

New Tree Planting

Information on proper practices for planting a tree with a nine-step approach to successful planting and establishment.



Purchasing a tree is an investment, and how well that investment grows depends on the type of tree selected, the location, and the care provided.

When to Plant

- Ideally during the dormant season—in the fall after leaf drop or in early spring before bud break.
- Weather conditions are cool and allow plants to establish roots in the new location before spring rains and summer heat stimulate new top growth.
- Healthy balled and burlapped or container trees can be planted throughout the growing season.
- In tropical and subtropical climates where trees grow year round, any time is a good time to plant a tree, provided that sufficient water is available.

Planting Stress

Balled-and-burlapped trees lose a significant portion of their root system when dug at the nursery. As a result, trees commonly exhibit what is known as “transplant shock.” Transplant shock is a state of slowed growth and reduced vitality following transplanting.

Container trees may also experience transplant shock, particularly if they have circling (girdling) or kinked roots that must be cut. Proper site preparation, careful handling to prevent further root damage, and good follow-up care reduces transplant shock and promotes faster recovery.



Steps to Plant a Tree

Note: Before you begin planting your tree, be sure you have located all underground utilities prior to digging. **811 is the national call-before-you-dig phone number.** Anyone who plans to dig should call 811 or go to their state 811 center's website.

Carefully follow these nine steps to help your tree establish quickly in its new location:

1. The trunk flare is where the trunk expands at the base of the tree. **Ensure trunk flare is partially visible after the tree is planted.** Remove excess soil prior to planting if flare is not visible.
2. Dig a shallow, broad planting hole. **Holes should be 2–3 times wider than the root ball,** but only as deep as the root ball.
3. If wrapped, remove any cover from around the root ball and trunk to facilitate root growth. Remove wire basket or cut one or two rings off so it is low-profile and will not interfere with future root growth. Inspect tree root ball for circling roots and straighten, cut, or remove them. Expose the trunk flare if necessary.
4. Place the tree at the proper height. When placing the tree in the hole, lift by the root ball, not the trunk. The majority of tree's roots develop in the top 12 inches (30 cm) of soil. Planting too deep can be harmful to the tree.
5. Straighten the tree in the hole. Before filling the hole, have someone examine the tree from several angles to confirm it is straight.
6. Fill the hole gently but firmly. Pack soil around the base of the root ball to stabilize it. Fill the hole firmly to eliminate air pockets. Further reduce air pockets by watering periodically while backfilling. Avoid fertilizing at the time of planting.
7. If staking is necessary, three stakes or underground systems provide optimum support. **Studies have shown that trees develop stronger trunks and roots if they are not staked;** however, it may be required when planting bare root stock or on windy sites. Remove stakes after first year of growth.

8. Mulch the base of the tree. Place a 2–3 inch (5–7.5 cm) layer of mulch, but be sure not to pile much right against the trunk. **A mulch-free area of 1–2 inches (2.5–5 cm) wide at the base of the tree will reduce moist bark and prevent decay.**
9. Provide follow-up care. Keep the soil moist by watering at least once a week, barring rain, and more frequently during hot, windy weather. Continue until mid-fall, tapering off as lower temperatures require less-frequent watering.

Other follow-up care to consider:

- Minor pruning of branches damaged during the planting process may be required.
- Prune sparingly after planting. Delay corrective pruning until a full season of growth.
- If trunk wrapping is necessary, use biodegradable materials and wrap from the bottom.

