of \$90,000 in fines. But the company writes off the fines and continues polluting. The citizens believe regulatory remedies have been exhausted.

Exercise: Break class into groups of 3-5 students. Each group writes an ordinance for Community X, spelling out the rights, responsibilities, limitations, and consequences corporations will have in their town. With the ordinance, students will attempt to remedy the problems the incinerator has caused, as well as prevent future problems from occurring. For clear examples of real ordinances drafted in a variety of towns around the U.S., visit www.celdf.org/scm/ord.htm.

Extra Credit:

- Research your own community. Are there any corporations operating within your community that have been fined for violations? Find out if there are any efforts in your community to limit corporate power or increase corporate responsibility.
- Research why most multi-national corporations are chartered in Delaware.

Good references: www.POCLAD.org, “Lies My Teacher Taught Me” by James Loewen, “Peoples History of the US” by Howard Zinn, “Taking Care of Business: Citizenship and the Charter” by Richard Grossman & Frank Adams.



Social Studies

Behind the Redwood Curtain

CA SOCIAL SCIENCE CONTENT STANDARDS
PRINCIPLES OF AMERICAN DEMOCRACY AND
ECONOMICS, GRADE 12: 12.7 Students analyze and
compare the powers and procedures of the national, state,
tribal, and local governments. 6. Students compare the
processes of lawmaking at each of the three levels of govern-
ment, including the role of lobbying and the media.

Overview

Students will do a role play to examine the current system of watershed management in Northern California, exploring whom it benefits and whom it harms. They will then design an alternative means of management that better addresses the interconnectedness of the water and forests. **Reference Terrain Article “Sediment of Corruption,” pg. 19.**

Background

A *watershed* is an area wherein all rivers, streams, and subsurface water drains to the same place. Various watershed interests include:

Conservation: A watershed contains both aquatic (water) and terrestrial (land) components. As such, it is part of a larger natural system involving all terrestrial and aquatic flora and fauna (conifer, hardwoods, algae, salmon), along with groundwater and surface water, geology and hydrogeology.

Resource extraction: Watersheds contain extractable resources for humans such as timber, drinking water, gravel, fisheries.

Recreation: Watersheds offer opportunities for hiking, camping, fishing, hunting, sightseeing, boating and swimming.

In Northern California, the timber industry (Maxxam, LP, Sierra Pacific) is very powerful politically and economically, and its interests hold sway over the tourism (recreation) industry, the fisheries industry, and conservation interests. In “Sediment of Corruption,” the author reports that Maxxam logging practices, among other things, have led to increased flooding and streams loaded with sediment, which can prevent salmonids from reproducing.

Activity A: Reality Reversal

1. Cut out, fold, and place in a hat the characters listed on page 12. It is preferable to have more than one of each character, because individuals within any group may differ in their perspective. Each student will draw a character from the hat.
2. One side of the classroom will be designated “Advantage.” The other side of the room will be designated “Disadvantage.” Students will position themselves in the room according to whether they believe

the current situation (timber interests dominant) is to their character’s advantage or disadvantage. Some students may think the situation holds a mixture of benefits and drawbacks for their character. They will stand at a point between the poles that reflects that mixture.

3. Students must state which character they drew from the hat and explain why they chose to stand where they did.
4. Repeat steps 2 and 3, using Hypothetical Situations A, B and C described below.
5. Have students introduce new characters into the mix, then repeat the exercise.

Hypothetical Situation A: Suppose the fisheries industry were more powerful politically or economically than the timber industry.

Hypothetical Situation B: Suppose (as seems to be coming true) that the tourism industry grew to be more powerful politically and/or economically than the timber industry.

Hypothetical Situation C: Suppose that conservation interests held more political power than resource extraction interests (timber, fisheries, etc.) and recreation interests, which include campers and off-road drivers.

Questions to research and ponder

1. How might it have come to pass that the interests of the timber industry hold sway over the other interests of the watersheds in Northern California? What priorities are reflected by the current system? What role do you think political donations play?
2. Our taxes fund the California Forestry Department. Their mission includes “to protect and enhance forest, range, and watershed values providing social, economic, and environmental benefits to rural and urban citizens.” Yet, according to the article, the CDF considers timber companies to be their clients. Why might this be so?



