

Time Frame
5 Class periods

OVERVIEW

Key Words

Algonquin
Land Use
Forest Succession
Silviculture

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From Forest to Farm and Back Again uses Harvard Forest in Petersham, Massachusetts as a case study for students to unearth the history of land use from colonial settlement to the emergence of modern America. Students will examine, interpret, and analyze physical and cultural patterns of forest use and management over a 300-year period.



Wilderness Home

Photo courtesy of Lycoming County Historical Society, Pennsylvania

OBJECTIVES

National Council for History

- The student will understand how environmental values of European economic life took root in the colonies.
(Era 2, Colonization and Settlement: Standard 3)
- The student will understand the impact of the American Revolution on politics, economy, and society.
(Era 3, Revolution and the New Nation: Standard 2)

National Standards for Social Studies

- The student will employ processes of critical historical inquiry to reconstruct and interpret the past, such as using a variety of sources and checking their credibility, validating and weighing evidence for claims, and searching for causality.
(Standard II, Time, Continuity and Change)
- The student will examine, interpret, and analyze the physical and cultural patterns and their interactions, such as land use, settlement patterns, and ecosystem changes.
(Standard III, People, Places and Environments)

LESSON PLAN

Day 1

Set the stage for this activity by leading a group discussion answering the following questions:

1. What do you think the conditions of the woodland ecosystems were when Europeans first began settling this area?
2. What do you think the condition of the woodland ecosystems would be 100 years later?
3. What would have been the primary cause of the ecosystem change?

Assign Worksheet 1 and Worksheet 2 and have students read the Essay in order to answer the questions. **(Student Pages 1-7)**

Day 2

Assign Worksheet 3 and have students study the History of Petersham and the Harvard Forest Dioramas to answer the questions. **(Student Pages 8-11)**

Day 3

Assign Worksheet 4 and have students study the Population Density Maps to answer the questions. **(Student Pages 12-13)**

Day 4

Assign Worksheet 5 and have students analyze the Diagram to answer the questions. **(Student Pages 14-15)**

Day 5

Teachers can choose one of three types of assessments.

- The Application and Integration Exercise has been designed to allow students to integrate the content into broader contexts. **(Teacher Page 4)**
- The Test has been designed to measure how well students master the History objectives. **(Teacher Pages 5-6)**
- The Reflective Exercise has been designed to measure how well students master the Social Studies objectives. **(Teacher Page 7)**

Use Teacher Answer Key to grade assessments. **(Teacher Pages 8-11)**

CLASS EXTENSIONS

- Organize field trips to two different forests, one managed by industry and one managed by state parks. Compare and contrast the forest management activities and the condition of the forest.
- Research the 400-year history of a local forest.

TEAM TEACHING POSSIBILITIES

Technology: Have students create a PowerPoint presentation describing the changes to the forest ecosystem (clearing forests, farm abandonment, return of second-growth forests) in Petersham, Massachusetts following the arrival of the Europeans.

English: Using the essay, the historical record ("Petersham History,") and Worksheet 3 as a guide, ask students to create 3 short, fictional, first-hand accounts (in the form of journal entries) that describe the physical landscape of Petersham, Massachusetts in 1700, 1740, and 1850. In addition to describing the changes in the land, students also should speculate about how alterations to the landscape may have affected the daily lives of people in the area between 1700 and 1850.

Math: Since Worksheet 4 incorporates math skills, this exercise could be introduced in a social studies class and completed in a math class. Alternatively, math teachers could build on this activity by having students analyze and answer questions regarding historical maps that require similar mathematical skills.

Science: Because a major theme of the activity focuses on how the arrival of Europeans affected the various forest ecosystems over time, science teachers could have students study how either plant life or wildlife changed in a local forest (following European colonization) as a result of human interaction with the land between 1700 and 1850.

LINKS

Forest History Society--Bibliographic resources on forestry, conservation and environmental history. <http://www.foresthistory.org>

Harvard Forest--A base for research and education in forest biology, silviculture and forest management, soil, forest ecology, and economics. [Internet.edu/hfr](http://internet.edu/hfr)

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ASSESSMENT 1: APPLICATION AND INTEGRATION

More than a walk in the woods

Questions for a Field Trip to a Forest

1. When was the last time this forest was cleared?
(How tall are the trees? How big is the diameter of the tree trunks?)
2. Is the stand of trees even-aged or variable?
(Are trees a mixture of tall and short trees, fat and skinny trunks?)
3. Are there any contours in the forest floor that indicate the past use of the land?
(Logging roads leave skid marks. Row crops leave furrows.)
4. Are there any scars on the trees that indicate a forest product was harvested?
(Maple sap for syrup, pine sap for turpentine)
5. Are there any rare or endangered species in your region present in the forest?
(A call to your local conservation agency would be able to tell you how to look for them.)
6. Who is managing the forest and for what purpose?

