# Proper Tree Pruning

**TEXAS MASTER GARDENER**
2019 TREE CARE SPECIALIST TRAINING

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# Pruning Basics

- Understanding tree biology prior to pruning will optimize tree health and structure
- Cuts should be made with an understanding of how a tree will respond

# Pruning Objectives

- Prune only when necessary and for a specific purpose
- Understand tree biology and structure
- Improving aesthetics and removal of dead limbs
- Improving the health and branching structure

# Pruning Objectives

- Decrease the odds of structural failure
- Decrease wind resistance
- Increase sun exposure for turf
- Clearance

# Pruning Objectives

Reduce dominant stems on shade trees

# Pruning Objectives

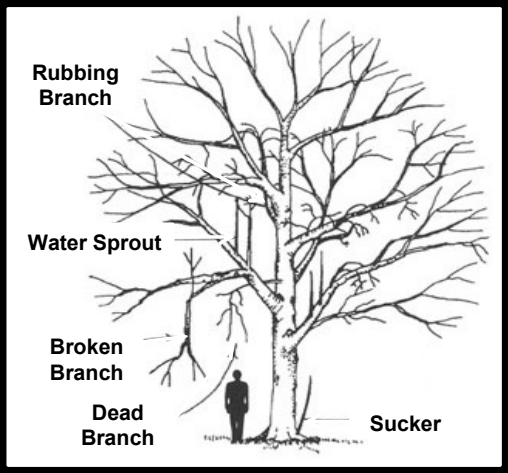
Prevent co-dominant stem failure as they get larger

# Pruning Objectives

- Define objectives before pruning
- Each cut has the potential to change the growth of a tree
- Consider future growth and long term effects

# Pruning Objectives

- Increase fruit and flower production
- Remove rubbing limbs

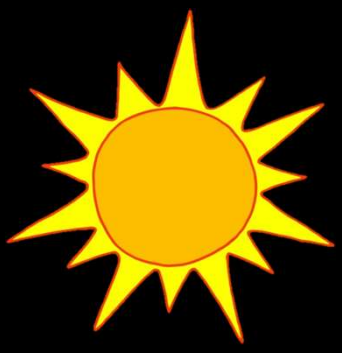


# Pruning Objectives

- Improve a view
- Maintain and improve health

# Pruning Basics

- Removing leaves reduces photosynthetic capacity and overall growth
- Removing branches removes stored resources



# Pruning Basics

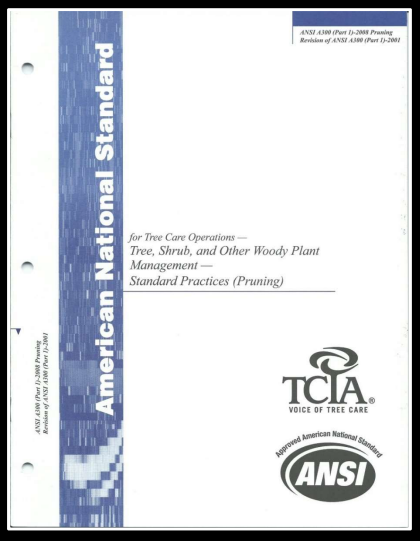
- Growth following pruning takes place on fewer shoots
- Unpruned parts tend to grow more (shoot invigoration)

Growth after pruning

# Pruning Standards

*ANSI A300* (Part 1) - 2017 Pruning

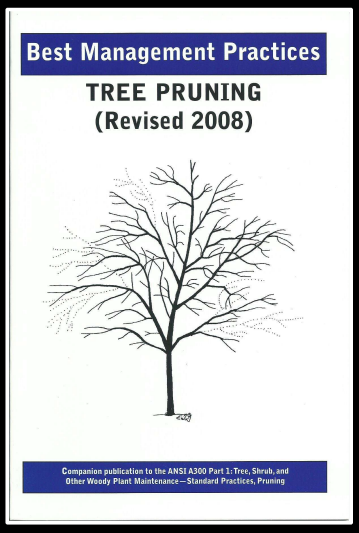
www.tcia.org



# Pruning Standards

Best Management Practices – Tree Pruning

www.isa-arbor.com



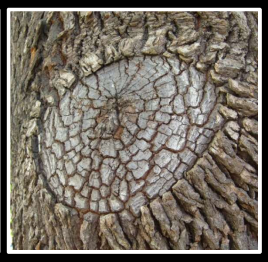

# Timing

Pruning to remove dead, broken or rubbing limbs can be accomplished anytime with little negative affect.

# Timing

- Late winter to early spring (before bud swell), allows a full growing season to compartmentalize cut wounds
- Limb structures and defects are more visible





# Timing

- Late winter early spring minimizes the risk of disease
- Prevents sap ooze on bleeders (Maples, Birch and Walnut)


# Timing

Spring and early summer (after leaf out) can reduce the amount of new growth and reduce food storage or energy.

# Timing

- Late spring pruning (after blooming) preserves more flowers
- Provides larger and higher quality fruit

# Timing

Late summer pruning allows some species to bloom all summer because they bloom on the current seasons growth.

