



LESSON PLANS from the IFPC Sustainable Forestry Tour

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The lessons can be accessed at the

SFT Google Site: <https://sites.google.com/site/sustainableforestrytour/>

and at the Idaho Forest Products Commission SFT webpage:

<http://www.idahoforests.org/tour.htm>



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MANAGED FORESTS ARE RENEWABLE & SUSTAINABLE

MANAGED FOREST SUCCESSION ACTIVITY

Objective: After this activity, students will be able to describe how ponderosa pine forests are affected by sunlight, pre-commercial thinning and commercial thinning.

	ACTIVITY INSTRUCTIONS	BACKGROUND INFORMATION FOR INSTRUCTOR
Scenario	Students will represent the replanting of a ponderosa pine forest. Forest managers determined that the best way to help this forest was to harvest all the trees (clearcut) and replant. The trees have been harvested and it is time to plant the new trees.	Forest managers determined that this ponderosa pine forest had been without fire or harvest for so long that it was totally overgrown with grand fir trees that were now dying from root rot. To restore the area to a ponderosa pine forest, clearcutting to salvage the remaining trees was determined to be the best harvest method, followed by replanting the area with ponderosa pine seedlings, and then managing it to maintain the forest's health.
Round 1: planting	Instruct students to sit on the floor. Explain that each student represents a ponderosa pine seedling. Their goal is to capture sunlight and grow.	Ponderosa pines are shade intolerant – they like direct sunlight and don't grow well in the shade. When first planted, the seedlings will all begin to grow because there is plenty of sunlight.
Round 2: 10 years growth	<ul style="list-style-type: none"> • Have students close their eyes • On the count of 3, students will hold up either 1, 2 or 3 fingers • Students who chose 3 may "grow" by getting onto their knees • Students who chose 1 or 2 do not grow and remain seated 	Some trees will grow more quickly than others.
Round 3: 20 years growth	<ul style="list-style-type: none"> • Students close eyes • On the count of 3, students will hold up either 1, 2 or 3 fingers • Students who chose 1 may "grow" to the next level (kneeling students stand; sitting students kneel) • Students who chose 2 or 3 do not grow. 	

<p>Round 4: 30 years growth</p>	<ul style="list-style-type: none"> • Students close eyes • On the count of 3, students will hold up either 1, 2 or 3 fingers • Sitting students will not grow because they don't get enough light. They remain seated. • Kneeling/standing Students who chose 3 may "grow" to the next level (kneeling students stand; standing students raise their arms up high) • Students who chose 1 or 2 do not grow and remain seated 	<p>Ponderosa pines growing in the shade will not grow well and remain small.</p>
<p>Pre-commercial Thinning</p>	<ul style="list-style-type: none"> • Students who are still sitting are thinned – removed from the forest. Have them stand and move off to the side. 	<p>Healthy ponderosa pine forests must be thinned. In nature, these forests are thinned by periodic, naturally occurring forest fires that burn through a forest quickly, clearing the understory. In a managed forest, foresters use pre-commercial thinning – the process of removing small, unhealthy, unproductive, and overcrowded trees to allow room for remaining trees and understory plants to grow.</p>
<p>Round 5: 40 years growth</p>	<ul style="list-style-type: none"> • Remaining students close eyes • On the count of 3, remaining students will hold up either 1, 2 or 3 fingers • Students who chose 1 or 2 may "grow" to the next level (kneeling students stand; standing students raise hands high). • Students who chose 3 do not grow. 	<p>Growth continues in the thinned forest.</p>
<p>Round 6: 50 years growth Commercial Thinning</p>	<ul style="list-style-type: none"> • Eliminated students standing to the side are now "loggers." Each will "selectively harvest" one tree from the forest. Instruct them each to enter the forest and remove one tree. 	<p>As the forest matures, tree harvesting provides timber while thinning the forest to allow space for new growth and habitat.</p>
<p>Round 7: 60 years growth</p>	<ul style="list-style-type: none"> • Instruct eliminated students to seat themselves on the forest floor to represent new trees. 	<p>When forests are selectively logged in commercial thinning, the remaining trees drop seeds as the forest replants itself.</p>

MANAGED FORESTS ARE RESILIENT

MATCHSTICK FORESTS

Objective: Compare and contrast the way fires move through models of managed/unmanaged forests.

