

# Sustainable Urban Landscapes

## Pruning Trees: Shade, Flowering, and Conifer

Considered both an art and a science, pruning has changed dramatically over the last 30 to 40 years. In fact, practices such as flush cutting of branches, topping of trees, and treating pruning wounds with asphalt-based dressings are now relics of the past. Today, landscape professionals must combine their creative and artistic talents with a thorough knowledge of hundreds of plants and how each plant responds to pruning.

### Reasons for pruning

There are many valid reasons for pruning trees and shrubs. However, the most important reasons include pruning for safety, health, and appearance.

### Safety pruning

often becomes necessary to correct a “plant in the wrong place” situation. Examples of safety pruning include trimming branches from trees and shrubs that interfere with lines of sight for



Trees interfering with utility lines must be pruned.

automobile, bicycle, and pedestrian traffic; eliminating branches that grow into utility lines; and removing dead or structurally unsound branches from trees. Sometimes eliminating a tree from the landscape is the best option when large sections must be removed to ensure safety.

**Pruning for health** might involve removing crowded, rubbing, or crossing branches to decrease the chance of self-wounding, and eliminating diseased or insect-ridden branches. Promoting a strong framework through judicious pruning also falls under the heading of pruning for health. Trees and shrubs that are neglected at an early age frequently have structural problems later in life.

**Pruning for appearance** requires a certain amount of subjectivity. Some situations call for plants to be molded into formal or rigid shapes. Other landscapes require a plant’s natural tendencies be accentuated, not modified. Each style has its place; however, trees and shrubs pruned to take advantage of their natural growth habit usually require less maintenance than their carefully sculpted counterparts.



Conifers can be sculpted into formal shapes.

### When to prune

Unlike humans, who repair, replace, restore, and regenerate wounded tissue, trees and shrubs respond to any wound, including those inflicted during the pruning operation, by “walling-off” or compartmentalizing injured tissue. Once these areas are walled-off, the isolated wood dies, but the rest of the plant is protected from decay-causing pathogens and rot. Because this wound response takes place most rapidly just before the onset of growth in the spring when energy reserves are at their highest, the late dormant season (February to March) is commonly regarded as the “best” time to prune. This also is a time when woody plants will not have to cope with opportunistic insects and disease-causing pathogens. Also, absence of foliage makes it easier to view the general structure of deciduous trees and shrubs, and facilitates the removal of appropriate branches.



Pruning cuts should not injure the branch collar or branch bark ridge.

Maple, elm, birch, and fruitless mulberry often experience sap flow or “bleeding” from pruning wounds made in late winter or early spring. Although sap flow is not injurious to trees, it may bother the homeowner. Pruning in early to midsummer, after the leaves have matured, will prevent unsightly sap flow.

Pruning can be accomplished at other times of the year with little negative consequence. In fact, pruning to remove broken, dead, or diseased branches should be done as soon as these defects are noticed. But there are two exceptions. Pruning should not take place in the spring when leaves are forming because energy reserves are low and the bark “slips” or tears easily at this time. Autumn pruning, particularly during the period when leaves are falling, also should be avoided because this is when new absorbing roots are forming, and the wound response drains energy from this important period of growth.

**Making the cut**

Contained within the branch collar (the flared base of most branches), is an important barrier or protection zone that prevents the spread of decay into the trunk or parent branch. The branch collar and raised strip of bark, the branch bark ridge, mark this important boundary between the branch and trunk.



Avoid improper pruning techniques.

Pruning cuts that injure or eliminate the collar destroy the protection zone, leaving vulnerable tissues open to invasion and infection. Therefore, the proper pruning cut should be made to the outside of the branch bark ridge and collar. Flush cuts must be avoided because they violate the protection zone and leave large wounds that are difficult for trees and shrubs to defend.

When removing larger limbs (diameter exceeding 1 inch), use a three-cut technique to prevent the branch from tearing away as it is being removed.

The initial cut is made on the underside of the branch, 6 to 12 inches from the trunk, about a third to halfway through the limb. The second cut is made on the top of the branch, 1 inch further out. As the second cut is made, the weight of the branch will cause it to break at the pivot point between the two cuts. Once the branch falls, the third and final cut is made outside the branch collar.



1. The initial cut is made on the underside of the branch.



2. The second cut is made on the top of the branch, about 1 inch further out.



3. The branch will break at the pivot point between the cuts.



4. The final cut is made outside the branch collar.



5. Wound dressings are unnecessary.

## Wound dressings

Prior to the mid-1970s, it was standard practice to coat all pruning wounds with an asphalt-based paint or dressing. These materials have since fallen out of favor after experimental work proved they do not prevent decay in wood, and in some cases actually stall the wound response and protect wood-rotting fungi. Non-phytotoxic wound dressings (such as orange shellac) have been recommended for pruning wounds made on several oak species and American elm in the spring and early summer. Though the use of wound dressings may be justified to prevent the transmission of fungal pathogens causing oak wilt and Dutch elm disease, a better approach is to avoid pruning susceptible species during periods when insect vectors for these diseases are active.

