

Lesson C4–3

Pruning Landscape Plants

Unit C. Nursery, Landscaping, and Gardening

Problem Area 4. Landscape Maintenance

Lesson 3. Pruning Landscape Plants

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: 6. Control plant growth (e.g., pruning, pinching, disbudding, topping, detasseling, staking, cabling, shearing, shaping).

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

1. Explain why woody landscape plants are pruned.
2. Describe how to properly prune trees.
3. Describe various pruning techniques used with shrubs.
4. Identify tools used in pruning woody landscape plants.

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:

Biondo, Ronald J. and Charles B. Schroeder. *Introduction to Landscaping: Design, Construction, and Maintenance*, Second Edition. Danville, Illinois: Interstate Publishers, Inc., 2003.

Gilman, Edward F. *An Illustrated Guide to Pruning*, Second Edition. Albany, New York: Delmar Publishers, 2002.

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

Ingels, Jack E. *Landscaping: Principles and Practices*, Fifth Edition. Albany, New York: Delmar Publishers, 1997.

Major Pruning of Trees. Urbana, Illinois: University of Illinois, ITCS. Item F639 (Filmstrip).

Schroeder, Charles B., et al. *Introduction to Horticulture*, Third Edition. Danville, Illinois: Interstate Publishers, Inc., 2000.

List of Equipment, Tools, Supplies, and Facilities

Writing surface
Overhead projector
Transparencies from attached masters

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

Branch bark ridge
Callus
Candle stage
Collar
Compartmentalization
Dead zone
Heading back
Leader
Pruning
Rejuvenation pruning
Renewal pruning
Rootstock
Scaffold branches
Scion
Suckers

U-shaped crotches
V-shaped crotches
Watersprouts

Interest Approach. Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

Ask the class if they have ever seen a large limb that has split off from a tree. Or, have they noticed the growth of shrubs that have made their way into walkways or sidewalks? Proceed by explaining that both of these occurrences are undesirable. They are not only unsightly, they are not good for the health of the plant. Also, they are potentially dangerous. Go on to introduce the topic of pruning and its necessity in preventing situations like above. Pruning is a major landscape maintenance activity. Landscapers need to be trained in why, how, and when woody landscape plants should be pruned.

Summary of Content and Teaching Strategies

Objective 1: Explain why woody landscape plants are pruned.

Anticipated Problem: What are the reasons for pruning woody landscape plants?

- I. **Pruning** is the term used for the selective removal or reduction of certain plant parts. It can range from the removal of large tree limbs to the pinching off of growing tips. Proper pruning leads to attractive, healthy plants. Improper pruning damages both the appearance and health of plants. Some of the many reasons for pruning plants include the following:
 - A. Promote the development of a strong framework of branches.
 - B. Restrict the size of the plant.
 - C. Repair damaged limbs.
 - D. Improve flowering of trees and shrubs.
 - E. Reduce the spread of pests by removing diseased limbs.
 - F. Direct the plant's growth in a particular direction.
 - G. Maintain desired cultivars.
 - H. Open the crown to allow for light and wind to pass.
 - I. Maintain safe conditions for humans.
 - J. Improve fruit quality.

Display TM: C4–3A to summarize some of the reasons for pruning woody landscape plants. Ask students if they have ever pruned plants at their homes. Determine why they did so. Were there actions related to any of the reasons listed above? During the discussion, ask the class to generate a list of other possible reasons for pruning. Some may be valid, while others may not. Use the content of this objective to

explain that there are specific reasons for pruning woody landscape plants. If the pruning is done improperly or when it is not necessary, it can possibly damage the health and appearance of the plant.

Objective 2: Describe how to properly prune trees.

Anticipated Problem: What are guidelines for properly pruning trees?

- II. Before a tree is cut, a good decision should have been made as to why it will be pruned. Any cuts that are made should contribute to the pruning goals that have been established. Before any cuts are made, it is important to understand the parts of trees, the best times to prune, how trees heal, and how to remove large limbs.
 - A. An understanding of major tree structures and their functions is important in pruning. These structures include:
 1. A **leader** is a central branch that is dominant over other branches on the tree. It leads the growth of the tree. Co-leaders are not desirable. They are unattractive and lead to the development of weak V-shaped crotches. When co-leaders exist, one of them should be removed.
 2. **Scaffold branches** grow laterally from the trunk. The trees' weakest point is where scaffold branches attach to the trunk. The manner in which the branches are attached to the trunk influences their structural soundness.
 - a. **U-shaped crotches** are created by branches that attach to the trunk at angles of 45° to 90°. These branches are structurally sound.
 - b. **V-shaped crotches** are created by branches that attach at sharp angles. The joint is weak because the bark is crushed between the branches as the tree grows and expands. Trees with V-shaped crotches are prone to splitting due to weather conditions.
 3. **Watersprouts** are soft, green shoots that usually grow vertically from existing branches. They seldom flower and should be removed from the tree. If they are allowed to grow, crossing branches may result.
 4. Crossing branches are unattractive. The friction created by the rubbing together of these branches may open wounds. The wounds allow disease and insects to enter. Regular removal of branches that are growing towards the tree's center will eliminate most crossing branches.
 5. **Suckers** are soft, green shoots that develop at the base of the tree. Like watersprouts, suckers are of no ornamental value to the tree. It is particularly important to remove suckers from grafted plants. In grafting, the **rootstock** (root system) has different qualities than the **scion** (top growth). If suckers from the rootstock are allowed to grow, they will interfere with the desired ornamental effect of the scion.
 6. Dead, diseased, and broken wood should be removed from the tree. Removal of dead and diseased wood reduces the spread of disease. Pruning dead wood also eliminates safety hazards.

