

# Finding the Forest through the Trees

## Forest Succession

### Grade Levels 10 – 12, Alternative Education Program

**Objectives:** In order to understand the essential question of “How do forests return after a disturbance?” students compare and contrast multiple photos of an area and learn about forest succession. Students observe photographs, learn about forest succession, predict the age difference of two photographs, and paint ceramic tiles. *Time Needed: 4 hours*

#### Vermont’s Framework of Standards and Learning Opportunities:

7.15 Theories, Systems and Forces: (analyze and explain natural resource management)

1.16 Artistic Dimensions: (relate arts knowledge and skills within & across disciplines)

#### Grade Level Expectations:

Natural Resources S9-12:49: (processes and change within Natural Resources)

Making Connections A16: (connections between/among the arts and other disciplines)

#### Materials & Resources:

*Landscape Change Program* Archive, [www.uvm.edu/landscape](http://www.uvm.edu/landscape)

Images: LS00781, LS07902, LS5997, LS02054, LS06228,

Extension Photos: LS04027, LS11203, LS00410, LS00226, LS09044 and LS02856

Photo Analysis and Ceramic Tile Prompt Sheet (below)

Tree Identification Sheet (see below)

Forest Succession Sheet (see below)

#### Activities:

<p style="text-align: center;"><b>1. Hook Your Students</b></p> <p>Students examine and analyze a photograph to determine if the forest is old or young. Students brainstorm ways to determine the age of a forest. Use picture LS06228_000 as an example of a landscape where the forest is beginning to take back the fields.</p>	<p style="text-align: center;"><b>4. Culminating Activity</b></p> <p>Students create an artistic rendition of one stage of forest succession on a ceramic tile. Each student does a different stage. When complete, students group their tiles to show the complete range of stages of forest succession.</p>
<p style="text-align: center;"><b>2. Introduce Concepts</b></p> <p>Students compare images from the <i>Landscape Change Program</i> showing change over time of landscapes, making observations about the differences/similarities. Students identify trees and interpret stages of forest succession.</p>	<p style="text-align: center;"><b>5. Assessment</b></p> <p>Conduct teacher-student <i>discussions</i> to assess worksheets, photo analysis/age comparison essay, and ceramic tile, having students correct their work after teacher review and correct grouping of tiles.</p>
<p style="text-align: center;"><b>3. Apply Skills</b></p> <p>Students write analyses of photos for forest succession. Skills include: compare and contrast, observation, photo analysis, tree identification, forest analysis.</p>	<p style="text-align: center;"><b>6. Extensions</b></p> <p>Look at local woods to determine the age, and predict how it will look in 50 years. Find historic photos of high school (CVU) before and after construction and upload them to the LCP website.</p>

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## Lesson Plan Details

*Detailed summary of curricular format:*

### Overview:

Students will be shown samples of various local trees and shrubs – maple, oak, white pine, red pine, sumac, beech, cedar, hemlock, birch, tamarak. Students will identify the species, and use that knowledge to understand forest succession.

Students will then observe pairs of photographs (one historical, one current) of areas that show deforestation in one photograph and reforestation in another. Students will make observations of the photographs. Students will identify the species of trees in the photographs. Students will learn about forest succession, how to determine the age of a forest and attempt to determine the age difference of certain photographs based on their knowledge of forest succession. The purpose of this activity is for students to make observations, comparisons and understand the stages of forest succession and how it relates to the history of Vermont's landscapes.

Day 1: The Hook ( One 60 minute session): Students will use photo LS06228\_000 as an example of a Vermont forest. They will be asked to make observations and describe what they see or don't see. They will be asked to respond to the following:

- List some objects in the photo
- Describe the scene
- What does the photo show?
- Describe the vegetation
- What clues could you use to help identify the location of the photo?
- What do you notice about the fields in the background?
- Why do you think I chose this photo to start our discussion about forest succession?
- How can current landscapes be improved or restored?

Look at the following pairs of LS 07902\_000 / 001 and LS05997\_000 / 001 and describe what you see.

- What is similar about each pair?
- What is different about each pair?
- How do you know they are taken from the same spot?
- How has the landscape changed from one picture to the other?
- What is the time difference between the two photographs?
- Why do you think the landscape has changed?

Day 2: Background information – Tree identification (One 60 minute class): Students will use samples of trees (from different stages of succession) and tree identification books to complete a Tree Identification sheet. Students will try to determine why the Tree Identification sheet is organized the way it is (in order of forest succession). Students will be introduced to forest succession.