# Improper Pruning

- Reduces photosynthesis
- Reduces food storage
- Cut wounds that don`t heal
- Increased decay
- Increased potential for structural failure
- Can ruin a tree for life

# Improper Pruning

- Avoid removing over 25% of the foliage in a year
- Avoid cuts over three-inches in diameter that may be slow to compartmentalize

# Improper Pruning

Lion tailing is the removal of all interior growth leaving only a tuft of foliage on the ends.

# Improper Pruning

Excessive thinning of foliage causes sunscald and epicormic sprouts (suckers).

# Improper Pruning Effects

- Reduced branch taper
- Poor wind load distribution
- Weakened branch structure
- Higher risk of structural failure
- Increased decay and branch dieback
- Increased insect and pathogen problems

# Branch Collar

- Formed when a branch remains small relative to the diameter of the stem from which it originates
- Area where a branch joins another branch or trunk that is created by the overlapping vascular tissues from both the branch and the trunk
- Overlapping wood makes it a stronger union

# Branch Attachment

Branch Union:

Where a branch joins another branch or the trunk of the tree. Also known as the crotch and node.

# Branch Attachment

Branch Protection Zone:

- Inside the branch collar
- Chemically and physically modified tissue that retards the spread of discoloration and decay into the trunk
- Compartmentalizes the pruning wound

# Branch Attachment

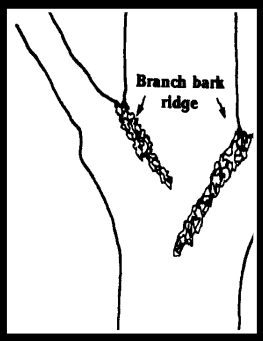
Included Bark:

- Bark that becomes embedded in a crotch (union) between branch and trunk or between codominant stems
- Causes a weak structure prone to failure

# Branch Attachment

Branch Bark Ridge:

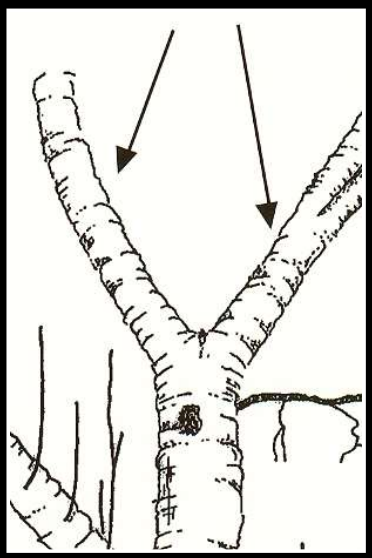
Raised strip of bark at the top of a branch union, where the growth and expansion of the trunk or parent stem and adjoining branch push the bark into a ridge.




# Branch Attachment

Codominant Stems:

Forked stems nearly the same size in diameter, arising from a common junction and lacking a normal branch union or a *branch bark ridge.*



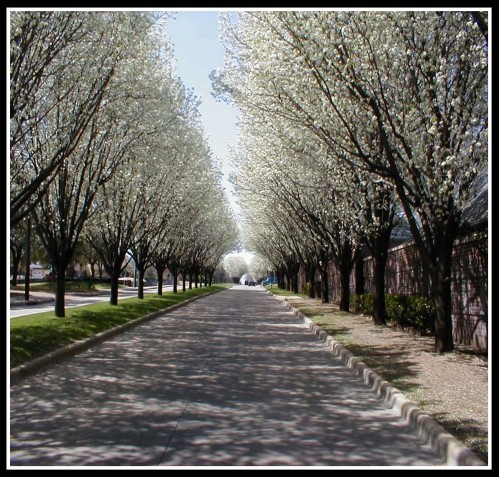
# Branch Attachment

Codominant Stems:

- Do not have a branch protection zone
- Often contain *included bark*
- Result in a weak union and allow decay to enter when one of the stems is removed

# Branch Attachment

All growth forms are genetic, with some being predisposed to structural failure.



# Proper Cuts

Each cut is a wound that must heal.

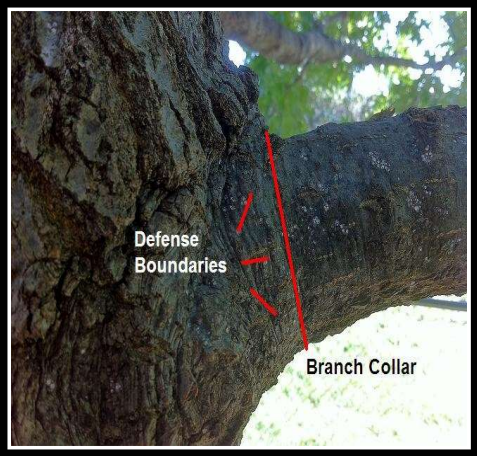
Compartmentalization:

A natural defense process by which chemical and physical boundaries are created that act to limit the spread of disease and decay organisms.


# Proper Cuts

Trees have a natural defense boundary that should not be damaged.

The final cut should be made at the branch collar.

