

Course	Agricultural Science II
Unit	Forestry
Lesson	Planting Trees
Estimated Time	Two 50-minute blocks

Student Outcome

Describe how to plant and care for seedlings.

Learning Objectives

1. Identify how to develop a tree planting plan.
2. Identify how many trees should be ordered, and where the trees can be ordered from.
3. Identify how to care for seedlings before planting.
4. Identify how to plant tree seedlings.
5. Identify how to care for seedlings after they have been planted.

Grade Level Expectations

Resources, Supplies & Equipment, and Supplemental Information

Resources

1. PowerPoint Slides
 - ☐ PPt 1 – Planting Forest Trees
 - ☐ PPt 2 – Center Hole Method Using a Grubbing Hoe
 - ☐ PPt 3 – Slit Method Using a Tree Planting Bar
2. Handout
 - ☐ HO 1 – Uses of Trees
3. *Forestry* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1986.
4. *Forestry Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2008.

Supplemental Information

1. Internet Sites
 - ☐ Arbor Day Foundation Website. Accessed April 11, 2008, from <http://www.arborday.org/>.
 - ☐ Planting Trees in Your Landscape. Virginia Cooperative Extension. Accessed April 11, 2008, from <http://www.ext.vt.edu/pubs/envirohort/426-702/426-702.html>.
 - ☐ Tree Planting: In Your Backyard. USDA Natural Resources Conservation Service. Accessed April 11, 2008, from <http://www.nrcs.usda.gov/feature/backyard/TreePtg.html>.
2. Print
 - ☐ Slusher, J.P., and G. Hoss. *Before You Order Tree Seedlings* (Guide G5006). Columbia: University of Missouri Extension, revised 2000. Accessed May 27, 2008, from <http://extension.missouri.edu/explore/agguides/forestry/g05006.htm>.

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- ❑ Slusher, J.P., and T. Robison. *How to Plant Forest Trees* (Guide G5008). Columbia: University of Missouri Extension, reviewed 1993. Accessed May 30, 2008, from <http://extension.missouri.edu/xplor/agguides/forestry/g05008.htm>.
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Interest Approach

Seedlings planted for forest products are a long-term investment. They won't be harvested this year or even next year. The time before you realize a profit may be anywhere from 5 years (for some Christmas trees) to 25 years for hardwood species. Therefore, choosing good stock and starting that stock off on the right track is important.

Communicate the Learning Objectives

1. Identify how to develop a tree planting plan.
2. Identify how many trees should be ordered, and where the trees can be ordered from.
3. Identify how to care for seedlings before planting.
4. Identify how to plant tree seedlings.
5. Identify how to care for seedlings after they have been planted.

Instructor Directions	Content Outline
Objective 1 <i>Discuss with students the necessity of careful planning and list factors to be considered when selecting the species of trees to be planted. Refer to HO 1.</i>  HO 1 – Uses of Trees	Identify how to develop a tree planting plan. Trees must be selected according to their intended uses. 1. Wood products 2. Wildlife 3. Windbreaks 4. Erosion control 5. Ornamental or shade Factors to consider in developing a planting plan. (Specific information on some individual species is given in Lesson 2.) 1. What trees grow well in the area? 2. What species will best fit the landowners needs? 3. What species will grow in the soil type? 4. What are the growth rates of selected species? 5. How many trees should be planted in the given area? 6. How much time and funds are available to be spent on tree planting and maintenance each year? 7. Financial returns needed on initial investment. 8. Consider how the factors listed above can be developed into a long-range forest management plan. Reasons for developing a long-range forest management plan 1. Basis for determining economical use of forest resources (enables timber grower to allocate time and finances to obtain maximum timber production and returns from forest land)

Instructor Directions	Content Outline
	- Prevents spur-of-the-moment decisions (harvesting prematurely or too late depending on financial needs) - Allows scheduling and planning of management practices such as thinning, planting, cutting, fire, and pest protection, etc.
Objective 2 <i>Discuss with students how to figure the number of trees and where and how they can order trees. Have students complete an application for planting stock or a State Nursery application form. Refer to PPt 1.</i>  PPt 1 – Planting Forest Trees	Identify how many trees should be ordered, and where the trees can be ordered from. Good tree stock is essential to successful planting. Choose the right species for your forest plan. (Refer to Lesson 2 for common Missouri trees, their use, and areas where they grow.) If planting a cleared area, calculate the spacing and number of trees needed. - Example – find the number of oaks needed for a 1/2 acre area. - From tree spacing chart, oaks are spaced on 15' x 15' centers. - From tree quantity chart, there are 194 trees/acre at 15' x 15' spacing. Where to obtain trees: - A list of private nurseries which carry seedling trees and shrubs can be obtained from an extension forester. - State Nursery is at Licking, Missouri - Contact your county extension center or local vocational agriculture instructor for the following forms. - A list of seedlings available - Application form - It is important to order early as the nursery provides seedlings on a first-come-first-serve basis.
Objective 3 <i>Discuss with students how to handle nursery stock on arrival or demonstrate with tree seedlings how they are handled.</i>	Identify how to care for seedlings before planting. Best success is obtained when seedlings are planted in the spring as soon as possible after arrival. (Always make sure packing material around roots is kept moist.)

