ARBOLEDA

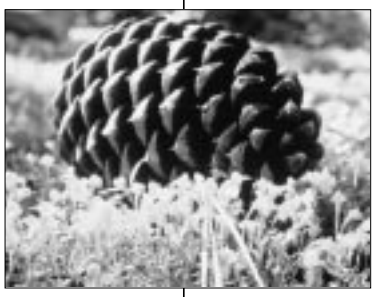
Volume 1, Issue 1 *The Forest Foundation Newsletter for Educators* *Summer/Fall 2000*

Free Publications Available

- **A Walk in the Woods Activity Book**
  Adaptable K-6
- **Un Paseo por el Bosque**
  Spanish version of **A Walk in the Woods**
- **Forests Forever Environmental Education Unit**
  Adaptable K-6
- **Video Lending Library Catalog**
- **Forest Resources Fact and Activity Sheet**
  Adaptable K-Adult
- **We Care for the Forest**
  Adaptable 7-Adult
- **A Lot of What We Do is for the Birds**
  Poster
- **It Doesn't Take Rocket Science**
  Poster
- **California Conifers**
  Bookmarks: 6

UNDER THE CANOPY

What has sprouted this summer? We have! Welcome to the first edition of ***Arboleda***, The Forest Foundation's newsletter for educators. The name ***Arboleda*** means "woodlands." It refers not only to our rich Spanish heritage, but also to California's prized natural resource, trees—37% of all land in California is in public or private forest land. More than 8 million acres of those forests are set aside for parks, wildlife habitat, and botanical and wilderness areas.



In each of our issues, you will find updates on the latest materials from The Forest Foundation, a calendar of forest education-related events and lesson plans with corresponding hands-on activities. Each mini-lesson is created to be not just informative, but user-friendly and entertaining, as well.

We hope you will take the opportunity to browse through the list of resource support programs found on the back page. And don't forget to visit our web site. There you will find a variety of forest-related articles and free educational materials you can order or download and print. You can also link to other forest education sites around the globe. Come follow our trail!

Susana Taylor, Editor

Did you Know?

- Each person needs about 365 pounds of oxygen a year to breathe. Most of that oxygen is produced by trees.
- An acre of young trees can consume almost 6,000 pounds of carbon dioxide and produce over 4,000 pounds of oxygen per year!
- As trees stop growing, they begin to consume oxygen instead of exude it.
- There are about 200,000 leaves on a healthy 100-foot tree. These take up about 11,000 gallons of water from the soil and breathe it into the air - enough air conditioning for 12 rooms.

In this issue:

Arboleda is a publication of
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www.calforests.org/foundation

Crazy-Clay Candleholders: mini-lesson for "seedlings" (primary grades)

Adapted from ***Fantastic Forest Fun: Learning Centers in Forest Education*** - The Forest Foundation

Objectives

1. To understand and appreciate the value of our natural resources
2. To understand that fire is a natural part of California's ecosystem
3. To understand that fire has been both a help and a threat to mankind since prehistoric times
4. To understand that management for forest health and productivity depends on fire, or the mimicking of its patterns, for clearing areas and for creating openings in the forest
5. To understand that certain species of trees depend on fire to germinate succesfully

Skills

1. Natural / physical science
2. Ecology
3. Art
4. Social studies
5. Association
6. Math
7. Language arts

Procedure

1. Mix up batches of "clay" as needed. The mix should be on the dry side, but not crumbly. It should feel like a soft, bread-type dough.
2. The finished product should NOT be baked. Air drying works well. The candleholders dry quickly.
3. Have the students take a lump of "clay" and roll it in their hands to form a ball, the size of a plum, approximately 2 inches across.
4. Pat it down on a paper plate (or a piece of cardboard, if preferred) to finish shaping. It is possible to crimp the edges with gentle thumb prints, or by using the tines of a plastic fork. Be careful not to press all the way down.
5. Place a candle firmly in the center of the candleholder, but not all the way through.
6. Decorations may be added as if the candleholder were a cookie. Clear nail polish may be applied to the top and sides, sparingly and gently, and then sprinkled with glitter.
7. Option: For added sparkle, before preparing and molding the crazy soap clay, roll the candle briskly between the palms to warm and soften the wax a bit. Roll the candle back and forth onto a plate of glitter, putting light pressure so that the glitter will embed itself into the wax.
8. The outside clay will become firm rather quickly, but the inside takes longer to set up.
9. Keep the candle in the holder while "clay" is drying.
10. Use a spatula to remove the candleholder from the plate when dry.
11. When completely dry, put into a box or decorated bag along with the candle.
12. Clean-up is a breeze!
13. This project is also good for units on recycling. The candleholder may be recycled to help do the laundry.