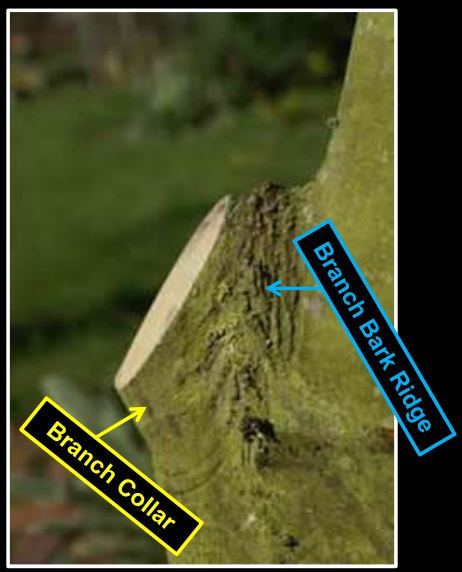


# Proper Cuts

- A proper cut does not leave jagged edges or torn bark
- A flush cut removes the trees defense boundary, may not heal and is more prone to insects and disease

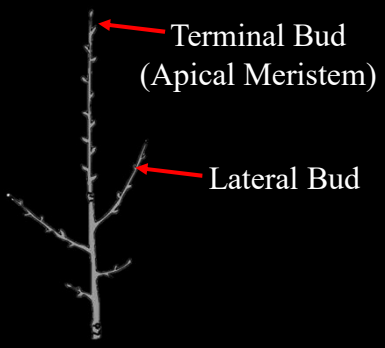
# Thinning Cuts

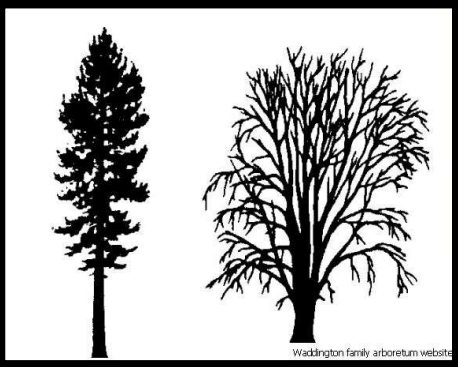
- Thinning cut is removing a limb to the parent branch or trunk
- Made outside branch bark ridge and branch collar



# Apical Control or Dominance

A condition in which the terminal bud inhibits growth and development of the lateral buds on the same stem formed during the same season.




Strong and Weak Apical Dominance

# Apical Control or Dominance

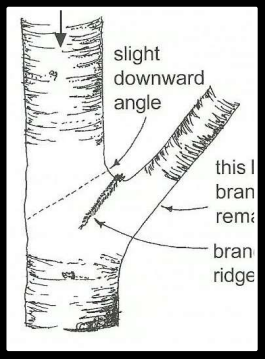
Inhibition of lateral buds, decreasing from the top down, by apical buds over many seasons, resulting in trees with an excurrent growth form.

**Excurrent Growth**

**Decurrent Growth**

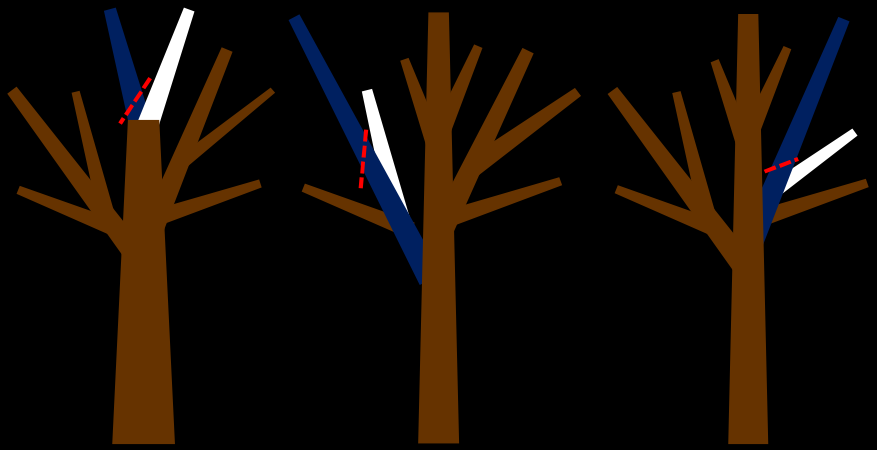
# Reduction Cuts

- Reduces the length of a branch or stem back to a lateral branch large enough to assume apical dominance
- Does not readily compartmentalize
- Avoid cuts over three-inches



