Teacher's Guide

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Introduction

Purpose

The **FOREST FEVER** CD-ROM offers educators of all types a teaching tool that:

- is fun and interactive
- provides the student a balanced viewpoint of the profession of forestry and the forest industry
- promotes the practice of sustainable forest management
- emphasizes the career opportunities in forest resources management

Forest Fever is designed to capture the intrigue of middle and high school students. This is accomplished by including topic-specific information, enrichment activities that challenge students to apply science, math, language arts and critical thinking skills, and an exploration into career opportunities in forestry resources.

The *Forest Fever* CD-ROM is hosted by three voices who each represent a specific role in forestry: managing environment, economic, and social objectives. They deliver enlightening descriptions of their forest-related careers and specific examples of the types of challenges and decisions they encounter each day in their work. Finally, they discuss how each of these roles must be considered to establish and maintain a balanced, healthy, and productive forest.

Introduction

CD/Teacher's Guide Features

The *Forest Fever* CD uses video, text, interactive learning episodes, and links to the Internet to facilitate the learning process. Navigation buttons allow the user quick and easy access to the desired section. The user can replay, fast forward, and pause the videos at any time, thus allowing the instructor flexibility to lead a discussion or activity related to a specific section.

INTRODUCTORY MESSAGE

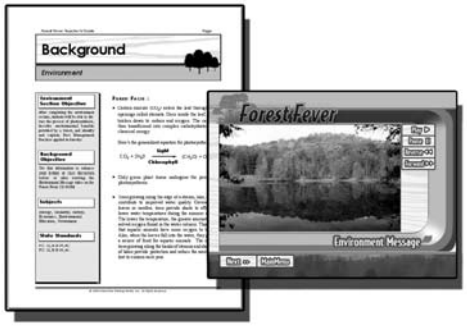
The Introductory Message primes the user with basic information about the practice of sustainable forestry, the benefits of the forest, and outlines the learning objectives set forth for the CD.

ENVIRONMENT, ECONOMIC, AND SOCIAL

These sections provide the user with topic-specific content information related to forestry. In addition to this information, the videos describe the challenges associated with their specific job responsibilities.

MESSAGE

The Background section of this Teacher's Guide has additional information that corresponds with the video message. Background information may be used for class discussion or lecture.



Introduction

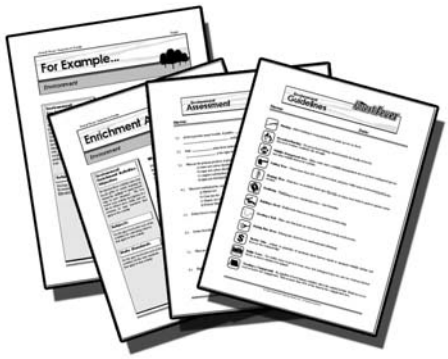
CD/Teacher's Guide Features (continued)

PRESS CONFERENCE

Included in each section is an interactive Press Conference. The virtual press asks several questions to test the user's knowledge. Then the user selects the correct multiple-choice answer. The corresponding Press Conference pages in this Teacher's Guide give the questions, answers, and explanation of each answer to help the teacher with class discussion.

GUIDELINES

Finally, the Environment, Economic, and Social sections each offer Guidelines for different approaches to forest management tools. In the Guidelines section, students will learn about 10 functions performed in forestry, and how each function is different. These Guidelines will help the students manage their own virtual forests later in the lesson plan. Teachers may use the For Example… pages of this Teacher's Guide to provide specific examples or further explanation of the Guidelines in their class discussions. Handouts of the Guidelines for each section are provided in the Additional Resources section of the Teacher's Guide. Enrichment and Assessment Activities are also provided and correlated to state standards.



BALANCE

Students learn here that forest management requires cooperative interaction. The underlying message is this: to reach the desired objectives of a forest landowner, a forest manager must balance the environment, economic, and social objectives.

Introduction

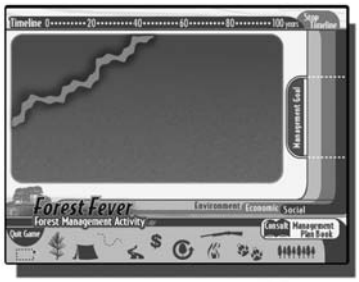
CD/Teacher's Guide Features (continued)

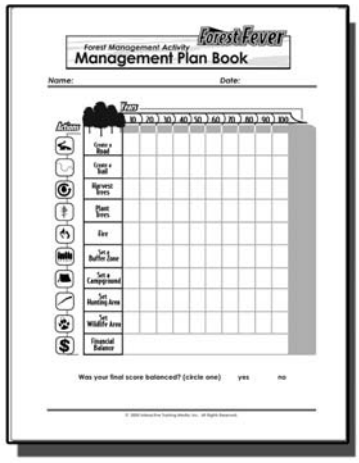
ENVIRONMENTAL CONDITIONS

Next, the CD-ROM describes environmental conditions such as wildfire, disease, and endangered species that are present in the forest, and how they affect the forest ecosystem. These environmental conditions will help the students manage their own virtual forests later in the lesson plan. Teachers may use the For Example… pages of this Teacher's Guide to provide specific examples or further explanation of environmental conditions in their class discussions. Also, a handout of the environmental conditions is provided in the Additional Resources section of the Teacher's Guide.

FOREST MANAGEMENT ACTIVITY

The Forest Management Activity is a forest growth simulation. Students watch a forest grow before their eyes. They are expected to use their newly gained knowledge to manage and grow a forest for 100 years (5 minutes). The user develops an understanding of the complexity of managing a forest while balancing environmental, economic, and social perspectives. The final score is based on successfully balancing environmental, economic, and social objectives. Teachers may use the Forest Management Tool Kit located in the Teacher's Guide to instruct their students on how to use the Forest Management Activity effectively. A student handout of the toolkit is located in Additional Resources. Additionally, Enrichment Activities are provided for and are correlated to your state standards. All scores for the Press Conference Activities and Forest Management Activity are saved to a file on the computer's desktop, along with the student's Login information and the date and time of the disc's use.





Introduction

Presenting Forest Fever in the Classroom

The description below is a recommendation of how to present the *Forest Fever* CD-ROM and accompanying Teacher's Guide materials. The amount of time you spend on each section is at your discretion.

STAGE 1:

- Read the Introduction and CD/Teacher's Guide Features in the Teacher's Guide and install the CD-ROM on your classroom computer. Begin the CD-ROM and **show the Introductory video.**
- From the Main Menu of the CD-ROM, go to the (Environment, Economic, or Social) Section and **show the video.**
- Hold a **class discussion** using the "Background Notes" found in the Message section of this guide.
- Begin the **Press Conference Activity** on the CD-ROM, and solicit answers from the class.
- Hold a **class discussion** using the "Press Conference Questions – Further Explanation" prompts found in the Message section of this guide.
- Pass out copies of the (Environmental, Economic, or Social) **Guidelines student handout**, found in the Additional Resources section of the guide. Begin the Guidelines section of the CD-ROM.
- Use the **"For Example…" talking points** in the Message section of the guide to enhance class discussion, and encourage students to take notes on their handouts.
- **Repeat** this process with the two (2) remaining topics.

STAGE 2:

- From the Main Menu, go to the **Balance Section** and **show the introductory video.**
- Pass out copies of the **Environmental Conditions Guidelines student handout**, found in the Additional Resources section of the guide. Begin the Environmental Conditions Guidelines screen in the Balance Section of the CD-ROM. Use the "For Example…" talking points in the Message section of the guide to enhance class discussion, and encourage students to take notes on their handouts.

Introduction

Presenting Forest Fever in the Classroom

STAGE 2 (CONTINUED) :

- Before you begin the Forest Management Activity, pass out copies of the **Forest Management Tool Kit student handout**, found in the Additional Resources section of the guide. A **teacher's copy** is located in the **Balance Message section** of the guide. Discuss each of the forest management tools with the class before beginning the activity.
- As you **begin the Forest Management Activity**, encourage the students to use both their handouts and the "Management Plan Book" button on the screen to help them make good decisions.
- After completing the activity, discuss the successes and difficulties of the students' forest management plans. **Review the Guidelines handouts and the Management Tool Kit** and discuss ways to improve the plan.

STAGE 3:

- From the Main Menu, click the Exit button and **show the closing video.** Use the student assessment handouts in the Assessment section of the guide to test knowledge.
- Choose several activities from the **Enrichment Activities** section of the guide that correspond to each section of the CD-ROM (Environment, Economic, and Social). Initiate **class participation** activities or use as homework.
- Use the **Careers section** of the guide to **discuss** the areas of interest, organizations, and educational requirements associated with different careers in forestry.
- Use the **website link** from the CD-ROM to **research** more information about forestry topics, or allow students to access the website so that they can research topics of interest themselves.

Introduction

How to Read the Teacher's Guide

This guide is organized so that teachers may quickly understand the objectives, subject areas, and state standards of each page or activity. The "Message" Section incorporates the information presented in the *Forest Fever* CD-ROM into lecture materials. The "Enrichment Activities" Section provides classroom activities from Project Learning Tree curriculum and the corresponding *Forest Fever* sections that relate to the *Forest Fever* materials. The "Assessment" Section contains Assessment opportunities from the Project Learning Tree high school modules. Finally, the "Additional Resources" Section gives the teacher more information about forestry careers, education, and more online resources as well as student handouts for the classroom.

You will find the objectives, subjects, and the state standards listed in the shaded left column of each new section or in the shaded box underneath each Enrichment Activity. This means that you can choose which activities and information will best suit you and your students. Below is a brief description of each heading:

Section Objective :

This area describes the specific educational goal(s) of each of the main menu sections of the *Forest Fever* CD-ROM: Environment, Economic, Social, and Balance. You will find the Section Objective on the first page of each section in Part I: Message of the Teacher's Guide.

Background/Press Conference/ For Example... Objective :

This area describes the intended use for the information or activities listed on that page. This gives you a quick description of how to use the given information in your lesson plan.

Introduction

How to Read the Teacher's Guide (continued)

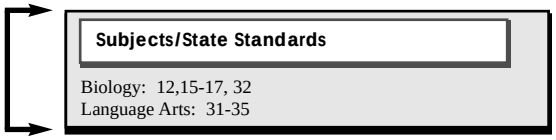
SUBJECTS :

This area lists the specific subject areas covered through information or activities listed on that page. This lets you quickly determine which portions of each section directly apply to your class. The subjects are listed in the shaded left column in Part I: Message and in the shaded box under each activity in Part II: Enrichment Activities.

STATE STANDARDS :

This area lists the state standard correlations to the information or activities listed on the page. The state standards are listed in the shaded left column in Part I: Message and in the shaded box under each activity in Part II: Enrichment Activities.

This is how the **subjects** and **state standards** box is illustrated under each activity in Part II: Enrichment Activities.



This area refers to the pages of recommended Project Learning Tree Activities for either environment, economic, or social sections.

FOREST/RECREATION FACTS :

Found in the Background subsection of the Message section, Forest Facts gives additional educational information that relates to the video in each of the three main *Forest Fever* sections: Environment, Economic, and Social.

TALKING POINTS :

Found in the Background subsection of the Message section, Talking Points provides the teacher with interesting facts or concepts meant to generate class discussion.

Introduction

How to Read the Teacher's Guide (continued)

HISTORY :

Found in the Background subsection of the Message section, History gives the background of some of the important legislative and environmental issues mentioned in the video from each section of *Forest Fever*.

DEFINITIONS :

Found in the Background subsection of the Message section, Definitions are vocabulary terms that are specific to that section and are supplemental to the glossary on the CD-ROM.

SOCIAL APPLICATION :

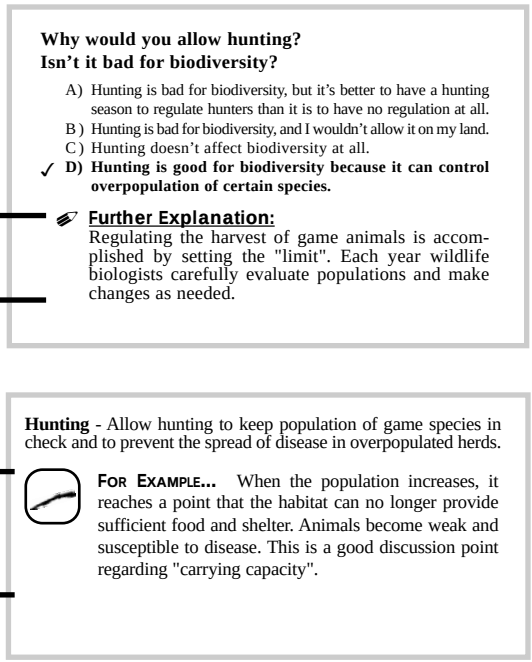
Found in the Background subsection of the Message section, Social Application describes how some of the information given in the videos relates to, or has an influence, on society.

FURTHER EXPLANATION :

Found in the Press Conference subsection of the Message section, Further Explanation gives a more comprehensive description of the correct answer to each of the Press Conference Questions.

