Lesson C3–3

Installing Woody Landscape Plants, Ground Covers, Perennials, and Annuals

Unit C. Nursery, Landscaping, and Gardening

Problem Area 3. Landscape Installation

Lesson 3. Installing Woody Landscape Plants, Ground Covers, Perennials, and Annuals

New Mexico Content Standard:

Pathway Strand: Plant Systems

Standard: III: Apply fundamentals of production and harvesting to produce plants.

Benchmark: III-A: Apply fundamentals of plant management to develop a production plan.

Performance Standard: 1. Identify and select seeds and plants. 2. Manipulate and evaluate environmental conditions (e.g., irrigation, mulch, shading) to foster plant germination, growth and development. 3. Evaluate and demonstrate planting practices (e.g., population rate, germination/seed vigor, inoculation, seed and plant treatments). 7. Prepare plants and plant products for distribution.

Student Learning Objectives. Instruction in this lesson should result in students achieving the following objectives:

1. Identify the different methods of harvesting plant materials used by the nursery trade.
2. Prepare for planting trees, shrubs, and ground covers.
3. Outline proper planting techniques.
4. Describe the methods of planting annuals and perennials.
5. Understand the importance of the use of mulch, landscape fabric, antitranspirants, and climate.
List of Resources. The following resources may be useful in teaching this lesson:

Recommended Resources. One of the following resources should be selected to accompany the lesson:


Other Resources: The following resources will be useful to students and teachers:


List of Equipment, Tools, Supplies and Facilities

- Writing surface
- Overhead projector
- Transparencies from attached masters
- Copies of student lab sheets

Terms. The following terms are presented in this lesson (shown in bold italics):

- Annual flowers
- Antitranspirant
- Balled and burlapped (B&B)
- Bare root (BR)
- Container grown
- Flower bed
- Flower border
- Guying
- Hardy plant
- Herbaceous plants
- Landscape fabric
- Mulch
- Perennial flowers
- Root circling
- Soil ball
- Staking
- Tender plant
- Woody plants
- Xeriscaping
Interest Approach. Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situation. A possible approach is included here.

Ask students what they think might be important for planting trees. Have students generate a list of things they think will need to be taken into consideration when doing a landscape installation project, then have them unify their various ideas as a class on a writing surface.

Summary of Content and Teaching Strategies

Objective 1: Identify the different methods of harvesting plant materials used by the nursery trade.

Anticipated Problem: How can students select the best harvesting method for the plant they are installing?

I. Plants can be grown many ways for the commercial nursery trade. Choosing the best style of plant harvesting is important for getting the most successful rates of transplant. Differences between the growing styles of herbaceous plants (plants with non-woody stems which die back to the ground each year) and woody plants (plants with woody stems) mean that different methods can have distinct advantages. Many planting plans indicate which style of plant should be used, but this is not always true. It is important to know which method is the best choice for a particular plant specimen. Commercial growers produce plants for sale in three basic methods:

A. Container grown plants are grown and sold in containers, typically plastic plant pots. Container grown plants are easy to handle and move while providing good protection for the plant’s roots system. This method is especially suitable for evergreen shrubs, broadleaf evergreens, some herbaceous shrubs, perennials, and annuals.

B. Balled and burlapped (B&B) plants are grown “in the field” and are then dug up with the soil ball, which is then wrapped in burlap. This method is particularly suitable for herbaceous shrubs and larger specimens such as large evergreen or woody trees. Some growers also sell small and medium plants in the B&B method. This traditional method has been successfully used for centuries.

C. Bare root (BR) plants are grown “in the field” and are usually harvested when dormant, cleaned to remove soil, and stored in a cool place. Plants sold in the BR method need to be protected from drying out before planting. This method is suitable for many perennials (especially roses), all bulbs, and some medium or smaller herbaceous trees and shrubs. Fruit trees are frequently sold BR. Bare root plants are easier to ship and are lighter in weight, so shipping costs can be significantly reduced resulting in a less expensive product.
Using the overhead projector and TM: C3–3A, have students review the types of harvest methods available. Then have them generate some examples of which type of plants might be found in each method (e.g., rhododendron = container grown, 4" blue spruce = B&B). If students are unfamiliar with plant names, have them identify which method would be used for a general sample (e.g., large woody tree = B&B)

**Objective 2:** Prepare for planting trees, shrubs, and ground covers.

**Anticipated Problem:** Are students able to correctly prepare for planting a tree, shrub, or groundcover?

**II.** There are several things which need to be considered when installing plants, namely water requirements, growth rate, hardiness, and nutrient and pH needs. Once the growth requirements have been dealt with, proper planting technique can make all the difference in the success of the transplant.

