



How about Taking a Bird's Eye View of the Forest?

Middle School Food and Agricultural Literacy Curriculum

Precepts

- K. Emotional Growth
- K1. Cope with life's trials.

National Standards

- NRS.03.01.01.a. Describe forest harvesting methods.
- NL-ENG.K-12.12 – Applying Language Skills
- NS.5-8.3 – Life Sciences
- NSS-G.K-12.5 – Environment and Society

Student Learning Objectives

- As a result of this **unit** the students will...
- Explain the basic concepts of the forestry industry.
- As a result of this **lesson** the students will...
- Recognize the rationale behind different harvesting techniques.

Content Outline

Objective 1. Recognize the rationale behind different harvesting techniques.

- I. **Silviculture: The art and science of managing and regenerating forests to control their composition, structure, and growth.**
 - A. Systems of **silviculture**
 1. **Clear-cutting system:** a system that requires removing all of the trees in a **stand** (defined as a group of trees similar enough in species composition, condition, and age distribution to be considered a unit; however, the trees may or may not be the same age). Seedlings are planted to establish a new **stand**. New trees can also regenerate from the seeds from a nearby **stand** or from the forest floor.
 2. **Seed-tree system:** A system that removes the majority of mature trees but leaves a few good seed-producing trees. These seed trees will produce the seeds to establish a new **stand**.

Time

Instruction time for this lesson: 45 minutes.

Resources

Center For Environmental Learning. (2009). Project Learning Tree: PreK-8 Environmental Education Activity Guide. Washington, D.C: American Forest Foundation. — Idaho Forest Products Commission. (2009). Harvesting methods and options. Retrieved August 20, 2009, from <http://www.idahoforests.org/harvopt1.htm> — National FFA Organization. (2003). LifeKnowledge Precepts and Signs of Success.

Tools, Equipment, and Supplies

Overhead projector/transparencies
MS.NR.5.4.TM.A – one per teacher
8-1/2x11" white copy paper – two sheets per student
Markers – several per student
Modeling clay or Play-Doh (approximate amounts = brown: 1/2"x 1/2"cube, green: 1/2" x 1" piece) per student
Large paper plates– one per student
MS.NR.5.4.ASSESS.A – one per student

Key Terms

The following terms are presented in this lesson and appear in **bold italics**:

Silviculture

Stand

Clear-cutting system

Seed-tree system

Shelterwood system

Group selection system

Single-tree selection system

3. **Shelterwood system:** This harvesting method removes certain trees to establish new seedling growth under the protection of the trees that are left. Enough mature trees are left to shelter the site until the new growth is well established.
4. **Group selection system:** Small groups of mature trees are harvested and intermediate size trees are thinned frequently. This system resembles a miniature clear-cut and is advantageous to wildlife that has adapted to the older forest habitat.
5. **Single-tree selection system:** Each tree's individual merit is considered and the trees are selectively harvested as they mature, leaving the majority of trees on a site standing. This system is also used to remove dead and diseased trees to protect the health of the forest.



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Interest Approach

This interest approach will allow students to relate the different forestry harvesting techniques to their lives by thinking about different hair cuts and how there are different haircuts for different desired results just as there are different tree-cutting plans for the different desired harvest results. Optional: For dramatic interest, you could plug in a set of clippers (human or animal) and turn them on and off before you ask the question!

Who would like a buzz cut? What happens when we cut all of our hair off? Will it take a long time to grow back? Do we all want the same type of haircut?

Allow students to respond to the questions.

We don't automatically assume that we want to cut all trees down, just like we don't assume everyone wants a buzz cut.

Yesterday we learned about the many different measurements and calculations that a forester must use to determine which trees to harvest and what they are worth. Another important decision a forester must make is how to manage and harvest different tracts of forest. This practice is called **silviculture** and is defined as the art and science of managing and regenerating forests to control their composition, structure, and growth.

Silviculture includes using different harvest techniques depending on the objectives set for the tract of land. Knowing about the reasons why the different systems of **silviculture** are used will allow you to make informed decisions about how the trees should be managed on the land you own or lease. Learning about **silviculture** will also benefit you if you are interested in a career in forestry or wildlife management or if you just plan to own land sometime in the future.

Today we will learn about the five systems of **silviculture** a forest manager can choose from to harvest and grow new trees within a forest **stand**. Let's continue to be focused learners as we consider the different techniques used for forest management.

