Pruning Trees & Shrubs

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Tree Anatomy

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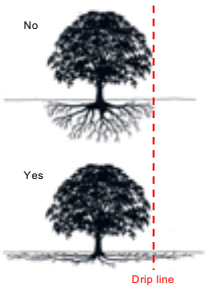
Roots

- Collect water & minerals from the soil
- Grow mostly in the top 6-24 inches
- Extend up to 2x the distance of the drip-line
- Damaged by
  - Compacted soil
  - Heat, salt & other chemicals
  - Aggressive removal (e.g. nearby construction)



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Trunk

- **Bark** – Protects the tree
- **Phloem** – Transports food from crown to rest of tree
- **Cambium** – Creates new cells & generates growth
- **Xylem** – Transports water from roots to crown

- Damaged by
  - Storms (wind, heavy snow)
  - Lawnmowers/weed trimmers
  - Insects & animals (e.g. Emerald Ash Borer & rabbits)

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Crown

- Includes leaves, twigs, branches, flowers & fruit
- Leaves create food for growth
  - Water & minerals (from the roots)
  - Sunlight & CO_2 (from the air)
- Damaged by
  - Storms (wind, heavy snow)
  - Insects & disease

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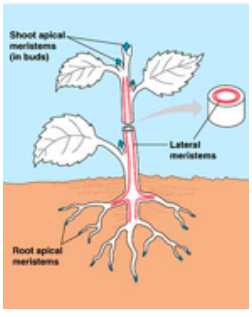
Meristem

- Produces new cells that cause plant to grow
- **Lateral Meristem** grow in the cambium (along the trunk & branches)
- **Apical Meristem** grow on the tips of branches & roots
  - Removing the tips of branches encourages the nearest buds to grow



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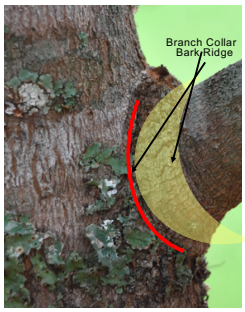
Branch Morphology

- Branch collar
  - Where trunk tissues overlap with branch tissues
- Bark ridge
  - Where the trunk bark meets the branch bark



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Reasons to Prune

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Poor Structure: Co-dominant Leads

- Co-dominant leads are competing vertical branches
- Prone to breaking under stress
- Characteristics
  - Two or more
  - Very vertical
  - Weak branch unions

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Poor Structure: Weak Branch Union

- Joined at acute angles
- Prone to breaking under stress
- Characteristics
  - Acute (narrow) angle between trunk & branch
  - **Included bark** appears when two branches physically push together as they continue to grow

Weak branch union Strong branch union

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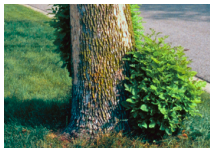
Poor Structure: Weak Growth

- Have poor branch attachment, block sun from reaching inner branches & consume extra nutrients and water
- Often grow when plants are stressed (severe loss of/ or damage to roots & branches, insects, disease or drought)
  - "Water sprouts" (from branches)
  - "Suckers" (from base)
- Characteristics
  - Fast-growing
  - Point vertically instead of laterally
  - Grows densely



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Poor Structure: Rubbing Branches

- Creates wounds in bark
  - Increases risk of insect & disease
  - Prevents nutrients from moving between roots & crown
  - Can kill branches or entire tree
- Characteristics
  - Rubbing branches (crossing branches can eventually grow together as the tree matures)
  - **Girdling roots** wrap around trunk at ground level

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Damaged Trees

- Caused by strong winds, heavy snow, lightning, animals, & people
- Address major damage immediately
- Hire an arborist if you cannot complete the pruning safely
- Characteristics
  - Breaks to significant branches
  - Cracks in trunk
  - Uplifted roots

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Damaged Trees: Decay

- Caused by fungi infiltrating the protective bark
- Location & extent of decay determines the risk for structural failure
- Characteristics
  - Wood that is soft, white, spongy, & stringy; or brown & brittle
  - Cavities
  - Mushroom growth (trunk or roots)

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Damaged Trees: Infections

- Caused by insects, fungi, bacteria & viruses
- Remove infected material
- Prevents the spread to healthy parts of plant
- Characteristics
  - Strange growths
  - Die-back in crown
  - Weak growth (suckers/water sprouts) development

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Damaged Trees: Deadwood

- Requires healthy parts to hold dead weight
- Can cause breaking under stress
- Characteristics
  - Lack of new growth
  - Brittle woody material
  - Often on ends of branches

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Encourage New Growth

- Stimulates guided growth
- Very intentional
- Often involves removing healthy plant material
- Examples
  - Fruiting trees, vines, shrubs
  - Plants with ornamental bark
  - Topiary or bonsai

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Types of Pruning Techniques

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Crown Cleaning (Trees)

- Removes excess growth from the crown of a tree
- Characteristics
  - Dead or dying branches
  - Diseased plant matter
  - Weakly-attached branches (e.g. watersprouts)