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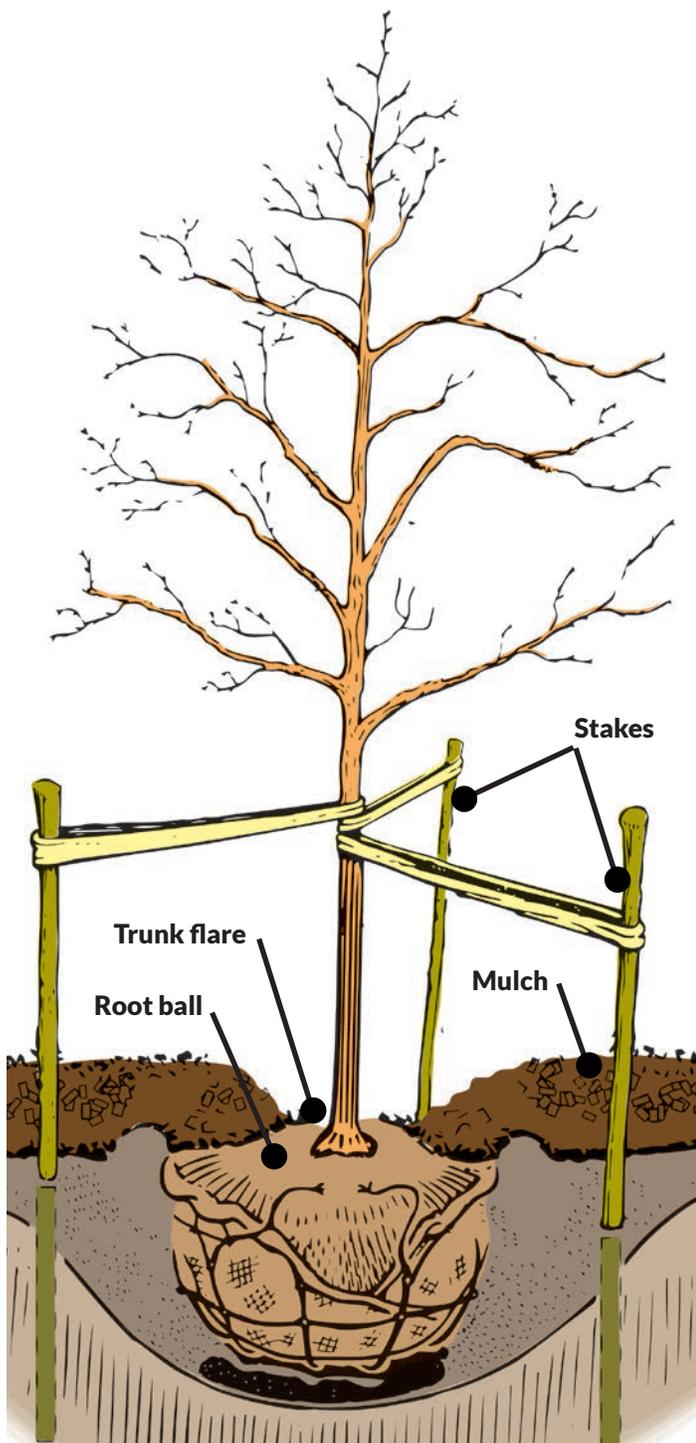
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Proper Mulching Techniques

Mulching is one of the most beneficial practices a homeowner can use for better tree health.



Mulches are applied to the soil surface to maintain moisture and improve soil conditions. However, if misapplied, mulch may have little, or even negative, impact on trees.

Benefits of Proper Mulching

- Reduces soil moisture loss through evaporation.
- Controls weed germination and growth.
- Insulates soil, protecting roots from extreme summer and winter temperatures.
- Improves soil biology, aeration, structure (aggregation of soil particles), and drainage over time.
- Increases soil fertility as certain mulch types decompose.
- Inhibits certain plant diseases.
- Reduces the likelihood of tree damage from string trimmers and lawn mowers.
- Gives planting beds a uniform, cared-for look.

Trees growing in a natural forest environment have their roots anchored in a rich, well aerated soil full of essential nutrients and soil microorganisms. The soil is blanketed by fallen leaves and other organic materials that organisms break down to release nutrients into the soil. This environment is optimal for root growth and mineral uptake.

Urban landscapes and new developments, however, are typically harsher environments with poor-quality soil, reduced organic matter, and large fluctuations in soil temperature and moisture. Many benefits of the natural environment can be replicated, while maintaining a formal appearance, with the application of an organic mulch.