FOR EXAMPLE... :

Found in the For Example… subsection of the Message section, For Example… gives additional information or specific scenarios that enhance understanding of the Guidelines for each section of *Forest Fever.*



Introduction

System Requirements/Installation Instructions

SYSTEM REQUIREMENTS :

WINDOWS	MACINTOSH
Win98, Pentium II, 64MB RAM Win2K, Pentium III, 128MB RAM WinXP, Pentium III, 128MB RAM	Classic mode (9.2) Power Mac G3, 9.2, 64 MB RAM OS X 10.1-10.3 Power Mac G3, 128 MB RAM

INSTALLATION INSTRUCTIONS :

PC Platforms

1. Insert the disc into the CD-ROM drive. The installation screen should appear. If the installation program does not run automatically, click the Forest Fever CD-ROM icon and then the file named "install" to start the installation.

2. Progress through the installation screens by clicking "next." The program will ask you to install QuickTime™. This program is required for the CD-ROM to play correctly.

3. When finished with installation, reboot your machine. Select the icon on your desktop labeled MACE Forest Fever or use the program group now installed in your start menu to start the CD-ROM.

Macintosh Platforms

1. Insert the disc in the CD-ROM drive. Click the Forest Fever CD-ROM icon on your desktop. If you are running OS X, choose "OSXinstall." If running 9.0 or higher (excluding OS X), choose "Classicinstall."

2. Progress through the installation screens by clicking "next." If not detected, the program will ask you to install QuickTime™. This program is required for the CD-ROM to play correctly.

3. Restart your computer. Click the MACE Forest Fever icon to run the program.

Technical Help: For free technical support, call (toll free) 1-866-463-6486 (9-5 EST).

Background

Environment

Environment Section Objective

After completing the environment section, students will be able to discuss the process of photosynthesis, describe environmental benefits provided by a forest, and identify and explain Best Management Practices applied in forestry.

Background Objective

Use this information to enhance your lecture or class discussion before or after viewing the Environment Message video on the Forest Fever CD-ROM.

Subjects

Science, Agriscience, Social Studies, English Language Arts

State Standards

Science - 1,2, 6, 7, 8
Social Studies - Geography 2
Language Arts - 1, 2, 3
Agriscience *(see below)*
Exploring Agriscience Careers 1,4,7
Natural Resources 1,5,6,9
Plant Science Content Standards 4,8

Project Learning Tree Activities

See pages 49-51.

FOREST FACTS :

- Carbon dioxide (CO_2) enters the leaf through small openings called stomata. Once inside the leaf, CO_2 is broken down to carbon and oxygen. The carbon is then transformed into complex carbohydrates using light energy.

  Here's the generalized equation for photosynthesis:

$$6CO_2 + 12H_20 \xrightarrow[\text{Chlorophyll}]{\text{Light}} (C_6H_{12}O_6) + 6O_2 + 6H_20$$

carbon dioxide, water → glucose, oxygen, water

- Only green plant tissue undergoes the process of photosynthesis.

- Trees growing along the edge of a stream, lake, or river contribute to improved water quality. Covered with leaves or needles, trees provide shade to effectively lower water temperatures during the summer months. The lower the temperature, the greater amount of dissolved oxygen found in the water column. This means that aquatic animals have more oxygen to breathe. Also, when the leaves fall into the water, they provide a source of food for aquatic animals. The roots of trees growing along the banks of streams and shorelines of lakes provide protection and reduce the amount soil lost to erosion each year.

Background

Environment

TALKING POINTS :

- Think about other sources of energy like coal and wood, and how photosynthesis is responsible for storing energy.

- Foresters must know and understand how individual trees grow and reproduce. They must also take into consideration the influence that environmental factors like sunlight, precipitation, soil, climate, and even fire have on tree growth. The ecosystem itself must be part of the equation, and includes such things as the wildlife, plant succession, and population variations within the forest community.

HISTORY :

- Best Management Practices, commonly referred to as BMPs, are a practice or group of practices determined to be the most effective to reduce the amount of non-point source pollution generated during forest management activities, and that are voluntarily implemented. The concept of BMPs was established under the Federal Water Pollution Control Act of 1972. This act is the primary law that protects our nation's lakes, streams, rivers, aquifers, and coastal areas. The two fundamental goals behind this law are:

    1) eliminate the discharge of pollutants into the nation's waters, and
    2) achieve water quality levels that are fishable, drinkable and swimmable.

SOCIAL APPLICATION :

- The Sustainable Forestry Initiative (SFI)™ is a nationwide program adopted by the American Forest & Paper Association (AF&PA) in 1994. Implementation of the principles, objectives and performance measures is a condition of membership for AF&PA. The sole intent of the SFI program is utilize sound business practices to ensure the benefits of the forest are enjoyed by generations to come, while protecting water quality, wildlife, plants, and soil through the use of responsible environmental practices.

Press Conference

Environment

Environment Press Conference Objective

This section relates to the Environment press conference activity. Each question and its correct answer are listed.

Enrichment:
Teachers may use the "Further Explanation" tips to enrich the class discussion about the correct answers.

Another enrichment tip is to divide part of the class into press members, who have to think of questions, and another part of the class into speakers from each role: environmental, economic, and social. Hold a press conference in class, then let the two teams switch sides.

Subjects

English Language Arts, Science, Agriscience, Social Studies

State Standards

Science - 1,2,6,7,8
English Language Arts - 1, 2, 3
Social Studies - Geography 2
Agriscience *(see below)*
Exploring Agriscience Careers 7
Natural Resources 1,5,6,9
Plant Science 4

ENVIRONMENT
PRESS CONFERENCE QUESTIONS :

(Correct answers are bold and checked)

1. Why should we manage forests? Don't they do fine on their own?

A) Because the forest wouldn't survive without us. It's grown to depend on us because we've improved on its natural cycle so much.
✓ **B) Forests have a great natural life cycle. Forest management mimics these natural conditions to maintain good forest health and biodiversity while meeting the needs of people.**
C) We don't need to manage the forest at all.

Further Explanation:
Intensive forest management activities can increase the growth rate of trees. These activities include targeted use of herbicides to control competing vegetation around the trees, application of fertilizers, and even pruning of lower limbs to produce high quality saw logs.

2. Why do you allow hunting? Isn't it bad for biodiversity?

A) Hunting is bad for biodiversity, but it's better to have a hunting season to regulate hunters than it is to have no regulation at all.
B) Hunting is bad for biodiversity, and I wouldn't allow it on my land.
C) Hunting doesn't affect biodiversity at all.
✓ **D) Hunting is good for biodiversity because it can control overpopulation of certain species.**

Further Explanation:
Regulating the harvest of game animals is accomplished by setting the "limit". Each year wildlife biologists carefully evaluate populations and make changes as needed.

Press Conference

Environment

3. Do the environmental risks in prescribed burning outweigh the positive effects?

✓ **A) Actually, properly set prescribed burns help both the environment and nearby communities by eliminating underbrush that can lead to damaging wildfires.**
B) Prescribe burns are neutral - they do not hurt the environment, but they do not help it, either.
C) Prescribed burns are bad for animal habitats, and should never be used.

Further Explanation:
Check with your state forestry agency for prescribed burn regulations.

4. You say that trees keep us healthy. Can you explain how?

A) Studies have show that just by having a view of green, people are more productive and happy.
✓ **B) Through the process of photosynthesis, trees take in carbon dioxide and release oxygen, which we need to breathe.**
C) Trees provide many products, including cancer fighting drugs.
D) All of these are ways trees keep us healthy.

Further Explanation:
Besides producing oxygen, trees keep us healthy in other ways. The roots of trees filter pollutants from our water. The leaves of trees provide shade and keep us cooler. Researchers have found people recover from illness quicker when they have a view of trees and the outside.

5. What's the best way to take care of a stream in a forest?

✓ **A) It's best to leave trees around the stream. Trees next to a stream can provide habitat and food for water dwellers.**
B) I would build a trail near the stream to help prevent erosion from runoffs.
C) It's best to clear most of the trees from the area. Trees cause debris that clog the water and make it unhealthy.

Further Explanation:
Riparian forest buffer is land along a stream, river, pond, or lake that protects the waterway from negative impacts. Riparian forest buffers filter pollutants from surface water runoff and provide shade that will impact water temperature.

Press Conference

Environment

6. Are clearcuts harmful to a forest ecosystem?

A) Clearcuts provide no value to the forest ecosystem.
B) Clearcuts should be stopped and the forest allowed to mature as old growth.
✓ **C) Clearcuts mimic natural events and provide homes and food for wildlife by growth of early successional species.**
D) Trees will not grow back in a clearcut.

Further Explanation:
The clearcut forest regeneration method imitates effects of nature, such as fires, flooding, and hurricanes, which generates sun-loving tree species. After a clearcut, foresters manage the forest to ensure a new forest regrows in place of the old.

7. How can I help the trees planted along the street survive the harsh conditions?

A) Mulch around the trunk to retain moisture.
B) Educate about non-point source pollution.
C) Water during drought.
✓ **D) Using mulch around tree trunks, educating citizens about non-point source pollution, and watering during drought all help trees survive along the streets in our cities and neighborhoods.**

Further Explanation:
In cities trees endure soil compaction, lack of room to grow, vandalism, and either too much or too little water. There needs to be more urban plantings to counteract tree loss. Communities can play an active role in the planting and caring of trees.

8. Which insect(s) or disease(s) threaten our forests?

A) The Southern pine beetle larvae feed on the inner layers of pine trees, which cuts off the flow of nutrients and kills the tree.
B) The leaf eating gypsy moth larvae will defoliate any tree, but prefer oak.
C) Bacterial leaf scorch is a disease transmitted by insects or through root grafts that stops the flow of water and nutrients inside the tree.
✓ **D) The Southern pine beetle, the leaf eating gypsy moth, and bacterial leaf scorch all threaten the health of our forests.**

Further Explanation:
There are always forest health threats. You may contact the following websites for further information: www.fs.fed.us/ne/fia/, www.rce.rutgers.edu/pubs/plantandpestadvisory, and www.aphis.usda.gov.

Press Conference

Environment

9. It is hotter in the city where I live than the surrounding countryside. What can I do to make it cooler?

A) Go to the mall or somewhere air-conditioned.
✓ **B) Plant trees! They counteract the heat island effect by providing shade and evaporating water from**
C) **leaves to cool the air.**
Go inside, drink something cold, and sit in front of a fan.

Further Explanation:
Cool Cities Initiative is a tree planting campaign designed to address the urban heat island effect, where man-made materials such as buildings and asphalt absorb much of the sun's energy producing a dome of elevated air temperatures over cities. You may contact the following website for further information: www.charityadvantage.com/njtf/home.asp.

10. Should all dead and dying trees in a managed forest be cut down?

A) Yes. All dead and dying trees are hazardous.
B) Yes. Trees have no value in the ecosystem once they are dead.
✓ **C) No. There's life in dead things. You should leave some dead or dying trees to provide homes and food for animals and insects.**

Further Explanation:
As trees die and decompose, they provide new soil to the forest floor.

11. What has the greatest impact on forests today?

A) Tree harvesting impacts the forest most because the trees aren't being regenerated.
✓ **B) The greatest impact is the change of land use from farms and forests to development.**
C) Invasive species have changed the composition of the forests and have the greatest impact.

Further Explanation:
The principal challenges to sustain our forests are changes in land use from population growth and development. Community and state governments need to organize and decide to make choices that will protect and sustain our forests. You may contact the following websites for further information: www.nj.gov/dep/parksandforest/forest/community and www.na.fs.fed.us.

For Example...

Environment

Environment For Example... Objective

This section provides the guidelines that appear in the Environment Management Guidelines section. Use these guidelines and the "For Example… " information that corresponds with each guideline to enhance class discussion and provide additional information. A ready-to-copy handout of these guidelines is in the "Additional Resources" section of this guide.

Subjects

Science, Social Studies, English Language Arts, Agriscience

State Standards

Science - 1, 2, 6, 7, 8
Social Studies - Geography 2
English Language Arts - 1, 2, 3
Agriscience *(see below)*
Exploring Agriscience Careers 7
Natural Resources 1, 5, 6,7,8, 9
Plant Science 4

ENVIRONMENT MANAGEMENT GUIDELINES :

Fire - Use prescribed burning, which benefits the health of forests. Check for weather conditions like relative humidity, wind direction, and wind speed.

FOR EXAMPLE... In the southern pine forests fire is used to control hardwoods and other undesirable vegetation. The thick bark of the pine trees insulates the tree against the heat of the fire.

Hunting - Allow hunting to keep population of game species in check and to prevent the spread of disease in overpopulated herds.

FOR EXAMPLE... When the population increases, it reaches a point that the habitat can no longer provide sufficient food and shelter. Animals become weak and susceptible to disease. This is a good discussion point regarding "carrying capacity."

Wildlife Management Area - Establish a wildlife management area to protect endangered species and other wildlife that need a habitat.

FOR EXAMPLE... The different management techniques affect the species diversity of a forest. The method used to harvest trees is a good example. A clearcut system removes all the trees and opens the site to allow a diversity of pioneer (sun-loving) species to grow. This creates a great source of forage for deer, turkey, quail, and other wildlife species. On the other hand, the shelter wood system provides a residual tree canopy that protects young trees growing underneath. This provides habitats for birds, squirrels, and other species that live in protection of the forest. Each state has its own laws and regulations on how to use fire as a forest management tool.

Harvesting Trees - Generally, cut no more than 20% of a harvest stand, and place buffer zones between harvest blocks.

FOR EXAMPLE... The objective of the landowner, the species of trees to be cut, and the condition of the forest will drive the selection of the most appropriate management activities to use. Foresters maximize tree growth by controlling competition for water, nutrients, light, and space.