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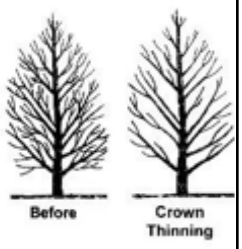
Crown Thinning (Trees)

- Selectively removes lateral & parallel branches
- Increases light & air to the crown
- Reduces risk of disease



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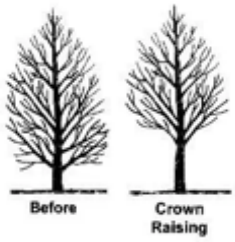
Crown Raising (Trees)

- Removes lower branches
- Increases clearance for buildings, people & vehicles
- Improves visibility for street signs



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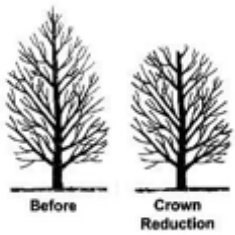
Crown Reduction (Trees)

- Make the crown smaller
  - Lowers the height or width of the tree
  - Uses thinning cuts
- Used when tree overgrows the space it occupies



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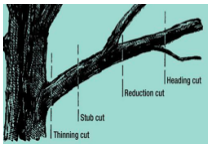
Healthy Pruning (Trees & Shrubs)

- **Thinning Cuts** – remove growth at its point of origin on the trunk
- **Reduction Cuts** – remove growth back to a large lateral branch
- Characteristics
  - Used to remove damaged, dead, or weak branches
  - Leaves no stubs



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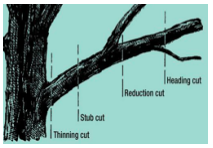
Damaging Pruning (Trees)

- **Heading Cuts** – remove growth to a branch or leader; terminate the growth of that branch
- **Stub Cuts** – remove growth to an indiscriminate point on a branch or leader where no bud or branch exists
- **Not recommended**
  - Reduces tree's ability to make food
  - Increases risk of disease & insect problems
  - Increases risk of storm damage
  - Hurts tree appearance



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Rejuvenation Trimming (Shrubs)

- Gradual removal of limbs at the base of shrub
  - Remove up to 1/3 of branches per year
  - May take 3-4 years to rejuvenate whole plant
  - Improves flower display

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How to Prune

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Timing

- Prune in late winter or early spring
  - Shape of plant is apparent
  - No active insect or disease problems
  - Healing is rapid when spring growth occurs
- Bad times to cut woody plants
  - Late summer (Aug -Sep)
  - At planting or in the first-year of growth
  - When incurably damaged/diseased
- Some exceptions exist

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Equipment

- Hand Pruners (3/4 inch or less)
  - **Bypass Pruners** – have 2 passing blades and make clean cuts that don't damage plant tissue
  - **Anvil Shears** – presses the blade against a solid surface; best for dead branches and plants
- Loppers (1 ½ inch or less)
  - Longer handles provide more leverage and reach
- Pruning Saws (over 1 inch)
- Hedge Shears (3/4 inch or less)

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Equipment Cleaning

- Benefits
  - Increases duration
  - Reduces damage to healthy plant material
- Check blades often
  - Remove plant debris & sap after pruning
  - Disinfect if working with diseased plants
  - Sharpen blades yearly

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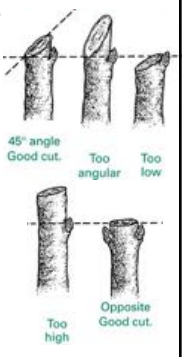
Removing Small Branches

- Identify a bud for new growth
- Use pruning shears to cut at a 45º angle
- Avoid leaving excess material above the cut
- Be careful not to damage the bud itself



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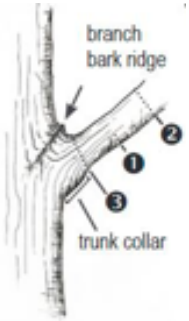
3-Step Pruning Method (Trees)

1. **Undercut** – small incision under the branch prevents bark from tearing
2. **Overcut** – removes the majority of the branch to reduce weight; may tear back to the undercut
3. **Final Cut** – angles the cut for ideal wound healing



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Removing Large Branches

- Use pruning saw
- Make **thinning** or **reduction** cuts as appropriate
- Prevent damaging using the **3-Step Pruning Method**
- Cut at an angle to preserve the branch collar (avoid flush cuts)

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Recovery

- Correct pruning along the branch collar encourages the formation of a callus that seals the wound and protects the tree
- Wound Dressing Sealants
  - **Not recommended**
  - Thought to accelerate wound closure & reduce decay
  - Actually slows healing & increases risk of disease
  - Exception may exist for preventing oak wilt, rose stem borers & sucker formation

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When to Remove a Tree

- Sometimes pruning will not help and the tree should be removed
- Watch for
  - Over 50% loss of crown
  - Trunk damage (cracks, splitting, hollows)
  - Tree is leaning
  - Tree is unrecoverable (insects, disease, or damage)