Instructor Directions	Content Outline
	If planting must be delayed, use the following procedures. 1. To store trees for 1 week or less: a. Put bundles in cool shaded place. b. Separate bundles to avoid overheating and elevate the end slightly. c. Pour enough cold water into elevated end to keep roots moist. d. Do not store trees in water because roots may be damaged. e. Protect trees from severe freezing. 2. To store trees for more than a week: a. Method 1: Hold bundles in cold storage at 35° to 37° F. b. Method 2: Put trees in a “heeling-in” trench. – Dig trench in a shaded, protected place; adjust the depth to fit roots. (Avoid areas with high rodent populations.) – Cut bundle strings and spread trees. – Pour water on roots as trench is being refilled. – Water as often as necessary thereafter to keep soil moist (avoid overwatering). – A mulch placed on soil near trees will help hold moisture. 3. General guidelines: a. Never leave bundles exposed to sun and wind. b. During planting, take out a few seedlings at a time. c. Avoid damaging terminal buds and roots.
Objective 4 <i>Discuss with students how seedlings are planted. If possible allow students to plant forest seedlings on school grounds, in the school lab, or on their home farms. Refer to PPT 2 and PPT 3.</i> ☐ PPT 2 – Center Hole Method Using a Grubbing Hoe	Identify how to plant tree seedlings. Prepare the site well in advance. 1. Plowing 2. Disking 3. Herbicides 4. Scalping Keep seedling roots moist by placing them in a bucket 1/2 full of water or wet moss. Planting may be done by hand or by machine.

Instructor Directions	Content Outline
☐ PPt 3 – Slit Method Using a Tree Planting Bar	General rules for planting: 1. Plant seedling at the same level that it was in the nursery. 2. Make sure seedling is upright and roots not doubled over. (Trees with doubled roots grow more slowly.) 3. Pack the soil around the roots so tree will remain upright. 4. Plant only one tree per space. Procedures for planting: 1. Center hole method using a grubbing hoe a. Dig hole to fit root system of seedling. b. Set tree at same depth grown in nursery. c. Fill hole half full of soil and tamp well. d. Finish filling hole and tamp with feet. 2. Slit method using a tree planting bar a. Hold bar vertically and drive blade full length into soil. – Pull handle toward you 4 or 5 inches. – Make a similar thrust in opposite direction. b. Remove the planting bar and insert the seedling making sure the root is in normal position. c. Drive tree planting blade in at a 30° angle, 3 inches behind seedling. – Pull the bar toward you. – Push the bar forward to close the bottom and top slit. – Remove the bar and tamp with heel.
Objective 5 <i>Discuss with the students the general rules of ensuring success of seedlings after planting.</i>	Identify how to care for seedlings after they have been planted. 1. Protect trees from fire by plowing or disking fire breaks. 2. Keep livestock out of plantations. 3. Control weeds, particularly during the first 2 years. a. Light disking b. Chemicals c. Mowing d. Hoeing 4. Check for disease and insect problems.
Application	Other activities: 1. Develop a tree planting plan. 2. Have students order trees for their home or farm.

Instructor Directions	Content Outline
	3. Have students plant previously ordered trees on school grounds. 4. Invite your Department on Conservation Field Service Agent to explain tree ordering procedures to the class.
Closure/Summary	Seedlings planted today will be around for many years before they yield a return. It is very important, therefore, to have success. Success will depend on obtaining good seedling stock, properly storing that stock before planting, planting the stock correctly, and caring for the seedlings after planting.
Evaluation: Quiz	Answers: 1. a. Private nurseries b. State nursery at Licking, MO 2. Either hold bales in cold storage at 35° to 37° F or put trees in a heeling-in trench. 3. a. Plowing b. Disking c. Herbicides d. Scalping 4. a. Plant seedlings at the same level that they were in the nursery. b. Make sure seedlings are upright and roots are not doubled over. c. Pack the soil around the roots so the tree will stay upright. d. Plant only one tree per space. 5. - Hold planting bar vertically and drive blade full length into soil. Pull handle toward you 4 to 5 inches and then push it away from you. - Remove planting bar, insert seedling, and straighten roots in slit. - Drive tree planting blade in at a 30° angle, 3 inches behind seedling. Pull bar toward you, then push bar forward to close the bottom and top slit. Remove bar and fill in remaining hole. 6. Answers should include three of the following: Fire, livestock, weeds, disease, or insects