Denizens of the Watershed:

Commercial Fisherman: Wants bountiful harvest of fish. Freshwater fish require clean, unimpeded streams and rivers. Salmon and steelhead require cold, clear water with gravel-bottoms (i.e. no silt) for spawning. Excessive fishing (esp. ocean fishing) could collapse the fisheries. Opposes landscape changes that endanger fish stocks.

Recreational Fisherman: Wants bountiful harvest of fish (salmon, steelhead, trout, crabs, etc.). Freshwater fish require clean, unimpeded streams and rivers. Fish such as salmon and steelhead require cold, clear water with gravel-bottoms (i.e. no silt) for spawning. Opposes changes to the landscape that might endanger fish stocks.

Logger: Wants bountiful supply of high-quality timber and job security. Old-growth timber fetches the highest price. Believes environmental restrictions that slow down timber harvests could threaten his job security.

Town Mayor: Wants economic and social well-being for his town and community. Plenty of high-paying jobs attract other businesses to his community. A healthy tourist economy depends on the natural beauty of the area.

Timber Executive: Responsible to the shareholders and Board of Directors, who want to maximize short-term profits as well as ensure a financial future for the corporation.

Backpacker/Dayhiker: Values unspoiled beauty of wilderness, clear, flowing streams, plenty of fish and other wildlife. Needs access trails into wilderness. Sometimes has conflicts with mountain bikers and off-road enthusiasts.

Mountain Biker: Values unspoiled beauty of wilderness, yet desires both narrow bike trails and wider fire roads. Sometimes has conflicts with backpackers and hikers.

Forest Ranger: Manages national forests for multiple uses (including recreation) and the sustained yield of resources such as water, forage, wildlife and wood. Often trained in timber management. Forest Service's latest priority is facilitating recreation (e.g. keeping trails clear).

Professional Photographer: Freelancer sells photos to newspapers and magazines. Exhibits and sells works in several galleries.

Native American: For millennia, Wiyot, Yurok, Karuk and others have considered the region their traditional territory. They still make pilgrimages to sacred sites. Those who live in the area often rely on forests for medicinal plants, ceremonial plants, and food.

Local Apple Grower: Needs stable, fertile soil, drinking water in well, and aerated soil, because fruit trees' roots are mainly in the first three feet of ground. Flooding rots roots.

Local Teenager: Requires money from job or from parents, who hold steady jobs. Requires decent school and enough other teens living in the area to have friends and romantic interests. Needs clean drinking water.

Northern Spotted Owl: Lives in old-growth forest. Needs prey base of mice, squirrels, voles. Needs nesting space and distance from barred owls, a more aggressive species that will prey on spotted owls. Easily disturbed.

Old-growth redwood: Need trees around it to cross-pollinate and to protect from unaccustomed wind stress. Can survive flooding. Needs fog and moist atmosphere. Roads compress roots, destabilize, endanger trees' food and water supply.

New-growth Redwood: Grows in a community. Needs other trees to cross-pollinate and to stabilize sloped land. Grows from "nurse logs," decomposing fallen trees. Needs the nutrients of dead plants or animals. Needs sunlight.

Steelhead: Requires silt-free, cold, clear waters to spawn. Needs unimpeded streams to migrate to ocean and to return to spawn.

Scientist: Could work for an environmental organization, a regulatory agency, or a corporation.

Local Assembly Member: Wants to stay in office. Needs campaign contributions. Advocates for those who voted him/her into office.

Local Barkeep: Third generation citizen of town. Father and grandfather worked at sawmill. Bar patrons include loggers, mill workers, fishermen and townspeople whose homes have been jeopardized by mudslides and flooding.



Activity B: Design A Regulatory System

Investigate how the law and regulatory agencies deal with the watershed. Because of the current laws, each regulatory agency deals with only part of the watershed: CDF deals only with timber extraction, RWQCB deals only with water, DFG deals with game species. This fractured approach neglects the interconnectedness of all parts of the watershed ecosystem. For example, salmon, a **game** fish, need clear, unimpeded **rivers** to facilitate their migration to the ocean and back. They also depend on **trees** to prevent siltation in their spawning pools.