Types of Mulch

Organic Mulch

- Examples include wood chips, pine needles, hardwood and softwood bark, cocoa hulls, leaves, compost mixes, and a variety of other products usually derived from plants.
- Decomposes in the landscape at different rates depending on the material, climate, and soil microorganisms present.
- Requires more replenishing depending on how fast it decomposes.

Inorganic Mulch

- Examples include various types of stone, lava rock, shredded rubber, and other materials.
- Does not decompose or need to be replenished often.
- Does not improve soil structure or provide nutrients.

Not Too Much!

Too much mulch can be harmful. The recommended mulching depth is 2–4 inches (5–10 cm). Unfortunately, many landscapes are falling victim to a plague of over mulching.

“Mulch volcanoes” are excessive piles of mulch materials applied around the base of trees.

While organic mulches must be replenished over time, buildup can occur if reapplication outpaces decomposition or if new material is added simply to refresh color.

Deep mulch can be effective in suppressing weeds and reducing maintenance, but it often causes additional problems.

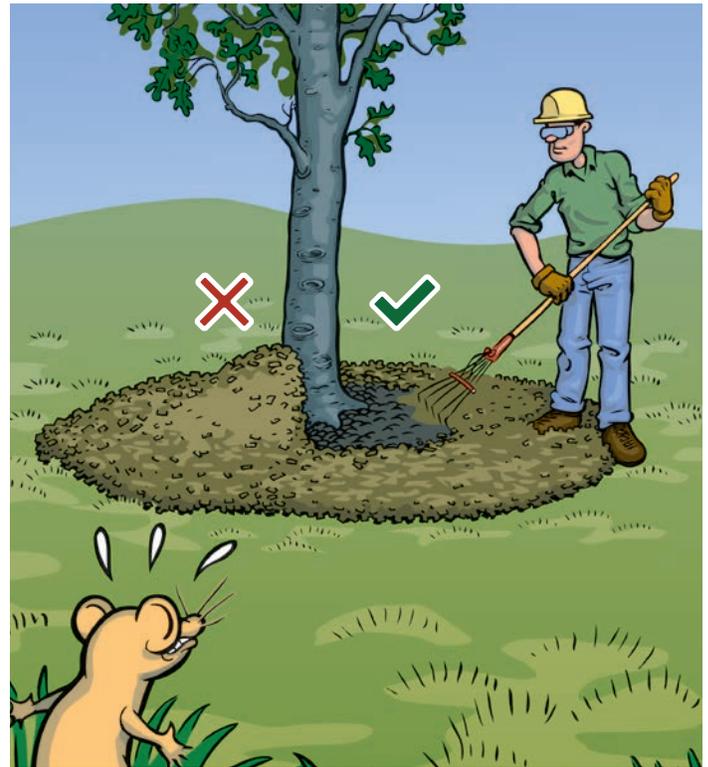
Problems Associated with Improper Mulching

- Applying mulch against the trunk or stems of plants can soften the tissues, making them more susceptible to the development of insects and diseases (see figure top right).
- Mulch against the trunk can also lead to the growth of stem girdling roots. This type of root growth can reduce tree growth or eventually kill the tree.
- Thick blankets of fine mulch can become matted and may reduce the penetration of water and air.
- On wet soils, applying more than 2 inches (5 cm) of organic mulch can reduce soil drying, which can lead to excess moisture in the root zone, which can stress the plant and cause root rot. In these cases, it may be best to leave bare ground exposed or to use a thin layer of inorganic mulch.
- Some mulches, especially those containing fresh grass clippings, can affect soil pH and may eventually lead to nutrient deficiencies or toxic buildups. Anaerobic “sour” mulch may give off pungent odors, and the alcohols and organic acids that build up may be toxic to young plants.