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Arborists

- Hire an arborist if the pruning project:
  - Needs a diagnosis of tree health
  - Is too large or dangerous
  - Requires special equipment
- How to choose an Arborist
  - Check with your city or town for a list of approved arborists
  - Choose a certified professional who is fully insured
  - Ask for & check local references

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Species Specific Advice

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Oak Trees

- Reason: Avoid **oak wilt**, a fungal disease that kills oaks
- Recommendations
  - Prune between Nov-Mar
  - If you must prune outside this time may, cover the wound **immediately** with latex paint to avoid attracting disease-carrying beetles

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"Bleeding" Ornamentals

- Reason: Avoid distracting heavy sap production
- Recommendations
  - Looks bad but nor harmful to the tree
  - Prune after the leaves have matured (mid-summer)
  - Affects maple, birch, dogwood, beech, elm, willow, flowering plum and flowering cherry

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Evergreens: Pines

- Reason: Maintain smaller size
- Recommendations
  - New growth appears as upright branches called **candles**
  - Use fingers to snap off ½–⅔ of candles between June & early-July (Note: pruners cause needles to brown)
  - Warning: Avoid cutting back to hardened older wood because new shoots will not grow

Is it a Pine? *Pine needles attach to the branches in clusters of 2, 3 or 5*

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Evergreens: Spruces, Firs & Douglas-Firs

- Reason: Maintain smaller size
- Recommendations
  - Remove new growth in before August after growth is complete for the season
  - Cut back to a lateral branch to encourage side growth
  - Warning: Avoid cutting back to hardened older wood because new shoots will not grow

Is it a Spruce or Fir? *Spruce and Fir needles attach individually to the branches*

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Evergreens: Winterburn

- Reason: Remove dead growth
- Recommendations
  - Remove dead material after new foliage is produced
  - If new foliage does not emerge, scratch the bark on affected branches to look for green tissue underneath
    - If the tissue is green, new growth may yet grow
    - If the tissue is brown, the branch is most likely dead; prune the branch back to a live, lateral bud or branch

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Hedges

- Reason: Maintain shape
- Recommendations
  - Prune when new growth is 6-8 inches long
  - May happen 2x per year (spring & mid-summer)
  - Remove back to within 2-inches of last pruning
  - Bottom should be wider than top

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Oaks, Bleeding Ornamentals, Pines, Spruce/Firs, Winterburn, Hedges, **Fruiting**, Flowering, Roses

Fruiting Trees & Vines

- Reason: Improve fruit yield
- Recommendations
  - Varies highly depending on species
  - Pruning may begin in the first season
  - Know where fruit develops on your plant:
    - 1st year growth (peach, nectarine, grape & kiwi)
    - 2nd year growth (apple, pear, cherry, plum, apricot, gooseberry, currant, walnut, chestnut)
  - Remove growth that competes with fruit production or slows plant development

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Oaks, Bleeding Ornamentals, Pines, Spruce/Firs, Winterburn, Hedges, Fruiting, **Flowering**, Roses

Flowering Shrubs & Trees

- Reason: Encourage improved flowering
- Recommendations
  - If flowers bloom **before July**, prune immediately after flowering
  - If flowers bloom **after June**, prune in late winter (immediately before new growth starts)

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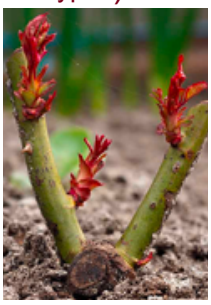
Oaks, Bleeding Ornamentals, Pines, Spruce/Firs, Winterburn, Hedges, Fruiting, Flowering, **Roses**

Roses (hybrid tea & grandiflora types)



- Reason: Encourage improved flowering & reduce foliar disease
- Recommendations
  - Remove growth back to an outward-facing bud
    - Dead, diseased & crossing canes
    - Up to 1/3 of oldest canes
    - Thin & long, spindly canes
  - Seal cut ends with a drop of white glue to keep out stem boring insects

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Oaks, Bleeding Ornamentals, Pines, Spruce/Firs, Winterburn, Hedges, Fruiting, Flowering, Roses, **Buckthorn**

Buckthorn (Invasive woody plants)

- Reason: Kill plants & discourage new growth
- Recommendations
  - Best time to cut is in late summer (avoid May/June)
  - (Chemical) Remove growth back to the ground & treat stump with an herbicide
  - (Non-chemical) Remove growth back to the ground & cover stump for 1-2 years
- Types of Invasive woody plants include: Amur & Norway maple, Buckthorn, Non-native bush honeysuckles, Multi-flora rose, Black locust, Japanese barberry, Mulberry, Russian olive, Siberian elm & Siberian pea shrub

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Parting Considerations

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Pruning Recommendations

- Be safe
  - Use the right tool for the job
  - Hire an arborist when necessary
- Use good pruning practices
  - Thinning & Reduction cuts
  - 3-Cut Method for large branches
- Encourage healing
  - Prune at the right time
  - Avoid flush and stub cuts
  - Skip tree paint or sealant

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