For Example...

Environment

Planting Trees - Plant trees to ensure the regeneration of a new forest and to protect watersheds.

FOR EXAMPLE... Planting trees is the best method of altering the species composition of an area. Spacing of the seedlings will determine the density of the forest as it grows. The more dense the trees, the greater amount of competition for water, nutrients, light, and space.

Building a Road - Build roads when necessary for recreation or harvesting.

FOR EXAMPLE... The placement of roads can adversely affect trees. Cutting root systems and piling dirt over root systems can, over time kill a tree.

Creating a Trail - Make sure that trails are away from wetlands to help avoid erosion and soil compaction.

FOR EXAMPLE... Just like roads, trail construction can be harmful to trees. Foot traffic compacts the soil. The roots of a tree must "breathe". If the soil is compacted oxygen cannot enter the soil and carbon dioxide can not escape, and this will suffocate the tree.

Timber Sales - Use reproduction harvests to sustain forests, maintain wildlife habitat, and create a distribution of age, size, and species of trees.

FOR EXAMPLE... Properly planned and implemented, thinning and harvest activities are beneficial to maintain a healthy forest and produce economic benefits.

Buffer Zones - Use buffer zones to protect sensitive areas such as wetlands, bodies of water, and endangered species habitat. Also, leave trees between harvest stands as travel corridors for animals.

FOR EXAMPLE... Buffer zones provide multiple environmental benefits. They also must be maintained. Trees can be "selectively" removed to maintain the health of a stand without causing damage to the environment.

Creating a Campground - Be mindful of how human activities affect the natural habitat. Build an access road or trail to the campground. Thin no more than 40% of the stand in the campground area.

FOR EXAMPLE... Campgrounds are high traffic areas like trails. The same environmental concerns apply to these sites as well. Another issue is the damage caused by campers looking for firewood. Branches are cut, or worse, broken off leaving openings for insects and disease to enter the tree.

Background

Economic

Economic Section Objective

After completing the economic section, students will be able to describe the pattern of forest land ownership in the U.S., list different wood products, and discuss the importance of a stand prescription.

Background Objective

Use this information to enhance your lecture or class discussion before or after viewing the Economic Message video.

Subjects

Science, Agriscience, Social Studies, English Language Arts

State Standards

Science - 1, 2, 6, 7, 8
Social Studies - Geography 2, Economics 1, 3
English Language Arts - 1, 2, 3
Agriscience *(see below)*
Exploring Agriscience Careers 1, 4, 7
Natural Resources 1, 5, 6, 9
Plant Science 4, 8

Project Learning Tree Activities

See pages 49-51.

DEFINITIONS :

- A ***prescription*** is a written plan developed by a professional forester to meet the objectives of the landowner. Two major elements comprise the prescription: Site data (geology/soils, climate, hydrology, vegetation, archeological features, and site quality) and Stand data (timber resources, wildlife habitat, range, protection, and recreation). Using the information gathered from the field, the professional forester can then begin to develop the prescription - matching appropriate management activities (silviculture) with projected outcomes to meet landowner objectives. A prescription also projects treatment costs and returns through an entire rotation (time from planting to final harvest).

- ***Timberlands*** are forests capable of growing 20 cubic feet of commercial quality wood fiber per acre per year.

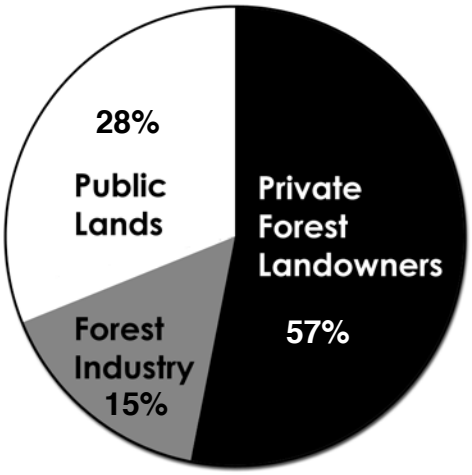
- An area of land with similar characteristics is classified as a ***stand***. Management prescriptions are written on a stand basis to increase treatment efficiency (reduce cost) and effectiveness (increase tree health and vigor).

Background

Economic

FOREST FACTS :

- In the year 2001-2002, about 57 percent of the timberland in the United States was owned by private forest landowners; the forest industry, about 15 percent; and public lands, which includes our national forests, 28 percent.



2001-2002 U.S. Timberland Ownership

- About 1/3 of the US land area, or approximately 730 million acres is considered as forestland. Of this, about 483 million acres are classified as timberlands (commercial forest land).

- About 245 million acres of the total forestland area is considered "non-commercial", and is held in areas like national parks, designated wilderness, and other holdings. For example, there are over 8 million acres of old growth forest on federal lands in Washington and Oregon, of which nearly 57% is preserved in parks, wilderness areas, and other set-asides.

TALKING POINTS :

- Did you know that cellulose from a tree is used to thicken cough syrup? Cellulose powder is used to keep the tiny pieces of Parmesan cheese from sticking together. What other products come from trees?

- Trees are one of our few renewable resources from which many important and convenient products are made that are recyclable and biodegradable. What are some of these products? How does recycling work? What does "biodegradable" mean?

- What are Best Management Practices (BMPs)? Can you list several examples? Explain the Sustainable Forestry Initiative.

Background

Economic

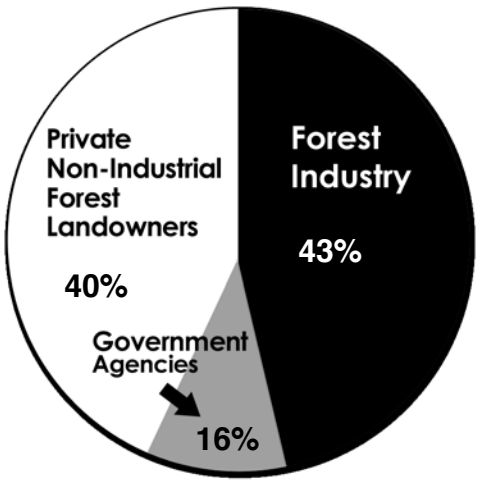
HISTORY :

- When the early European settlers arrived it was believed that a squirrel could travel from the East coast to the Mississippi River without touching the ground. This was not true. Another misconception about our forests is that we are running out of trees. We are far from it! We have more trees today than we had 70 years ago.

SOCIAL APPLICATION :

- The forest industry employs over 1.4 million people. Collectively they produce over $200 billion worth of paper and wood products each year.

- Each year, approximately 1.6 billion seedlings are planted in the U.S. (That's 5 seedlings per person) The forest industry plants a little more than 43% of these seedlings, while private non-industrial forest landowners plant 40%, and government agencies plant around 16%.



Percentage of U.S. Seedlings Planted
Total = Approximately 1.6 billion seedlings a year

Press Conference

Economic

Economic Press Conference Objective

This section relates to the Economic press conference activity. Listed below is each question and its correct answer. Teachers may use the "Further Explanation" tips to enrich class discussion about the correct answers.

Enrichment:
Another enrichment tip is to divide part of the class into press members, who have to think of questions, and another part of the class into speakers from each role: environmental, economic, and social. Hold a press conference in class, then let the two teams switch sides.

Subjects

English Language Arts, Science, Agriscience, Social Studies

State Standards

Science - 1, 2, 6, 7, 8
Social Studies - Geography 2, Economics 1, 3
English Language Arts - 1, 2, 3
Agriscience *(see below)*
Exploring Agriscience Careers 7
Natural Resources 1, 5, 6, 9
Plant Science 4

ECONOMIC PRESS CONFERENCE QUESTIONS :

(Correct answers are bold and checked)

1. What is the most valuable forest product in our state?

✓ **A) Clean air and water is the most valuable forest product because it sustains our quality of life.**
B) The wood we build our homes with is the most valuable forest product.
C) Firewood to heat homes and cook food is the most valuable forest product.

2. I see that you just bought this property. Do you plan to cut down all of the trees?

A) Yes. Since my main goal is to generate revenue, I plan on harvesting the entire landscape. Then I'll plant more.
B) No. I'll cut down 40 to 50% of the trees, and let the rest grow naturally. This way there will always be trees.
✓ **C) No. My plan is to divide the land into harvest blocks and harvest each block intermittently. I'll replant after harvesting each block - this way there will always be trees.**

Further Explanation:
Staggering the harvest time for each block is good for many reasons: steady flow of income, planning can be done well in advance, and it regulates the growth of the entire forest. However, not all areas can be easily divided. It depends on many variables. What is the current condition (health and vigor) of the forest? What is the primary objective of the landowner for owning the property? Is the land area big enough to divide the property into harvest blocks? Is there sufficient diversity to divide the property into "forest stands"?

Press Conference

Economic

3. I have a large oak tree next to my home. What is its value?

A) It works as a natural air conditioner in the summer by shading the house.
B) A large tree can reduce noise levels.
C) Trees increase the resale value of the house.
✓ **D) Your oak tree can cool the house, reduce noise levels, and increase the value of the house with its natural beauty.**

4. Since you want to make money, are you still planning on setting prescribed burns?

A) No. The expense of planning and implementing a prescribed burn would severely cut down on my revenue.
B) No. Trees grow faster with the underbrush around them, which means that I can harvest my trees faster. Prescribed burns would get rid of the underbrush.
✓ **C) Yes. Prescribed burn clears out underbrush, which provides more space, water, and nutrients that trees need to grow faster and helps protect the forest from wildfire risk.**
D) Yes. Prescribed burns are not expensive and are easy to implement.

Further Explanation:

When properly applied, fire is a natural, inexpensive, and effective forest management practice. Hardwood trees are very susceptible to the killing effects of fire. On the other hand, fire is used in pine forests to reduce competition. Tree growth is improved with less competition for water, nutrients, light, and space.

Press Conference

Economic

5. As the trees get older, doesn't their value increase?

✓ **A) Up to a certain point. Then they begin to maintain or lose value due to natural succession.**
B) The older the trees are, the more valuable they are because of the products they're used for.
C) Saplings and young trees are the best because their wood is strong and vibrant.

Further Explanation:
As a tree matures, the rate of growth slows. Trees reach a peak where growth and value are maximized. Then it is time to harvest the trees to generate a new forest.

6. There are so many alternatives to wood, why do we still need to harvest trees?

A) Wood is the only 100% renewable, recyclable, reusable, and biodegradable building product we have, so we
B) will continue to use wood as long as forests are managed to grow healthy new trees.
C) Wood is the least expensive building material to produce.
Thousands of products other than timber come from trees, like cancer-fighting drugs, paper, food, and the pencil you're holding.

✓ **D) All of the above are reasons we need trees for products.**

Further Explanation:
Many breakthrough technologies that influence the way we live get their start at the Forest Products Laboratory. Check their website: www. fpl.fs.fed.us.

7. I am in high school and interested in a career in forestry, what is the first step?

A) Learn your trees; a good forester can identify the tree by its bark.
B) Enroll in scouting.
✓ **C) Apply to the forestry program at a Society of American Foresters accredited college.**
D) Spend as much time in the woods as possible.

Further Explanation:
The website for Society of American Foresters is www.safnet.org.

For Example...

Economic

Economic For Example... Objective

This section provides the guidelines that appear in the Economic Management Guidelines section. Use these guidelines and the "For Example…" information that corresponds with each guideline to enhance the class discussion and provide additional information. A ready-to-copy handout of these guidelines are provided for you in the "Additional Resources" section of this guide.

Subjects

Science, Social Studies, English Language Arts, Agriscience

State Standards

Science - 1, 2, 6, 7, 8
Social Studies - Geography 2, Economics 1, 3
English Language Arts - 1, 2, 3
Agriscience *(see below)*
Exploring Agriscience Careers 7
Natural Resources 1, 5, 6, 7, 8, 9
Plant Science 4

ECONOMIC MANAGEMENT GUIDELINES :

Fire - Set prescribed burns to clear out undergrowth. Less competition increases the growth rate of desired trees.

FOR EXAMPLE... Prescribed burning is a very affordable forestry activity. At a cost of around $3/acre, prescribed burning reduces fire hazard, controls disease outbreaks, reduces competition, initiates the growth of forage plants, and is often a technique used to prepare a site for planting.

Hunting - Allow hunting to provide revenue from hunters.

FOR EXAMPLE... Hunting leases are an excellent way to earn extra money from your forestland. Typically, the cost of a lease is on a "per acre" basis. Contact your local state forestry or wildlife agency for more information about what price to charge.

Wildlife Management Area - Manage the forest so people want to visit and enjoy the diverse environment.

FOR EXAMPLE... What species of wildlife you are interested in having populate your area will dictate your forest management decisions. Not all wildlife need full time protection of the forest. Deer and other wildlife species are often seen in the open savannah-like conditions created by a clearcut.

Harvesting Trees - Thin trees between 15-25 years of age. Final harvest should be between 60-120 years of age. Divide your forest into harvest stands and leave buffer strips between stands.

FOR EXAMPLE... The time it takes to grow a economically mature tree depends on the species.

For Example...

Economic

Planting Trees - Replant new seedlings within 2 years of harvesting timber to ensure quick growth and less competition with other vegetation.

