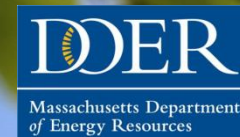


# Looking Ahead: Your New Tree

Greening the Gateway Cities  
Springfield

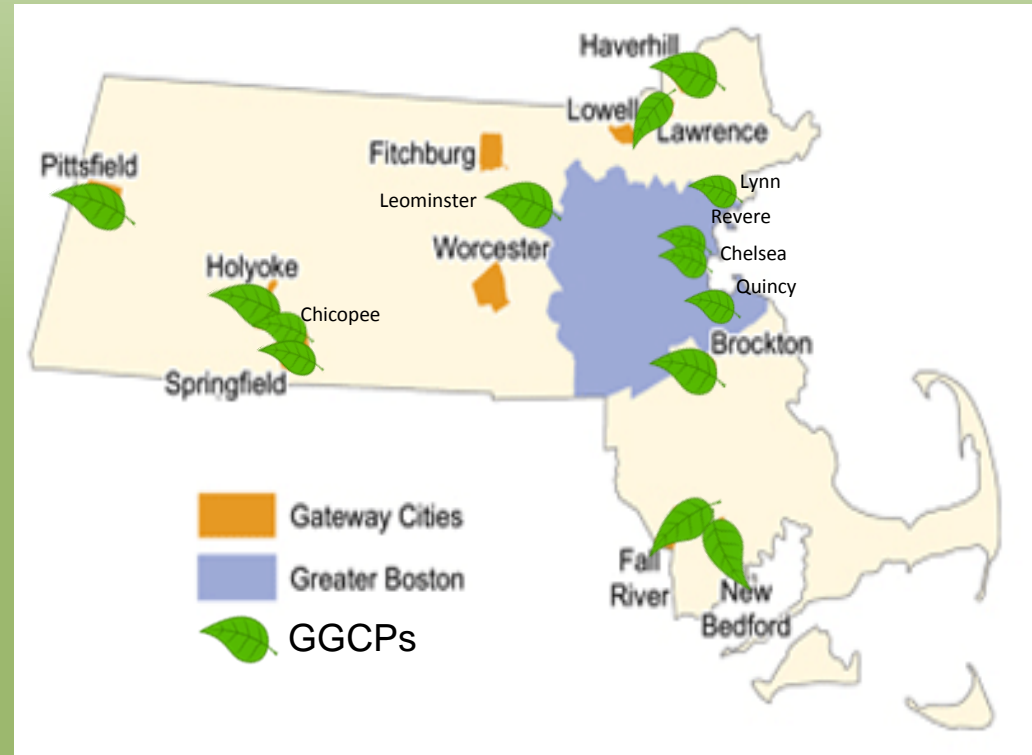


ReGreenSpringfield



# Greening the Gateway Cities

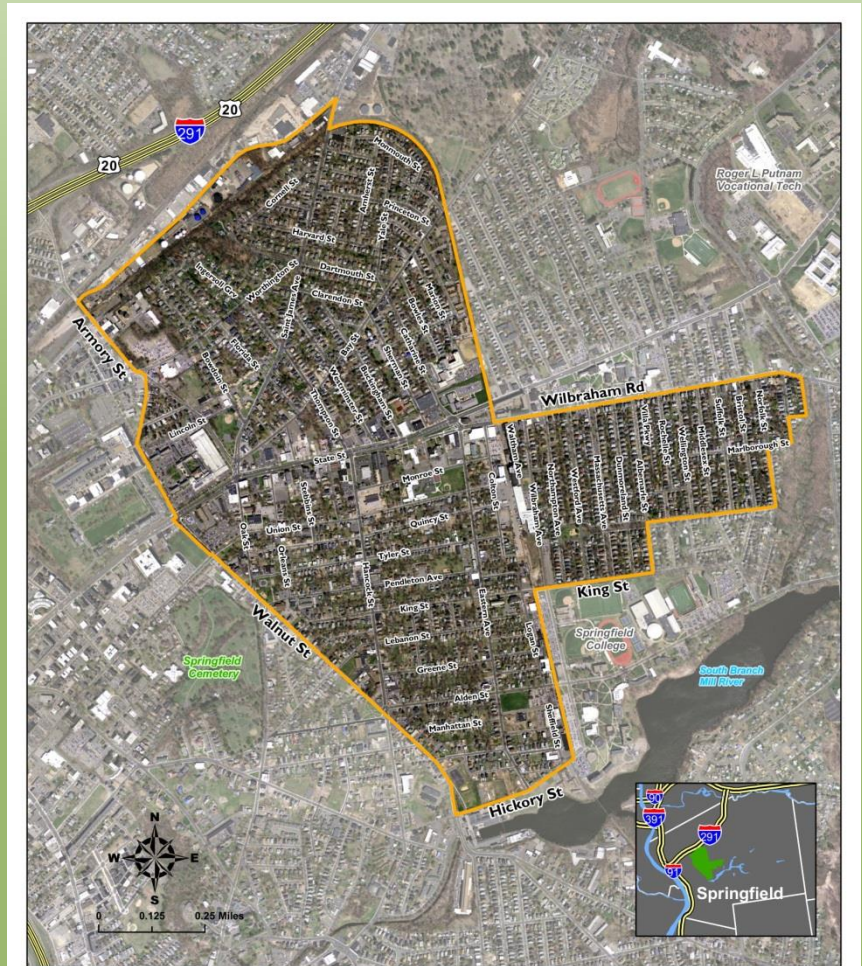
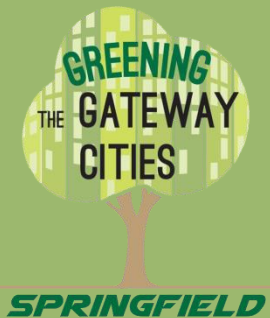
- State grant program
- 14 “gateway” cities across Massachusetts
- Funded by DOER and administered by EEA
- Aims to reduce household heating and cooling costs