- B. When to prune relates to the season of the year in which trees are cut and the tree's stage of maturity at which the pruning is carried out.
1. Late winter and early spring are the best times to prune most deciduous trees. Pruning when trees are dormant include the following advantages:
 - a. Branching structure is more visible without the presence of leaves.
 - b. The limbs are much lighter without leaves.
 - c. Tree cuts made at these times of the year give the tree an entire growing season in which to heal.
 2. Some trees such as maples, birches, and elms will ooze sap if pruned in the late winter or early spring. Although the sap causes no damage, it is best to prune these types of trees in midsummer when the sap is not flowing.
 3. Pruning newly transplanted trees requires special considerations. The key to a tree's survival is its ability to develop a new root system. Removing limbs means the loss of energy-producing leaves and stored starches. Removal of over 15 percent of the crown at the time of transplanting slows tree growth for several years. Pruning should be restricted to the removal of co-dominant leaders, dead and diseased wood, and V-shaped crotches.
 4. A tree's second pruning should occur two to four years after planting. During the second pruning, crossed branches, limbs that have died back, and some lower branches are removed. To contribute to a strong trunk, it is best to not remove all of the lower branches at once.
 5. The tree should be pruned again five to seven years after planting. The amount to be removed should be minimal.
- C. Closing wounds—trees produce chemicals that inhibit decay caused by fungi and bacteria. The chemicals that are produced seal the tree's wound. This formation of a chemical barrier is called **compartmentalization**. Chemical barriers are at the base of every branch. The **branch bark ridge** is a raised line of bark that forms on the upper side of where the branch joins the bark. The **collar** is the swollen tissue surrounding the base of the branch. These structures contain chemicals that inhibit the spread of disease. When a tree is wounded, it forms a **callus**, or protective growth of tissue over the wound. Removal of the branch bark ridge and collar destroys the tissues that defend the tree from infection and decay.
- D. Removing large limbs—safety is the utmost consideration when pruning large limbs. Large limbs can be quite heavy. Such weight will not only injure people, but it can also damage the tree if the limb is not removed properly. Improper removal often strips bark from the tree. To avoid stripping the bark, the following steps should be followed when removing large limbs:
1. Make an undercut about 1/3 of the way through the limb.
 2. Cut the upper side of the limb about 1 inch from the under cut. This cut should be made closer to the trunk than the first cut to swing the branch toward the tree before it drops. A cut made further from the trunk will cause the limb to drop without swinging.

3. Make the final cut closer to the trunk than the previous two. The proper cut is one that is made as close to the collar and branch bark ridge as possible without causing damage to those tissues. After the final cut is made, the wound should be left exposed. Sealers are never needed. They promote decay by keeping conditions moist.

Since there is a great deal of information associated with this objective, it may be best to present it in segments. Use TM: C4–3B to reinforce an understanding of U-shaped and V-shaped crotches. TM: C4–3C presents a good illustration of obvious faults that should be pruned from a tree. TM: C4–3D presents the three cuts that are made when properly removing a large limb. TM: C4–3E provides examples of proper and improper final cuts when removing a large limb. Through class discussion, help students realize that pruning is not done simply for cosmetic reasons. Proper pruning will insure both healthy and attractive plants. Because safety is so important when discussing pruning, it would be advisable to invite a guest speaker who could present practices used in industry to reduce hazards.

Objective 3: Describe various pruning techniques used with shrubs.

Anticipated Problem: What are the main techniques used when pruning shrubs?

- III. Proper pruning of shrubs in the landscape insures many years of pleasure. Pruning helps keep shrubs vigorous and ornamental. The techniques and practices used in pruning shrubs are influenced by the types of shrubs being pruned.
 - A. Deciduous shrubs—several pruning techniques are used to prune deciduous shrubs. These include the following:
 1. **Renewal pruning** is defined as the selective removal of older plant stems. When old stems are removed, new growth is encouraged, plant size is maintained, and flowering is promoted. After carefully choosing which stems are to be removed, they are cut at ground level. Lilacs, Forsythias, Arrowwood Viburnum, and St. Johnswort respond well to renewal pruning.
 2. **Rejuvenation pruning** involves the complete removal of all stems to 4 to 6 inch stubs. Rejuvenation pruning is best done in late winter or early spring. Honeysuckle, Glossy Abelia, and Privet all respond well to this type of pruning.
 3. **Heading back** is a technique that involves the shortening of individual stems. It is done to remove dead or diseased wood and to restrict the size of the stem. Cuts are made back to the parent stem, and not to the ground.
 4. Shearing effectively reduces the total leaf surface a plant has to produce energy. This technique should be reserved for clipped hedges and formal gardens. If a hedge is desired, the shrubs should be sheared so that they are wider at the base than at the top. This allows light to reach all of the leaves. Some plants that make good hedges include spirea, privet, and honeysuckle.
 - B. Evergreens—the technique used to prune evergreens relates to the type of evergreens to be pruned. Examples include the following:
 1. Arborvitae—these evergreens are easily maintained by using the heading back technique during the spring. Heavy pruning that exposes the dead zone should be