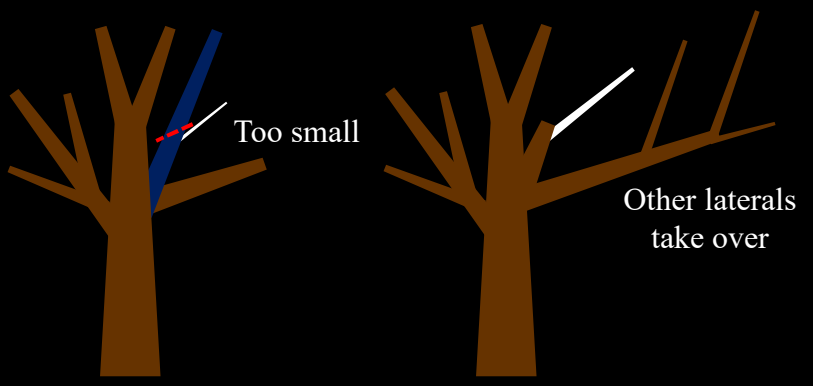

# Proper Cuts

- Lateral branches
- Secondary or subordinate branches



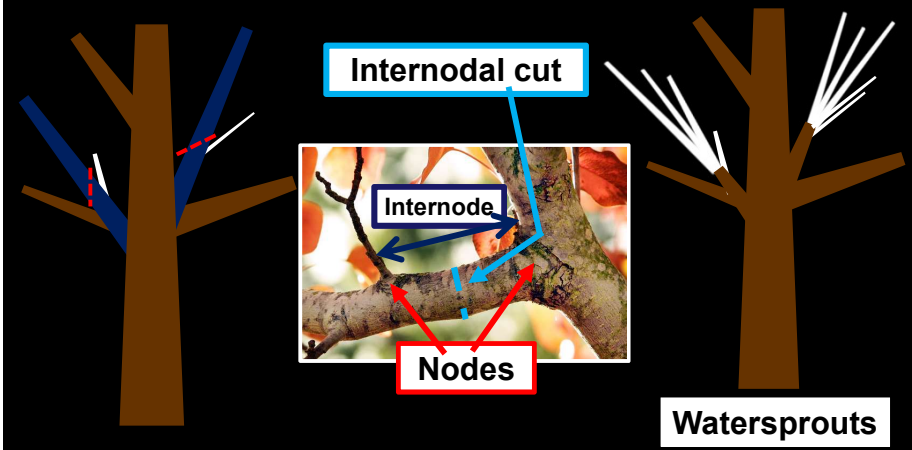
# Reduction Cuts

Consider the ability of remaining branch to assume *apical control or dominance.*




# Reduction Cuts

Cutting back to a lateral branch insufficient in size to assume apical dominance is a *heading* cut, also known as internodal or stub cut.

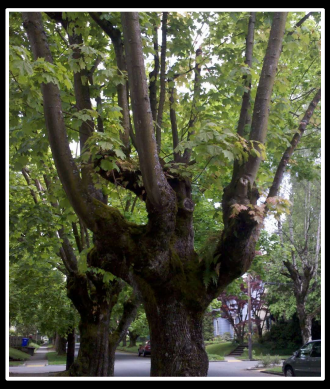


# Heading Cuts

Heading cuts are used for pruning bushes or storm damaged trees, but thinning or reduction cuts are preferred for trees.

# Topping Cuts

Topping cuts are used to reduce tree size often at internodes leaving a stump. This leads to branch dieback, decay and unstable sprout growth which increases risk in the future.



# Topping Cuts

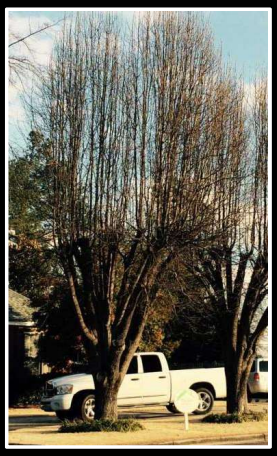
- Lead to branch dieback, decay and unstable sprout growth which increases risk
- Can lead to complete loss of foliage and food producing capacity/storage
- Root to crown ratio being unbalanced which decreases health and increases sunscald/pathogen entry
- Do not compartmentalize well

# Topping Cuts

Never “top” a tree because all re-growth is structurally weak.

# Topping Cuts

- The goal is reduced height but regrowth quickly occurs to produce food
- Structure never regains its form
- Reduces property value
- Increases cost to maintain and liability