Guidelines for Applying Mulch

The choice of mulch and the application techniques are important to the health of landscape plants. The following are guidelines for applying mulch:

- For well-drained sites, apply a 2–4 inch (5–10 cm) layer of mulch. Fine mulches, such as composed materials, should be applied in a 2–3 inch layer and coarse mulches, such as arborist wood chips, should be applied in a 3–4 inch layer.
- Apply mulch near, but not touching, the trunk and extend to the drip line, if practical. If it is not practical to apply mulch to the drip line, apply as far out as you can. Generally, a 3 foot (1 meter) radius ring is the minimum for most trees.
- If the species you are mulching has symptoms related to a pH problem, select a mulch that can aid in correcting.
- If mulch is already present, check the depth. If sufficient mulch is present, break up any matted layers and refresh the appearance with a rake. Some landscape maintenance companies spray mulch with a water-soluble, vegetable-based dye to add color to faded material.
- If mulch is piled against the stems or tree trunks, pull it back several inches/centimeters so that the base of the trunk is exposed (see figure top right).
- Fresh arborist wood chips, especially those that contain bark and leaves, are an excellent material to apply around trees and large shrubs.



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Pruning Young Trees



Proper pruning is essential in developing a tree with a strong structure and desirable form. Trees that receive the appropriate pruning measures while they are young will require less corrective pruning as they mature.

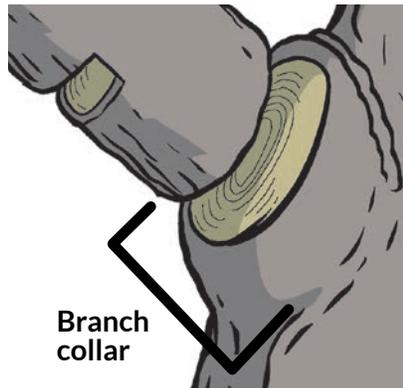
Key Points for Pruning Young Trees

- Set an objective for why the tree will be pruned. For younger trees, the objective is to improve tree structure so the tree will be strong and not interfere with its surroundings as it matures.
- Each cut has the potential to alter the growth of the tree.
- Poor pruning can cause life long damage for the tree. When a tree is damaged it must grow over the damage and the wound is contained within the tree forever.

Deciding Where to Cut

- Pruning cut location is critical to a tree's growth and wound closure response.
- Make pruning cuts just outside the branch collar (see figure below) to avoid damaging the trunk.

- When a long branch needs to be shortened, prune it back to a secondary branch or bud.



- Cuts made between buds or branches may lead to stem decay, sprout production and misdirected growth.

Pruning Tools

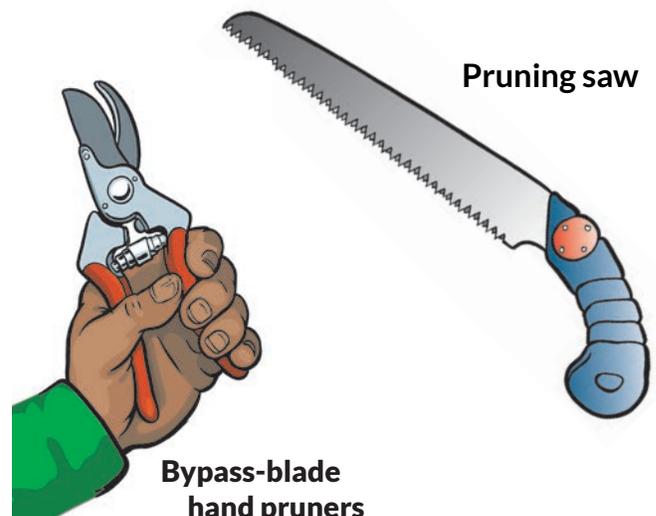
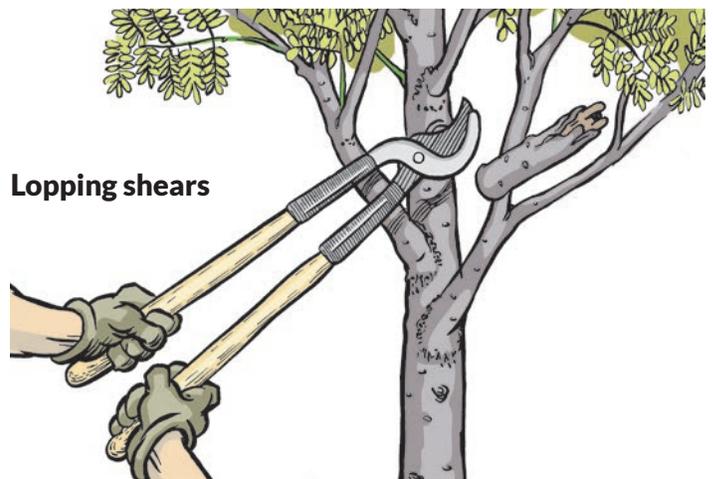
- Small branches can be cut with hand pruners.
- Scissor-type or bypass-blade hand pruners are preferred over the anvil type because they make cleaner, more-accurate cuts.
- Cuts larger than one-half inch (1.27 cm) in diameter should be made with lopping shears or a pruning saw.
- Hedge shears should be used on hedges only.
- Ensure tools are kept clean and sharp.