avoided. The **dead zone** is the area in the center of the plant that rarely produces new shoots when exposed to light.

2. Firs—annual pruning in early summer, to shorten the leader and lateral shoots, promotes dense growth.
 3. Junipers—use the heading back technique in the spring. Since junipers do not produce new growth on old wood, cuts into the dead zone should be avoided.
 4. Pines—pines should be pruned when they are in the candle stage of growth. The **candle stage** refers to new growth resembling candles. Terminal candles should be cut to stubs that are 8 to 12 inches in length. Lateral candles should be cut so they are 2 to 4 inches shorter than the terminal candles.
 5. Spruce—light pruning in early summer is best. Leaders should be cut to leave at least three buds. Lateral shoots should be 2 to 3 inches shorter than the leader.
 6. Yews—prune yews in the spring and again in the early summer using the heading back technique. Yews respond well to pruning and can tolerate removal of up to 50 percent of the plant.
- C. Broadleaf evergreens—light heading back is recommended to maintain dense plants. Some types, such as boxwood and holly, which are used as clipped hedges, are tolerant of shearing. Rhododendrons should be pruned after they have flowered. Faded flowers should be removed and new growth should be pinched back.

Use TM: C4–3F and TM: C4–3G to illustrate the various techniques used in pruning deciduous shrubs. Bring samples of evergreen branches to class. Have individuals or teams of students explain the pruning practices associated with each type of evergreen. Take the class on a walk around school grounds. Point out examples of shrubs that have been correctly pruned. Ask the class to identify what technique was most applicable to particular types of shrubs. If available, point out examples of shrubs that were improperly pruned.

Objective 4: Identify tools used in pruning woody landscape plants.

Anticipated Problem: What are some common tools used in pruning woody landscape plants?

- IV. There are a number of tools used for pruning purposes. Safety should be kept in mind when choosing and operating any of the following tools:
- A. Hand pruners or loppers are best used on small branches. There are two major styles.
 1. Scissor style slices the plant stem.
 2. Anvil style is less desirable than scissor styles as it crushes the plant stem as it cuts.
 - B. Pruning saws have larger teeth with wider spacing than carpenter’s saws. The large teeth and spacing ease the cutting of larger limbs.
 - C. Chain saws are gas powered or electric and have a chain that continuously cuts. They are best used on large limbs. Chain saws are extremely dangerous if used improperly. To avoid hazards, obtain training on their safe operation. Additional guidelines for using chain saws in pruning are:

1. Study branches before making any cuts.
 2. Accelerate the saw before beginning a cut.
 3. Keep feet completely still while the chain is turning.
 4. Do not use the guide bar's upper tip for cutting.
 5. If pinching occurs, shut the saw off before extracting the saw blade.
- D. Pole saws and pole pruners are specialty tools that allow a person to reach high limbs from the ground.
- E. Hedge shears may be hand operated, gas powered, or electric. They are used to trim hedges and shape shrubs in formal gardens.

Use TM: C4–3H to illustrate some of the basic tools used in pruning woody landscape plants. Bring examples of the each type of tool to class and explain its particular use. Ask students to identify potential hazards associated with each tool. When discussing tool safety, it would be a good opportunity to reinforce the use of personal protective equipment such as gloves, hard hats, ear plugs, and face shields. For more information on tool operation and maintenance, see Lessons C6–1 and C6–2.

Review/Summary. Focus the review and summary around the lesson's student learning objectives. Call on students to explain the content associated with each objective. Use their explanations as the basis for determining whether any areas need to be taught again. Questions at the end of the chapters in the recommended resource text will also be useful for review. The exercises contained in the Activity Manual for the recommended resource text will also be helpful.

Application. The labs contained in the *Introduction to Landscaping Activity Manual* will be helpful to students in applying the lesson's content.

Evaluation. Evaluation should focus on the objective for the lesson. Various techniques such as student performance on lab activities and the recommended text's chapter self-check can be used. A sample written test is also attached.

Answers to Sample Test:

Part One: Matching

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

Part Two: Completion

1. suckers
2. collar
3. leader
4. Compartmentalization
5. renewal
6. U-shaped

7. rejuvenation
8. branch bark ridge

Part Three: Short Answer

1. Use the content of Objective 2 and TM: C4–3D and TM: C4–3E to assist in grading answers.
2. Use the content of Objective 1 and TM: C4–3A to assist in grading answers.