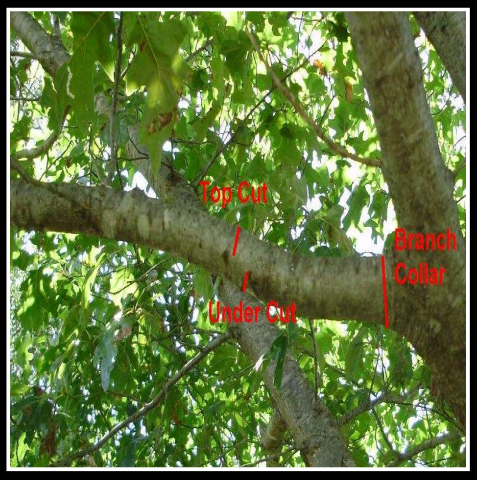
# Weight of Common Species

**Weight of Green Logs**

| SPECIES | WEIGHT PER LINEAR FOOT | WEIGHT OF A ONE-FOOT SECTION (BASED ON AVERAGE DIAMETER) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10" | 12" | 14" | 16" | 18" | 20" | 22" | 24" | 26" | 28" | 30" | 32" | 34" | 36" |
| Apple | 55 | 30 | 43 | 59 | 77 | 97 | 120 | 145 | 173 | 203 | 235 | 270 | 307 | 347 | 368 |
| Ash, White | 48 | 26 | 38 | 51 | 67 | 85 | 104 | 126 | 150 | 177 | 205 | 235 | 267 | 302 | 338 |
| Basswood | 42 | 23 | 33 | 45 | 59 | 74 | 92 | 111 | 132 | 155 | 180 | 206 | 235 | 265 | 297 |
| Beech | 54 | 29 | 42 | 58 | 75 | 95 | 118 | 142 | 169 | 199 | 231 | 265 | 301 | 340 | 341 |
| Birch, Paper | 50 | 27 | 39 | 53 | 70 | 88 | 109 | 132 | 157 | 164 | 214 | 245 | 279 | 317 | 353 |
| Birch, Yellow | 57 | 31 | 45 | 61 | 80 | 101 | 124 | 151 | 179 | 210 | 244 | 280 | 319 | 360 | 403 |
| Butternut | 46 | 25 | 36 | 49 | 64 | 81 | 100 | 121 | 144 | 170 | 197 | 226 | 257 | 290 | 325 |
| Cherry, Black | 45 | 25 | 35 | 48 | 63 | 79 | 98 | 119 | 141 | 166 | 192 | 221 | 251 | 283 | 318 |
| Chestnut | 55 | 30 | 43 | 59 | 77 | 97 | 120 | 145 | 173 | 203 | 235 | 270 | 307 | 347 | 388 |
| Cottonwood | 49 | 27 | 38 | 52 | 68 | 86 | 107 | 129 | 154 | 180 | 209 | 240 | 273 | 310 | 346 |
| Elm, American | 54 | 29 | 42 | 58 | 75 | 95 | 118 | 142 | 169 | 199 | 231 | 265 | 301 | 340 | 381 |
| Gum, Black | 45 | 25 | 35 | 48 | 63 | 79 | 98 | 119 | 141 | 166 | 192 | 221 | 251 | 283 | 318 |
| Gum, Red | 50 | 27 | 39 | 53 | 70 | 88 | 109 | 132 | 157 | 164 | 214 | 245 | 279 | 317 | 353 |
| Hackberry | 50 | 27 | 39 | 53 | 70 | 88 | 109 | 132 | 157 | 164 | 214 | 245 | 279 | 317 | 353 |
| Hickory, Shagbark | 64 | 35 | 50 | 68 | 89 | 113 | 140 | 169 | 201 | 236 | 273 | 314 | 357 | 403 | 452 |
| Honey Locust | 61 | 33 | 48 | 65 | 85 | 108 | 133 | 161 | 192 | 225 | 261 | 299 | 341 | 385 | 431 |
| Magnolia, Ev | 59 | 32 | 46 | 63 | 82 | 104 | 129 | 156 | 185 | 217 | 252 | 289 | 329 | 372 | 417 |
| Maple, Red | 50 | 27 | 39 | 53 | 70 | 88 | 109 | 132 | 157 | 164 | 214 | 245 | 279 | 317 | 353 |
| Maple, Silver | 45 | 25 | 35 | 48 | 63 | 79 | 98 | 119 | 141 | 166 | 192 | 221 | 251 | 283 | 318 |
| Maple, Sugar | 56 | 31 | 44 | 60 | 78 | 99 | 122 | 148 | 176 | 206 | 239 | 275 | 313 | 353 | 396 |
| Oak, California Black | 66 | 36 | 51 | 70 | 92 | 116 | 144 | 174 | 207 | 243 | 282 | 323 | 368 | 416 | 466 |
| Oak, Live | 76 | 41 | 60 | 81 | 106 | 134 | 166 | 200 | 238 | 280 | 324 | 372 | 424 | 478 | 536 |
| Oak, Red | 63 | 34 | 49 | 67 | 88 | 111 | 137 | 166 | 198 | 232 | 269 | 309 | 251 | 397 | 445 |
| Oak, White | 62 | 34 | 48 | 66 | 86 | 109 | 135 | 163 | 194 | 228 | 265 | 304 | 346 | 390 | 437 |
| Pecan | 61 | 33 | 48 | 65 | 85 | 108 | 133 | 161 | 192 | 225 | 261 | 299 | 341 | 385 | 431 |
| Persimmon | 63 | 34 | 49 | 67 | 88 | 111 | 137 | 166 | 198 | 232 | 269 | 309 | 251 | 397 | 445 |
| Poplar, Yellow | 38 | 21 | 30 | 40 | 53 | 67 | 83 | 99 | 119 | 140 | 162 | 186 | 211 | 239 | 268 |
| Sassafras | 44 | 24 | 34 | 47 | 61 | 78 | 96 | 116 | 138 | 162 | 188 | 215 | 245 | 277 | 310 |
| Sycamore | 52 | 28 | 41 | 55 | 72 | 92 | 113 | 137 | 163 | 191 | 222 | 254 | 290 | 327 | 366 |
| Walnut, Black | 58 | 32 | 45 | 62 | 81 | 102 | 126 | 153 | 182 | 213 | 248 | 284 | 323 | 364 | 409 |
| Pine, White | 36 | 20 | 28 | 38 | 50 | 64 | 78 | 95 | 113 | 128 | 154 | 176 | 201 | 227 | 254 |
| Spruce, Red | 34 | 19 | 27 | 36 | 47 | 60 | 74 | 90 | 106 | 125 | 145 | 166 | 189 | 214 | 239 |

# Three-Cut Method

- Weight must be removed from larger limbs before making a final cut to avoid a tear cut
- Although called the three cut method, larger limbs require more than three cuts in order to remove the weight in stages

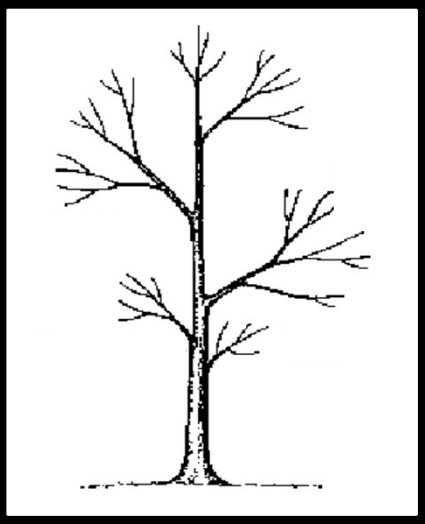



# Branch Collar Cut

A proper branch collar cut is outside the callus on a dead limb.