A. Water requirement refers to the amount of water plants need to live and grow well. In addition to traditional styles of landscape design which typically have higher water requirements, new styles of garden design are incorporating native plants or xeriscaping (using drought tolerant plants) to reduce water needs.

B. Plants grow at different rates and to different sizes. Good plant design and selection takes into account the mature habit of the selected plant material. Trees and shrubs are classified by height and spread. Height is the vertical space needed by a plant. Spread is the horizontal space needed, or fullness of the canopy. Plants should be selected and spaced based on the mature plant’s size.

C. Hardiness refers to overall plant suitability to a particular climate. Some plants withstand cold or drought, others do not; some plants require full sun, others need part or full shade; some plants can withstand salt or salt spray, others cannot. Hardiness zones have been developed that aid in plant selection based on local climate. There are 11 plant hardiness zones, based on minimum temperatures which a plant can survive. When a tree or shrub is assigned a hardiness zone rating, it should be able to survive the winter in that zone or any zone having a higher numbered rating. A hardy plant is one that can withstand the climate in which it is planted, with no special help, to grow year after year. A tender plant cannot withstand the climate where it is planted without special care and protection for harsh weather conditions.

D. Nutrients and pH requirements affect plant growth. Soil analysis determines what is available to plants. Part of preparing the site for planting includes soil testing and consequent soil improvement based upon test results. Matching plants to the natural nutrients and pH of the site will reduce costs.

E. Plants need to be protected from wind burn, sunscald, and dessication while being transported. Covering trees with tarps or plastic sheeting when transporting on trucks can significantly increase the success rate of transplants.

F. In most climates, the best time to plant is in the spring when rainfall is generally most abundant and plants are entering their most active growth cycle. Some plants, namely perennials and woody trees, can also be successfully transplanted in the fall. If planting
must be done in summer, extra care needs to be taken to reduce plant stress by mulching, watering regularly, and possibly even using a sunshield fabric.

Use TM: C3–3B to show students their local hardiness zone. Have them research the plant hardiness ratings and growth habits of various landscape plants regularly used in your area. Based on their information, ask students if they think there are subzones within a larger zone. Discuss their responses. Which plants do they think would be best suited for a bed which is exposed to harsh westerly winds? Which plants would grow well in a sheltered courtyard? Which plants would be best for a small entryway? Which plants would provide good shade for a patio? Help students to realize that knowing the habit and growth needs of a plant makes for proper plant selection.

Objective 3: Outline proper planting techniques.

Anticipated Problem: What is the best way to plant so that the specimen has optimal chances for survival?

III. There are many different ways to successfully plant trees, shrubs, perennials, and annuals. Plants are a significant investment of time and money for the landscaper and property owner. It is important that each plant receives the best possible installation to improve its chances of thriving. Be aware that different employers may use different planting methods. The following techniques are common ways to plant, supported by the latest research.

A. When planting B&B trees and shrubs, the soil ball, the soil surrounding the root system, needs to be protected. Do not remove the burlap or twine until the final placement of the tree. Always dig the planting hole at least 12” wider than the soil ball to allow space for future root growth. The larger the hole the better the chances are that the plant will thrive in its new location. The top of the soil ball should be level with the surface of the surrounding soil. The bottom of the hole should be flat allowing the tree or shrub to be planted at the same depth as it was originally growing. A plant should never be planted deeper than it was originally, as this leads to root rot and death. Once the hole has been checked against the original plant for size and depth, the plant should be carefully placed with the burlap and twine intact. Handle the plant by the root ball. Once located, all twine should be removed from around the stem of the plant. Otherwise, the plant may choke to death as it grows. If the burlap is plasticized it should be removed completely; if not, it should be pulled back from the top of the root ball and tucked down between the soil ball and the hole.