# GGCP Springfield

- Launched 2018
- 2,400 trees over the course of 3 years
- 80% private trees
- 20% public trees



## Legend

 Planting Zone

## Greening the Gateway Cities Program West Region - Springfield



# Outline

- A. Basic knowledge on tree growth
- B. Care and maintenance
- C. Pruning
- D. Brief History of Urban Forestry
- E. Benefits to the Urban Environment

# Tree Growth

## Parts and Processes



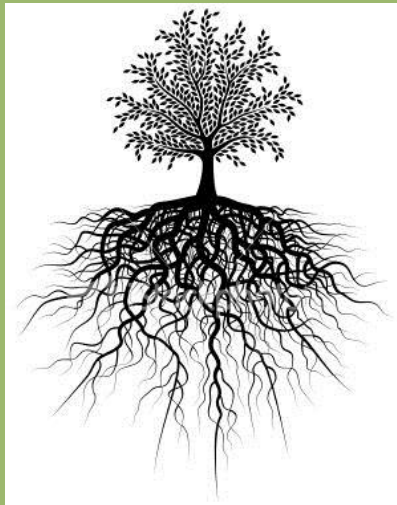
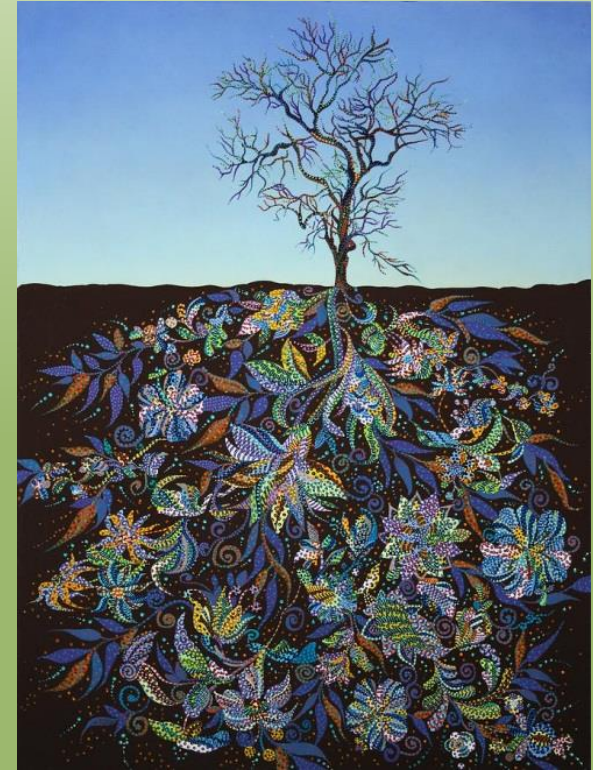
# Trees

- Woody plant with a single stem, growing to at least 12 to 15 feet tall. Has branches and a distinct head some distance from the ground
- Trees made up of
  - Roots
  - Stems and Branches
  - Leaves