Materials:

- 100 matches
- 2 burning trays (cookie sheets or metal garbage can lids work well)
- Clay, sand or Masonite boards with a grid of holes about 1.5 cm apart.
- 1 nail (if using grid idea)
- spray bottle of water
- fire extinguisher

Setup::

1. Roll out clay or sand on burning trays.
2. If using clay, sprinkle baking soda on the surface to prevent melting during the “forest fire.”
3. Create 2 identical “forests” by standing the matches in two 7 x 7 match grids, with each match about 1.5 cm apart.
 - (One way to do it: Use heavy paper to make or print a grid. Students can place the grid on the substrate and use a nail to punch holes. Remove the grid, and place matches in the holes.)
4. Use a brick or other heat-resistant item to prop the burning tray up so it is at a slight angle, representing a forested hillside.

Activity:

1. Class discussion: What is forest management?
 - a. Forest management utilizes forest resources in a way that is sustainable - ecologically sound, economically viable and socially desirable.
 - b. Forest management uses “tools” such as planting, harvesting and prescribed burning.
2. Demonstration (best done outdoors in a sheltered location):
 - a. Carefully light the bottom edge of “trees” in one of the matchstick forests. (It will likely spread easily through the “crowns” of the trees, burning the entire forest. If it doesn’t, light the bottom row again and gently blow on it to provide a slight breeze.)
 - b. Discuss student observations of the first fire. Explain that this was an unmanaged forest.
 - c. “Manage” the second forest by harvesting some of the timber (removing some of the matches). Light the outside edge of the managed forest and observe the way the fire moves through it. (Thinning the forest should limit the spread of the fire leaving some of the forest unburned. However, if there is a breeze, you may have a different result!)
3. Class discussion: How did “forest management” affect the fire in the second forest? Why?
 - a. Wildfires burn fuel in the forest
 - b. When forests are not managed, fuel builds up over time. A fire in an unmanaged forest does greater damage because there is more fuel available to burn.
 - c. Managed forests have a limited supply of fuel for wildfires. Fires in these forests are usually smaller, fast moving surface fires that do less damage to the forest. (Our

demonstration didn't have any surface fuels. See variations for a way to demonstrate surface fuels.)

4. Variations:

- a. Divide students into small groups.
- b. Provide each group with materials to build their own matchstick forest.
- c. Ask each group to demonstrate a different forest variable in their model (i.e. a thinned forest, shredded paper as extra fuel on forest floor, rain on a fire, etc.)
- d. After testing each group's model, lead a class discussion based on student observations.

Lesson Extensions:

1. Fireworks Curriculum – for middle and high school students, a more extended version of this lab is available along with an entire unit of fire curriculum at <http://www.firelab.org/science-applications/science-synthesis/75-fireworks>. Divide the class into groups and allow each group to make their own matchstick forest, testing variables such as forest slope, forest density, and fuel buildup on forest floor.
2. Project Learning Tree: Environmental Education Activity Guide. #81, *Living with Fire*. – Students investigate the fire triangle, burn different fuel recipes, and play Fire Tag. Secondary Environmental Education Program. *Focus on Forests*, #5 – The Nature of Fire. Students learn about the role of fire in forest ecosystems, examine issues of fire in the wildland-urban interface, and conduct a wildfire safety assessment in their community.
3. Find out what's going on right now by visiting the National Interagency Fire Center's web site www.nifc.gov and the Incident Information System at www.inciweb.org/.