B. Before planting containerized plants, remove the container by inverting the plant, tapping the sides on a solid surface to release the plant, and then sliding the soil ball out. Try not to disturb the soil ball if possible. Check the plant for root circling. Root circling is when the roots have become too large for the container causing them to grow around the outside edge of the pot. If the plant is rootbound by root circling, cut the roots at the edge with a knife, spreading them out before planting. Generally, four or five vertical cuts from the top to the bottom of the soil ball are sufficient. Place the soil ball in the
hole and check for the proper size and depth. Position the plant with the best side facing toward the main viewing point.

C. Bare root planting follows the same general guidelines as that of container grown plants, with a few differences. Remove the plastic or other wrapping material from around the plant’s roots, discarding any sawdust, shredded newspaper or plastic. If sphagnum is used, it may be retained. Dig the hole as deep as the longest root and at least 12” in diameter. The bark or stem of a bare root plant will usually have a stain marking the level of the original field height. The tree or shrub should be planted at the same depth as it was growing in the nursery. Once the hole has been dug, replace some of the tilled soil at the bottom center to form a cone. Rest the plant crown and stem on this cone. Carefully spread the secondary roots out over the rest of the hole in their natural shape. Backfill the hole a few inches, tamping the soil carefully to remove air pockets. Repeat this process until the hole is filled.

D. Filling the planting hole is similar regardless of the type of plant. Backfill the hole with loose, loamy soil about half way. Carefully tamp the soil down to reduce air pockets but be careful to be gentle. Depending on the size of the tree, you may wish to water larger specimens at this point. Continue to backfill and tamp. Once at the original soil level, shape the loose soil on top to create a large saucer dish. Build a small berm or dam around the outside edge of the planting hole using extra soil. Fill the saucer with water, letting it slowly wet the root system and surrounding soil. The saucer will help to retain rain or irrigation water for use by the tree or shrub.

E. Staking is not necessary for smaller trees. In fact, recent research demonstrates that unstaked plants grow roots for stability in response to wind, so staking actually weakens the support system of the tree. Medium trees (over 6’ in height but less than 12’) may need staking due to the loss of original roots. When staking a tree, two or three long wooden stakes should be driven into the ground at the outside edge of the plant hole, with a wire attached between the stakes. The wire should be wrapped to protect the tree’s bark from damage. Larger trees (over 12’ in height) may need guying. Guying is when cables are attached to the tree trunk which are in turn anchored to three equally-spaced ground stakes.

Use TM: C3–3C, TM: C3–3D, TM: C3–3E, TM: C3–3F, and TM: C3–3G to illustrate and explain the above information. If possible, have students actually plant a tree or shrub. Emphasize the importance of proper placement and watering. Use a rubric to evaluate their successful comprehension of the subject.

**Objective 4:** Describe the methods of planting annuals and perennials.

**Anticipated Problem:** How can students install annuals and perennials?

IV. Annuals and perennials provide a colorful, exciting enhancement to any landscape project. They are relatively inexpensive compared to most trees and shrubs. Bright-colored flowers attract the public’s eye, enhancing any setting when well-designed.
A. Flowers in front of shrubs in a planting bed create a *flower border* with the shrubs providing a backdrop. A *flower bed* is a planting that contains only flowers. Tall growing plants should be placed toward the back of the bed with shorter plants in the foreground. Installing plants in groups of the same species is visually more appealing than one or two plants haphazardly placed within the design. Flower bed design is more effective if kept simple.

B. *Annual flowers* are plants that geminate from seed, grow to maturity, flower, and produce seed in one growing season. Annuals give the landscape quick color at a reasonable price. Additionally, most bloom continually throughout the growing season. On the negative side, they must be replaced each year since they die in the fall.

1. Annuals are easy to plant if the soil bed has been well prepared. The bed should be free of all grass and weeds before planting. Organic matter, such as peat moss, compost, or manure should be tilled into the top 6 inches of soil before planting. Be sure to take into consideration the growing needs of the plants regarding the amount of sunshine, water, soil pH, etc., needed for optimum growth.

2. Container grown annuals should be planted in small holes the size and depth of the soil ball of their growing container. Once in place, they should be well watered.

3. If annuals are grown from seed, the seed company’s directions should be followed precisely. This is a very cost effective way of creating color and interest in a landscape.