Test

Lesson C4–3: Pruning Landscape Plants

Part One: Matching

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

- | | | |
|----------------------|----------------------|-----------------|
| a. scaffold branches | d. watersprouts | g. pruning |
| b. callus | e. dead zone | h. shearing |
| c. scion | f. V-shaped crotches | i. heading back |

- _____ 1. Soft, green sprouts that usually grow vertically from existing branches.
- _____ 2. A pruning technique that involves the shortening of individual stems.
- _____ 3. The part of the tree structure that grows laterally from the trunk.
- _____ 4. The area in the center of the plant that rarely produces new shoots when exposed to light.
- _____ 5. The selective removal or reduction of certain plant parts.
- _____ 6. The protective growth of tissue that a tree grows over a wound.
- _____ 7. A pruning technique that effectively reduces the total leaf surface a plant has to produce energy.
- _____ 8. Weak points in a tree's structure that are created by branches attaching at sharp angles.
- _____ 9. In grafting, the term that refers to the top growth.

Part Two: Completion

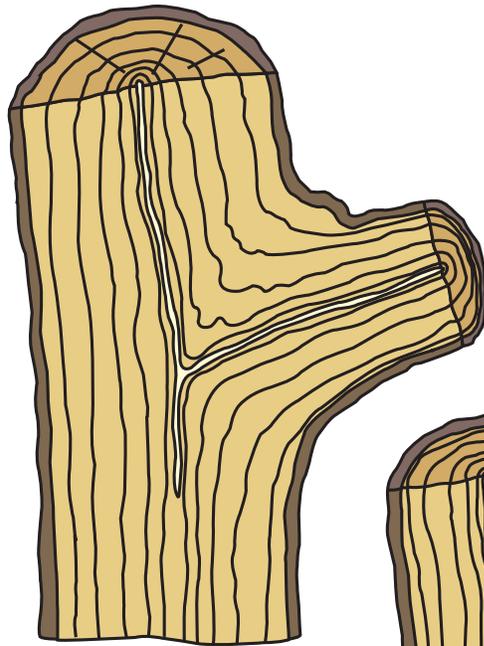
Instructions. Provide the word or words to complete the following statements.

1. Soft, green shoots that develop at the base of the tree are called _____.
2. The _____ is the swollen tissue surrounding the base of the branch.
3. A _____ is a central branch that is dominant over other branches of the tree.
4. _____ is the tree's formation of a chemical barrier that seals its wounds.
5. The selective removal of older plant stems is the technique known as _____ pruning.

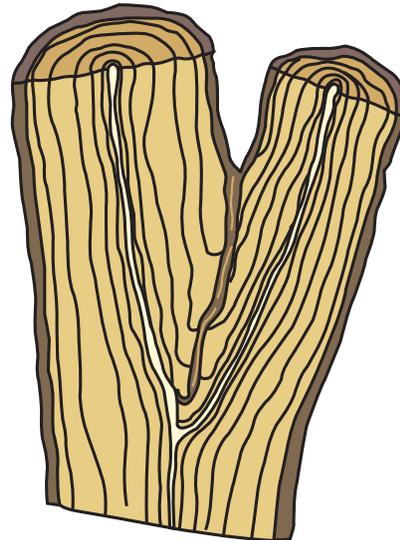
POSSIBLE REASONS FOR PRUNING

- 1. Promote the development of a strong framework of branches.**
- 2. Restrict the size of the plant.**
- 3. Repair damaged limbs.**
- 4. Improve flowering of trees and shrubs.**
- 5. Reduce the spread of pests.**
- 6. Direct the plant's growth.**
- 7. Maintain desired cultivars.**
- 8. Open the crown so light and wind may pass.**
- 9. Maintain safe conditions for humans.**
- 10. Improve fruit quality.**