FOR EXAMPLE... Regeneration is either artificial or natural. Artificial regeneration is when seedlings are planted by hand or a mechanical planter, or seed may be dispersed by plane or helicopter. Natural regeneration is the management of the forest to promote the natural seeding of an area. For example, when an area is cut several trees are left standing to provide seed, and after a sufficient new crop of trees is growing the seed trees are harvested

Building a Road - Build a road to get to harvest areas. Build roads to keep down maintenance costs and to protect the ecosystem.

FOR EXAMPLE... Roads provide access for recreation and add value to timber land. Roads take time to construct so planning is a critical factor - start at least one year in advance of the timber sale. Always follow the recommended BMPs. The type of road constructed will determine cost. A woods road is less expensive than an all weather road that is covered with gravel.

Creating a Trail - Create trails to provide income through fees. Create trails to avoid harvesting areas.

FOR EXAMPLE... Trails designed for occasional use by the landowner are often simple and require minimum labor to construct. However, if opening the property to the public is the objective, then more stringent guidelines must be followed such as the Americans with Disabilities Act.

Timber Sales - Trees between 60-120 years of age generate the most revenue. Different size trees are used to manufacture a variety of products.

FOR EXAMPLE... The local market should guide the landowner in the right direction. Growing trees for a sawtimber market is not advisable if there are no saw mills nearby. Pulpwood may be the only choice.

Buffer Zones - Create buffer zones between harvest stands.

FOR EXAMPLE... Buffer zones are part of practicing responsible forestry. The width of a buffer zone depends on the slope of the land. On land with steep slopes, the width of the buffer is wider than land with a gentle slope.

Creating a Campground - Campgrounds create revenue through fees. Build a road or trail to access the camping area, and thin no more than 40% of the area.

FOR EXAMPLE... To increase the economic gain from building a campground, advertise in specialized magazines. Inviting guests to enjoy the forest also requires the need for insurance. There are many sources of insurance. Check with your local forestry professional for help in finding an insurance provider.

Background

Social

Social Section Objective

After completing the social section, students will be able to identify the values and benefits of the forests as a recreational resource and to understand the complexities of trail design and construction.

Background Objective

Use this information to enhance your lecture or class discussion before or after viewing the Social Message video.

Subjects

Science, Agriscience, Social Studies, English Language Arts

State Standards

Science - 1, 2, 6, 7, 8
Social Studies - Geography 2, 4
Economics 1, 2, 3
English Language Arts - 1, 2, 3
Agriscience *(see below)*
Exploring Agriscience Careers 7
Natural Resources 1, 5, 6, 7, 8, 9
Plant Science 4

Project Learning Tree Activities

See pages 49-51.

DEFINITIONS :

- ***Outdoor recreation*** is when a person voluntarily engages in an activity from which they derive pleasure, and that is to some degree dependent on the natural setting of the area.

RECREATION FACTS :

- The USDA Forest Service is responsible for taking care of 155 national forests and 22 national grasslands, covering a total land area of 192 million acres.

- There are 403 "Wilderness Areas" covering 35.2 million acres; 20 National Recreational Areas, 9 National Scenic Areas, and 7 National Monuments, Volcanic Monuments, and National Preserves.

- There are:
  - ➔ 136 (9,126 miles) national forest scenic byways;
  - ➔ 95 (4,418 miles) wild and scenic rivers;
  - ➔ 133,087 miles of trails;
  - ➔ 4,300 campgrounds; and
  - ➔ 23,000 developed recreation sites in the U.S.

- All 50 states have passed a law that limits the liability of a landowner who makes available to the public certain areas of land for recreational purposes without charge.

Background

Social

TALKING POINTS :

- When designing a trail, important questions to ask are:
  - ➔ what is the purpose of the trail(s)?
  - ➔ how many trails will be constructed and how long will they be?
  - ➔ who and how often will the trails be used?
  - ➔ what are the potential hazards/conflicts of the trails?
  - ➔ where will parking and access be located?
  - ➔ what must be done to accommodate visitors with disabilities?

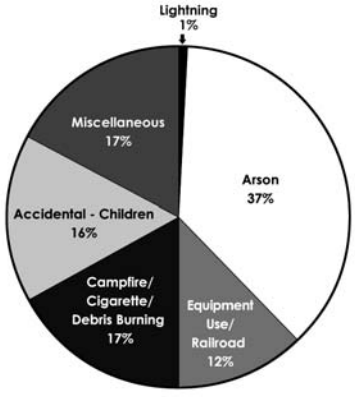
SOCIAL APPLICATIONS :

- Forest land can provide other social opportunities like bird watching, photo safaris, and hunting.

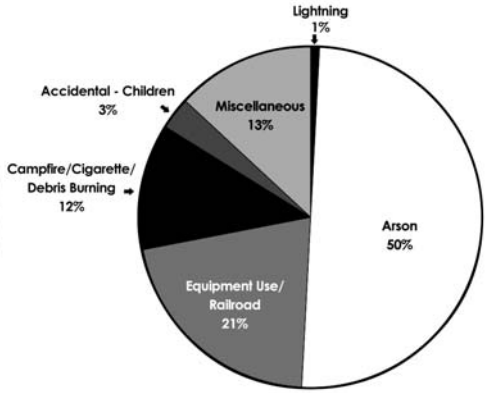
- The Federal Government's Forest Stewardship Program (FSP) encourages multiple use forestry for non-industrial private landowners. It brings professional management expertise to landowners and helps them develop plans that manage forests for timber production, wildlife habitats, watershed protection, recreational opportunities and other benefits. The Stewardship Incentives Program (SIP) is a cost share program of FSP that provides financial assistance to non-industrial private landowners who agree to maintain management plans and multiple use management strategies for their land. The program encourages the development of trails for people, bikes, horses and wheelchairs and requires certain standards for the development of those trails.

WILDFIRE FACTS :

Communities whose residents take proactive steps to reduce their vulnerability have a greater probability of withstanding a wildfire and reducing damage and loss. Prepared communities become part of suppression efforts. The Forest Fire Service facilitates community enrollment in the Firewise Communities/USA Program. Website: www.firewise.org/usa.



Wildfire Causes (1995-2004)
14,377 fires



Acres Burned by Wildfire (1995-2004)
66,977.5 acres

Press Conference

Social

Social Press Conference Objective

This section relates to the Social press conference activity. Listed below is each question and its correct answer.

Enrichment:
Teachers may use the "Further Explanation" tips to enrich the class discussion about the correct answers.

Another enrichment tip is to divide part of the class into press members, who have to think of questions, and another part of the class into speakers from each role: environmental, economic, and social. Hold a press conference in class, then let the two teams switch sides.

Subjects

English Language Arts, Science, Agriscience, Social Studies

State Standards

Science - 1, 2, 6, 7, 8
Social Studies - Geography 2
Economics 1, 2, 3
English Language Arts - 1, 2, 3
Agriscience *(see below)*
Exploring Agriscience Careers 1, 4, 7
Natural Resources 1, 5, 6, 9
Plant Science 4, 8

SOCIAL
PRESS CONFERENCE QUESTIONS :

(Correct answers are bold and checked)

1. What would you do if you discovered that the bike trail you just created ran through an endangered species habitat?

A) I'd close down the park - I can't risk any human contact with the species.
B) As long as people do not attempt to touch the species, I'd leave the trail open.
C) I'd relocate the endangered species to a safer environment.
✓ **D) I'd place a new bike trail in another area a safe distance away from the species.**

Further Explanation:
The Endangered Species Act (ESA) has specific provisions for activities within the habitat of an endangered species. Research the ESA as a class. Forestry Best Management Practices enhance, protect, and sustain endangered species and their habitats.

2. Bikers and hikers are arguing over who gets to use your trail. What's your decision?

A) Since there are more bikers than hikers, I'll designate the trail for bikers only.
B) Since hikers are less damaging to the habitat than bikers, I'll designate the trail for hikers only.
✓ **C) Since I've opened the land for all of the community, I'll make accommodations for both on the trail system.**
D) Since it's stirred up so much controversy, I'm going to close the trail down to all visitors.

Further Explanation:
There are issues of safety and liability associated with land use and recreational activities. The American Disabilities Act (ADA) is an important issue to address when building community access facilities. Research ADA regulations.

Press Conference

Social

3. What do you say to community members who don't want prescribed burning near their neighborhood?

A) Prescribed burning will increase the safety of your homes by eliminating underbrush that could cause an uncontrollable wildfire.
B) Prescribed burning will be closely monitored by a fire specialist. Their goal is to keep the fire under control.
C) Prescribed burning might agitate those with health problems like asthma. I'll make sure to give advanced warning so that you can leave the area before we begin.
✓ **D) I'd say all of these things.**

Further Explanation:
Following the state law is the first step. Secondly, the issue of private property rights must be respected. The guidelines for burning are established for each state and take into account the issues of public concern and safety. Smoke management is very important. Dangerous situations can occur if smoke blows across highways or through neighborhoods.

4. I've heard that you're planning a "buffer zone" near our neighborhood. Can you explain what a buffer zone is?

✓ **A) A buffer zone is a vegetation strip maintained along the stream, lake, road, or recreational site to enhance aesthetic values or mitigate impacts of disturbance on the neighboring site.**
B) A buffer zone is an animal wildlife management area, to keep animals safe from human contact.
C) A buffer zone is a section of land that we can play in the safety of open spaces.
D) A buffer zone is a protective fence to keep pesky animals away from your neighborhood.

Further Explanation:
A buffer zone is many things. A buffer zone can be a combination of trees and shrubs to block unsightly views. A buffer zone can reduce the noise of a busy roadway. A buffer zone can filter water before it enters a stream or river. A buffer zone is a "work zone for trees".

Press Conference

Social

5. Why did the tree outside my house push up the sidewalk?

A) The tree was planted in a shallow hole that allowed the roots to grow too close to the surface.
B) Roots grow everywhere.
✓ **C) Because of soil compaction, the roots grow toward the surface to get a sufficient amount of oxygen and water to grow.**

Further Explanation:
Trees grow larger over time. Plant the right tree on the right site. Allow trees sufficient room to grow.

6. I live in the city, where can I go to enjoy the forest?

A) You have to go outside the city; forests aren't in developed areas.
✓ **B) There is a forest outside your door; everyone lives in a forest.**
C) You can watch some movies about forests and pretend you're there.

7. I live on the border of a forest, should I be concerned about wildfires?

A) No, wildfires never occur in our area.
✓ **B) Yes, you live in the wildland urban interface and you should take precautions to make your home firewise.**
C) No, foresters are responsible for protecting your home from fire.

Further Explanation:
Wildland/urban interface is defined as the area where human development (homes and other buildings) meets undeveloped wildland or vegetative fuels, such as shrubs, dead leaves, twigs, and branches. As more and more people move to these locations, the risk of fire damage to homes and other buildings increases. Keep your community safe from wildfire, become firewise. Apply for a grant to help your community. Contact Firewise Communities USA Program at www.firewise.org/usa.

Press Conference

Social

8. Besides math and science, what other skill or subject should I focus on in high school to prepare for a degree in forestry?

✓ **A) A forester must be a good public speaker and writer so he or she can help the public better understand the complexities of forestry.**
B) Work hard in gym class; you must be in excellent physical condition to be a forester.
C) Concentrate solely on math and science, other skills are insignificant.

Further Explanation:
There are two national competitions for high school students that promote forestry education: Canon Envirothon at www.envirothon.org and Science Olympiad at www.soinc.org. Refer to Careers in Forestry, Additional Resources, on pages 59-61 for additional information.

9. There is a vacant lot filled with litter and debris near where I live. How can I get it cleaned up and trees planted?

A) Trees don't grow in abandoned lots.
✓ **B) Contact your local shade tree commission and promote your idea.**
C) Call your local politician and complain about the conditions.

Further Explanation:
You may consider contacting your local soil conservation district. The national website is www.nrcs.usda.gov. You may wish to contact the New Jersey Shade Federation at www.njstf.org and/or Community Forestry at www.nj.gov/dep/parksandforests/forest/community.

For Example...

Social

Social For Example... Objective

This section provides the guidelines that appear in the Social Management Guidelines section. Use these guidelines and the "For Example…" information that corresponds with each guideline to enhance the class discussion and provide additional information. A ready-to-copy handout of these guidelines are provided for you in the "Additional Resources" of this guide.

Subjects

Science, Social Studies, English Language Arts, Agriscience

State Standards

Science - 1, 2, 6, 7, 8
Social Studies - Geography 2
Economics 1, 2, 3
English Language Arts - 1, 2, 3
Agriscience *(see below)*
Exploring Agriscience Careers 7
Natural Resources 1, 5, 6, 7, 8, 9
Plant Science 4

SOCIAL MANAGEMENT GUIDELINES :

Fire - Use prescribed burns to create a more attractive forest. Notify local communities of prescribed burn before setting. Prescribed burning is a regulated activity. Contact your state forestry agency.

FOR EXAMPLE... The key to success is proper planning. Skilled professionals evaluate the site (humidity, fuel load, wind speed and direction, and make the decision of when to burn. Fire lines are plowed to keep the fire within the target area, tactical burning techniques (i.e. back fire, head fire) are employed, and fire fighting equipment is on hand should a problem occur.

Hunting - Allow hunting as a social pastime.

FOR EXAMPLE... Hunting leases and resorts are a popular recreational application of forest land. The landowner can realize income and the community can benefit too. Controlling the population of game animals may also be necessary. A large population of deer can cause damage to personal property - especially flower and vegetable gardens. Consult your state Fish and Wildlife Service website for hunting laws and regulations.