# Roots





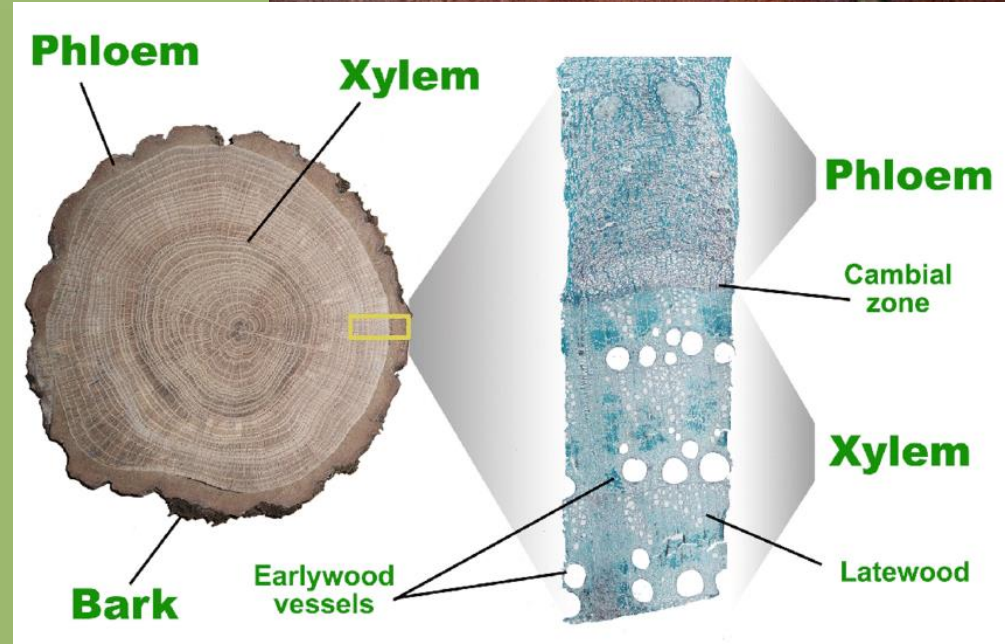


- Anchorage, support, storage, movement of water and nutrients
- Found in upper 2-6' of soil
- Meristem



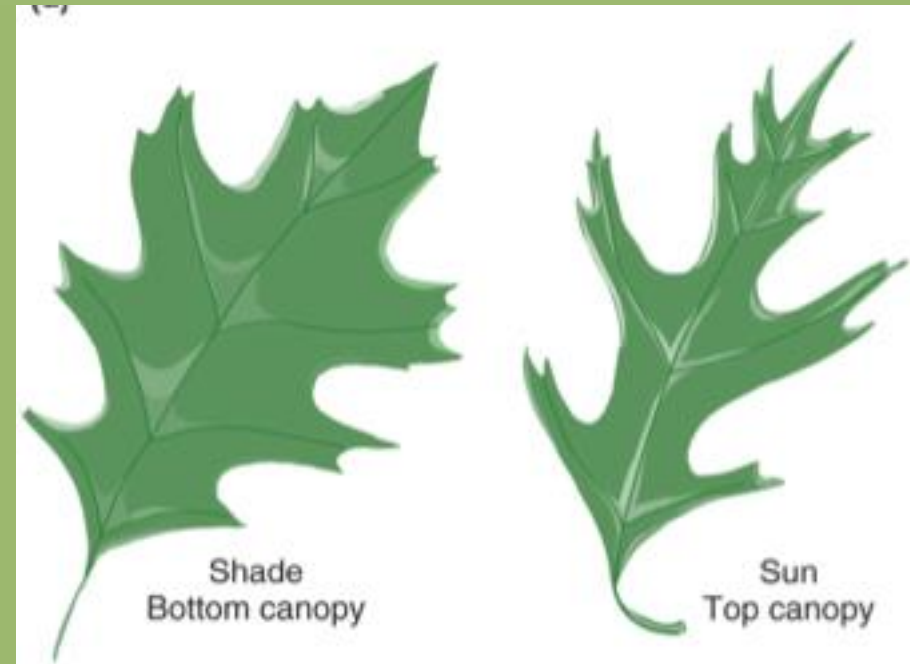
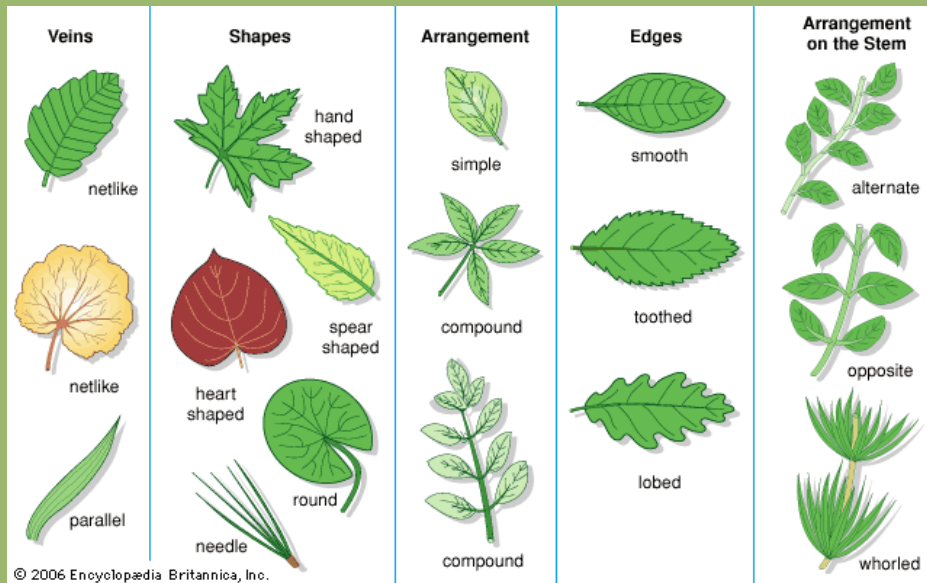
# Stems and Branches