Summary of Content and Teaching Strategies

Objective 1. Recognize the rationale behind different harvesting techniques.

You will be helping students understand reasons why a forest manager chooses among five systems of **silviculture** (**clear-cutting system**, **seed-tree system**, **shelterwood system**, **group selection system** or **single-tree selection system**) to harvest and grow new trees within a forest **stand**.

Have **MS.NR.5.4.TM.A** ready to project before class starts. Read the content on **MS.NR.5.4.TM.A** and discuss with the class, being sure that students are listening, not writing. Next, distribute two sheets of 8½ × 11" white copy paper and markers to each student. Then you will instruct students to create their own "Knowbook" (a foldable note sheet created for capturing information) with the information you have just discussed. You should model the steps for making the knowbook as you say the directions.

I. **Silviculture: The art and science of managing and regenerating forests to control their composition, structure, and growth.**

A. Systems of **silviculture**

1. **Clear-cutting system:** a system that requires removing all of the trees in a **stand** (defined as a group of trees similar enough in species composition, condition, and age distribution to be considered a unit, however, the trees may or may not be the same age). Seedlings are planted to establish a new **stand**. New trees can also regenerate from the seeds from a nearby **stand** or from the forest floor.
2. **Seed-tree system:** A system that removes the majority of mature trees but leaves a few good seed-producing trees. These seed trees will produce the seeds to establish a new **stand**.
3. **Shelterwood system:** This harvesting method removes certain trees to establish new seedling growth under the protection of the trees that are left. Enough mature trees are left to shelter the site until the new growth is well established.



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4. **Group selection system:** Small groups of mature trees are harvested and intermediate size trees are thinned frequently. This system resembles a miniature clear-cut and is advantageous to wildlife that has adapted to the older forest habitat.
5. **Single-tree selection system:** Each tree's individual merit is considered and the trees are selectively harvested as they mature, leaving the majority of trees on a site standing. This system is also used to remove dead and diseased trees to protect the health of the forest.

Today we will make a Knowbook using the information we just discussed about the different **silviculture** methods used by foresters to determine how to manage a **stand** of trees. When I say TREE, take the two pieces of paper each of us has and fold each sheet in half, hamburger style, place the two folded pages together to make an eight-page book and write the title, "Forest **Silviculture** Systems" on the front of the book. What questions do you have? TREE

Thank you for working so efficiently. Now, when I say GO, use five minutes to write or paraphrase the information on the transparency to list a different **silviculture** system on each page of your knowbook. Include what trees are harvested for each system and why that method is used. Also on each page, draw an illustration that corresponds with that harvest method. You can copy the illustrations on the transparency or come up with your own. Let's repeat those directions together. On each page you should include:

Encourage students to repeat directions.

1st **Silviculture** system name, 2nd what trees are cut, 3rd why that harvest method is used. And a drawing of what that method would look like. Excellent. What questions do you have? GO

Allow students to complete their books.

Now we will put the finishing touches on our knowbook. Turn to the back cover and put your name as author and illustrator. Even add your own copyright symbol if you like!

Allow students to finish.

Wow! Awesome work! Please take two minutes to turn to a partner and share each of your books.

Allow students to share their books and then call on two students to share their books with the class.

Let's hear a big "yahoo" to thank each participant for contributing to this lesson. Incredible! We have created some great books that compare the different **silviculture** systems. Now let's pause for a moment. We have learned that a tree can be harvested at whatever time the market deems it valuable. Likewise, a valuable service to society can come from a beginning middle school student as well as the upper class students. Every person has valuable contributions to make whether it is to a club, school group, church, or a community project so let's all take the time to look for those opportunities we can take advantage of to make a positive difference for someone. And when you do, I bet you will discover that it made a positive difference in you as well!

Review/Summary

For the next activity, you will give the students small amounts of brown and green modeling clay or Play-Doh (approximate amounts = brown: 1/2"x 1/2"cube, green: 1/2" x 1" piece) and a large paper plate. Do not give the clay out until you are ready for the students to use it, and take up any unused clay at the end of the activity. This activity involves the students dividing their plate equally into five sections and making a model of the different **silviculture** systems in each section of the plate. Help the students to follow the instructions below.