Wildlife Management Area - Create a wildlife management area to meet society's goals of protecting and enjoying wildlife. Forestry practices can create habitat and species diversity.

FOR EXAMPLE... In addition to protecting wildlife, there are also educational components of wildlife management areas. Teaching the public about land use issues, private property rights, and wildlife management can increase the social value of such an area.

Harvesting Trees - Cut damaged or infected trees. Thin trees according to guidelines for campgrounds, roads, and trails. Leave buffer zones near roads and houses to maintain beauty.

FOR EXAMPLE... Keep in mind that trees are a renewable resource and everybody uses products made from trees every day. We need to continue to harvest trees, while protecting our water quality and providing wildlife habitat. Professional foresters have the environments' best interest in mind every time they make decisions about cutting trees. Trees are their job.

For Example...

Social

Planting Trees - Plant trees for shade, recreation, and aesthetics and to improve our quality of life.

FOR EXAMPLE... Planting the right tree in the right place is very important. Each species of tree provides a different benefit. For example, pine trees are grown for pulpwood to make paper products, oak trees are a good source of food for wildlife, and other trees are better suited for providing shade in your backyard.

Building a Road - Build a road for user access to campground. Use no more than 5% of harvest stand to build a road.

FOR EXAMPLE... The type of road will be important. A dirt road would not be desired if it is the main point of entry into a heavily used area. The location of the road is also important. A professional forester can help locate the route a road should follow.

Creating a Trail - Build trails for user enjoyment. Use no more than 5% of harvest stand to build a trail.

FOR EXAMPLE... Design of a trail can influence the amount of use it receives. A trail that is a straight line is not good because it leads the user out and back along the same route. Make trails that loop and intersect to let users extend or shorten their trail experience. Incorporate learning stations along the way to add educational value.

Timber Sales - Harvesting timber creates products society wants and needs.

FOR EXAMPLE... If timberland is located near a public use area, use it as an opportunity to educate the public about the operation. Tell them why the timber is being harvested, explain the process that is used, and most importantly, be sure the site is regenerated. Demonstrate that sustainable forestry is being practiced.

Buffer Zones - Create buffer zones around roads, trails, campgrounds, and neighborhoods to maintain natural beauty.

FOR EXAMPLE... Locate trails and educational stations within the buffer zone. Point out how the buffer zone provides habitat and protects water quality.

Creating a Campground - Build a campground for people to enjoy the forest. First, build an access road or trail. Next, thin the trees for campground space up to 40%. Finally, build the campground.

FOR EXAMPLE... Safety and enjoyment are the top priorities of a public campground. Concerns are unsightly camp areas from overflowing trash cans or campsites located too close to each other.

For Example...

Balance

Environmental Conditions Guidelines For Example... Objective

This section provides the Environmental Conditions Guidelines that appear in the Balance section. Use these guidelines and the "For Example…" information that corresponds with each guideline to enhance the class discussion and provide additional information. A ready-to-copy handout of these guidelines are provided for you in the "Additional Resources" section of this guide.

Subjects

Science, Social Studies, Agriscience

State Standards

Science - 1, 2, 6, 7, 8
Social Studies - Geography 2
Economics 1, 2, 3
Agriscience *(see below)*
Exploring Agriscience Careers 7
Natural Resources 1, 5, 6, 7, 8, 9
Plant Science 4

ENVIRONMENTAL CONDITIONS GUIDELINES :

Drought - Do not plant seedlings and do not schedule a prescribed burn.

FOR EXAMPLE... Newly planted trees are more vulnerable since they are still trying to replace roots lost in the transplanting process. However, lack of moisture is not the only danger to your trees during drought. The stressed stand of trees might survive the loss of water only to be ravaged by wildfire, insects, or disease.

Wildfire - Reduce the severity of wildfire damage by scheduling prescribed burn or mechanical removal. After a wildfire is contained, damaged stands should be harvested.

FOR EXAMPLE... Without prescribed burns, fuels build up over time, increasing the risk of catastrophic fires, which are more likely to destroy human life and property--and whose intense heat can cause severe ecosystem damage. People who live in homes near a forest can protect their property by keeping tidy lawns, cutting branches away from their houses, and clearing the nearby area of any woody debris. Firewise Community/USA is a nationwide initiative sponsored by the National Wildfire Coordinating Group. It is designed to encourage and acknowledge community action that minimizes loss to wildlife. Contact website: www.firewise.org/usa.

Insects and Disease - If invading insects or disease are discovered, harvest the entire affected area immediately, then replant.

FOR EXAMPLE... There are three main factors necessary for disease to begin and spread: the right type of environment, a pathogen (the agent that causes disease), and a host (an organism from which the pathogen derives nutrition). Insects have many different methods of attacking trees. Some are borers, some eat the leaves, and others attack the seeds, cones, or flowers. Insects also like different types of trees: some prefer pines, while others attack hardwoods.

For Example...

Balance

Endangered Species - Cut damaged or infected trees. Thin healthy trees according to guidelines for campgrounds, roads, and trails. Leave buffer zones near roads and houses to maintain beauty.

FOR EXAMPLE... Mammals and birds are not the only living things to be protected as endangered species. Insects, reptiles, amphibians, fish, and plant species are also being protected from extinction. There are also different classifications for how rare the species is, including endangered, threatened, and species of special concern. Firewise Community/USA is a nationwide initiative sponsored by the National Wildfire Coordinating Group. It is designed to encourage and acknowledge community action that minimizes loss to wildlife. Contact website: www.firewise.org/usa.

Severe Storms - After the storm is over, selectively cut the damaged trees, then replant new ones.

FOR EXAMPLE... Storms affect different types of trees differently. For instance, a hurricane or wind storm might bring down more hardwoods because their broad spreading canopies and flat leaves catch the wind. Many hardwood trees also have shallow, spreading root systems, which increase their susceptibility to tipping over. Pines have the deep roots holding them upright. The smaller canopies and aerodynamic needles of pine trees make them less susceptible to uprooting. However, tall pines are more likely to break because of their thinner trunks.

Invasive Species - Educate landowners about planting native species. Remove invasive species from the forest.

FOR EXAMPLE... Plant native species to ensure a healthy ecosystem.

Forest Management Activity
Tool Kit

Balance

Forest Management Activity Objective

After completing this activity, the student will possess a basic understanding of the complexity of forest management, increased critical thinking skills, and be able to explain the different tools used to manage a forest. The goal of the Forest Management Activity is to achieve a well-balanced forest. Students achieve this by raising the scores of all three objectives – environmental, social, and economic – into the "Management Goal" area of the bar graph by the end of the activity.

Tool Kit Objective

This toolkit explains to teachers how each of the management tools work and effect the scoring of the activity. Teachers should use this as a guide to instruct their students in the use of the Forest Management Activity. A student handout of the toolkit is available in the "Additional Resources" section.

Subjects

Science, Social Studies, Agriscience

State Standards

Science - 1, 2, 6, 7, 8
Social Studies - Geography 2
Economics 1, 2, 3
Agriscience *(see below)*
Exploring Agriscience Careers 7
Natural Resources 1, 5, 6, 7, 8, 9
Plant Science 4

FOREST MANAGEMENT HELPER TOOLS :

Check Finances - Clicking the dollar sign-shaped icon allows the user to check his or her finances. A box will appear that lists the user's current total balance and the costs and values of each action that has been performed.

Management Plan Book - You can refer to the management guidelines discussed in earlier portions of the program at any time during the game. To do this, click the "Management Plan Book" button located in the lower-right corner of the screen. Select the management goal area you'd like to research (environment, economic, social, or natural concerns). After you've finished, click the "Close" button to return to the management activity.

Selection Tool - You must choose the selection tool to select an area of the forest you would like to manage. First, click the square-shaped icon located in the lower left corner of the screen, underneath the "Quit Game" button. Then click your mouse down and drag it across the area you would like to manage. When you've selected the area, release the mouse. You may move the selection area after you've chosen it by clicking inside the selection area and dragging it to a different location. After you've chosen the area, choose the icon for the tool you would like to use on this area, such as hunting, cutting trees, campground, etc.

Stop/Start Timeline - You can stop the progress of the activity at any time by clicking the "Stop Timeline" button located in the upper-right corner of the screen, directly to the right of the timeline bar. When you are ready to resume, click the same area, which will read "Start Timeline".

FOREST MANAGEMENT ACTION TOOLS :

Buffer Zones - Clicking the icon shaped like a row of trees allows the user to establish a buffer zone around certain areas. After the icon is clicked, the user can roll over the forest, and buffer zone possibilities highlight. When the user clicks on a highlighted area, a buffer zone is built. The user can build a buffer zone around a water body, a neighborhood, a road, and endangered species.

Forest Management Activity
Tool Kit

Balance

- If you do not build a buffer zone, you will lose environmental points.
- If you cut trees around a stream without a buffer zone in place, you will lose environmental points.
- If you build a road or trail without making a buffer zone, you will lose social points.

Build a Road - Clicking the road-shaped icon lets you build a road through the forest. First, use the selection tool to choose the placement of the road. Next, choose the icon to pave a road in that area. If the chosen area has not been cleared enough, a message will appear and the action will not be performed.

- Initial building funds will be taken from your finances and affect the economic score.
- Maintenance costs will affect the economic score
- Gradual points will be added to the social score.

Create a Campground - Clicking the tent-shaped icon allows the user to build a campground. First, the user must choose the selection tool to designate the placement of the campground. Next, choose the icon to build a campground in that area. A picnic table graphic overlay will appear on the forest to indicate the campground. If the chosen area has not been cleared sufficiently, a message will appear informing the user of this and the action will not be performed.

- Initial building funds will be taken from your finances and affect the economic score.
- Maintenance costs will affect the economic score.
- Gradual points will be added to the social score. You must maintain adequate forest cover to keep the campground.

Create a Trail - Clicking the trail-shaped icon allows the user to blaze a trail through the forest. First, the user must choose the selection tool to designate the placement of the trail. Next, choose the icon to blaze a trail in that area. If the chosen area has not been cleared sufficiently, a message will appear informing the user of this and the action will not be performed.

- Trail building fees and maintenance costs will be taken from your finances and affect the economic score
- Gradual points will be added to the social score.

Harvest Trees - Clicking this icon allows the user to harvest trees. First, the user must choose the selection tool to designate the specific area to be harvested. Next, choose the harvest trees icon to cut trees within that area. A slider bar will appear that allows the user to determine the age range of the trees and the percentage of that range to be cut (from 1-100%). The user can choose both a minimum and maximum age for the trees. After the user chooses the age range and percentage, he or she may click "Cut" to perform the action. The user will receive economic points for this choice.

- You will gain economic points for this choice. The amount of money you get depends on the number and age of trees cut.

Forest Management Activity
Tool Kit

Balance

Hunting - Clicking the gun-shaped icon allows the user to create a hunting area. First, the user must choose the selection tool to designate the specific area to be used for hunting. Next, choose the icon to assign hunting grounds to that location. A graphic animation will appear to indicate that this tool has been selected. Additionally, a graphic overlay of the word "hunting" will appear on the forest to indicate the hunting grounds.

- You will receive points on the social score.
- Initial building funds will be taken from your finances and affect the economic score.
- Maintenance costs will affect the economic score. You must maintain adequate forest cover to keep the hunting grounds.

Plant Trees - Clicking the seedling-shaped icon allows the user to plant new trees. First, the user must choose the selection tool to designate the specific area in which to plant. Next, choose the icon to plant trees within that area. A slider bar will appear that allows the user to determine the number of trees to plant in the area. The maximum number allowed on the selection bar is calculated by the maximum number of trees that can be sustained in the selected planting area.

Prescribed Burning - Clicking the flame-shaped icon allows the user to set a prescribed burn in the forest. After the icon is clicked, the prescribed burning tool calculates all of the forest that is safe for a prescribed burn and determines the score for this area. A graphic animation will appear to indicate that this tool has been selected.

- A prescribed burning fee will be taken from finances and affect the economic score.
- The prescribed burning tool sets the underbrush and pine straw counters back to zero so that if a wildfire starts, it will spread less rapidly.

Wildlife Management Area - Clicking the paw print-shaped icon allows the user to create a wildlife management area. First, the user must choose the selection tool to designate a wildlife management area. Next, choose the icon to assign the wildlife management area to that location. A graphic animation will appear to indicate that this action has been performed. Additionally, a paw print graphic overlay will appear on the forest to indicate the wildlife management area. The user will receive social and environmental points for this choice. Maintenance costs will gradually affect the economic score. The user must maintain adequate forest cover to keep the wildlife management area. If the user attempts to build another area on the wildlife management area, the new selection will take over the chosen space.

- You will receive environmental and social points for this choice.
- Maintenance costs will affect the economic score. You must maintain adequate forest cover to keep the hunting grounds.

Enrichment Activities

Environment

Environment Enrichment Activities Objective

Incorporate these activities into your lesson plans to enrich learning by asking the students to apply knowledge to new situations. The box below each activity description is a list of subject areas, skills, and correlations to state standards that apply to the activity.

Subjects

See the gray box below each of the activities for correlating subjects that apply to that activity.

State Standards

See the gray box below each of the activities for the state standards that apply to that activity.