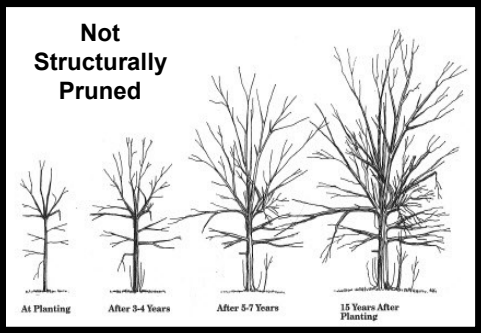
# Structural Pruning

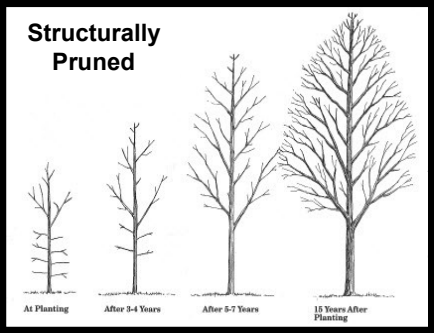
Establishes a strong arraignment or system of scaffold branches which form the architecture or structure of a tree.



# Structural Pruning

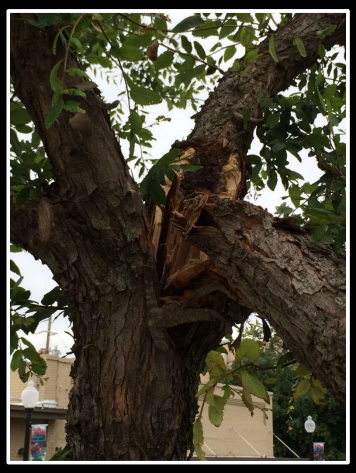
- Of critical importance on young trees to develop good branch spacing and strong branching habits
- Older trees require structural pruning, but all deficiencies may not be corrected



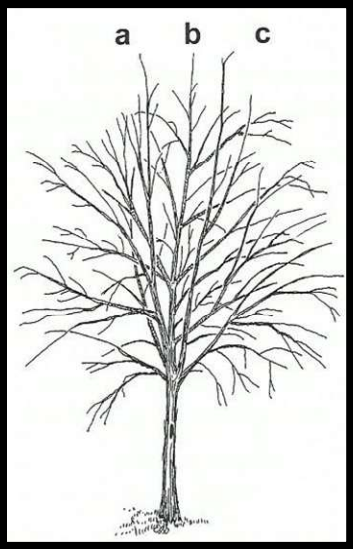
# Structural Pruning

Removes codominant stems and branches with narrow angles of attachment which reduces structural failures in the future.

# Structural Pruning

- Removal of dead, dying, broken or damaged limbs
- Establish desired structure often selecting a dominant leader
- Remove subordinate and competing limbs



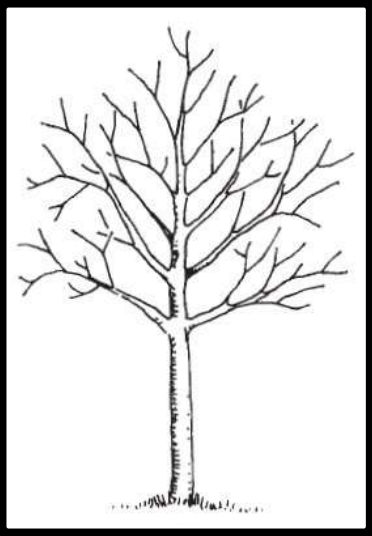
# Subordinate Pruning

Pruning to reduce the size of limbs that compete for dominance and slows the growth of remaining or lateral stems.

# Structural Pruning

Dominant Leader:

The primary terminal shoot, usually larger and more upright and dominates the crown by suppressing lateral growth.