TREE STRUCTURE



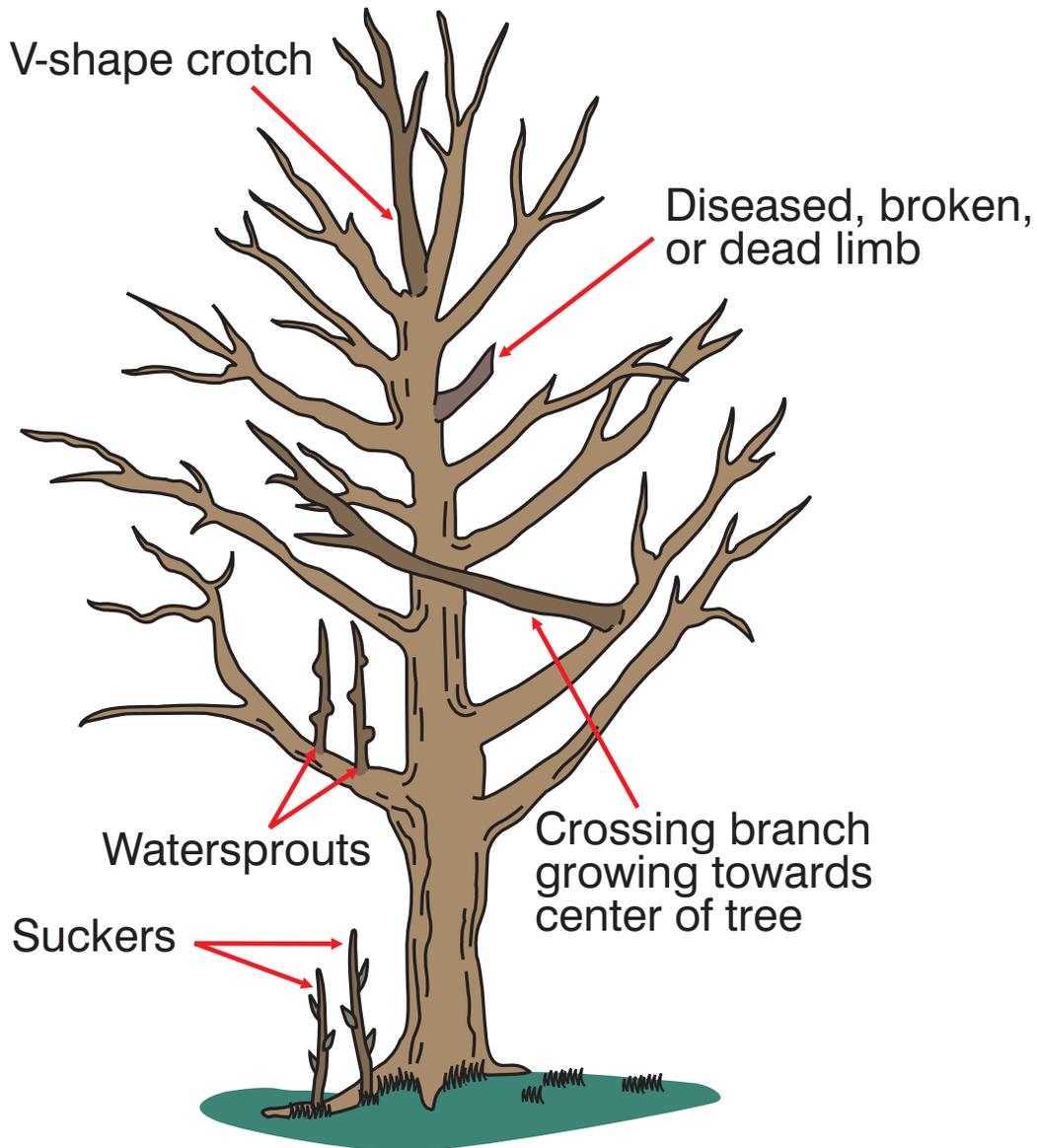
U-shaped Crotch
Structurally Sound



V-shaped Crotch
Prone to Splitting

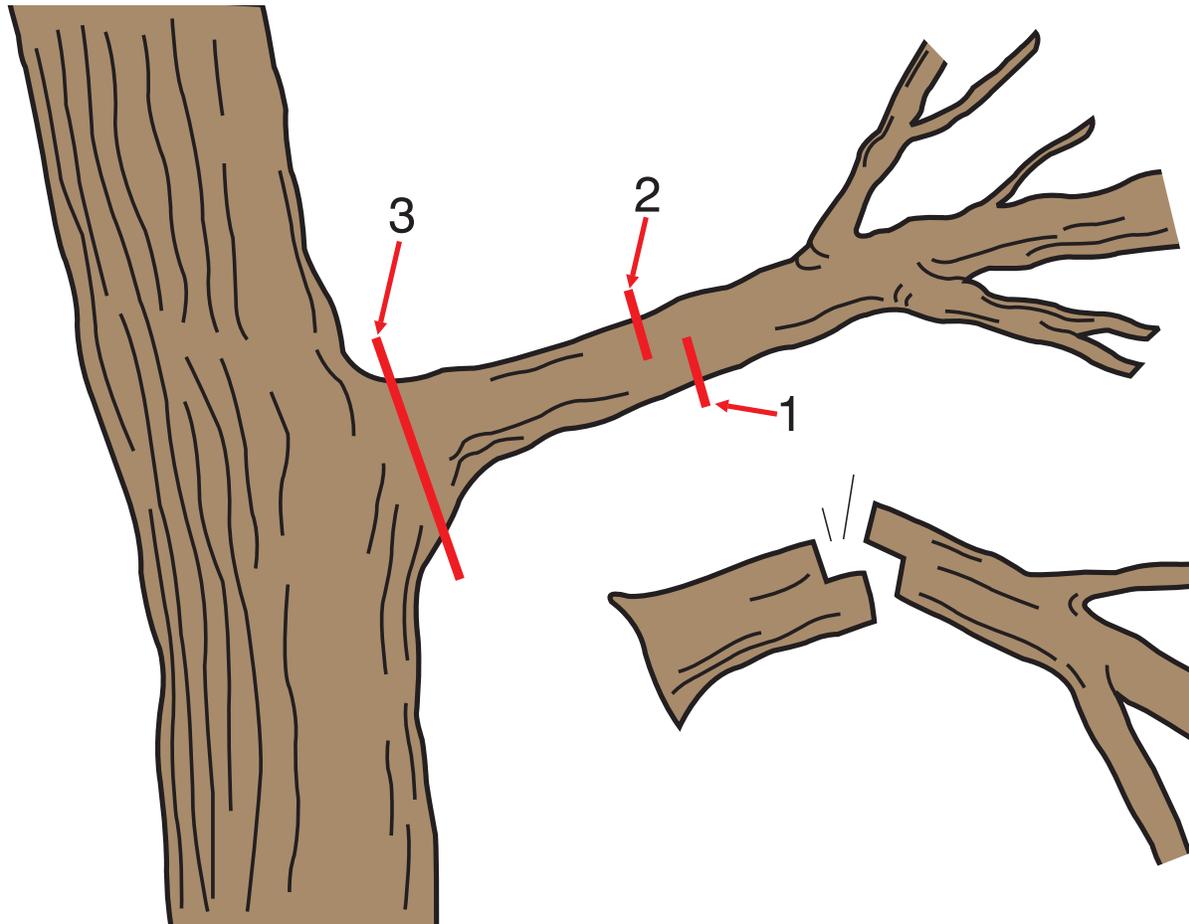
(Courtesy, Interstate Publishers, Inc.)