All About Best Management Practices

Search the world wide web for information about BMPs in your state. Who is the agency responsible for enforcing the regulations? Invite a natural resource professional who has a working knowledge of BMPs (installation and compliance), to speak to your class. If possible, take students to see BMPs in action. Ask the students to describe the impacts to the site if BMPs were not used. What are the social, economic, and environmental costs with, and without, BMP compliance?

Subjects/State Standards

Science: 1, 2, 6, 7, 8
English Language Arts: 1, 2, 3
Social Studies: Geography 2, Economics 1, 2, 3, Civics 1, 3, 4
Agriscience: Exploring Agriscience Careers 7, Natural Resources 1, 2, 3, 5, 6, 7, 8, 9, Plant Science 4

Enrichment Activities

Environment

LEARNING ABOUT SUSTAINABILITY

Ask students to list their ideas of what sustainable forestry means to them. After participating in the forest management activity, students will gain an understanding of how foresters balance the environmental, economic, and social needs for today and future generations. Have students investigate the issue of private property rights. Can a private landowner be told what to do on their own land as long as they are not breaking any laws? Develop a role play with a local issue and ask students to represent the various parties (landowners, professional resource managers, environmental regulatory agency, citizens, resource users, for example).

Subjects/State Standards

Science: 1, 2, 6, 7, 8
English Language Arts: 1, 2, 3, 4
Social Studies: Geography 2, Economics 1, 2, 3, Civics 1, 3, 4
Agriscience: Exploring Agriscience Careers 7, Natural Resources 1, 2, 3, 5, 6, 7, 8, 9, Plant Science 4

Enrichment Activities

Environment

MY ECOSYSTEM: WE ALL LIVE IN A FOREST

Define and discuss the forest ecosystems in your area. Invite a professional forest resource manager or ecologist to lead the discussions. Using a topographic map, delineate a watershed. What information can be determined from the map? Show Global Positioning System (GPS) and Geographic Information System (GIS) technology, aerial photos, and satellite images, and demonstrate how they are used to construct maps of various types. Contact your local state forestry agency, extension forestry specialist, or forest landowners association and ask to see a stand map. Lots of information about mapping and types of maps is available on the web. Make a map of an area. Indicate the boundary of the watershed and the different ecosystems located within the boundary.

Explore a nearby ecosystem. List the trees, wildlife, soil, and vegetation found. Discuss how human activities can disrupt the natural cycles and processes within the ecosystem. Choose an activity like building a hiking trail or harvesting trees, and list the impacts these activities would have on the site.

Subjects/State Standards

Science: 1, 2, 6, 7, 8
English Language Arts: 1, 2, 3, 4
Social Studies: Geography 1, 2, 3, 4, Economics 1, 2, 3, Civics 1, 3, 4
Agriscience: Exploring Agriscience Careers 7, Natural Resources 1, 2, 3, 5, 6, 7, 8, 9, Plant Science 4

Enrichment Activities

Economic

Economic Enrichment Activities Objective

Incorporate these activities into your lesson plans to enrich learning by asking the students to apply knowledge to new situations. The box below each activity description is a list of subject areas, skills, and correlations to state standards that apply to the activity.

Subjects

See the gray box below each of the activities for correlating subjects that apply to that activity.

State Standards

See the gray box below each of the activities for the state standards that apply to that activity.

The Cost of Doing Forestry

Understanding the financial aspect of forestland ownership. Ask the local tax assessor or certified land appraiser to visit with the class. Ask your visitor to explain the different taxes associated with forestland ownership. Lead a discussion about taxes: how they are calculated, what activities/costs can be charged to your tax bill, and what, if any, are the tax incentives to owning forestland?

Subjects/State Standards

Science: 1, 2, 6, 7, 8
English Language Arts: 1, 2, 3, 4
Social Studies: Geography 1, 2, 3, 4, Economics 1, 2, 3, Civics 1, 3, 4
Agriscience: Exploring Agriscience Careers 7, Natural Resources 1, 2, 3, 5, 6, 7, 8, 9, Plant Science 4

Why Do You Own Forestland ?

Part 1 Invite a private forest landowner and a professional forester (consultant or state agency) to visit with your class. Inform your guests that they will be the subject of an interview process. They will be provided with the list of questions, in advance of their visit, the students will be asking. Allow at least one week for them to review and prepare for the class activity.

Part 2 At least two weeks prior to the day of the activity, divide your class into small groups (3-5). Ask each group to make a list of questions, such as: why do you own forest land? (inherited, investment, forest preserve, wildlife habitat, etc.) or what are the challenges (economic, social, environmental) of owning forestland? Other questions may be

Enrichment Activities

Economic

WHY DO YOU OWN FORESTLAND ? (CONTINUED)

explored. Regroup, list each group's questions, eliminate duplicates, and generate a master list of questions. Inform the class that they are going to interview the visitors. Working in the same small groups, each group must assign a minimum of two recorders and only one speaker who asks questions. Give each group an equal share of questions from the master list. The recorders must take accurate notes. After the interview, allow students to work within their groups to discuss the results of the interview. Assign a writing exercise using the information from the interview and any research the group can do. They must write a position paper - either for or against the idea of owning forestland.

Subjects/State Standards

Science: 1, 2, 6, 7, 8
English Language Arts: 1, 2, 3, 4
Social Studies: Geography 1, 2, 3, 4, Economics 1, 2, 3, Civics 1, 3, 4
Agriscience: Exploring Agriscience Careers 7, Natural Resources 1, 2, 3, 5, 6, 7, 8, 9, Plant Science 4

MY FORESTLAND

Learn about the forests of your state. If you have internet access, search the web for your state's forestry department website. The amount of information you can find grows daily. For example, you can look for maps, land use statistics, research data, education programs, urban forestry. Ask students to make a map of the forestland in your state or around your school. Evaluate ownership patterns - who owns the most forestland (federal, non-federal, and private)? How many acres are held by each group? Fit map on an 8.5" x 11" piece of paper; draw areas of different ownership on 8.5" x 11" transparencies; draw major rivers, cities, and highways on another layer; now stack different layers to create a multilayered map. Are there any evident patterns of landownership? If yes, explain possible reasons.

Subjects/State Standards

Science: 1, 2, 6, 7, 8
English Language Arts: 1, 2, 3, 4
Social Studies: Geography 1, 2, 3, 4, Economics 1, 2, 3, Civics 1, 3, 4
Agriscience: Exploring Agriscience Careers 7, Natural Resources 1, 2, 3, 5, 6, 7, 8, 9, Plant Science 4

Enrichment Activities

Economic

WHAT IS A FOREST PRODUCT ?

To help students understand the breadth of the forest industry, have them research a product, or group of similar products made from trees. Expect the student to be able to explain the chain of events from the time the tree is harvested to final product. Suggestions of what to include in report: What are the processes involved in producing the product(s)? What species of tree(s) are used to produce the product? Where is the product produced? What is the market of the product? Are there any by-products produced during the manufacturing process of the selected product(s)? Allow students to prepare multi-faceted reports: oral, computer, visual aids, demonstration, what ever they feel comfortable with. Compile reports and publish. Be sure to keep a copy in your school library.

Provide students with a list of forest products that are used on a daily basis. A good resource is Our Daily Wood at www.evergreenmagazine.com. Ask students to select one product from the list, write it down on a slip of paper along with their name, and hand it in. Next, inform them that they must TRY not to use the product they just selected for one day. Select the day for the "Product Challenge". Then ask each student to share with the class the product they selected and how their life was affected. After the Product Challenge day, assign the students the task of writing a short story about their experience. How would their life change if all forest products were no longer available? Are there any substitutes for the product? What do they think about cutting trees and the application of sustainable forest management activities?

Subjects/State Standards

Science: 1, 2, 6, 7, 8
English Language Arts: 1, 2, 3, 4
Social Studies: Geography 1, 2, 3, 4, Economics 1, 2, 3, Civics 1, 3, 4
Agriscience: Exploring Agriscience Careers 7, Natural Resources 1, 2, 3, 5, 6, 7, 8, 9, Plant Science 4

Enrichment Activities

Social

Social Enrichment Activities Objective

Incorporate these activities into your lesson plans to enrich learning by asking the students to apply knowledge to new situations. The box below each activity description is a list of subject areas, skills, and correlations to state standards that apply to the activity.

Subjects

See the gray box below each of the activities for correlating subjects that apply to that activity.

State Standards

See the gray box below each of the activities for the state standards that apply to that activity.

WRITE A STEWARDSHIP PLAN

Invite a local state forestry representative to speak to your class. Ask them to describe the Forest Stewardship Program (FSP) and the Stewardship Incentive Program (SIP), and how the program works in your state. Be sure that the students are provided with brochures, etc. that describe the FSP and SIP for your state. Ask your speaker to discuss how to write a Stewardship Management Plan. Be sure students understand the importance of setting objectives and applying the principles of the FSP to managing natural resources. Give them a scenario with a description of property they just inherited and ask them to come up with a primary and secondary objective for the property and to justify their choice.

DESIGN-A-TRAIL

Select a site and challenge students to design a trail system. The site can be at your school or in a public park or recreation area. Have students work in teams and help them set an educational objective for their trail. Give them a realistic budget to work with. Tell them they must incorporate local civic groups as in-kind labor to help make the trail. Invite a local state forestry agency representative to help students learn the technical aspects of trail design, and ask a volunteer agency to talk about building partnerships and managing volunteers. Have each team present their trail design ideas to the class. Have a panel evaluate and select the best plan.

NOTE: The standards below apply to <u>both</u> activities on this page.

Subjects/State Standards

Science: 1, 2, 6, 7, 8
English Language Arts: 1, 2, 3, 4
Social Studies: Geography 1, 2, 3, 4, Economics 1, 2, 3, Civics 1, 3, 4
Agriscience: Exploring Agriscience Careers 7, Natural Resources 1, 2, 3, 5, 6, 7, 8, 9, Plant Science 4

Enrichment Activities

Project Learning Tree Activities

Project Learning Tree (PLT) is widely recognized as one of the premier environmental education programs. Project Learning Tree is correlated to the state standards. If you are interested in using the PLT materials in your classroom, but have not completed the PLT educator training workshop, please contact the PLT coordinator in your state through www.plt.org.

Project Learning Tree activities are selected from three of the PLT Secondary Environmental Education Modules:

- The Changing Forest: Forest Ecology
- Exploring Environmental Issues: Focus on Forest
- Exploring Environmental Issues: Focus on Risk

Each Project Learning Tree activity provides a range of pre-assessment activities and post-assessment opportunities.

PLT Secondary Module | *The Changing Forest: Forest Ecology*

ADOPT-A-FOREST

Overview: Students will identify a section of a local forest or wooded area to study and investigate the types of plants and animals that live there. Through this investigation, students will identify the biological and structural diversity within a forest ecosystem.

CAST OF THOUSANDS

Overview: Students will further explore the variety of life in their adopted forest and will discover the importance of this biological diversity. They will take measurements, in much the same way as a forester does, to draw conclusions about the overall health of their forest.

Enrichment Activities

Project Learning Tree Activities

THE NATURE OF PLANTS
Overview: Through a series of experiments, students will learn the importance of photosynthesis and the elements needed for photosynthesis to take place. They will also discover the factors necessary for healthy plant growth and the detrimental effects of a variety of environmental stresses.

HOME SWEET HOME
Overview: Overview: Students will identify "exotics", plant or animal species introduced into non-native environments and determine their effect. Students will gather information about a selected plant or animal species within their adopted forest and determine its natural range.

UNDERSTANDING FIRE
Overview: Students will explore the patterns of change brought about by fires in a forest ecosystem. They will also examine the environmental, social, and political factors that influence forest-use decisions.

FIRE MANAGEMENT
Overview: Students will learn about interdependencies of forest and fire in healthy ecosystems. They will also look at problems that occur when humans live in or near forested areas.

PLT Secondary Module | *Exploring Environmental Issues: Focus on Forest*

WHAT'S A FOREST TO YOU?
Overview: Students will have an opportunity to explore the role that forests play in their lives and to develop a balanced, unbiased survey to investigate what family and friends think about forests.

WORDS TO LIVE BY
Overview: Students can express their own views about forests, and then explore different perspectives by reading excerpts from the writings of different authors.

Enrichment Activities

Project Learning Tree Activities

PLT Secondary Module | *Exploring Environmental Issues: Focus on Risk*

DECISION-MAKING

Overview: Students will develop and apply decision-making skills to various environmental risk scenarios including wildland fires, natural hazards, and threats to coral reefs and mangrove swamps.

Subjects/State Standards *(for the PLT Activities on the previous pages)*

Adopt-A-Forest, Cast of Thousands, The Nature of Plants, Home Sweet Home
Science: 1, 2, 6, 7, 8
English Language Arts: 1, 2, 3
Social Studies: Geography 1, 2, 3, 4
Agriscience: Exploring Agriscience Careers 7, Natural Resources 1, 2, 3, 5, 6, 7, 8, 9, Plant Science 4

Understanding Fire, Fire Management
Science: 1, 2, 6, 7, 8
English Language Arts: 1, 2, 3
Social Studies: Geography 1, 2, 3, 4, Civics 3, 4
Agriscience: Natural Resources 1, 2, 5, 6, 7, 8, 9, Plant Science 1, 2, 3, 4, 5, 8

What's a Forest to You?
Science: 1, 8
English Language Arts: 1, 2, 3
Social Studies: Geography 1, 2, 3, 4, Civics 3, 4

Words to Live By
English Language Arts: 1, 2, 3, 4

Decision-Making
Science: 1, 8
English Language Arts: 1, 2, 3, 4
Social Studies: Geography 1, 2, 3, 4, Civics 3, 4

Part III: Assessment

Post-Assessment Activities

Each Project Learning Tree activity provides a range of pre-assessment activities and post-assessment opportunities for the *Forest Fever* CD program.