C. *Perennial flowers* are plants that live for two or more growing seasons. Perennials may be further divided into woody and herbaceous plants. Most perennials have a distinct bloom time; they will not flower all summer. However, careful design planning can create a bed or border that will have appealing color and texture regardless of the season.

1. Perennial beds need to be carefully prepared since the plants, once established, make it more difficult to add soil improvements. Be sure that the soil is well-tilled with adequate drainage and organic matter. Extra time spent in soil preparation pays off with healthier, more beautiful plants.

2. Container grown perennials should be planted in holes the size and depth of their growing container. Once placed, they should be well watered. Unless the flower bed is very small, plants should be clumped in same species groupings of three or more for maximum visual impact. Generally, taller plants should be placed to the back or center of the bed, although plants with fine or “airy” texture may “bend” this rule somewhat.

*Give students some parameters and have them design a small flower bed or border using annuals or perennials shown in their textbook or in reference books. Have students select one of the designs to be implemented on the school’s property as a beautification project. They can each take a hand in planting the bed following the design plan.*
Objective 5: Understand the importance of the use of mulch, landscape fabric, antitranspirants, and climate.

Anticipated Problem: How can students optimize transplant health and growth in a newly planted design?

V. Once planted, trees, shrubs, and flowers need follow-up care to become established. Watering, weeding, and fertilizing can literally mean life or death to a newly planted specimen. Mulch, landscape fabric, and antitranspirants are valuable aids to a landscaper's arsenal in helping plants to thrive.

A. Plant mulch, whether organic or inorganic, has many benefits to a newly planted tree or shrub. Mulch is the material used around plants to reduce water loss, prevent weed growth, keep soil temperatures more uniform, protect roots, and prevent erosion.

1. Organic mulches include wood chips, pine needles, tree bark chips, shredded corn cobs, cocoa bean hulls, peat moss, and salt hay. Organic mulches tend to take advantage of local products so there often is a regional bias to the materials used. All organic mulches have a negative side effect in that they draw nutrients from the soil in their decomposition process. However, they also add organic matter back to the soil, and can be very pleasing in appearance. Organic mulches usually need a yearly top-dressing to replenish them. Large particle mulches tend to last longer. Organic mulches should be spread 2 to 4 inches deep in the soil saucer around the base of tree or shrub, leaving small 2–3 inch clear area at the base of the plant to reduce the risk of rot or insect damage.

2. Inorganic mulches come from non-living substances and include such things as gravel, crushed stone, sand, brick chips, and shredded rubber. They are very long lasting but should be used mainly for high-traffic or well-shaded areas since they can heat up, causing undue stress on young plants. An advantage to inorganic mulches is that they are very durable and rarely if ever need top-dressing.

B. Landscape fabric is a lightweight, woven material that breathes, allowing water, air, and fertilizer to a plant's roots but restricting weed growth. Since it is unattractive by itself, as well as vulnerable to UV light, landscape fabric is always covered with mulch once it is installed.

1. The fabric is installed by rolling it out over bare soil that has been carefully weeded. If there are existing plants, an “X” can be cut in the fabric to allow it to be threaded over the plant. If it is placed in a new bed, “Xs” can be cut to allow planting. The fabric is always carefully rolled back to the base of any plant to reduce the chances of weeds getting established.


C. Antitranspirant is a spray or aerosol product which is applied to the leaves of a plant to reduce transpiration. Spraying of a plant during transport, or just after transplanting, can significantly improve its chances of getting a good start in its new location.
Antitranspirant cuts down on water loss by the plant’s leaves. It counteracts the effects of root loss, making it especially effective in tree and shrub transplanting.

Stress to students the importance of follow-up care to the health of transplants. Remind them that healthy plants mean satisfied customers and lower costs for the business (no need to replace a dead plant). A few extra minutes of preparation and follow-up can save hours and money in having to replace a dead specimen. Have students install landscape fabric and mulch around an existing or newly planted bed/tree on the school’s property. Experiment by mulching around one specimen and not around another to show students the long term benefits of follow-up care.

**Review/Summary.** People like to see attractive outdoor areas. A beautiful landscape adds visual interest as well as monetary value to property. A well-designed, well-installed garden doesn’t just happen; it must be created. Choosing a properly grown and harvested plant, following a design plan, preparing a bed, installing plants properly, meeting a plant’s needs, and providing follow-up care all add up to creating a beautiful space.