- Movement, Support, Maximizing Photosynthesis
- Vascular System
  - Xylem
  - Phloem
  - Cambium



# Leaves

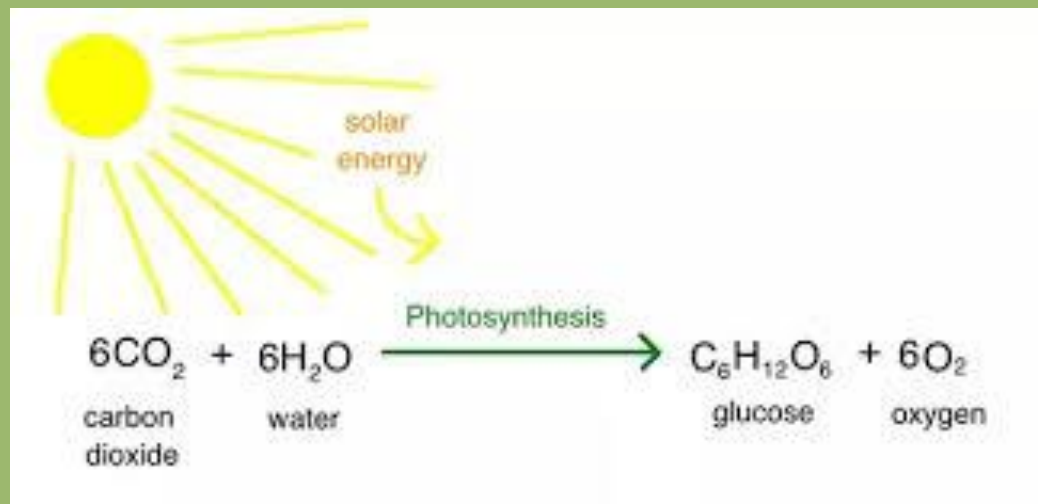
- Shape, size, color, orientation
- Photosynthesis
  - Sun Leaves vs. Shade Leaves



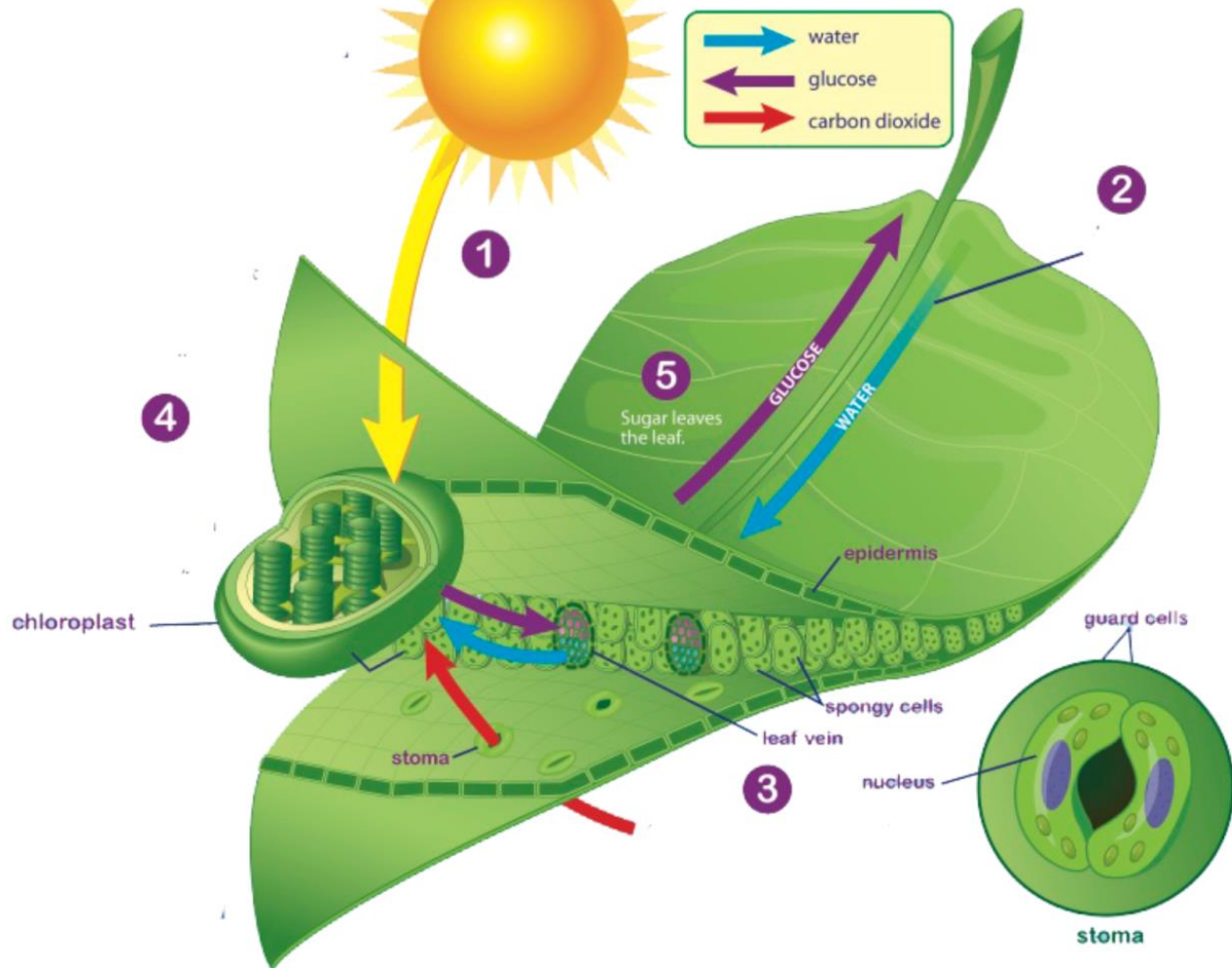
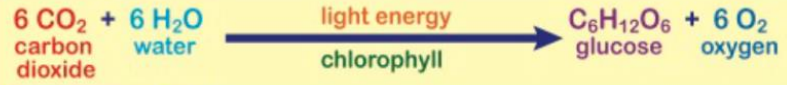