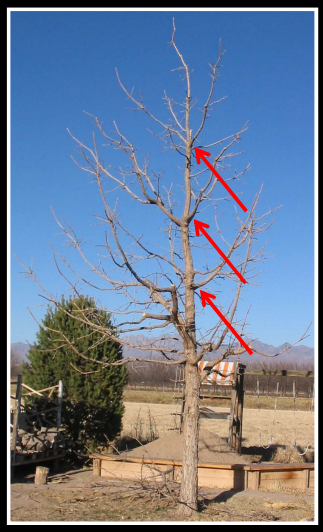


# Permanent Branch

- Left in place to form the scaffold framework
- Height of low limbs varies by location and function, but no higher than 50% of the height and no more than 25% canopy removal in one year

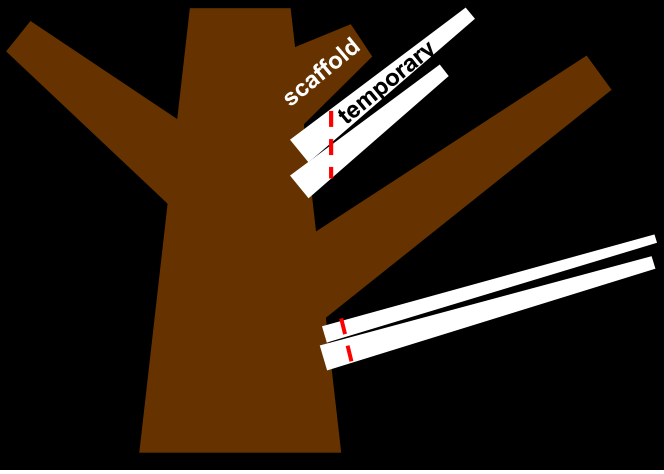
# Proper Pruning

- Establish scaffold branches with good angles of attachment and appropriate size along with the desired spacing of 12 to 18 inches apart
- Training process that should be spread out over years



# Temporary Branches

Select the temporary branches among the scaffold branches that are left in place (or subordinated) and will be removed later. They provide energy, increase trunk taper and shade bark.

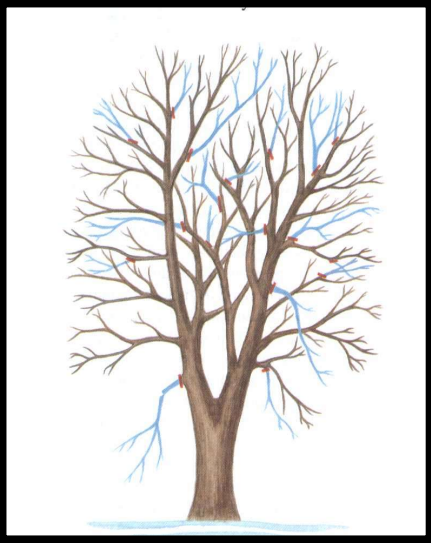



# Pruning Mature Trees

- Older trees may not tolerate severe pruning as they have less energy reserves
- Often limited to dead limb removal, but based on the condition and size of tree, site conditions and client objectives

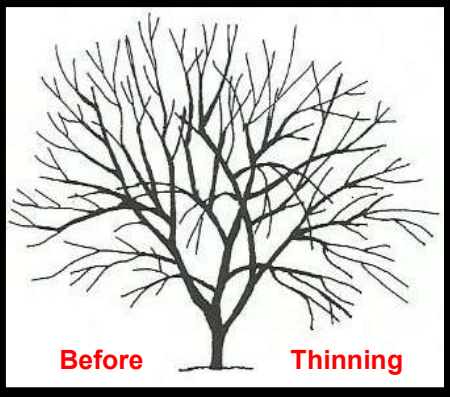
# Crown Cleaning - Thinning

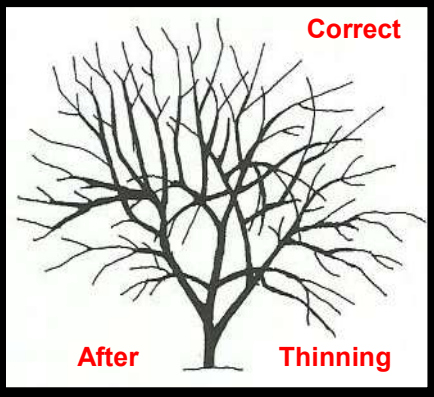
- Crown Cleaning: Removal of dead, dying, diseased, broken or weakly attached limbs
- Crown Thinning: Includes crown cleaning, but also thinning for light, air movement or structure



# Crown Thinning

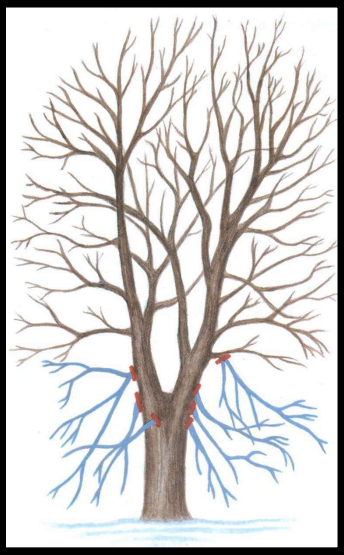
- Relieves weight on longer limbs and reduces the sail effect
- Retains the natural shape and not overly thinned



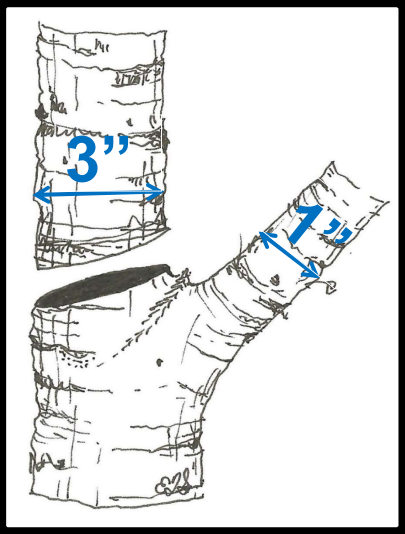
# Crown Raising

- Provides clearance for structures, traffic or people
- Avoid excessive removal of limbs to allow trunk taper development
- Often provides vista pruning for street signs or a favorable view