"Humans learn about environments by realizing patterns within them."

Science Framework for California Public Schools

Materials: for making 8 candleholders

- 4 cups white powdered laundry detergent (Non-phosphate brands do not work well. Avoid products that have bleach or harsh ingredients.)
- 1/2 to 2/3 of a cup of water, depending on the type of detergent used
- A large bowl, wooden spoon, and measuring cup
- Food coloring for working into the detergent, a few drops at a time
- Cake decorating sprinkles and beads, tube frosting with nozzles. (Note: Decorating gel does not work well.)
- Glitter and shiny confetti
- Clear nail polish to use as glue for glitter
- Candles - short utility ones work well
- White paper plates
- Sponges for clean-up
- Hand cream to soften very clean hands!

Vocabulary

Wildfire: a fire that burns out of control
Prescribed burn: a controlled and supervised fire set under safe conditions to protect forest health and to reduce the chance of wildfire
Crown or canopy fire: a fire that moves along the tops (canopies) of the trees
Surface fire: a fire that burns along the ground
Soil fire: a fire that burns beneath the surface of the soil
Ecology: the study of how plants and animals interact with their environments
Ecosystem: a biological community together with its surrounding air, soil, and water.
Fire intensity: how hot a fire is—it can burn cool, moderate, or hot
Closed-cone conifers: evergreens, like the Bishop pine or Jack pine, that have seed cones that need the heat of a fire to open their tightly closed scales and release their seeds

"Science is an active enterprise, made so by our human capacity to think."

Science Framework for California Public Schools

Focus

1. Establish the concept of ecosystems by having students think of various communities:
- our planet
- our state
- our neighborhood
- our classroom
- our families

2. Expand the concept by asking students to name some ecological communities:
- a forest
- a stream
- a fallen log
- our bodies

3. Ask students to think of the members of those communities:
- a forest: trees, shrubs, wildlife, insects, people, fungi
- a stream: fish, insects, plants, wildlife
- a fallen log: fungi, moss, insects, bacteria
- our bodies: bacteria, mites, viruses.

4. Establish the concept of the interdependence of members of a community. Ask the students if they have played marbles or billiards: What happens when one ball hits another?

5. Establish man's interaction with fire by asking students what harm fire can do:
- harm human property and destroy animal habitat
- harm wildlife and humans
- leave soils vulnerable to erosion

6. What good can fire do?
- provide light and warmth
- open areas for planting
- clear underbrush to protect against future wildfire
- help some seeds to germinate
- thin small trees and shrubs to keep the forest healthy and productive

7. Relate Native American clearing and burning of the forest to the interdependence of members in an ecosystem
- provided wood for daily needs
- opened areas for crops
- made hunting easier
- protected against sudden approach of enemies
- kept the forest healthy

Additional Resources:

Learning to Live With Fire
California Department of Forestry and Fire Protection

Forests Forever: *Forest Health*
The Forest Foundation

A Walk in the Woods Activity Book
The Forest Foundation

PLT Environmental Education Activity Guide: *Living With Fire*
Project Learning Tree

Stories California Indians Told: *How Animals Brought Fire to Man*
Anne B. Fisher

Video Lending Library Catalog: *Two Sides of Fire*
The Forest Foundation

Waste Not - Want Not: *mini-lesson for "saplings" (grades 4-8)*

Adapted from ***Forests Forever: An Environmental Education Unit*** - The Forest Foundation