Exercise:

Break the class into groups of 3-5 students. Have each group design a regulatory system that would more effectively deal with the complexities and independencies of a watershed. Question to consider: Is it possible to design a regulatory arrangement that gives all watershed interests an equal amount of power?

Agencies that oversee aspects of the watershed:

CDF (California Department of Forestry and Fire Protection): Mission is to oversee logging operations and to approve Timber Harvest Plans (THPs) in accordance with the law and public policy, and to manage statewide firefighting efforts. Link: www.ca.fire.gov

NCRWQCB (North Coast Regional Water Quality Control Board): Mission is to preserve and enhance the quality of California's water resources and ensure their proper allocation and efficient use for the benefit of present and future generations.

Link: www.swrcb.ca.gov/rwqcb1

DFG (California Department of Fish and Game): Mission is to manage fish and wildlife species and habitats within the state for ecological and recreational value.

Link: www.dfg.ca.gov

USFWS (U.S. Department of Fish and Wildlife Service): Mission is to work with others to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.

Link: www.fws.gov

EPA (Environmental Protection Agency): Mission is to protect human health and to safeguard the natural environment.

Link: www.epa.gov

Humboldt County Agricultural Commissioner: Responsible for approving all local pesticide and herbicide applications within the county.



"Ravens in the Hemlock," © Andrea Rich

This clip, taken from Humboldt County's newspaper, *The Times Standard*, illustrates how the various agencies overlap, and the legal uncertainty that follows.

"The question now is whether the Regional Water Quality Control Board should hold special hearings on the Pacific Lumber logging activities, and possibly issue cease-and-desist orders if they are found to be polluting the streams. The board does this in other water pollution cases, including the recently-settled controversy over stream pollution from the Louisiana-Pacific particle board plant in Arcata.

Timber harvests, however, come under the jurisdiction of the California Department of Forestry. The water quality board, Department of Fish and Game and other agencies may comment on harvest plans, but they are not specialists on forestry issues.

The California Board of Forestry last year considered, and declined to make, changes in the present forest practice rules sought by the Freshwater and Elk River landowners, among others. There is a very real legal question as to whether one state agency could prohibit an activity that has been approved by another agency, if the latter has normal jurisdiction over that activity.

Another gray area of the law is whether runoff from a logging operation can be considered "point source pollution," such as a discharge pipe from a factory. The Environmental Protection Information Center has announced its intention to file suit in federal court on that issue."



Language Arts My Credo

CA LANGUAGE ARTS CONTENT STANDARDS
LISTENING AND SPEAKING STRATEGIES, GRADES
9,10: 1.1 Formulate judgements about the ideas under discussion and support those judgements with convincing evidence.
1.10 Analyze historically significant speeches to find rhetorical devices and features that make them memorable. 1.11 Assess how language and delivery affect the mood and tone of the oral communication and make an impact on the audience.

Overview

Students will read excerpts from the lives and works of naturalists Henry David Thoreau and David Brower, then write about and share their own beliefs regarding wilderness, technology, progress, success and independent thinking. Subsequently, students will craft and perform their own creeds, which will be based upon their earlier musings.

Reference Terrain poem by David Ross Brower, “Credo,” pg. 7.

David Brower was considered one of the most influential conservationist of the last 50 years. A tireless writer, speaker, and organizer, he was largely responsible for saving many of our country’s most illustrious wild places from development and ruin: Point Reyes, Redwood National Park, Dinosaur National Park, the Grand Canyon.

The writer **Henry David Thoreau**, who was born nearly 100 years before Brower, is considered by many the father of the American conservation movement. His writings have inspired generations of environmentalists and social justice activists, including Rachel Carson and Mahatma Ghandi. Both Brower and Thoreau were vocal critics of American society. But closer to the bone, both shared an intense fascination with nature and wilderness. Their speeches and writings are rife with passages like the ones below:

“Take a bird’s feather, for instance. I just marvel at that structure—the hairs, the spacing, the pattern. It’s a very nice bit of design, enabling it to fly, to handle temperature changes. Or look at beetles. Did you realize there’s a beetle that can produce steam to fire at enemies? There’s a clam that can manufacture cement at the temperature of seawater. What’s the trick? We have no idea. If we found out, we might pave everything in sight.” (*Outside magazine*, Dec. ‘95)



“One day when I went out to my woodpile, or rather my pile of stumps, I observed two large ants, the one red, the other much larger, nearly half an inch long, and black, fiercely contending with each other. Having once got hold they never let go, but struggled and wrestled and rolled on the chips incessantly. Looking farther, I was surprised to find that the chips were covered with such combatants, that it was not a duellum, but a bellum, a war between two races of ants...” (*Walden*, pg. 185)





Activity


The two parts of this activity are linked. In Part A, students contemplate their own value systems as they pertain to wilderness, technology, progress, success, and independent thinking. In Part B, students use those reflections as a basis for writing their own creeds.