# Photosynthesis

- Green plants use sunlight to make food from carbon dioxide and water
- Occurs during the day
- Releases oxygen
- Environmental effect internal processes

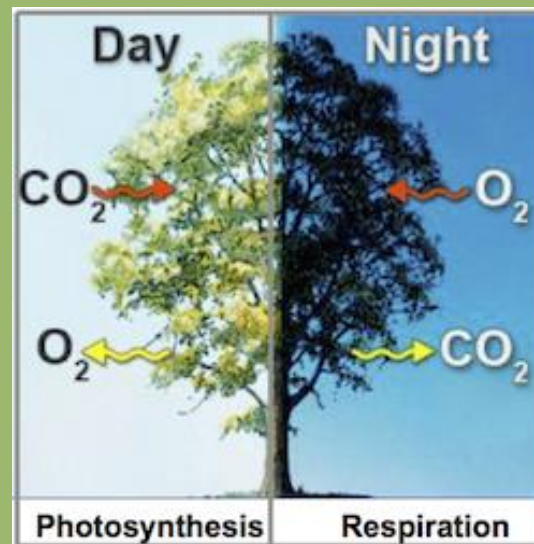


# Photosynthesis



# Respiration

- Creating and releasing usable energy for tree
- Byproduct are CO<sub>2</sub> and water vapor
- Happens all the time
- Water and oxygen break down sugar





# After Care

Watering, Mulching, Staking,  
Plant Healthcare



# Watering – How Often?

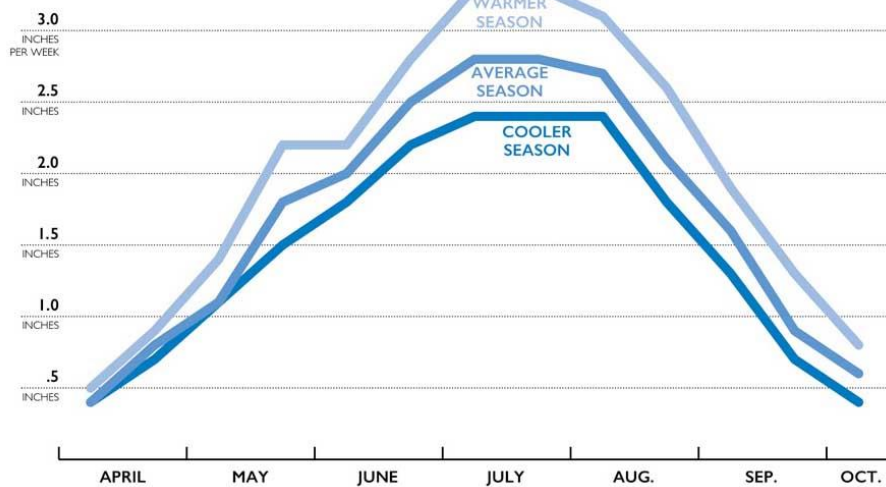
- Create a routine – be diligent in summer
- Keep track of weather
- Less frequent, deep watering
- Fill gator bag when empty



# How Much?

- Test soil moisture
- Drainage and texture factor
- Less frequent, deep watering
- New trees need 25 gallons a day