Newly Planted Trees

Limit pruning of newly planted trees to the removal of dead or broken branches. All other pruning should be withheld until the second or third year, when a tree has recovered from the stress of transplanting.

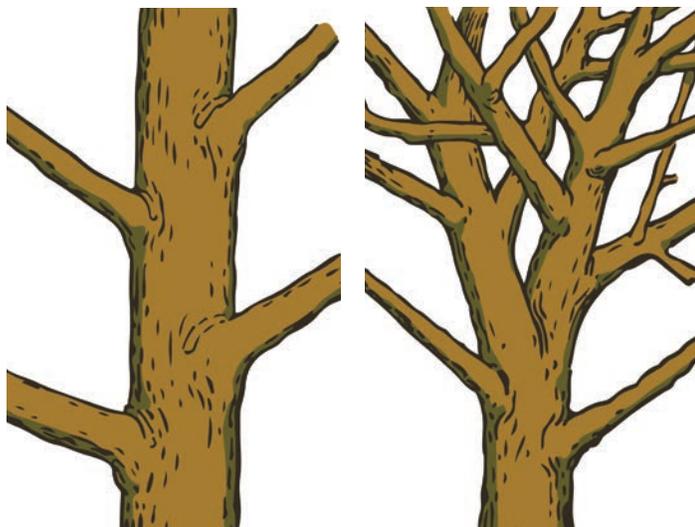
Wound Dressings

Research has shown that wound dressings do not reduce decay or speed up wound closure and rarely prevent insect or disease infestations. Most experts recommend not using wound dressings.



Permanent Branch Selection

- As young trees grow, most of the branches present at planting will be pruned away to provide clearance for mowing, pedestrians and/or vehicle traffic.
- The height of the lowest permanent branch is determined by the tree's intended function and location in the landscape. The road side of a street tree may be raised to 16 feet (5 m) to accommodate traffic. In most other situations, 8 feet (2.5 m) of clearance is sufficient. Trees used as screens or windbreaks, however, usually branch low to the ground.
- Sufficient branch spacing and balance, both vertically and radially, is important. The space between permanent branches should be approximately 3% of the tree's eventual height (for example, 1.5 feet [0.5 m] for a tree that can grow to be 50 feet [15 m] tall).
- The strength of branch structure depends on the relative size of the branches and branch angles. Branches similar in diameter to the trunk or limb from which they arise are more prone to failure than those smaller in diameter.
- Narrow angles of attachment can enclose bark within a branch union. Such growth is called included bark, a condition that weakens the branch attachment and may lead to failure when the tree matures. Branches with weak attachments should be pruned when small. Balance should be considered by retaining some branches in each direction radially, spreading from the center outward (see figure top right). Make sure one scaffold branch is not allowed to grow directly above another.
- When pruning, be sure not to remove too many branches. Leaves and supporting branches are major sites of food production and storage. Eliminating too much canopy can "starve" the tree, reduce growth, and increase stress.