## Pruning deciduous trees

Ideally, tree pruning should begin at the time of planting. Trees that receive proper pruning when they are young usually have fewer structural problems at maturity than those left to fend for themselves. But avoid the temptation to “thin” a young tree’s crown. Excessive pruning removes leaves needed to manufacture carbohydrates for the developing tree. Severe pruning also removes stored energy in branches and buds that the tree will need for root growth. Studies have shown that post-plant growth is more rapid and trees will establish sooner if pruning at planting time is limited to removing only weak, dead, diseased, rubbing, or injured branches. Also avoid removing the many small side branches that occur along the trunk. These lateral branches help the trunk

increase in base diameter or caliper, and make for a sturdier tree. Laterals also help shade the trunk, which reduces the likelihood of sunscald injury, and act as guards—warding off equipment operators, animals, and vandals. In general, two-thirds of the tree height should be left as crown (branches and leaves).

After the young tree has become established in the landscape (usually one year after planting), pruning really becomes a job of “training.” Two general concepts will help guide the pruner.

- Training or pruning should take place progressively over the next three to five years.
- No more pruning should take place in a single year than is needed to enhance the shape or structural strength of the tree.

The first step in training a young tree is to identify those primary limbs (scaffold limbs) that eventually will make up the tree’s framework. The height to the lowest limb will be determined in part by the anticipated activities that will occur under or near the tree.

The selected scaffold branches should be spaced evenly and distributed radially around the trunk, and they should be roughly one-half the diameter of the trunk or less. Optimally, major limbs on large-growing shade trees should be spaced 18 to 24 inches apart on alternating sides of the trunk. For smaller-growing trees, a spacing of 6 to 12 inches is recommended. Never let one limb grow directly over a lower one.



Do not allow trees to develop double leaders.

Unless the tree has a natural multi-stemmed habit, it should be trained to have a single, central dominant leader. The central leader is the topmost vertical stem extending from the trunk. Laterals that threaten to grow taller than the leader should be pruned. Double or codominant leaders, if left unattended, can pose problems for trees as they age. Either of the two stems (usually the weaker stem) should be removed as soon as it is noticed.

Branches that ascend from trees at steep angles and codominant stems that grow close together often are poorly attached because of the formation of included bark (bark that turns inward at the point where branch and trunk or codominant stems meet). As affected branches increase in size, they often tear away from the tree. These weakly attached branches should be pruned from the tree as early as possible.



Included bark indicates a weakly attached branch that may tear away.



As training continues in subsequent years, other practices will be necessary to maintain tree health and vigor. Laterals that have grown higher than the terminal leader or beyond the perimeter of the crown should be pruned back within the bounds of the tree. Any laterals that have grown inward toward the center of the crown should be removed back to their point of origin. And structurally weak water sprouts and basal sprouts (suckers) should be removed to preserve the beauty and natural growth habit of the tree.

Mature trees should be pruned cautiously. Dead branches and those that are structurally unsound should be removed as soon as they are noticed. But because they depend on carbohydrates produced by leaves and stored in twigs and branches, mature trees should never be pruned or thinned excessively. *Under no circumstances should trees ever be topped* (see Iowa State University Extension publication SUL 7 *Topping—Tree Care or Tree Abuse?*). Large branch stubs that result from topping are open invitations to insects and wood-rotting pathogens. Once decay enters the branch stub, it may progress into the main trunk, weakening the tree and creating a hazard for people and property.

### Pruning conifers and shrubs

Conifers that produce side buds (lateral buds) on shoots and branches, such as spruce and fir, can be pruned by cutting the tips back to the desired length in late winter when buds are dormant. The recommended place for cuts is just above a side bud or side branch. Central leader pruning is not recommended because it may result in the formation of unsightly and structurally weak multiple leaders.

**Pines**, easily recognized by their long needles grouped into bundles of two, three, or five, are pruned in early June to early July when the new growth is in the “candle” stage. Pinching or snapping off one-half to two-thirds of the candle reduces annual growth and makes the plant more compact.



Reduce annual growth on pine by snapping off part of the “candle” or new growth.

Pines do not produce buds along new shoots or existing branches, or from cuts made in older wood. Consequently, pruning must be confined to the current year’s growth if the plant is to be dwarfed or shaped. Unfortunately, it’s too late to start corrective pruning on pines once they’ve outgrown their site. Unwanted lower branches on all evergreens can be removed in the late dormant season.

**Arborvitaes, yews, and junipers** are best pruned before new growth begins in the late dormant season so that unsightly cuts will be covered quickly by new spring growth. Some landscape managers prune these species again in early July to prevent a ragged appearance. Fall and winter pruning should be avoided because it often results in tip die-back of the pruned branch.

Arborvitaes, yews, and junipers respond best to the “thinning-out” pruning method. A branch is cut off at its point of origin on the



Thinning cuts result in a natural, unpruned appearance.

parent stem or back to a lateral side branch. This technique promotes a more open plant with a natural, unpruned appearance, without stimulating excessive new terminal growth. Shearing, on the other hand, stimulates a proliferation of growth at the branch tips that shades the shrub interior and favors the formation of undesirable “dead zones” (areas devoid of foliage). New growth will not develop unless there are surviving green twigs and needles.

**For more information, visit these Iowa State University Extension Web sites**

*Distribution Center—*

<https://store.extension.iastate.edu/>

*Forestry—*[www.forestry.iastate.edu](http://www.forestry.iastate.edu)

*Horticulture*

[www.yardandgarden.extension.iastate.edu](http://www.yardandgarden.extension.iastate.edu)

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