Objectives

1. To understand and appreciate the value of our natural resources
2. To understand the value of responsible choices for protecting our natural resources
3. To understand the stresses that a large population places on natural resources
4. To understand that wood is a renewable, recyclable, energy efficient, and biodegradable resource
5. To understand that wise use of wood lessens the stresses on our non-renewable resources
6. To understand that responsible choices include the 5 R's:

- ***renew*** our forests through reforestation
- ***recycle*** when possible
- ***reuse*** when possible
- ***reduce*** waste
- ***refuse*** to buy items that are made from non-renewable resources, or are not biodegradable, whenever practical

Skills

1. Consumer awareness
2. Ecology
3. Natural science
4. Physical science
5. Social science
6. Association
7. Math
8. Language arts
9. Art

Procedure

1. Tear 1 or 2 pages of newspaper into small pieces of about an inch or less.
2. Put the paper "chips" into a large bowl and add 3 cups of water.
3. Keep adding paper, tearing it and squeezing it, until mixture looks like thick oatmeal.
4. Turn pan upside down on the table (or use the mesh frame) and place about 1 cup of the thoroughly mixed pulp over the bottom of the pan (or onto the frame).
5. Spread the pulp evenly across the surface.
6. Lay several sheets of newspaper over the pulp, leaving one side of the newspapers open.
7. Carefully turn the pan or wire frame over. Your pulp "sheet" should now be on one side of the newspaper.
8. Close the open side of the newspaper over the pulp.
9. With a rolling pin or the equivalent, roll over the covered pulp to blot out excess moisture, adding more layers of newspaper, as needed.
10. Uncover the blotted "sheet" and let dry completely.
11. When dry, peel the recycled paper away from the newspaper.
12. Decorate with chosen design or trim.
13. Punch holes on top or side of what will be the cover of the notepad.
14. Attach with ribbon to lined paper and cardboard or a construction paper back to form the completed notepad.

"We have the responsibility of confronting students with some of the political and social issues that require an understanding of science."

Science Framework for California Public Schools

Materials:

Making recycled paper for a recordkeeping notepad

- a large, rectangular pan, or wire mesh, stretched and stapled to a wooden frame
- a large bowl
- water
- abundant newspaper, not colored
- rolling pin, glass beverage bottle, sturdy plastic pipe, tube, or cylinder for rolling out the paper pulp
- a hole punch
- used acetate ribbon
- used photograph, greeting card, or pieces of use gift wrap paper to decorate the finished sheet of recycled paper
- crayons, broad markers, glitter, pens
- lined paper for notepad
- cardboard or construction paper for the back of the pad

Vocabulary

Renewable: having the ability to replenish itself
Recyclable: being able to be utilized again, usually for making something else
Reuseable: being able to be used again, sometimes as something else, without remanufacturing it
Biodegradable: being able to be broken down or decomposed by natural means
Natural resouces: things we use that come from the earth
Landfills: places in our communities where garbage is unloaded, covered over with dirt, and packed down
Decay: the coming apart or rotting of organic materials
Decompose: to decay or come apart
Organic: material made of carbon; made of living matter
Compost: a collection of organic scraps and garbage that decays and becomes good fertilizer for the soil
Economy: the way society manages its resources

"Respect for nature develops from understanding of how nature works."

Science Framework for California Public Schools

Focus

1. Establish the concept of interdependence of all members of an ecological community.
- What affects one member affects the rest of the community.
- Establish the concept of conservation.
- Human beings affect the environment through the choices they make.
- Ecosystems contain air, water, soil and the life forms that depend on these for survival.

2. Establish the concept of consumer responsibility.
- Our choices in the consumption of resources have consequences.
- Choosing renewable resources when available and balancing consumer needs with respect for the environment are examples of consumer responsibility.

3. Establish concepts in economics.
- Society takes natural resources (raw materials) and converts them into useful products
- The economic means (money that runs our economy) come from the processes of getting these resources, converting them into usable goods, selling them to distributors, selling them to consumers, and then disposing of them.
- Our choices help determine how those natural resources are maintained.