**Application.** Application can involve the following student activities:

- Visit a local nursery to see production and harvesting of plants.
- Visit a local mall or other public place to observe the landscape design.
- Contact a local landscaper to see if your students can spend a day job-shadowing.
- Prepare a flower bed on your school campus.
- Install a flower bed on your school campus.

**Evaluation.** Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activities. A sample written test is attached.

**Answers to Sample Test:**

**Part One: Matching**

1=h, 2=e, 3=d, 4=i, 5=c, 6=f, 7=g, 8=a, 9=b

**Part Two: Completion**

1. Antitranspirant
2. Guying
3. root circling
4. Xeriscaping

**Part Three: Short Answer**

1. reduce water loss, prevent weed growth, protect roots, improve appearance, keep soil temperatures more uniform, prevent erosion, add organic matter to soil
2. organic: salt hay, wood chips, tree bark chips, cocoa bean hulls, ground corn cobs, chopped leaves, pine needles, etc.
   inorganic: gravel, crushed stone, sand, brick chips, shredded rubber, etc.
3. No, they will develop a stronger root system if they are not staked.
4. Flower border is backed by shrubs, a flower bed has only flowers.
5. Because twine can choke a tree to death by cutting off its cambium layer.
Test

Lesson C3–3: Installing Woody Landscape Plants, Ground Covers, Perennials, and Annuals

Part One: Matching

Instructions. Match the term with the correct response. Write the letter of the term by the definition.

a. annual  
b. balled and burlapped (B&B)  
c. bare root (BR)  
d. container grown  
e. tender plant  
f. woody plant  
g. hardy plant  
h. herbaceous plant  
i. perennial

1. Plants with non-woody stems which die back to the ground each year.
2. A plant that cannot withstand the climate where it is planted without special care and protection from harsh weather conditions.
3. Plants that are grown and sold in containers.
4. Any plant that lives for two or more years (or growing seasons).
5. Plants that are grown “in the field” and are usually harvested when dormant, cleaned to remove soil, and stored in a cool place.
6. A plant which can withstand the climate in which it is planted, with no special help, to grow year after year.
7. Plants with woody stems.
8. Any plant that lives its entire life cycle in one growing season.
9. Plants that are grown “in the field” and are then dug up with the soil ball which is then wrapped in burlap.

Part Two: Completion

Instructions. Provide the word or words to complete the following statements.

1. ______________________________ is an aerosol or spray which is used to reduce the amount of water lost by a plant’s leaves.
2. ______________________________ is the process in which a larger tree is cabled to the ground using three equally spaced stakes.
3. Sometimes container grown plants exhibit ______________________________. This is when the roots have outgrown their container. They should be cut before planting to optimize future root growth.

4. _____________________________ is the term used for gardens in which the plants have been selected because of their ability to withstand drought.

**Part Three: Short Answer**

*Instructions.* Provide information to answer the following questions.

1. Give three of the benefits of using a plant mulch.
   a. 
   b. 
   c. 

2. Name two organic mulches. Name two inorganic mulches.

3. Do small trees need to be staked? Explain your answer.

4. What is the difference between a flower border and a flower bed?

5. Why is it important to remove any twine on a B&B plant once it’s in its final location?
Containerized  Bare root  Balled and burlapped

(Courtesy, Interstate Publishers, Inc.)
PLANTING A B&B PLANT

Balled & Burlapped plant

Planting hole a minimum of 12 inches wider than soil ball. Cut twine and push burlap back. Form a saucer at the base of the tree and fill with 3" of mulch.

Tree supported by guying

(Courtesy, Interstate Publishers, Inc.)
PLANTING A CONTAINERIZED PLANT

(Courtesy, Interstate Publishers, Inc.)
BARE ROOT VS. B&B PLANTING

Bare root
Hole mounded on bottom

Balled and burlapped
Flat on bottom

(Courtesy, Interstate Publishers, Inc.)
Staking a tree.  
Guying a tree.
ESTABLISHING A WATER SAUCER AT THE PLANT BASE

(Courtesy, Interstate Publishers, Inc.)