Part A: Questions for Reflection


Read the following questions, reflect, then write a paragraph for each of the five groupings of questions. After you have written down your thoughts, discuss your answers with a fellow student for ten minutes. Note where your ideas overlap with his/her ideas and where they differ.

1. “Most of the luxuries, and many of the so-called comforts of life, are not only not indispensable, but positive hindrances to the elevation of mankind,” wrote Henry David Thoreau in *Walden*. By living as simply as possible, and fishing and growing his own food, Thoreau could earn all his living expenses by working a total of six weeks per year. He believed that most people wrongly equated their value with their possessions.

In Credo, Brower hopes that humankind “may see that progress is not... the growing number of things we possess and cling to...” While Brower was largely unconcerned with accumulating possessions himself, he did enjoy certain luxuries: “Brower loves restaurants,” wrote Daniel Coyle in *Outside* magazine, “particularly fifties-era seafood-and-steak joints with studded-leather booths and bartenders who know his preferences—Tanqueray martinis straight up, no distractions.”


 **How are progress and success measured in the culture(s) in which you live? Explain why you agree/disagree with those standards for measuring progress or success. If you removed yourself from society and lived alone in the wilderness for six months, how do you think your values would change?**

2. Thoreau was born in 1817, Brower in 1912. Imagine that 100 years from Brower’s birth, in 2012, a child is born who will become a prominent naturalist writer or speaker midway through the century we’ve just begun.

 **Considering the modern trends of urbanization and deforestation, how likely is it that a future naturalist writer or speaker will have close access to wilderness midway through this century? Do you believe that a person must spend a significant amount of time in wilderness for him/her to value the preservation of wild places highly, as Brower and Thoreau did?**


3. While Thoreau was an inventor and engineer of sorts (he invented a machine to grind pencil lead into powder for a smooth line), he had mixed feelings about the technology of his day. “Our inventions are wont to be pretty toys, which distract our attention from serious things,” he wrote in *Walden*. “We are in great haste to construct a magnetic telegraph from Maine to Texas; but Maine and Texas, it may be, have nothing important to communicate.”

Brower, whose home in Berkeley once held 11 telephones, a fax machine, a typewriter, a laser printer, and a PowerBook, believed that the new communications technologies could aid in the efforts to preserve wilderness. During the 1960’s, he helped to produce coffee table books for the Sierra Club. “We were getting people to fall in love with the Earth,” he said of the books, which contained poetry and dynamic photographs of the wild. “We need to concentrate on that once again, whether it’s on e-mail, on the web, through the media, wherever we can get it.” (*California Wild, Winter ‘01*)

 **Do you believe our culture’s push to develop new technology is driven by utility (usefulness) or a love of novelty (newness)? To what extent do you believe technology has improved your life and/or made you happier?**

4. “If a man does not keep pace with his companions, perhaps it is because he hears a different drummer,” wrote Thoreau. “Let him step to the music which he hears, however measured or far away.” In his essay “Civil Disobedience,” which influenced both Ghandi and Martin Luther King, Jr., Thoreau expressed his belief that an individual must determine what is right from wrong, independent of the dictates of society. Exercising his beliefs, Thoreau refused to pay the poll tax which financed the war with Mexico and supported the enforcement of slavery laws.