4. Establish the concept of sustainability.
- supporting renewability
- supporting informed choices
- supporting balance of our economic and environmental needs

5. Establish the concept of the 5 R's by having students record and analyze consumer choices in their homes. Younger students may work more easily with parents or older siblings. Have them choose 5 different types of items in their home. Using the recycled paper note pads, have students record the following data for each of their consumer choices:
- How was it made?
- What resources were used in making it?
- What kind of energy was used to get the raw materials?
- What kind of energy was used to make it?
- Is it recyclable? biodegradable? reusable?
- Were the raw materials renewable?
- How much did it cost to produce? How much will it cost to dispose of?
- How and where will it be disposed of?

6. Discuss in terms of future choices.

Additional Resources:

Forests Forever: An Environmental Education Unit: ***Waste Not-Want Not***
The Forest Foundation

Video Lending Library Catalog: ***Miracle Resource***
The Forest Foundation

Video Lending Library Catalog: ***Choices***
The Forest Foundation

Where the Sidewalk Ends:
Hector the Collector
Sarah Sylvia Cynthia Stout
Shel Silverstein

In the Eye of the Beholder: *lesson for "palos altos" (grades 9-12)*

Adapted from ***Sempervirens: An Environmental Education Unit*** - The Forest Foundation

"Science is based on observations set in a testable framework of ideas"

Science Framework for California Public Schools

Objectives

1. To understand that diversity exists in the natural world
2. To understand that diversity arises from the interface of evolutionary forces and environmental conditions
3. To understand that no California forest is homogeneous throughout
4. To understand that forests are managed for a variety of purposes
5. To understand some of the conceptual issues in forest description and forest management
6 . To extract, describe, quantify, and interpret information from an aerial photograph of a segment of forest
7. To understand the concept of "fragmentation" and how it can affect wildlife and fire
9. To speculate on how stands could be managed to reduce fragmentation

Skills

1. Natural science
2. Ecology
3. Silviculture
4. Math
5. Logic
6. Geography
7. Association
8. Social studies

Procedure: working in pairs

1. Look carefully through a magnifying lense at a picture of the aerial photograph provided.
2. Identify the areas that appear homogeneous.
3. With a pencil, outline those discrete areas to make them easier to trace.
4. Trace the boundaries of these areas onto tracing paper.
5. Study all the discrete areas that have been traced and determine which are forest stands.
6. Examine each forest stand to see how close to each other the trees are in each stand. (This is canopy closure: open, moderate, or dense).
7. Look at the circles (the trees) found in each stand. Determine whether the stand is dominated by small, medium, or large trees. The widths of the tree crowns visible in the photo are directly related to the diameters of the stems or trunks.
8. Estimate the total percent of forest cover by:
   - cutting out each forest stand area identified,
   - weighing **all** the combined forest and non-forest pieces, and recording the total weight,
   - weighing the combined forest stand pieces alone and recording that weight,
   - dividing the combined forest weight by the total weight of all the identified pieces.

Additional Resources Materials:

These web sites are helpful in providing additional background information and enrichment.

- 149.170.199.144/new_gis/data/photoint.htm
- www.cof.orst.edu/cof/teach/for220/slides
- www.fs.fed.us/eng/remsense/aerialphoto.htm
- www.bcnet.org/learning/african/masart.htm
- terraserver.microsoft.com/digitalbackyard/aerial.html
- www.fs.fed.us/rm/ftcol/rwu4804/farm2.htm

- tracing paper
- pencil
- magnifying lense
- laboratory balance
- scissors
- ruler
- aerial photo
- paper for calculations and notes

9. Estimate the forest's structure by taking the cut pieces of forest stand and sorting them into 9 groups, as identified in the grid below. These represent stand types. They show canopy cover (low, medium, high) and tree size (small, medium, large).
10. Estimate the fragmentation of the forest by drawing a line around the boundaries of the stands with moderate and dense canopies and then measuring it.
11. Based on the findings for forest cover, forest types, and fragmentation:

- How variable are the estimates among students?
- How do you think variability in description affects decisions made about forest management?
- How might a wildfire affect fragmentation?
- Some wildlife, like owls, need open areas to hunt. Some animals need dense forest to nest. How does fragmentation affect wildlife management?