PRUNING OBVIOUS FAULTS



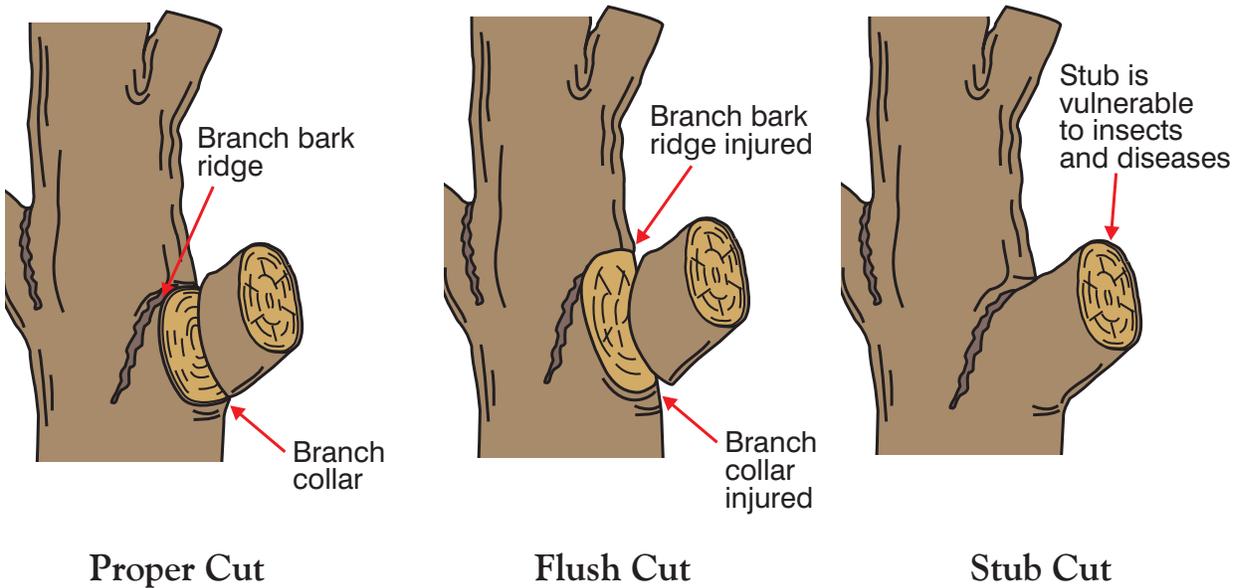
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REMOVING A LARGE LIMB



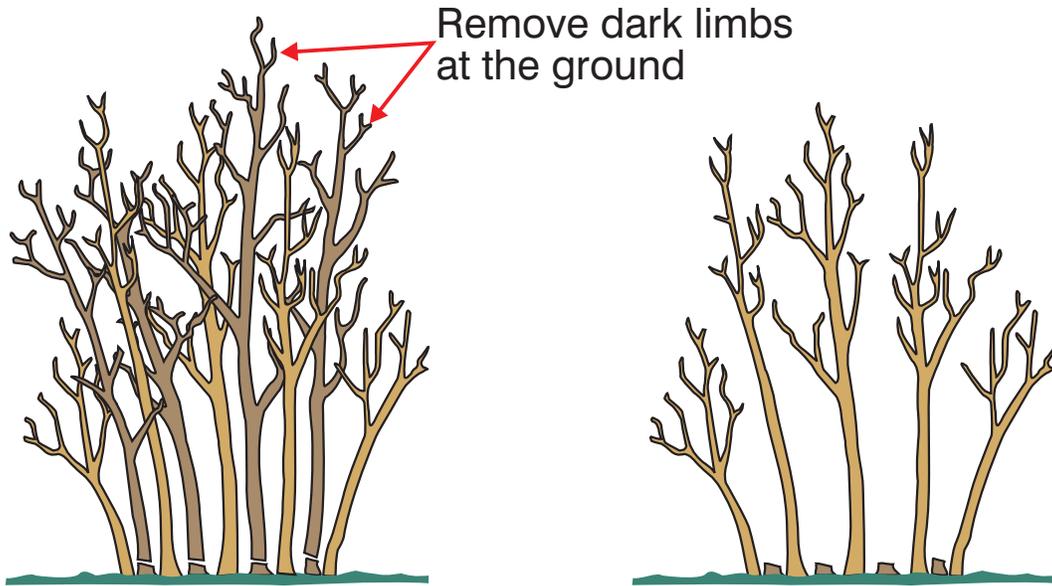
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FINAL CUTS OF A LARGE LIMB