By making our Knowbook, we learned about the different methods to harvest and manage our forest. Now we are going to imagine what that area would look like after it has been harvested. Continue to remain focused and attentive. Now, turn to someone next to you and say, "What would the forest look like to an eagle flying overhead?"

Allow students to repeat the question.

We are going to create a model to see what each forest area would look like from a "birds eye view" after it has been harvested using each of the **silviculture** systems. In other words, your model will be a representation of how it would look if the observation is made looking down on the stumps, small tree seedlings, and the mature trees from above.



When I say DIVIDE, take 30 seconds to use a marker to divide your paper plate into five equal sections like pieces of a pie. What questions do you have? DIVIDE

Allow students to draw the sections on the paper plates.

Excellent! Now we are ready to use our Knowbooks and the transparency to help us decide what a **stand** of trees in the forest would look like after it is harvested using each of our five **silviculture** systems. Imagine that your paper plate is a large forest area with lots of trees and that each section has been harvested using a different system. When I say HARVEST, take five minutes to use the brown clay to represent stumps of harvested trees and the green clay to represent live trees, with tiny pieces representing small/seedling trees and larger pieces representing larger/mature trees. Label each section with the marker to identify which system the section of your plate represents. Use only very small pieces rolled into a ball and firmly pushed into location on the plate to make it stick. Remember that you have a limited amount of both space and clay to work with. What questions are there? HARVEST

Allow students to complete their model. Choose a student with an accurate model to share it with the class.

We did it! We learned how to manage our forests and used all of the **silviculture** systems to accomplish our purposes! Knowing what method to use to harvest our forests is crucial to successfully continuing to produce this valuable renewable resource. Thanks for being attentive and for being so creative today! Your effort made learning worth it!

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Application

Extended classroom activity:

Take a field trip to a tree farm to see the management techniques first hand.

FFA activity:

Invite a manager of a tree farm to come to a meeting and speak to the members about timber **stand** management and forestry-related careers.

SAE activity:

Utilize the different **silviculture** methods for use in your forest products, wildlife management, or outdoor recreation SAE.

Evaluation

MS.NR.5.4.ASSESS.A

Answers to Evaluation

1. B
2. A
3.
 - A. Clear-cutting system to remove all of the trees
 - B. Seed-tree system to remove most of the mature trees but leave some mature trees to produce seeds to establish a new stand.
 - C. Shelterwood system to cut some mature trees but leave others to shelter the seedlings
 - D. Single-tree selection system to judge each tree on its own merits and harvest trees as they become mature.
 - E. Group selection system to harvest small groups of similar trees.



Name _____

Directions: Read each statement and decide which answer choice the statement is identifying.

1. _____ **A stand is a unit of trees in the forest that must be the same size.**
 - A. True
 - B. False

2. _____ **Silviculture is the art and science of managing and regenerating forests to control their composition, structure, and growth.**
 - A. True
 - B. False

3. _____ **List the five silviculture systems that were identified in class and explain why each might be used.**
 - A. _____

 - B. _____

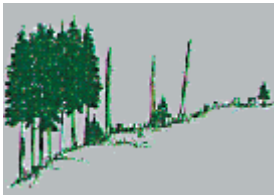
 - C. _____

 - D. _____

 - E. _____

Silviculture: The art and science of managing and regenerating forests to control their composition, structure, and growth.

Stand: A group of trees similar enough in species composition, condition, and age distribution to be considered a unit. Do not have to be trees of the same age, but they can be.



Clear-cutting System

Requires removing all of the trees in a stand. Seedlings are planted to establish new stand. Can also regenerate from seeds from a nearby stand or from the forest floor.



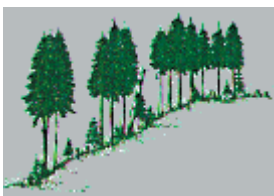
Seed-tree System

Removes the majority of mature trees but leaves a few good seed-producing trees. Seed trees produce the seeds to produce a new stand.



Shelterwood System

Removes certain trees to establish new seedling growth under the protection of the trees that are left. Enough mature trees are left to shelter the site until the new growth is well established.



Group Selection System

Small groups of mature trees are harvested and intermediate trees are thinned frequently to resemble a miniature clear-cut. Advantageous to wildlife that are adapted to an older forest habitat.



Single-tree Selection System

Each tree's individual merit is considered and trees are selectively harvested as they mature, leaving the majority of trees on a site standing. Used to remove dead and diseased trees.