Vocabulary

Species composition: the sum of the species living in an area
Structure: the combination of canopy closure, tree size, and other forest attributes
Topography: elevation portrait of a given landscape
Forest stand: an area of relatively homogeneous forest
Canopy closure: the percent to which tree foliage blocks the view of the ground when looking down (or the percent the foliage blocks the view of the sky when looking up)
Tree crowns: the canopies or tops of trees
Fragmentation: how patchy the forest is
Spatial information: any data dealing with how things are laid out in space
Geographic information systems: the computer software used to describe and analyze data regarding spatial information
Ecology: the study of how plants and animals interact with their environments
Habitat: the niche or home of an animal or plant

Focus

1. No California forest is homogeneous throughout. The state's forests consist of a mosaic of stands that differ in species composition, age, and structure.
2. The causes of this patchwork structure are varied. Most important is variation in topography and soils, followed by fire and human disturbance.
3. These forests are managed for a variety of purposes, recreation, wildlife habitat, watershed protection, timber production, wildfire control.
4. Interpretation of aerial photographs is a standard technique of forestry. It allows a forester to make informed decisions on forest management issues, such as thinning.

"Diversity is the concept that represents the panoramic variability in the natural world."

Science Framework for California

CANOPY CLOSURE

TREE SIZE

	Low	Medium	High
Small			
Medium			
Large			

- For **each** of the 9 segregated groups of classified tree stands, divide the weight of the group by the previously identified total weight of all the forest stands.
- You now have a fraction that represents the proportion that stand type forms of the total forest.
- Enter these fractions into the proper cells in the table.

A Walk in the Woods Exhibit: A Voyage of Joyous Exploration

If you have ever hiked in the woods, you know the beauty of California's forests. Now you can share the experience with your students and help them to discover the magic of Mother Nature's renewable resource—trees.

The Forest Foundation invites you and your students to take "A Walk in the Woods" and become explorers in this imaginary forest. Take a tour at one of its many venues. As you stop at each "forest grove," you'll discover something special about California's forests, the trees that grow there, the animals that live in their shelter, and the stewards who work to insure that our forests remain both protected and productive.

"The American poet Walt Whitman characterized science as a limitless voyage of joyous exploration."

Science Framework for California Public Schools

These interactive displays will capture your students' imaginations. They will learn about:

- Natural forest cycles
- Insects, fire and disease
- Forest health
- Wildlife habitat
- Forest management
- Forest products

To arrange for a free, hosted tour contact:

The Forest Foundation
1-877-REPLANT
fax 530-823-1850
cfpc@calforests.org/
foundation

A Walk in the Woods Year 2000 Venues

April:
Turtle Bay Museum
800 Auditorium Dr.
Redding, CA 96001
Contact: Linda Ragsdale
530-242-3132
May:
Bayshore Mall
3300 Broadway
Eureka, CA 95501
Contact: Sue Swanson
707- 444-3855
August 13 - September 20:
Santa Maria Town Center
142 Town Center East
Santa Maria, CA 93454
Contact: Charlotte Jones
805-687-8800
October: (Tentative)
Los Angeles
Children's Museum
310 North Main
Los Angeles, CA 90012
Contact: Candace Burret
213-687-8800

Partners in Agricultural Learning

Additional forest education information may be obtained by contacting these Forest Foundation PALs:

California Foundation for Agriculture in the Classroom
www.cfaitc.org

Forest Institute for Teachers
www.norcalsaf.org

Project Learning Tree
www.plt.org

Society of American Foresters
1-800-738-TREE

Talk About Trees
jnkbramhall@snowcrest.net

Educational Outreach

The Forest Foundation regularly exhibits at major education conferences throughout the state. Visitors to the Foundation's booth receive free materials, curriculum and lesson plan counseling, and a live seedling to take back to the classroom. In many cases, forest education presentations and hands-on workshops are offered, providing additonal free materials and lesson plans to workshop attendees. Look for us in your conference programs.

Education Calendar
Fall 2000

CA Science Teachers Assoc.
Oct. 12-15, Sacramento

CA League of High Schools
Nov. 10-12, Universal City

CA School Librarians Assoc.
Nov. 15-18, Santa Clara