Each Project Learning Tree activity contains several sections:

"Doing the Activity"

This section provides pre-assessment suggestions that allow the teacher to assess what students presently know or understand about a concept.

"Assessment Opportunities"

This section guides the teacher towards assessing students' understanding of the concepts covered in the activity; therefore, providing post-assessment choices.

Management Plan Book

Make copies of the chart on the next page to pass out to the class. Have each student or group chart their decisions as they do the Forest Management Activity. After completing the activity, have them discuss or write a report on their results. They can answer the following questions: Which tool impacted your score most? Which tool impacted your score least? Which tool did you like most? What activity variable did you use to make management decisions? (i.e.timeline, tree age, etc.) After the discussion, have the students use the chart to make a plan for their forest before starting the activity. What did they do differently this time? Did their score improve? Encourage them to keep a notebook of their charts.

Subjects/State Standards

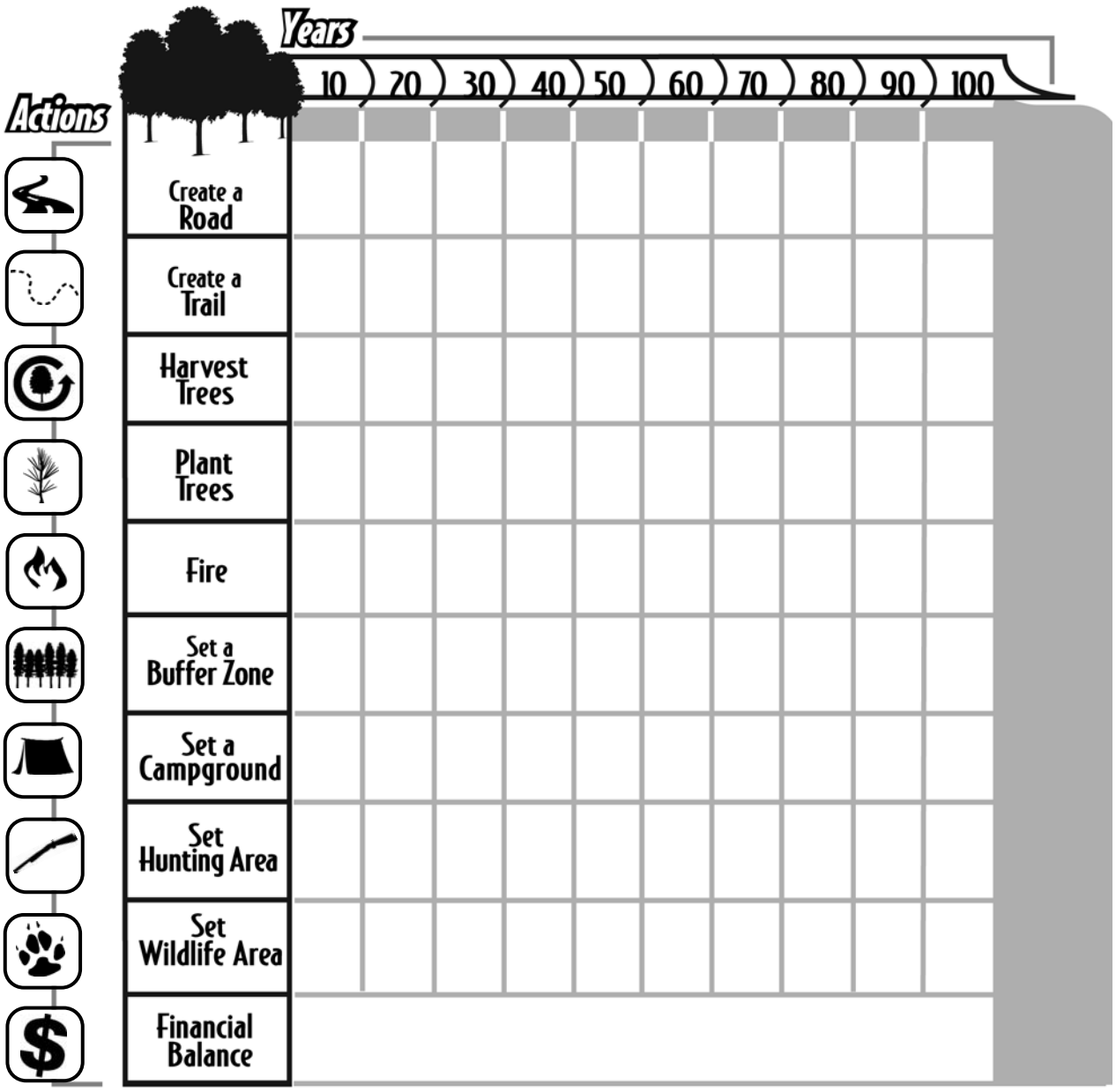
Science: 1, 8
English Language Arts: 1, 2, 3, 4
Social Studies: Geography 1, 2, 3, 4, Civics 3, 4
Agriscience: Natural Resources 1, 2, 5, 6, 7, 8, 9, Plant Science 1, 2, 3, 4, 5, 8
Mathematics: 1, 2, 5, 9, 10

Forest Fever

Post Assessment Activity

Management Plan Book

Name: ***Date:***



Was your final score balanced? (circle one) **yes** **no**

Careers in Forestry

Additional Resources

A career in forestry, or any field of study involving natural resources, is exciting and rewarding. Depending on the type of work that interests you, the level of education you must receive and employment opportunities will vary.

EDUCATIONAL REQUIREMENTS:

A high school education alone will not advance your career in forestry. If becoming a professional forester is your goal, completing a Bachelor of Science (BS) degree is a minimum requirement. However, earning a Masters or Ph.D. degree will increase your employment opportunities and your starting salary.

If you are interested in becoming a professional forester, you must graduate from a Society of American Foresters **(SAF) accredited** forestry school. The Society of American Foresters is the professional organization recognized by the Council for Higher Education Accreditation, and is responsible for granting accreditation. SAF website: www.safnet.org.

For further information about accreditation, contact:

Department of Science and Education, Society of American Foresters
5400 Grosvenor Lane
Bethesda, MD 20814-2198
(301) 897-8720, ext. 122
cillayp@safnet.org.

For a complete listing of the accredited professional forestry schools go to this website:
http://www.itm-info.com/fever/mace/schools.htm

Careers in Forestry

Additional Resources

Who hires a forester? What does a forester do?
There are lots of employment opportunities for professional foresters.
The following descriptions provide a glimpse into the opportunities for people with a forestry degree.

EMPLOYMENT OPPORTUNITIES :

Several agencies within the federal and state government hire forestry graduates. Working for a federal agency offers many career advancement opportunities. A person hired as a field technician can, by proving their skills and knowledge, find themselves being promoted to a management-level position. A federal agency most people recognize is the **U.S. Department of Agriculture, Forest Service**. They hire foresters who are responsible for much of the field work such as fire management, forest management, insect and disease management, forest research, forest health, recreation, conservation education, land stewardship, watershed management, and wildlife management. Another government agency who hires professional foresters is the **U. S. Department of Interior**. There are two organizations within the Department of Interior that offer forestry jobs - the Fish & Wildlife Service and National Park Service. Although the number of job opportunities are not as numerous as with the Forest Service, they are just as rewarding. Foresters working for the Fish & Wildlife Service usually have an undergraduate degree in forestry and a Masters degree in wildlife biology. Positions are located on National Wildlife Refuges. The type of work would involve using forest management techniques to maintain wildlife habitat. The National Park Service hire professional foresters, forestry aides, and forestry technicians to meet special forest protection and management needs, and are classified as a Park Ranger.

A government agency that you might not think about hiring forestry graduates is the **U. S. Department of Defense, Army Corps of Engineers**. They hire foresters to manage forestland, and wildlife biologists to handle issues involved with wildlife mitigation activities. Most of the positions are located at lake sites under the jurisdiction of the Corps of Engineers.

State agencies hire foresters too. Positions can be found with the **Department of Natural Resources or the State Forestry Commission**. As a forester with a state agency, your primary responsibility is to manage the state-owned forest lands and provide assistance to private forest landowners. Duties include reforestation, fire control, pest management, and public lands management. A minimum of a Bachelor's degree is required for most state level jobs.

Careers in Forestry

Additional Resources

EMPLOYMENT OPPORTUNITIES (CONTINUED) :

Foresters also find job opportunities at a **University**. Research, teaching, and extension positions exist that require different levels of education. If you are interested in research, technician positions require a Bachelor's or Master's degree, but a research scientist must have a Ph.D. If teaching at the college level is want you want to do, a Ph.D. is most often required. Extension specialists plan, develop and deliver educational programs for a variety of audiences and work with extension agents to address forest-related needs in communities. This type of work usually requires a Ph.D., but some positions may require Master's degree.

The private sector offers the greatest variety of forestry jobs. The level of education requirements ranges from a Bachelor's, to Master's, to Ph.D. The **forest industry** hires entry-level foresters to do many different jobs that include conducting land surveys, cruising timber, managing prescribed burns, monitoring water quality, plus many more. **Private consulting** is another option. Working for a private consulting firm, a forester offers professional services to private landowners. In some states, a private consultant must be a registered forester. A minimum of a Bachelor's degree and 2-5 years experience is required prior to becoming a private forestry consultant. **Utility companies** (electric, natural gas, etc.) hire foresters to maintain their right-of-ways. Controlling the vegetation is the primary responsibility, but some companies may own forest land too. **Non-profit organizations**, like the Nature Conservancy, hire foresters to oversee planning and policy issues. Educational requirements range from the Bachelor's degree to Ph.D. Other employment opportunities you might consider include golf courses to maintain the trees on the golf course, consumer product sales of wood products like doors, windows, and high quality lumber, and international organizations that work in forestry development projects overseas.

ENRICHMENT ACTIVITY :

Get a Job! --- As a group, ask students to list forestry-related jobs on the black board or flip chart. Then, break into small groups (3-5 each). Tell the students to choose one of the jobs listed. Once each group has chosen a job they are interested in, tell them they must now "Find a Job". This activity is designed to acquaint them with using the internet. Using an employment search engine like monster.com, each group should try to find employment opportunities that fit the desired job. Challenge the students to locate jobs working for different employers (state, private or government). For each job, students should take note of the educational requirements, work experience, and job responsibilities. Students will learn that a career in forest resources can be a rewarding experience.

Glossary

Additional Resources

Best Management Practices – (BMPs) guidelines that are designed to protect natural resources (such as forests) while allowing people to utilize those resources. They vary by state and many are voluntary.

Biodiversity – the variety and abundance of plants, animals and all other living things within an ecosystem.

Buffer zone – a vegetation strip maintained along the stream, lake, road, or recreation site to enhance aesthetic values or mitigate impacts of disturbance on a neighboring site. Within buffer zones forest management activities are prohibited or limited to protect special areas of the environment.

Carbon sequestration – forests absorb carbon dioxide from the air and store carbon into their plant tissues.

Cellulose – a chain of glucose molecules occurring mainly as long hollow fibers that make up the cell walls in woody plants.

Clearcutting – harvesting essentially all of the trees within a specific area.

Conservation – responsible use, protection, and improvement of natural resources for the present and future.

Ecosystem – a community of organisms together with its natural environment.

Endangered species – a plant or animal in danger of becoming extinct as defined by the Endangered Species Act.

Environment – all external conditions affecting the life, development, and survival of an organism.

Environmental education – an educational discipline to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones. (Belgrade Charter, UNESCO-UNEP, 1976)

Erosion – the wearing away of the land surface by rain, running water, wind, ice, gravity, or other agents.

Fire – to ignite, to cause burning, the chemical change in combustion producing heat and light.

Firewise – understanding of how to minimize risk of wildfire damage to your home or community.

Forest health – the condition of trees and forests at a point in time which includes tree growth, insects, disease, and other environmental factors that impact on their well-being.

Forest management - the practical application of scientific, economic, and social principles to the use and care of a forest.

Glossary

Additional Resources

Forester (Forest Manager) – a person, usually a graduate of a four-year accredited college and/or certified by state regulations, who directs the management, use and enjoyment of forests.

Forest fragmentation – the breaking up of a single forest landscape for various uses.

Forestry – the science and art of managing trees and forests for their many benefits.

Invasive species – An introduced species that out competes native species for space and resources.

Habitat – an area that provides an animal or plant with adequate food, water, shelter, and living space.

Harvest – to cut down trees to sustain forest growth and to maximize forest benefits

Harvest block – an area of trees that has been designated for harvesting.

Heat island effect – the phenomenon that cities are warmer than the rural areas that surround them because of their heat-absorbing concrete and black asphalt infrastructure.

Ladder fuels – combustible material such as needles and leaves that allows fire to climb into the crowns of trees or shrubs.

MACE – Mid-Atlantic Conservation Cooperative is a geo-regional conservation education cooperative group that provides quality educational programs that promote stewardship and environmental literacy.

Management objectives – goals that foresters set out to achieve when managing a particular area.