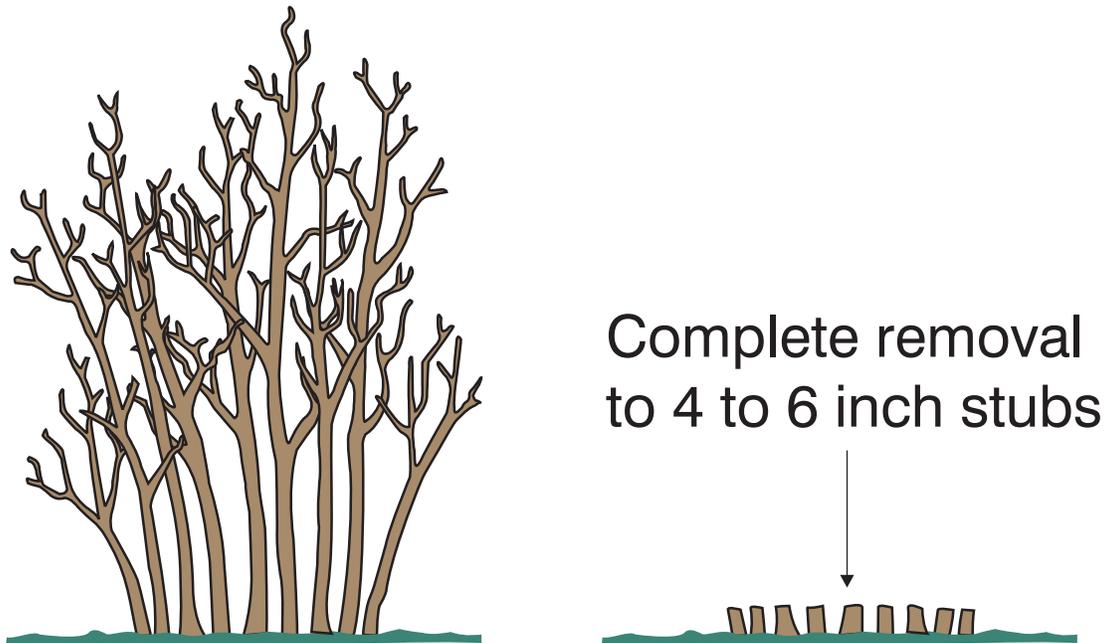


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RENEWAL PRUNING

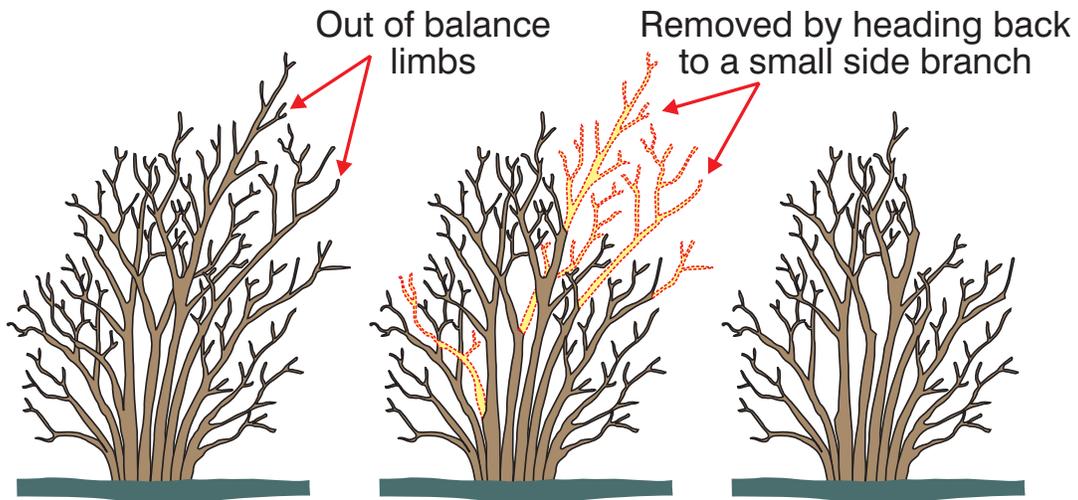


REJUVENATION PRUNING

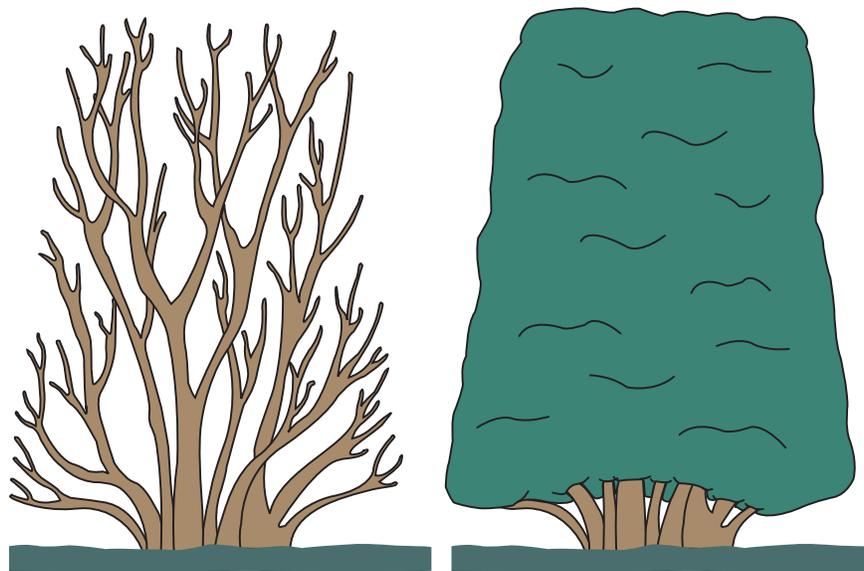


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HEADING BACK



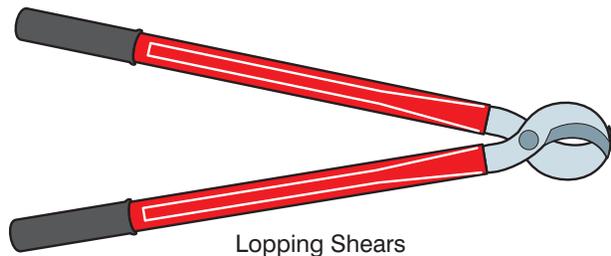
SHEARING



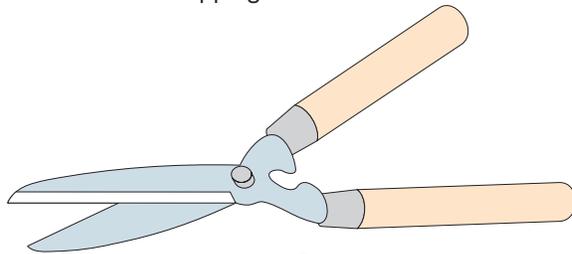
Shear hedges to be wider at the base.