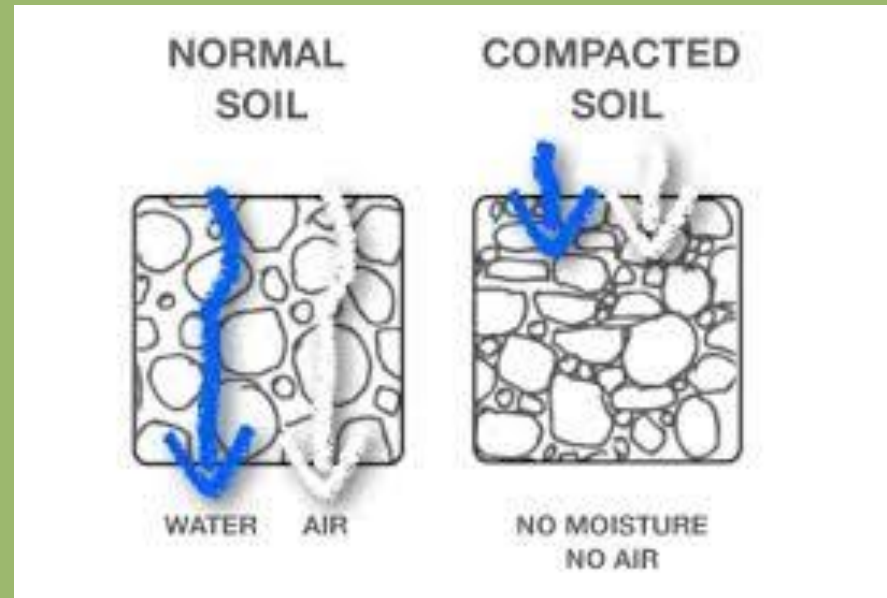
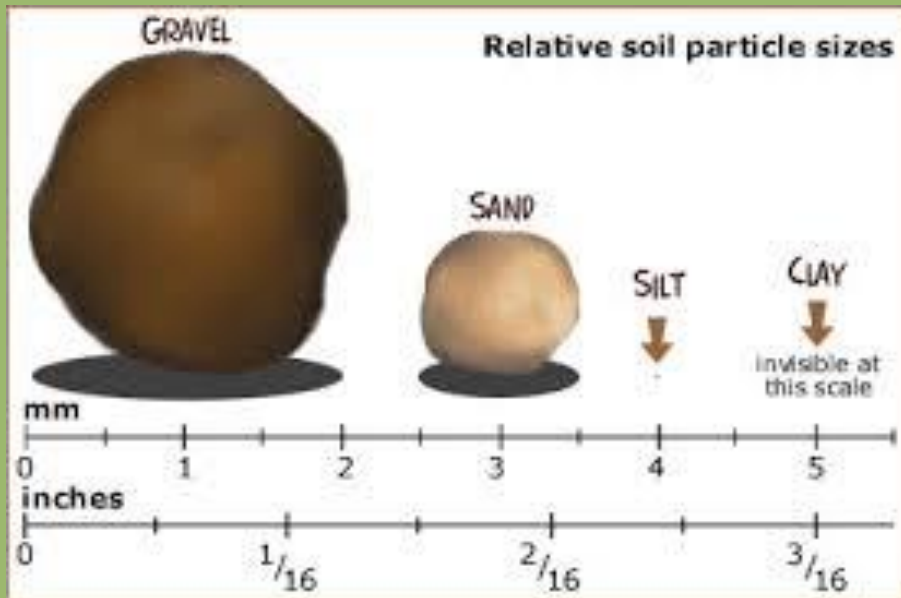
## How much water do your trees need?





# Soil

- Sand, silt, clay
- Water availability
  - Important for photosynthesis and respiration
- Compaction



# Watering Types



# Problems: Overwatering

- Leaves turn brown and wilt
- Stunted growth
- Water pressure builds, leaves soft





# Problems: Underwatering

- Wilt, brittle
- Brown
- Dieback





# Mulching

When done properly:

- Insulate soil
- Retain water
- Reduce competition
- Aesthetics
- Prevent compaction
- Prevent damage