Good structure

Poor structure

Establishing a Strong Scaffold Structure

- "Scaffold branches" are a mature tree's framework. Well trained young trees will develop a strong structure that requires less corrective pruning as they mature.
- The goal is to establish a strong, central trunk with sturdy, well-spaced branches. This form mimics tree growth in forests where outward branching is limited by neighboring trees.
- Some tree species develop some or all of these attributes naturally. Others may require more frequent attention.

Trunk Development

- Most young trees maintain a single dominant, upward-growing trunk, called a "leader".
- Do not prune back the tip of this leader or allow secondary branches to grow taller than the main leader.
- Sometimes, a tree will develop two or more nearly equal size leaders known as codominant stems. Codominant stems can lead to structural weaknesses, so it is best to remove or shorten all but one of the stems when young.
- A tree's secondary branches contribute to the development of a sturdy, well-tapered trunk.

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Pruning Mature Trees

Understand the pruning needs of mature trees and the proper pruning techniques for their care.



Pruning is the most common tree maintenance procedure. Although forest trees grow well with only nature's pruning, landscape trees require a higher level of care to maintain their structural integrity and aesthetics. Pruning must be done with an understanding of tree biology because improper pruning can create lasting damage or shorten the tree's life.

Reasons for Pruning

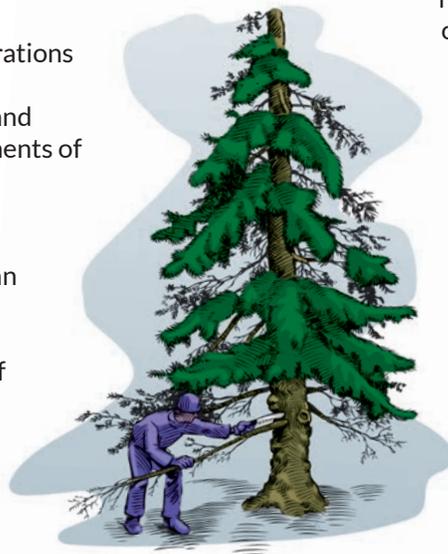
Because each cut has the potential to change the growth of the tree, no branch should be removed without a reason. Common reasons include:

- Removing dead branches, improving form, and to reduce risk.
- To increase light and air penetration to the inside of the tree's crown or to the landscape below.
- Generally, mature trees are pruned as corrective or preventive measures.

Routine thinning does not necessarily improve the health of a tree. Trees produce a dense crown of leaves to manufacture the sugar used as energy for growth and development. Removal of foliage through pruning can reduce growth and stored energy reserves. Heavy pruning can be a significant health stress for the tree.

There are many outside considerations that make it necessary to prune trees such as: safety, clearance, and compatibility with other components of a landscape.

Proper pruning, with an understanding of tree biology, can maintain good tree health and structure while enhancing the aesthetic and economic values of our landscapes.



When to Prune

Most light, routine pruning to remove weak, dead, or diseased limbs can be accomplished at any time during the year with little effect on the tree.

As a rule, growth and wound closure are maximized if pruning takes place before the spring growth flush. Some trees, such as maples and birches, tend to "bleed" if pruned early in the spring. It may be unsightly, but it is of little consequence to the tree.

Heavy pruning of live tissue just after the spring growth flush should be avoided, especially on weak trees. At that time, trees have just expended a great deal of energy to produce foliage and early shoot growth. Removal of a large percentage of foliage at that time can stress the tree.

A few tree diseases, such as oak wilt, can be spread through pruning wounds and provide access to pathogens (disease-causing agents). Susceptible trees should not be pruned during active transmission periods.