(Courtesy, Interstate Publishers, Inc.)

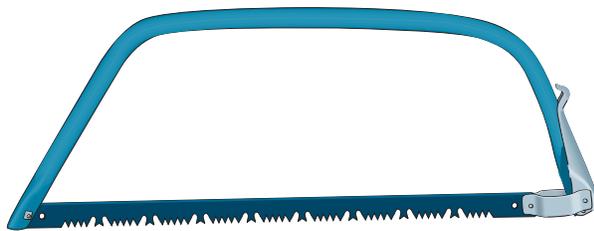
PRUNING TOOLS



Lopping Shears



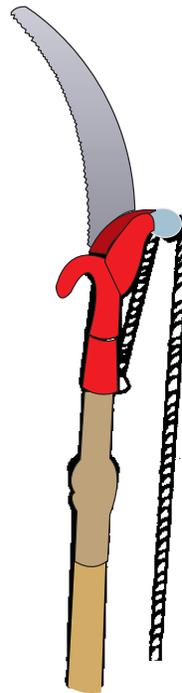
Hedge Shears



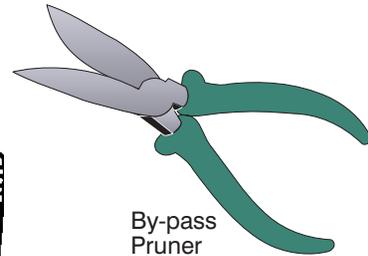
Bow Saw



Curved-blade Hand Saw



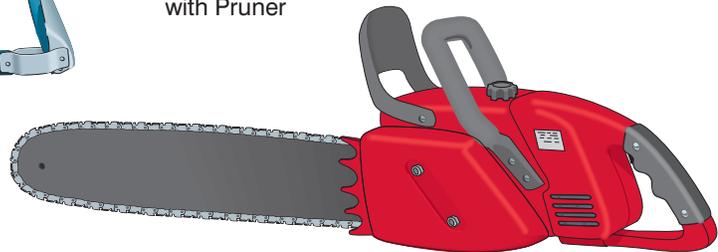
Pole Saw with Pruner



By-pass Pruner



Anvil-and-Blade Pruner



Chain Saw

(Courtesy, Interstate Publishers, Inc.)