Management plan – a long-term plan developed by land managers, using detailed information and research about a specific property to fulfill management objectives.

Multiple use management – any practice fulfilling two or more objectives of management.

Natural regeneration – the establishment of a plant from natural seeding or sprouting.

Natural resources – those raw materials supplied by the Earth and its processes. Natural resources include nutrients, minerals, water, plants, animals, etc.

Non-renewable resource – a nonliving resource

Photosynthesis – the process by which light energy is captured by green plants and used to provide food from carbon dioxide, taken in from the air and water and nutrients from the soil.

Glossary

Additional Resources

Prescribed burn (prescribed fire) – a controlled fire set by land managers that imitate the effects of fire in nature. Prescribed fires help reduce the potential for wildfires and their destructiveness by eliminating fuels such as dead limbs, leaves and straw, and thick vegetation.

Public lands – land owned by federal, community, state, and county governments.

Photosynthesis – the process by which light energy is captured by green plants and used to produce food from carbon dioxide, taken in from the air, and water from the soil.

Prescribed burn (prescribed fire) – a controlled fire set by land managers that imitates the effects of fire in nature. Prescribed fires help reduce the potential for wildfires and their destructiveness by eliminating fuels such as dead limbs, leaves and straw and thick vegetation.

Prescription – a set of management practices scheduled for application on a specific area to satisfy multiple uses or other goals and objectives.

Pulpwood – trees that are and made into pulp for making paper and other products.

Recreation – the use of forestland for human enjoyment and relaxation.

Recycle – to reclaim or reuse materials in order to make new materials.

Regeneration – the renewal of a tree crop whether by natural (seedlings and stump or root sprouts) or artificial (planting) means.

Renewable resource – a living resource whose supply becomes available for use at different time intervals and in which present use does not diminish future supply.

Runoff – water from precipitation and melting ice that flows on the ground and into nearby streams, lakes, and wetlands.

Sawtimber – trees yielding logs considered suitable in size and quality for producing lumber or sawn wood (logs cut into a square-edged form).

Seed beds – the soil or forest floor on which seed falls.

Seedling – a young tree grown from the seed.

Silviculture – the art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis.

Glossary

Additional Resources

Sprout – healthy new trees growing from the tree stump or roots of a tree that has been harvested.

Stand – a group of trees similar in age distribution and species composition to be a distinguishable unit.

Stewardship – caring for natural resources that enables their passing on to future generations.

Succession – the gradual replacement of one plant community by another through natural processes over time.

Sustainable forestry – forest management practices that provide goods and services from a forest ecosystem without degradation of the site quality, and without a decline in the yield of goods and services over time.

Sustainability – use and growth of natural resources to meet present and future needs.

Thinning – cutting some of the trees to reduce competition and improve growth.

Understory – layer formed by the leaves and branches of the smaller trees under the forest canopy.

Urban and community forestry – a program operated in cooperation between the USDA Forest Service and the National Association of State Foresters to provide statewide leadership through information dissemination, technical assistance, grants to local units of government, and networking of resources among various levels of government.

Urban forest – the trees and forests that belong to a municipality, town, community, city which includes tree-lined streets, right-of-ways, open space, parks, and recreation areas.

Veneer – a thin sheet of wood produced by rotary cutting, slicing, or sometimes sawing used to make plywood and cover other wood products.

Watershed – a region or land area drained by a single stream or river or network of streams and rivers.

Wildland Urban Interface – the line, area, or zone where structures and other human development meet or intermingle with undeveloped land.

Forest Fever

Environment

Management Guidelines

Name: ***Date:***

Hunting - Allow hunting to keep population of game species in check and to prevent the spread of disease in overpopulated herds.

Fire - Use prescribed burning, which benefits the health of forests. Check for weather like relative humidity, wind direction, and wind speed.

Wildlife Management Area - Establish a wildlife management area to protect endangered species and other wildlife that need a habitat.

Harvesting Trees - Thin trees between 15-25 years of age. Final harvest should be between 60-120 years of age. Divide your forest into harvest stands and leave buffer strips between stands.

Planting Trees - Plant trees to ensure the regeneration of a new forest and to protect watersheds.

Building a Road - Build roads when necessary for recreation or harvesting.

Creating a Trail - Make sure that trails are away from wetlands to help avoid erosion and soil compaction.

Timber Sales - Use reproduction harvests sustain forests, maintain wildlife habitat, and create a distribution of age, size, and species of trees.

Buffer Zones - Use buffer zones to protect sensitive areas such as wetlands, bodies of water and endangered species habitat. Also, leave trees between harvest stands as travel corridors for animals.

Creating a Campground - Be mindful of how human activities affect the natural habitat. Build an access road or trail to the campground. Thin no more than 40% of the stand in the campground area.

Forest Fever

Economic

Management Guidelines

Name: ***Date:***

Hunting - Allow hunting to provide revenue from hunters.

Fire - Set prescribed burns to clear out undergrowth. Less competition increases the growth rate of desired trees.

Wildlife Management Area - Manage the forest so people want to visit and enjoy the diverse environment.

Harvesting Trees - Thin trees between 15-25 years of age. Final harvest should be between 120-160 years of age. Divide your forest into harvest stands and leave buffer strips between stands.

Planting Trees - Replant new seedlings within 2 years of harvesting timber to ensure quick growth and less competition with other vegetation.

Building a Road - Build a road to get to harvest areas. Build roads to keep down maintenance costs and to protect the ecosystem.

Creating a Trail - Create trails to provide income through fees. Create trails to avoid harvesting areas.

Timber Sales - Trees between 60-120 years old generate the most revenue. Trees younger than 20 are less valuable. Diseased or damaged trees can be sold after they're cut.

Buffer Zones - Create buffer zones between harvest stands.

Creating a Campground - Campgrounds create revenue through fees. Build a road or trail to access the camping area, and thin no more than 40% of the area.

Forest Fever

Social

Management Guidelines

Name: ***Date:***

Hunting - Allow hunting as a social pastime.

Fire - Set prescribed burns to create a more attractive forest. Notify local communities of prescribed burn before setting.

Wildlife Management Area - Create a wildlife management area to meet society's goals of protecting and enjoying wildlife. Forestry practices can create habitat and species diversity.

Harvesting Trees - Cut damaged or infected trees. Thin trees according to guidelines for campgrounds, roads, and trails. Leave buffer zones near roads and houses to maintain beauty.

Planting Trees - Plant trees for shade, recreation, and aesthetics and to improve our quality of life.

Building a Road - Build a road for user access to campground. Use no more than 5% of harvest stand to build a road.

Creating a Trail - Build trails for user enjoyment. Use no more than 5% of harvest stand to build a trail.

Timber Sales - Harvesting timber creates products society wants and needs.

Buffer Zones - Create buffer zones around roads, trails, campgrounds, and neighborhoods to maintain natural beauty.

Creating a Campground - Build a campground for people to enjoy the forest. First, build an access road or trail. Next, thin the trees for campground space up to 40%. Finally, build the campground.

Forest Fever

Environmental Conditions

Management Guidelines

Name: ***Date:***

Drought - Do not plant seedlings and do not schedule a prescribed burn.

Wildfire - Prevent severity of wildfire damage by scheduling prescribed burn or mechanical removal. After a wildfire is contained, damaged stands should be harvested.

Insects and Disease - If invading insects or disease are discovered, harvest entire affected area immediately, then replant.

Endangered Species - Cut damaged or infected trees. Thin healthy trees according to guidelines for campgrounds, roads, and trails. Leave buffer zones near roads and houses to maintain beauty.

Severe Storms - After the storm is over, selectively cut the damaged trees, then replant new ones

Invasive Species - Educate landowners about planting native species. Remove invasive species from the forest..

Forest Management Activity

Tool Kit

Forest Fever

Name: ***Date:***

FOREST MANAGEMENT HELPER TOOLS :

Check Finances - Clicking this icon lets you check your finances. The Finances Box will lists your current total balance and the costs and values of each action you have performed.

Management Plan Book - You can refer to the management guidelines discussed in earlier portions of the program at any time during the game. To do this, click the "Management Plan Book" button. Select the management goal area you'd like to research (environment, economic, social, or natural concerns). After you have finished, click the "Close" button to return to the management activity.

Selection Tool - You must choose the selection tool to select an area of the forest that you would like to manage. First, click the square-shaped icon.Then click your mouse down and drag it across the area you would like to manage. When you've selected the area, release the mouse. You can move the selection area after you've chosen it by clicking inside the selection area and dragging it to a different location. After you've chosen the area, choose the icon for the tool you would like to use on this area, such as hunting, cutting trees, campground, etc. NOTE: Do not release the mouse directly over a tree; this may cause the selection area to disappear, and you will have to choose the management area again.

Stop/Start Timeline - You can stop the progress of the activity at any time by clicking the "StopTimeline" button directly to the right of the timeline bar. When you are ready to resume, click the same area, which will read "Start Timeline".

FOREST MANAGEMENT ACTION TOOLS :

Buffer Zones - Clicking this icon lets you establish a buffer zone around a water body, neighborhood, road and endangered species. After the icon is clicked, you can roll over the forest and buffer zone possibilities highlight. When you click on a highlighted area, a buffer zone is built.

- If you do not build a buffer zone, you will lose environmental points.
- If you cut trees around a stream without a buffer zone in place, you will lose environmental points.
- If you build a road or trail without making a buffer zone, you will lose social points.

Build a Road - Clicking the road-shaped icon lets you build a road through the forest. First, use the selection tool to choose the placement of the road. Next, choose the icon to pave a road in that area. If the chosen area has not been cleared enough, a message will appear and the action will not be performed.

- Initial building funds will be taken from your finances and affect the economic score.
- Maintenance costs will affect the economic score
- Gradual points will be added to the social score.

Forest Management Activity

Tool Kit

Forest Fever

Name: ***Date:***

FOREST MANAGEMENT ACTION TOOLS (CONTINUED) :

Create a Campground - Clicking this icon lets you build a campground. First, use the selection tool to choose the placement of the campground. Next, choose the icon to build a campground in that area. A picnic table graphic overlay will appear. If the chosen area has not been cleared enough, a message will appear and the action will not be performed.

- Initial building funds will be taken from your finances and affect the economic score.
- Maintenance costs will affect the economic score.
- Gradual points will be added to the social score. You must maintain adequate forest cover to keep the campground.

Create a Trail - Clicking this icon lets you blaze a trail in the forest. First, use the selection tool to choose the placement of the trail. Next, choose the icon to make the trail. If the area has not been cleared enough, a message will appear and the action will not be performed.

- Trail building fees and maintenance costs will be taken from your finances and affect the economic score.
- Gradual points will be added to the social score.

Harvest Trees -Clicking this icon lets you cut trees. First, use the selection tool to choose the area to be harvested. Next, choose the icon to cut trees in that area. A slider bar will appear that lets you to determine the age range of the trees and the percentage of that range to be cut (from 1-100%). You can choose both a minimum and maximum age for the trees. After you choose the age range and percentage, click "Cut" to perform the action.

- You will gain economic points for this choice. The amount of money you get depends on the number and age of trees cut.

Hunting - Clicking this icon lets you create a hunting area. First, use the selection tool to choose the area to be used for hunting. Next, choose the icon to assign hunting grounds to that location. A graphic animation will appear to indicate that this tool has been selected. Additionally, a graphic overlay of the word "hunting" will appear on the area.

- You will receive points on the social score.
- Initial building funds will be taken from your finances and affect the economic score.
- Maintenance costs will affect the economic score. You must maintain adequate forest cover to keep the hunting grounds.

Forest Management Activity

Tool Kit

Forest Fever

Name: ***Date:***

FOREST MANAGEMENT ACTION TOOLS (CONTINUED) :

Plant Trees - Clicking this icon lets you plant new trees. First, use the selection tool to choose the area in which to plant. Next, choose the icon to plant trees in that area. A slider bar will appear that allows you to choose the number of trees to plant in the area.

Prescribed Burning - Clicking this icon lets you set a prescribed burn. The prescribed burning tool calculates all of the forest that is safe for a prescribed burn and determines the score for this area. A graphic animation will appear to indicate that this tool has been selected.

- A prescribed burning fee will be taken from finances and affect the economic score.
- The prescribed burning tool sets the underbrush and pine straw counters back to zero so that if a wildfire starts, it will spread less rapidly.

Wildlife Management Area - Clicking this icon lets you create a wildlife management area. First, use the selection tool to choose a wildlife management area. Next, choose the icon to assign the wildlife management area to that location. A graphic animation will appear to indicate that this action has been performed. Additionally, a paw print graphic overlay will appear on the area.

- You will receive environmental and social points for this choice.
- Maintenance costs will affect the economic score. You must maintain adequate forest cover to keep the hunting grounds.

Saving Screenshots

Additional Resources

Directions to save screenshots during CD-ROM play:

1. Open Word or your word processing program before you launch the CD-ROM.

2. While you are playing the game (and you are at a point that you would like to share your progress with another player or team) press the "Print Screen" button on your keyboard.

3. Next, press "Alt-Tab" to see other open programs. Choose Word (or your word processing program).

4. Go to your empty document and press "Ctrl V" to paste the screen shot into the document. (Press "Enter" to make a hard return if you are pasting several screen shots in your document, otherwise you will paste over the first screen shot.)

5. Click "Launcher" on your start bar to return to the CD-ROM game.

Credits

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