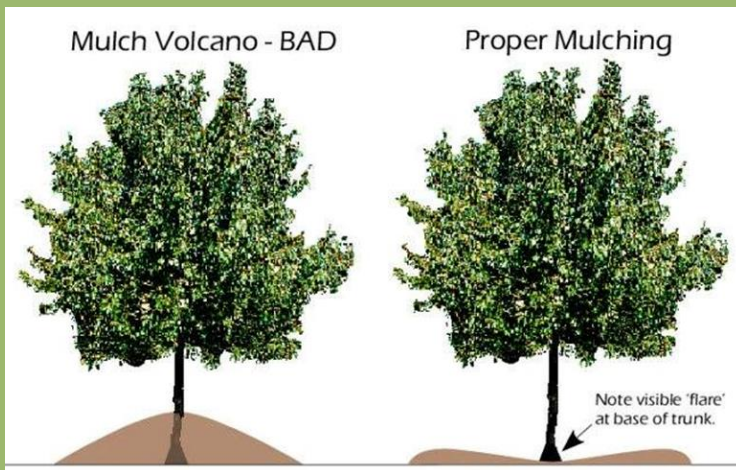
# How To

- 2-4 inches deep, 3 feet out, 3 inches away from trunk
- Create a berm



# Common Problems

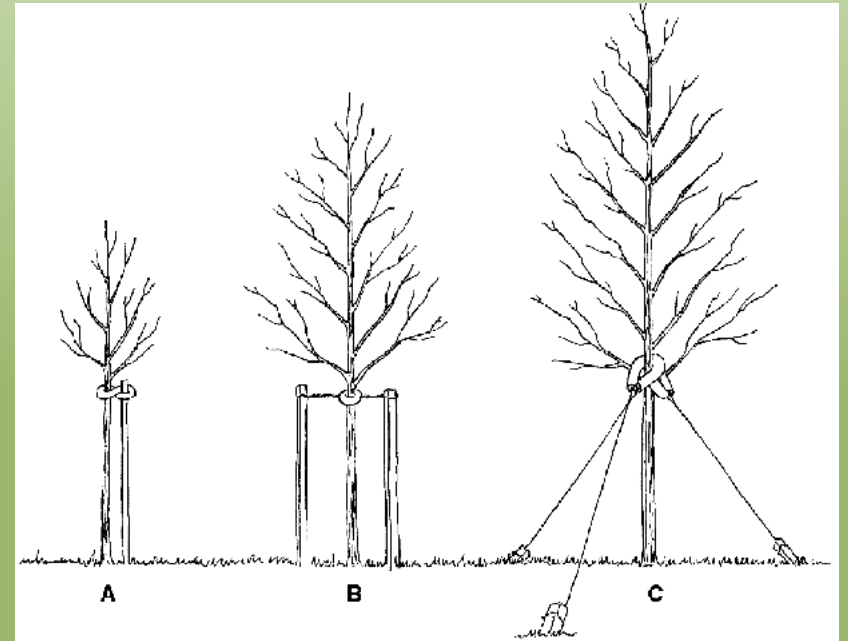
- Using shredded mulch
- Too deep
- Up against trunk
- “Volcano Mulch”





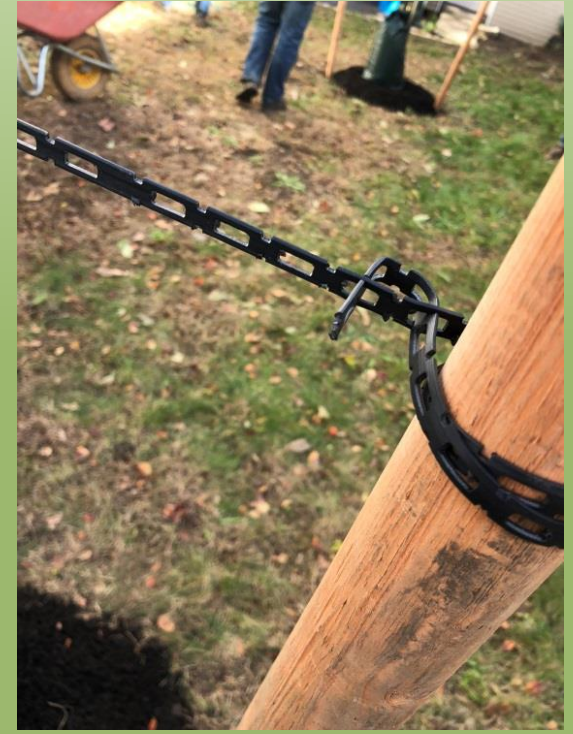
# Staking

- Additional support
- Only as a last resort
  - Reaction Wood





# Adjustments



- If you decide to stake on your own:
  - Leave ties just taut
  - Use something flat, broad, and flexible
  - Check often
  - Remove after one year



# Common Problems

- Stakes too tight
- Wrong tie material
- Forgetting to remove
- Partially removing





# Plant Healthcare

- Preventative process – holistic management and integrated treatment
- Includes
  - Care and maintenance
  - Fertilization
  - Pest and disease control





# Fertilization

- New trees do not need to be fertilized
- Read labels carefully and apply as stated



# Common Problems

- Over/under fertilization
- Ignoring labels – pesticides and herbicides





# Pests and Diseases





# Common New England Insect Pests

- Winter Moth
- Gypsy Moth
- Mites
- Asian Longhorned Beetle\*
- Emerald Ash Borer\*
- Fall Webworm
- Eastern Tent Caterpillar
- Lacebugs
- Hemlock Woolly Adelgid
- Scale insects