ASSESSMENT 2: TEST

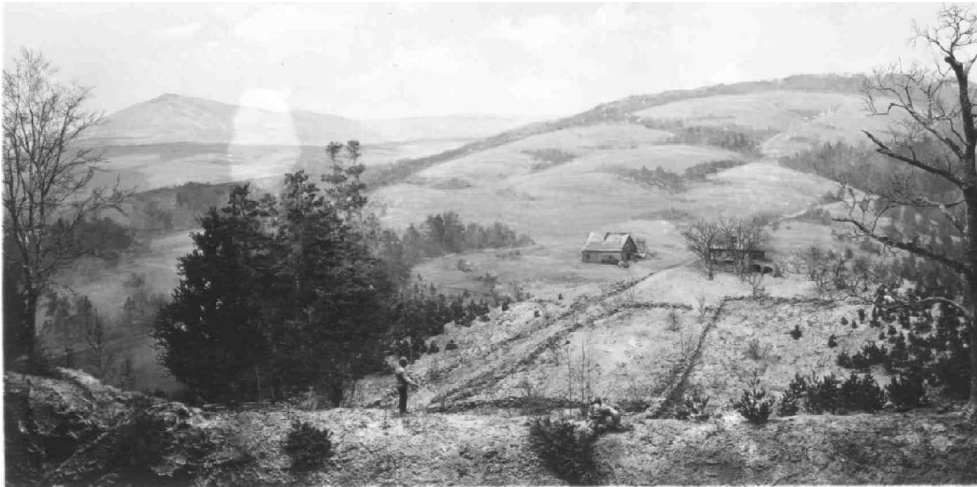


Figure 1

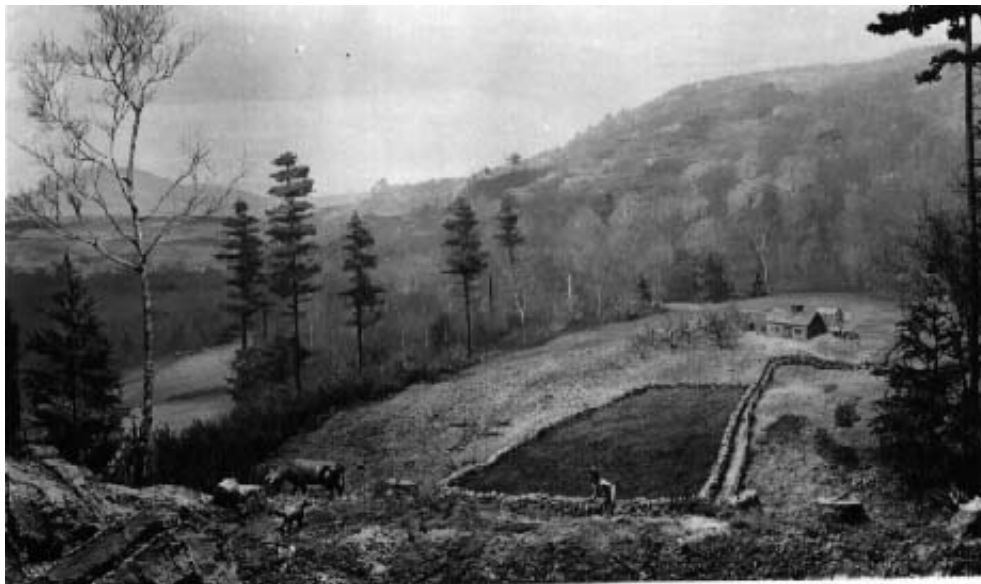


Figure 2



Figure 3

Questions

1. Which diorama depicts Native American New England in 1700?
2. How many people / km² were living on the land in 1700?
3. How did they manage the forests?
4. What products and services were derived from the landscape?
5. What technologies did they have to do this work?
6. Which diorama depicts colonial New England in 1740?
7. How many people / km² were living on the land in 1740?
8. How did they manage the forests?
9. What products and services were derived from the landscape?
10. What technology did they have to do this work?
11. Which diorama depicts post-revolutionary New England 1850?
12. How many people / km² were living on the land in 1850?
13. How did they manage the forests?
14. What products and services were derived from the landscape?
15. What technology did they have to do this work?
16. What evidence of European environmental values is visible in the dioramas?
17. What was the impact of the American Revolution on the goal of New England farmers?
18. What was the impact of westward expansion between 1801 and 1861 on communities in the east?