# Crown Reduction

- Reduces height or spread of a tree, often for utility line clearance
- Limbs are removed to the point of origin, but the remaining lateral must be one-third the diameter of the branch removed

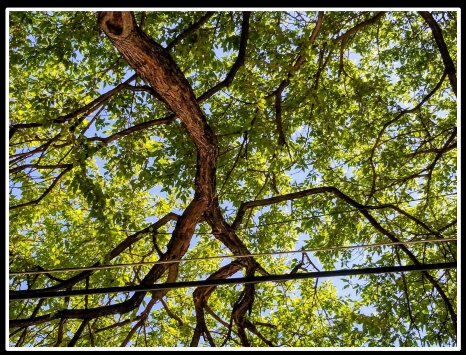


# Crown Restoration

- Pruning to improve trees which were improperly pruned or damaged
- Requires heading cuts and thinning epicormic sprouts in the future

# Utility Clearance

- Only qualified tree trimmers should be pruning any trees near power lines
- Trees closer than 11-feet to neighborhood power lines or more for larger lines should never be climbed, pruned or touched



# Espalier

Training a tree to grow a given shape that can be formal or informal.

# Pollarding

- A large form tree is consistently cut back to the same area to keep it small
- Internodal cuts are made at a given height starting when a tree is young

# Wound Dressings

Research shows that wound dressings slow the compartmentalization process.

However, if a pathogen is found to be a local problem, wound dressing may be required.

Avoid thick, tar-like dressings and use a light coat of aerosol paint, amber shellac or lac balsam.



# Sterilizing Tools

A few pathogens can be spread by pruning tools and tools may require sterilizing between trees, or sometimes between cuts.

Disinfectants are commercially available. You can also mix water with 10% bleach to disinfect.

After cleaning, oil your tools.

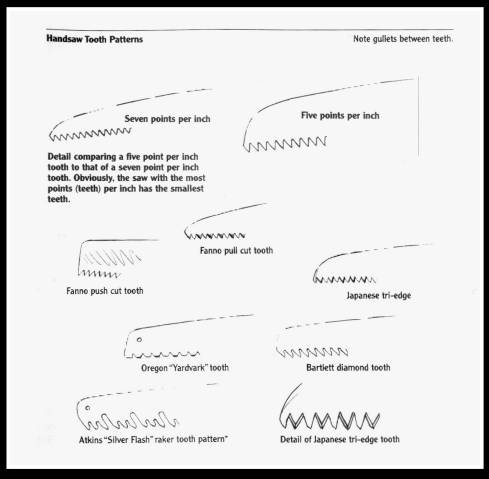
# Pruning Tools

- Safety glasses
- Long pants and long sleeves
- Work boots with non slip soles that cover the ankle
- Hard hat (required in our industry)
- Ear plugs or ear phones




# Pruning Tools

- Hand clippers (bypass)
- Hand saw (under three-inch limbs)
- Pole saw
- Pole lopper
- Sheers



# Pruning Tools

Chainsaw- the most dangerous hand tool ever invented…

Spikes?

Chainsaw on a stick?


# Tree Climbing

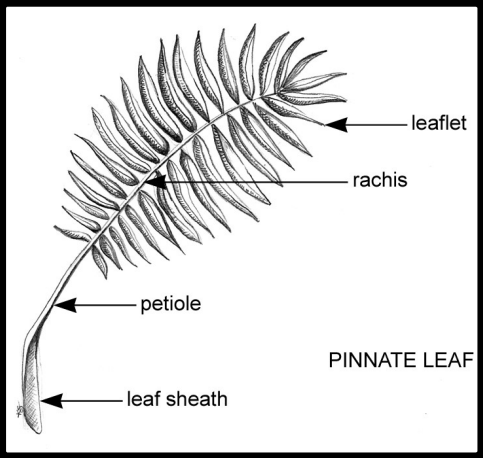
- Most dangerous business in the USA according to the insurance industry
- May only have one chance to make a mistake
- There are old climbers and bold climbers…but there are no bold and old climbers

# Pruning Palms

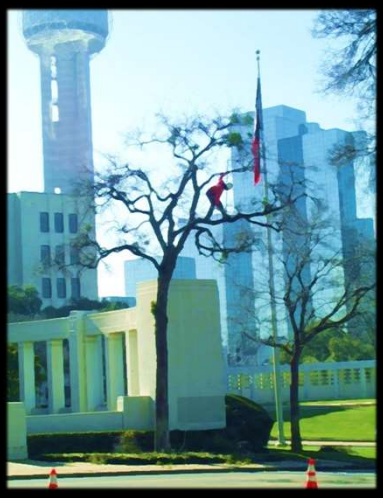
- Fronds, fruit or loose petioles can fall creating a risk
- Remove fronds from the top down
- Avoid removing fronds above 90 degrees


# Pruning Palms

Remove fronds close to the petiole base without damaging the trunk tissue.




# Any Questions?



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