In the 1960s, Brower agreed to a deal with the federal government that allowed construction of a dam that flooded Arizona’s Glen Canyon in order to keep two dams from deluging the Grand Canyon. It was a decision that would haunt him until his death. He vowed never again to compromise. Later, his activism and reluctance to compromise resulted in the Sierra Club losing its tax-exempt status. He was forced to resign from the Sierra Club. “Prickly and single-minded, Brower seems always to move too fast, want too much, push too hard. His sense of mission comes before allegiances, before friendship and family, before everyday comfort and affection,” wrote Daniel Coyle. (*Outside, Dec. ’95*)


 **Do you believe that time spent alone in wilderness leads a person to have a more independent spirit—one unconcerned with popular opinion? Why? What are the benefits and drawbacks to asserting your independent beliefs in our culture?**

Continued on next page.



5. David Brower grew up in the Berkeley Hills, an area which was virtually wilderness at the time. He would go on long walks near Grizzly Peak, sometimes leading his mother by the hand. Because she was blind, Brower would describe the plants and animals and terrain to her as they moved along. When his father lost his job, the family fell on hard times. For cheap recreation, they turned to camping, driving the tortuous dirt roads to the wild country at the south end of Lake Tahoe, which today features casinos, gas stations, hotels, restaurants and real estate offices.

Thoreau grew up in Concord, Massachusetts, where he explored the surrounding woods (and once, accidentally, set fire to 300 acres.) At the age of 27, Thoreau built a ten-by-fifteen foot cabin of pine logs and secondhand boards where he lived for two years. There, he wrote his most well-known book, *Walden (or Life in the Woods)*.

 Do you believe that a person’s childhood surroundings play an important role in what a person comes to value as an adult? What aspects of your own childhood have led to the specific values/beliefs you hold now?

Part B: Writing Your Creed

A credo, or creed, is a formal summary of one’s beliefs, an authoritative statement of that which is held true by a person, sect or school. Whether it takes the form of a poem, an inauguration speech, or a rap, a creed is most powerful when presented orally. Martin Luther King’s famously inspirational “I have a dream” speech contains a creed within a creed: “I have a dream that one day this nation will rise up and live out the true meaning of its creed: ‘We hold these truths to be self-evident: that all men are created equal.’” Credos frequently use the first person plural pronouns *we*, *us* and *our*, and are meant to be lasting documents, a means by which future generations may understand our beliefs and intentions.

Exercise

1. Select some of your favorite thoughts from questions 1.-5. Use them to write a credo that is a summary of those ideas you value or hold true.
2. Read or perform your credo before the class.

Sample Works Which May Be Considered Creeds:

Pulitzer prize-winning author and activist **Alice Walker** included this poem in the commencement speech she gave at Spelman College, entitled “*What Can I Give My Daughters, Who Are Brave?*”

We Alone

We alone can devalue gold
by not caring
if it falls or rises
in the marketplace.

Wherever there is gold
there is a chain, you know,
and if your chain
is gold
so much the worse
for you.

Feathers, shells,
and sea-shaped stones
are all as rare.

This could be our revolution:
To love what is plentiful
as much as
what is scarce.



“Bloodsong” by Eric Drooker, from *Street Posters and Ballads*, Seven Stories Press, 1998.

Winner of the Nobel Peace Prize, **Nelson Mandela** led the struggle in South Africa against apartheid. He was imprisoned for over twenty years, after which he became the first democratically-elected State President of South Africa.

Speech By Nelson Mandela

Our deepest fear is not that we are inadequate.

Our deepest fear is that we are powerful
beyond measure.

It is our Light, not our Darkness,
that most frightens us.

We ask ourselves, who am I to be brilliant, gorgeous,
talented, fabulous?

Actually, who are you not to be?

You are a child of God. Your playing small
does not serve the world.

There is nothing enlightened about shrinking so that
others people won’t feel insecure around you.

We were born to make manifest the glory of God
that is within us.

It is not just in some of us; it is in everyone.

And as we let our own Light shine, we unconsciously
give other people permission to do the same.

As we are liberated from our own fear, our
presence automatically liberates others.



Language Arts

What's In A Name?

CA LANGUAGE ARTS
CONTENT STANDARD
READING, GRADES 11, 12:
1.2: Apply the knowledge of
Greek, Latin, and Anglo-Saxon
roots and affixes to draw inferences
concerning the meaning of scientific
and mathematical terminology.

Overview

Students will explore the politics of naming by generating several names for a schoolyard species, including a Latin-based name, and gauging classmates' responses to the names. Students will create one field guide entry for a fictitious species and one for themselves, then draft contrasting first-person journal entries. Reference Terrain Article "Name that Species," pg. 31.