Assessment 3: In Your Own Words

Write an essay using a variety of sources to examine and analyze the physical and cultural patterns of land use, settlement patterns and ecosystem change.

Finding Out Forest History

Use notes below as a guide to writing a cohesive essay.

Paragraph 1: Take a stance.

Do historical artifacts--photos, maps, documents, dioramas--give clues to ecosystem change. Why or why not?

Body: Back up your argument with proof.

List your sources. Analyze their credibility and validity. Describe the evidence gleaned from each one.

- Photographs: Wilderness Home, Worm Fence, Diorama 1, 2, 3
- Documents: History of Petersham
- Web Information: The Nipmuc People, Indian Tribes Map
- Graphs: Changes in Land Use
- Diagrams: Forest Succession
- Maps: Forest Cover in 1930, Forest Cover in 1985, Population Density 1765, 1831
- Secondary Sources: From Farm to Forest and Back Again

Last Paragraph: Conclusion.

Restate your stance. Summarize your proof. Speculate on the long-range implications of your argument for society.

TEACHER'S ANSWER KEY

Worksheet 1: Keywords

Algonquin

1. The Native Americans living in the area were a group of Algonquin-speaking people referred to as the Nipmuc.
2. **The language group of many northeastern Native Americans.**

Land Use

1. In 1771, an inventory of the land use in Petersham reported 845 acres of livestock pasture, 443 acres of crop tillage, 958 acres of upland mowing, and 256 acres of meadow.
2. **The ways land is used by its inhabitants.**

Forest Succession

1. It is estimated that at least half of the open land went out of farming by 1870 and the process of forest succession began to reclaim the land.
2. **The pattern of change in the composition of plant species over time.**

Silviculture

1. By 1914, the Harvard Research Forest became a year-round headquarters for teachers and graduate students studying silviculture and forest management.
2. **The science of growing and harvesting trees.**

Worksheet 2: Essay Analysis

1. Create a pie chart, contrasting the amount of cleared land (and pasture) to forest for the years 1675, 1750, and 1850.

1700 - 72% forest 28% cleared

1740 - 53% forest 47% cleared

1850 - 35% forest 65% cleared

2. How many people /km² were present in central Massachusetts in 1700?

About 3 people per square kilometer.

How were the Native American people manipulating the landscape in 1700?

The Nipmuc cleared small patches of land in the village they called Nichewaug for Indian corn, squash, beans, and tobacco. They also burned regularly to clear large swaths of the forest to improve habitat for game animals. They harvested all the materials to build their homes, transportation, and house wares from the trees in the forests.

3. How many people / km² were present in central Massachusetts in 1740?

About 5 people per square kilometer.

How were the subsistence farmers manipulating the landscape in 1740?

Land was cleared for pasture, crop tillage, upland mowing, and meadow.

4. How many people / km² were present in central Massachusetts in 1850?

22 people per square kilometer

how were the lumber merchants manipulating the landscape in 1850?

Old growth forest was cleared to make way for dense plantations of second growth white pine.