Videos (available on loan from the Idaho Forest Products Commission lending library)

4. Two Sides of Fire (15 min) Examines a fire's "good" and "bad" sides in historic and present day ecosystems.
5. Fire Wars (2 hours) Join the front lines of America's "war on wildfire" in this NOVA production. Much footage of Idaho fires in the summer of 2000. Supporting activities and information online at NOVA website.
6. Wildfire: Feel the Heat (40 min) Discovery Production (was shown at IMAX theaters). Lots of Idaho footage about firefighters and fire ecology.
7. A Working Forest: Its Future with Fire, People and Wildlife Explore how family forest landowners manage to "have it all" – wood products, wildlife habitat, clean air and water, carbon storage, and beauty.
8. WILDFIRE: Preventing Home Ignitions (19 min) The combustion process, survivable space, why some homes survive, how to identify your home's ignition zone.

Source:

Smith, Jane Kapler; McMurray, Nancy E. "FireWorks featuring Ponderosa, Lodgepole, and Whitebark Pine Forests." *Fire, Fuel, and Smoke Science Program*. United States Forest Service, Rocky Mountain Research Station: Missoula Fire Sciences Laboratory. Retrieved February 18, 2012. <http://www.firelab.org/science-applications/science-synthesis/75-fireworks>.

MANAGED FORESTS PROVIDE JOBS

FOREST CAREERS WEBQUEST

Objectives: At the end of this lesson, students will be able to:

- Identify career opportunities in the forest industry
- Identify the wide variety of products dependent upon the forest industry

Equipment/Materials/Facilities:

- Computers with internet access and audio/video viewing capabilities
- Idaho Forest Products Commission website with biographical videos highlighting various careers in the forestry sector.
- Forest Careers Webquest worksheet (optional)

Anticipatory Set (Interest Approach):

- Ask students to list as many careers as they can think of related to the forest
- Have students share their ideas
- Explain that the class is going on a “webquest” to explore forest related careers

Activity: Forest Careers Webquest

- *Option A* – each student will use a computer to watch the forest careers biographical videos and complete the Forest Careers Webquest worksheet.
- *Option B* – if students do not have individual access to a computer, view the forest career videos as a class. Videos could be shown all in one day or one at a time over several days. Consider having the students complete the Forest Careers Webquest worksheet as the class views the videos.
- *Discussion* – After students view the videos, discuss the required education/training, responsibilities, and benefits of each career. Ask students to share their thoughts/feelings about the careers discussed.

Review: Consider having students review the lesson by answering the following prompts:

1. List as many careers as you can think of related to the forest.
2. What products come from the forest?
3. Choose at least 3 forest related careers that sound interesting to you. What type of education/training is required for each one? How do people in these careers work to protect the environment while providing the forest products we use?

Lesson Extensions:

1. *Integrating GPS Technology* –

- a. Load videos onto portable video devices and “hide” the devices at specific points throughout an outdoor area large enough to allow geocaching.
- b. Divide class into small groups. Give each group a GPS unit and a list of coordinates (GPS).
- c. Start each group at a different point in the rotation – they will find the kiosks in order.
- d. When the group finds their kiosk, they should listen to their “guest speaker” by watching the video and filling out the student worksheet.
- e. When students have found the last kiosk, they should bring it with them back to the designated meeting point.
- f. Lead a discussion about the required education/training, responsibilities, and benefits of each career. Ask students to share their thoughts/feelings about the careers discussed.

2. *Integrating Orienteering* –

- a. Follow the GPS lesson extension above, but instead of using GPS, set up a compass orienteering course with the informational kiosks hidden at each checkpoint.

3. *Timber Harvesting Equipment* –

- a. Have students use internet resources to find information about timber harvesting equipment. They should find the purpose, function, cost, weight, operator salary, and required training for each piece of equipment. Some equipment to include in search could be:
 - Feller-buncher
 - Timber harvester/processor
 - Log skidder
 - Log loader
 - Log truck
 - Cable yarder
 - Logging helicopter
 - Chainsaw

NAME _____ DATE _____

TIMBER HARVESTING EQUIPMENT STUDENT SHEET

Use the internet to find information and fill out the following chart ***in detail***.

Equipment	What does it do?	How does it work?	Cost	Weight	Operator Salary	Training Required
Feller-Buncher						
Timber Harvester/Processor						
Log Skidder						
Log Loader						
Log Truck						
Cable Yarder						
Logging Helicopter						
Chainsaw						