Background: What's in a Name?

The desire to name every living thing is perhaps as old as humankind. The theme of naming reappears in creation stories from around the world. In many of them, naming is an exercise in creation; by speaking their names, deities call creatures into existence. To European colonialists, bestowing a name was often a ritual in ownership: Colonists "discovered" and renamed many species that native inhabitants were already familiar with. The drive to name new species of orchids after aristocratic European families propelled ambitious plant hunters into the Amazon.

Taxonomic Names

Each animal and plant has its own scientific name that is instantly recognized by naturalists in the United States, Europe, or anywhere else in the world. This binomial (bi- meaning "two", -nomen meaning "name") system of taxonomy dates back to the 1750s, when Swedish naturalist Carl von Linne (Latinized to Carolus Linneus) adopted Latin, the scholarly language of the day, to describe organisms.

Each organism is assigned a genus name (which is capitalized) and a species name (in lower case). Both names are usually italicized. By translating the Latin roots that make up the taxonomic name, students may deduce the characteristics of an organism or something about its origin or habits. For example, the humpback whale's scientific name is *Megaptera novaeangliae*, which translates to "big-winged New Englander."



Art © Andrea Rich

Activity A: Name a Schoolyard Species

Names have the power to elicit different reactions. The following exercise allows students to develop names and to ponder the effect names have on preservation efforts.

1. List as many methods of naming species as you can find mentioned in "Name that Species."
2. On the school grounds, choose and briefly observe a creature or plant. Quickly write a short description of the species and/or draw a rough sketch of it.
3. Imagine that you are the "official discoverer" of the species. Carl von Linne's system for naming living creatures involved combining Latin roots to form a taxonomic name. Using the Latin roots on page 18, create a binomial for your discovery. The first part of the binomial will be a name you fabricate for the genus. It will end with the suffix *-ia*. The second part will be a name you fabricate for the species.
4. Choose four of the naming methods you listed in question 1. Create four more possible names for the creature or plant using those methods.
5. Once you have compiled a list of five possible names for your species, present the names to several fellow students. Can they guess the schoolyard species you chose to name?
6. If possible, use a field guide to find the true taxonomic name of the species you chose. Can you translate any of the Latin roots used in its official name?
7. There are approximately 1800 species threatened with extinction. For many of these species, the name may be all most people will ever know about them. Ask your fellow students which of the names you created for your schoolyard species would prompt general interest in the species' survival, if the name was all people knew of it. Which of the names would be easy to dismiss or ridicule?



8. After collecting feedback from your classmates, write a paragraph specifying which name you would choose for your species if it was threatened with extinction. Based upon the responses you received, explain the effect you think the name would have on people unfamiliar with the insect, animal, or plant.
9. Skim a list of endangered species.
(<http://endangered.fws.gov/wildlife.html#Species>)
Choose one from the list that you believe possesses a name that would fail to interest the general population in protecting it. Find out as much as you can about the species.