Worksheet 3: Historical Record Analysis

1. What eyewitness evidence does this history give about Native American management of the landscape?
"Nichewaug Hill, so called by the natives, whereon, as in some other parts of the town, they had formerly planted fields of Indian corn, of which there remained evident traces when the first English settlers began there."
2. What eyewitness evidence does this history give about the use of timber for shelter in 1793?
"The houses are large and well finished, standing on either side of the street."
3. What eyewitness evidence does this history give about the types of trees that were planted by the settlers? **The land in this place is exceedingly favorable to the growth of all kinds of fruit trees, being high and warm; and here are large and excellent orchards.**
4. What drink were farmers able to provide to both residents and neighboring towns? **Much cyder is made here, beyond what the inhabitants consume; but they find a ready market for the surplus in the newer settlements.**
5. What eyewitness evidence does this history give about the amounts and types of crops grown on the land in 1793? **The soil is rich and fertile, and the lands bear all kinds of grain, but most natural to grass and pasturage, and from the appearance and face of the town, we must judge the inhabitants to be industrious and wealthy, who subsist mainly by the cultivation of the earth.**
6. What eyewitness evidence does this history give about the industries in Petersham in 1793? **On each of [the streams] there are both corn and sawmills, and clothiers' works; and by the sides of both there are considerable bodies of good meadowland. Here are works for making pot and pearl ash, where much business is profitably carried on, and many persons employed.**
7. Describe the scene in each diorama.
1700: Dense old growth forest of red maple, beech, birch, red spruce, balsam fir.
1740: A subsistence farm with saw-log house and barn, livestock, pasture, stonewalls, forests on hills in background.
1850: A farm, once prosperous with all forest in sight cleared, row crops and orchard, a brick house and big barn, now abandoned.

Worksheet 4: Analyzing Historical Maps

1. How many people lived in Petersham in 1765? **700 People**
2. If we use the 1765 population density map and the 1771 inventory, we can estimate roughly how many acres of forest must have been cleared to meet the needs of one person in Petersham in the 1768. What is your estimate? **3.5 acres/person**
3. How many people lived in Petersham in 1831? **1700**
4. If the ratio of people to cleared land were the same in 1831 as it was around 1768, how many acres of forest would have been cleared in 1831?
 $1700 \text{ people} \times 3.5 \text{ acres/person} = 5950 \text{ acres}$
5. The 1771 inventory stated that the total of pasture, tillage, mowing and meadow was 2,502 acres or 12% of the town. What was the total acreage of the town?
 $\text{Total acres} = 2502 \times 100 / 12 = 20,850 \text{ acres}$
6. Based upon your answers to questions 4 & 5 above, what percentage of the town would have been cleared in 1831?
 $5950 / 20,850 = 28\%$
7. Does this percentage match the map depicted in Figure 4? Why or why not?
No, because settlers cleared more land to grow more produce for market and used more wood for industry.

Worksheet 5: Analyzing a Diagram

1. List the species present on a site three years after abandonment. **Blackberries, sumacs and other shrubs**
2. Which species competes most successfully on an abandoned Massachusetts agricultural site for the first 80 years? **White Pine**
3. What conditions favor the sprouting of trees like beech, maple and oak? **Moist soil and enough shade to suppress pine seedlings.**
4. In which stage do you think Harvard Forest would have been in 1903 when the research forest was created? **Stage 4.**
5. What stage would it be in now? **Stage 6.**

Assessment 1: Test

1. Which diorama depicts the forest in 1700?

Figure 3

2. How many people / km² living on the land in 1700?

About 3 people

3. How did they manage the forests? **Burning the under story and clearing small patches of land for agriculture.**

4. What products and services were derived from the landscape? **Materials for food, clothes, housing, and tools.**

5. What technologies did they have to do this work? **Stone tools and fire.**

6. Which diorama depicts the forest in 1740? **Figure 2**

7. How many people / km² were living on the land in 1740? **About 5 people**

8. How did they manage the forests? **Clearing for pasture, tillage, mowing, and meadow.**

9. What products and services were derived from the landscape? **Materials for housing and tools.**

10. What technologies did they have to do this work? **Fire, forged iron tools and oxen.**

11. Which diorama depicts the forest in 1850? **Figure 1**

12. How many people / km² were living on the land in 1850? **20**

13. How did they manage the forests? **Clearing forests to create surplus livestock and row crops.**

14. What products and services were derived from the landscape? **Surplus livestock and produce to sell for profit.**

15. What technologies did they have to do this work? **Fire, forged iron tools, oxen and a network of roads.**

16. What impact did 100 years of agriculture have on the condition of the forest of today?

The mowing, plowing, grazing and deforesting made a new type of forest, one that does not correspond to highlands or lowlands.

17. What was the impact of the American Revolution on the goal of New England farmers? **They switched from subsistence farming to mercantile farming—growing a surplus to sell at local markets and increase their personal wealth.**

18. What was the impact of westward expansion between 1801 and 1861 on communities in the east? **Agriculture shipped by train from farms in the Midwest put the rural eastern farmers with only wagons for hauling out of business.**