How Much Should Be Pruned?

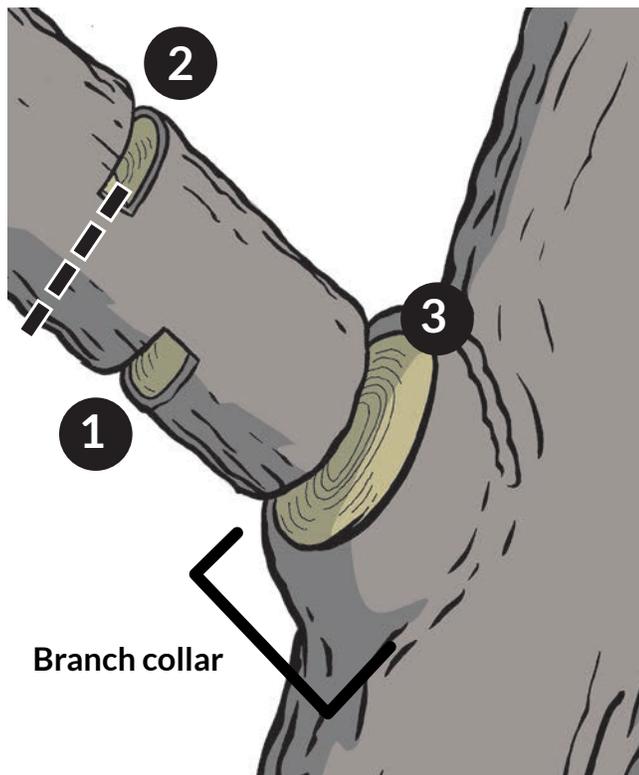
The amount of live tissue that should be removed depends on the tree's size, species, age, and pruning objectives. Younger trees tolerate the removal of a higher percentage of living tissue better than mature trees. Generally, no more than 25% of the crown should be removed at once, and less for mature trees.

Removal of a single, large-diameter limb can create a wound that may not be able to close. Care should be taken to meet pruning objectives.

Making Proper Pruning Cuts

A correct pruning cut removes the branch just outside of the collar. **Do not make cuts flush to the trunk.** Trunk tissues above and below a flush cut branch often die, creating dead spots.

If a collar has grown out on a dead limb, make the cut just beyond the collar. Do not cut the collar.



(See figure above.) If a large limb is to be removed, its weight should first be reduced as follows:

1. Make an undercut about 12–18 inches (30–46 cm) from the limb's point of attachment.
2. Make a second cut from the top, directly above or a few inches farther out on the limb. Doing so removes the limb, leaving a stub.
3. Remove the stub by cutting back to the branch collar. This technique reduces the possibility of tearing the bark.

Pruning Techniques

Cleaning is the removal of dead, dying, diseased, weakly attached, and low-vigor branches from the crown of a tree.

Raising removes the lower branches from a tree to provide clearance for buildings, vehicles, pedestrians, and vistas.

Reduction reduces the size of a tree, often for utility line clearance. Reducing a tree's height or spread is best accomplished by pruning back the leaders and branch terminals to secondary branches that are large enough to assume the terminal roles (at least one-third the diameter of the cut stem). Compared to topping (See "Why Topping Hurts Trees" brochure), reduction helps maintain the tree's form and structural integrity.

Reducing density of foliage at the crown periphery (previously called thinning) is sometimes performed to increase wind or light penetration for aesthetic reasons and to promote interior foliage development.

Wound Dressings

Research has shown that wound dressings do not reduce decay or speed up wound closure and rarely prevent insect or disease infestations. Most experts recommend not using wound dressings.

Hiring an Arborist

Pruning large trees can be dangerous. Pruning that involves working above the ground or using power equipment should be done by an ISA Certified Arborist®. These arborists can determine the type of pruning necessary to improve the overall health of the tree and provide the services of a trained crew with the required safety equipment and liability insurance.

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