Sampling of Latin Roots

Blue	<i>cyan</i>	Wings	<i>pter</i>
Black	<i>ater</i>	Big	<i>grandi</i>
Brown	<i>brun</i>	Creeping	<i>rep</i>
Gold	<i>aure</i>	Climbing	<i>scand</i>
Green	<i>virid, chlor</i>	Crazy	<i>mania</i>
Grey	<i>poli</i>	Curled	<i>crisp</i>
Orange	<i>aurant</i>	Drooping	<i>pendul</i>
Purple	<i>phoeni</i>	Dull	<i>typh</i>
Red	<i>ruf, rubr, rut</i>	Elegant	<i>elegans</i>
Silver	<i>arg</i>	Hairy	<i>cili</i>
White	<i>alb, cana</i>	Hidden	<i>crypt</i>
Yellow	<i>xanth</i>	Hump	<i>cypho</i>
		Little	<i>phyte</i>
Beak	<i>rostr</i>	Pretty	<i>bel</i>
Berries	<i>bacc</i>	Rough	<i>trachy</i>
Body	<i>corpus</i>	Sharp	<i>acri</i>
Arm	<i>brach</i>	Shiny	<i>fulg</i>
Claw	<i>ung</i>	Short	<i>brevi</i>
Eye	<i>ocul</i>	Slender	<i>lept</i>
Feet	<i>ped</i>	Small	<i>pygm, parvi</i>
Finger	<i>digit</i>	Smooth	<i>laevi</i>
Feather	<i>plum</i>	Spiral	<i>spir</i>
Fruit	<i>drup, carp</i>	Spotted	<i>maculos</i>
Hair	<i>capill</i>	Stupid	<i>brutus</i>
Head	<i>capit</i>	Tall	<i>elat, altus</i>
Leaf	<i>phyl</i>	Thick	<i>crass, dasy</i>
Leg	<i>gamba</i>	Twisted	<i>contort</i>
Mouth	<i>stom</i>	Ugly	<i>turp</i>
Nose	<i>rhync, nas</i>	Wide	<i>platy</i>
Roots	<i>rhiz</i>		
Seed	<i>cocc, sperm</i>	SUFFIXES:	
Skin/bark	<i>derm, cort</i>	<i>-phila</i> = loving	
Stalk	<i>pes</i>	<i>-olens</i> = smelling of...	
Stomach	<i>gast</i>	<i>-aticus</i> = refers to place	
Stem/trunk	<i>caul</i>	<i>-opsis, -otus</i> = resembling	
Tail	<i>caud, ur</i>	<i>-ascens, -icens</i> = becoming	
Tooth	<i>dent</i>	<i>-ij, -i, -e</i> = follows a proper noun	
Tongue	<i>ling</i>		
Thorns	<i>acanth</i>		
Horn	<i>corn</i>		
Voice	<i>vox, voc</i>		

Additional information on Latin roots:

<http://garden-gate.prairienet.org/botrts.htm#top>)

<http://cawley.archives.nd.edu/cgi-bin/lookdown.pl>.

The Furbish lousewort

an endangered plant in the snapdragon family, was used to block construction of a hydroelectric project in New England. The plant's name lent itself to ridicule. It was not a particularly large and showy plant, so it was often described as a weed. The snail darter was consigned to extinction when the Carter administration approved the Tellico dam in Tennessee. The name was not helpful; was it a fish or a snail? There are several endangered species of Kangaroo rats in California. A few years ago, a farmer in the San Joaquin Valley was charged with "unauthorized take" of Tipton kangaroo rats and destruction of their habitat. Some politicians rushed to the farmer's defense, proclaiming that the Endangered Species Act was intended to protect eagles and wolves, not rats. The farmer got off with a slap on the wrist. Kangaroo rats are not even closely related to brown and black rats, but to some folks, a rat is a rat.

—JOE EATON

Activity B: Field Guide Versus Journal

We tend to turn to field guides when we want to identify and learn more about a species. But does the information given offer much insight into the life of the creature? Students will write and compare two field guide entries and two journal entries.

1. Study the field guide entry for the Steelhead Trout on page 19. Create a field guide entry for a fictitious creature. Give it a common name and a Latin name. Make sure that the imaginary species' identification characteristics relate in some way to its habitat and nourishment habits. Use the headings Identification, Range, Habitat, Remarks, and Similar Species.
2. Make a field guide entry for yourself. Give yourself a new common name, and a new taxonomic name using Latin roots. Use the same headings as before.
3. Review the two field guide entries you've made. How accurately does the second one capture your life, who you are? Write a journal entry to accompany your field guide entry, attempting to explain the complexity and wholeness of your life better than the field guide entry did.
4. Write a second journal entry from the perspective of the fictitious creature you created.

Extra credit essay topic:

The author of "Name that Species" speaks of the recurring theme in literary fantasy that deals with the POWER OF NAMES. The same theme resurfaces in folktales (Rumpelstiltskin, Manawee) and creation stories (Genesis, the Sumerian Enuma Elish, the Mayan Popul Vuh) from around the world. Compare two different folktales, creation stories, or works from the fantasy genre that illustrate the power that naming bestows or the power that knowing a person or thing's true name bestows.



Journal Entry

Southern Steelhead In my own words...