Day 3: Forest Succession (60 min): Using their Tree Identification sheets, students will be introduced to the types of tree species that forest an area. Students will be introduced to terms such as *pioneer species*, *climax species*, *shade tolerant / intolerant species*. Students will then learn about the progression of forest succession and the species that occur at each stage. (Complete forest succession table).

Students can also use the *Landscape Change Program* to look at the “Tree History Part I” PowerPoint to look at different tree species as well as explore the usefulness of historic photos in tree identification and understanding the history and usefulness of trees in Vermont.

Students will then use the *Landscape Change Program* photos of the Vermont landscape to analyze forest succession. Using pictures LS 07902\_000 / 001 and LS05997\_000 / 001, students will describe what stage of succession the forests are in and estimate how long the forest has been growing.

Day 4: Photo analysis summary (60 min):

Students will be shown two photograph pairs (Rte 7 in Charlotte LS07902 and of the view from Mt. Philo – LS5997) and be asked to estimate the age difference between the two. They will use their tree identification sheets and their knowledge of forest succession to determine the current stage of succession and the amount of time it has taken to get to that stage. Students will write a short summary explaining their reasoning using forest succession evidence to support their analysis.

Day 5: Culminating Activity: Creating a ceramic tile (60 min):

Students will work in groups to depict forest succession using ceramic tiles. Each student will create one tile using carbon paper to transfer a drawing of an image of a stage of succession onto a ceramic tile. They will then paint it and arrange their tiles with those of their classmates in order to show the various stages of forest succession.

Extension:

Students will determine the age / stage of the woods behind Champlain Valley Union HS (CVU) campus as well as the woods behind the Life Program (two separate areas). Using their tree identification sheets and forest succession tables, students will analyze these woods. They will then look at the *Landscape Change Program* website for historical photos of CVU. They can also find historical pictures of CVU from the various stages of construction and upload them to the website.

Students could create a field guide to help interpret photos on the website or help them to identify the specific forest community that might emerge dependent on the climate.

Resources: Reading the Forested Landscape by Tom Wessels  
Wetland, Woodland, Wildland: A guide to the Natural Communities of Vermont by Elizabeth H. Thompson

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## Photo Analysis essay:

Given the two photos, your task is to determine the age difference between the two photographs. Be sure to answer the following prompts in your analysis. Students will be assessed on their knowledge of succession, tree identification and their use of evidence to substantiate their findings.

- What types of trees are shown in each photograph?
- What differences and similarities exist between the photos?
- Give a brief summary of your understanding of forest succession.
- Determine the stage of succession represented in the most recent photograph.
- Using your knowledge of forest succession, determine the difference in age between the two photographs.

## Culminating Activity – Creating a ceramic tile:

Students will be broken into groups of 4-5 and as a group will show the stages of forest succession on ceramic tiles. Students can choose to represent forest succession any way they choose, however viewer must be able to walk away with a clear understanding of forest succession.

- Each group must represent the entire continuum of succession.
- Each tile should be in color
- Students should include an example of tree species found at each stage
- Tiles should be arranged in correct order of succession
- Tiles should be clear so that the viewer understands forest succession

# Tree Identification

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Sample Name / Drawing:	Shade Tolerance	Description (height, age limit, etc)
Tamarak		
Willow		
Sumac		
Paper Birch		
Poplar		
Red Pine		
White Pine		
Red / White Oak		
Silver Maple		

# Tree Identification

Sample Name / Drawing:	Shade Tolerance	Description (height, age limit, etc)
Cedar		
Spruce		
Red Maple		
Hemlock		
Beech		
Sugar Maple		

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## Forest Succession

Stage	Description	Shade Tolerance	Species	Length of stage (years)
1 <sup>st</sup> – Pioneers / Shrubs	Quick growing shrubs and small trees. First to occupy site after clearing	<i>Very intolerant</i> - need lots of sun	Hardhack, Sumac, Tamarak, Willow	1 – 5 years
2 <sup>nd</sup> Young saplings	As the trees grow up, crowns close in and limit sunlight – seedlings cannot survive in canopy	Intolerant	Birch, Poplar, Red Pine	5 - 15 years
3 <sup>rd</sup> – Young mixed wood	New species that have higher tolerance for shade come in and become established	Intermediate	White Pine, Oaks, Silver Maple	50 years
4 <sup>th</sup> Maturing mixed wood	Beneath the canopy created by the mixed woods, more shade tolerant trees become established	High	Cedar, Spruce, Red Maple, Hickory	75 years
5 <sup>th</sup> Climax	The most shade tolerant trees are able to become established – seedlings of these species thrive in the shade of their parents	Very High	Hemlock, Beech, Sugar Maple	150 years