“I’ve been lucky. I ate some of my brothers and sisters before they ate me. I was born in a side canyon of the Ventura River, where there were plenty of wormy, wiggly things to eat. The water smelled wonderful, like algae and tadpoles. Only sometimes, on weekends, it smelled like sunscreen from those fools who thrash around up above the falls. Spring came and tadpoles didn’t seem like reason enough to stay. My remaining sisters and I started turning silver. We quit fighting the current and let the last rainstorm take us down to where the water feels itchy and salty, until my kidneys and gills and skin changed and I got used to it. There was no bottom there, and nothing to do but eat! We ate everything, especially squid, and outswam everything that chased us!

That winter, in the salty water, there was a terrific, miles-long cloud of stench and brown muck. Sewage, motor oil, detergent, dog poop, fertilizer, bug spray—things we’d barely tasted on our way down the river, past the trailer park and the strawberry fields—now made the water stink so bad we went far from shore to get away from it. I doubted we’d ever get back home, but I grew so big I didn’t care.

Finding a place to lay eggs was heavy on my mind. My whole body turned into an egg factory. I lost my appetite. I wandered for miles and miles along the beaches, sniffing the muddy, greasy outfalls here and there. I could feel the salt water getting too warm to be comfortable. But then I caught a smell that told me somewhere, up the current, there was a cool, sandy pool. We bore upstream until we found our paradise, a gravelly pool, just big enough, under the shade of a boulder. I chased the carp and bluegills out of my new territory, and along with some guys I met, we fertilized and buried hundreds of eggs.

Later, my appetite surged, and I was thinking about the ocean again. There’s really not much in fresh water to eat: someone’s unburied egg rolling along or a little shred of rotten meat... When a big orange chunk of protein swept by, I grabbed it. A pain shot through my mouth and I was drawn forward into dry air. It burned my gills. I found myself handled by a great, strange-smelling creature that turned me this way and that under the too-bright sun. There was a yank at my mouth and I spun back into the water, bleeding. I’m going back to the surf, where I can eat and eat and not be eaten!”

Sources:

Watson, Rupert, *Salmon, Trout, and Charr of the World: A Fisherman’s Natural History*. Shrewsbury, England: Swan Hill Press, 1999.
 Page, Lawrence M., and Brooks M. Burr, *A Field Guide to Freshwater Fishes: North America, North of Mexico*. Boston: Houghton Mifflin Co, 1991.
 Rodgers, Terry, “Fish Find Has Experts Hoping ...” *San Diego Union-Tribune*, March 10, 1999, p. A-1.

Field Guide Entry



Oncorhynchus mykiss [irideus], southern California population; **Southern Steelhead**. (*Oncorhynchus* means “hooked snout”; *mykiss* is the Kamchatkan name for the steelhead; *irideus* refers to a rainbow).

Related to other trout, and to salmon (genus *Salmonidae*). Steelhead (rainbow trout who migrate from fresh water to the ocean and back) are found from Alaska to California and in the Kamchatka Peninsula of Russia; southern steelhead, a genetically distinct population adapted to warmer waters, are rare and federally endangered, with perhaps 500 left in California south of San Luis Obispo. Southern steelhead were thought extinct from the Los Angeles area south, until 1999 when one was caught in San Mateo Creek on a bait of Kraft cheese.

Identification: Small, irregular black spots on back and most fins. Pink to red stripe on side (except in sea-run form). Distinct radiating rows of black spots on tail fin. Often black edge on adipose fin. Upper jaw reaches barely behind eye in young and female, well behind eye in large male. Highly variable: steel-blue, yellow-green, or brown above; silver to pale yellow-green below. Stream and spawning fish have intense dark colors; lake fish are light and silvery. Young has 5-10 widely spaced, short, dark, oval parr marks. Usually 115-130 lateral scales; 8-12 anal rays. No teeth on floor of mouth between gill arches. Grows to 45 inches.

Range: Native to Pacific Slope from Kuskokwim River, Alaska, to Rio Santo Domingo, Baja California; upper Mackenzie River drainage (Arctic Basin); endorheic basins of southern Oregon.

Habitat: Cold headwaters, creeks, and small to large rivers, lakes. Swims up coastal streams to spawn.

Remarks: One of the most important game fishes in North America. Unlike salmon, Steelhead survive spawning, and may spawn more than once. Fish migrating to ocean turn bluish-silver in color.

Similar Species: Golden Trout, Cutthroat Trout