# Common New England Diseases

- Root and stem rot (Phytophthora and Armillaria)
- Anthracnose
- Blights
- Apple scab
- Cedar Apple Rust
- Leaf spot
- Dutch Elm Disease\*
- Stem cankers



# Common Problems

- Misdiagnosis
- Monitoring Tips
  - Keep track of weather: temp, wind, rain, cloud cover
  - Track time of day
  - Take samples and photographs
  - Reach out to an arborist



# Hiring a Professional Arborist

- Trained to be your best resource
- Looking out for your safety as well as the safety of your tree





# When to Hire

- When you cannot find answers to questions or concerns
- In emergency situations
- When your tree is too big to manage from the ground



# What to look for

- Education
- Membership in Professional Organizations
- ISA Certification or State Certification
- Proof of Insurance
- Necessary permits and licenses
- Aware of safety standards



# Tips

1. Ask for references or speak to former clients
2. Get at least 3 estimates
3. Don't automatically accept the lowest bid
4. Never pay in advance
5. Get it in writing – when work will be completed, who is responsible for cleanup, what is hourly rate for additional work



**Break**

# After Care

## Pruning



# About Pruning

- Removing select parts of a tree in order to reach an objective that enhances safety, health and aesthetics
- Benefits to pruning young trees
- Takes practice



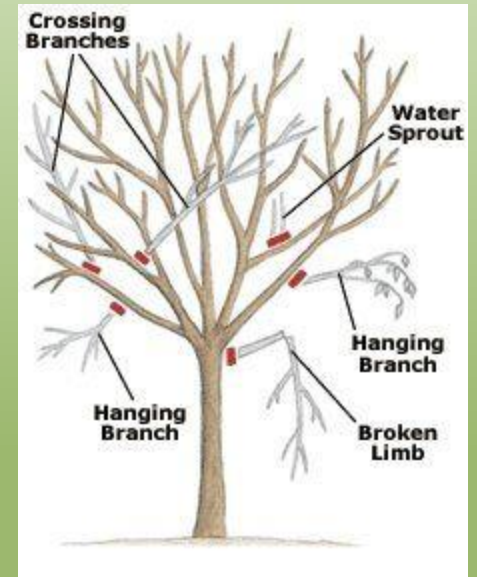


- No two trees are the same – shape, form, healing
- Healthy trees
  - well attached branches
  - good branch spacing
  - one central leader
  - good clearance
  - good crown height



# When to prune

- Pruning interval
  - Do not prune the first 2 years
  - Immature trees every 2-3 years
  - Mature trees every 4-7
- Never more than once a season
  - Broken, dead, dying, diseased branches are an exception
- Never remove more than 20-30% at a time



# Tools

- Hand pruners
- Pole clip/Pole saw
- Hand saw
- Chainsaw
- PPE



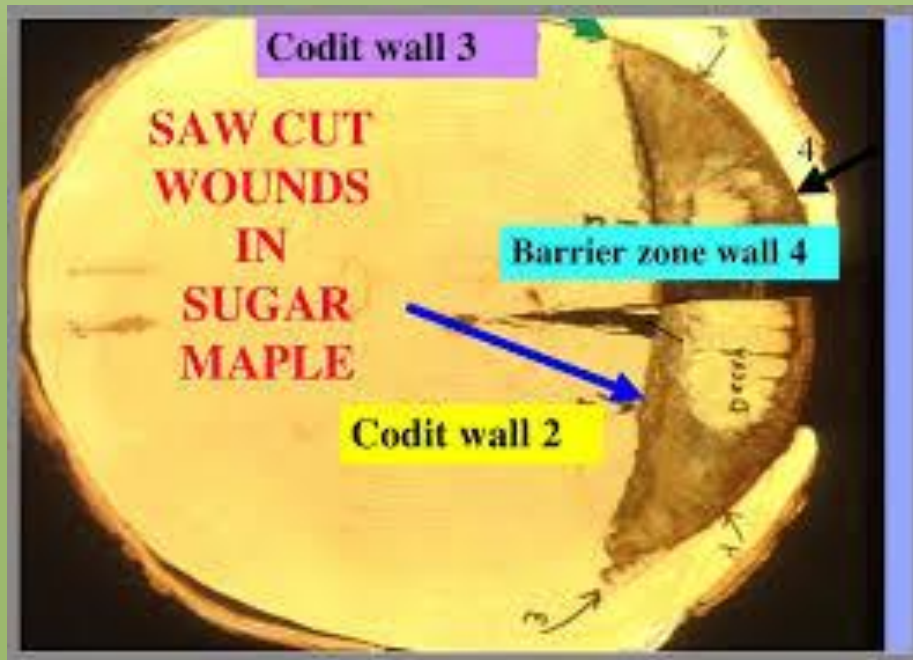


# Healing – CODIT

- Compartmentalization of Decay
- Chemical compounds to contain decay
- Develop new tissue to grow over wounds

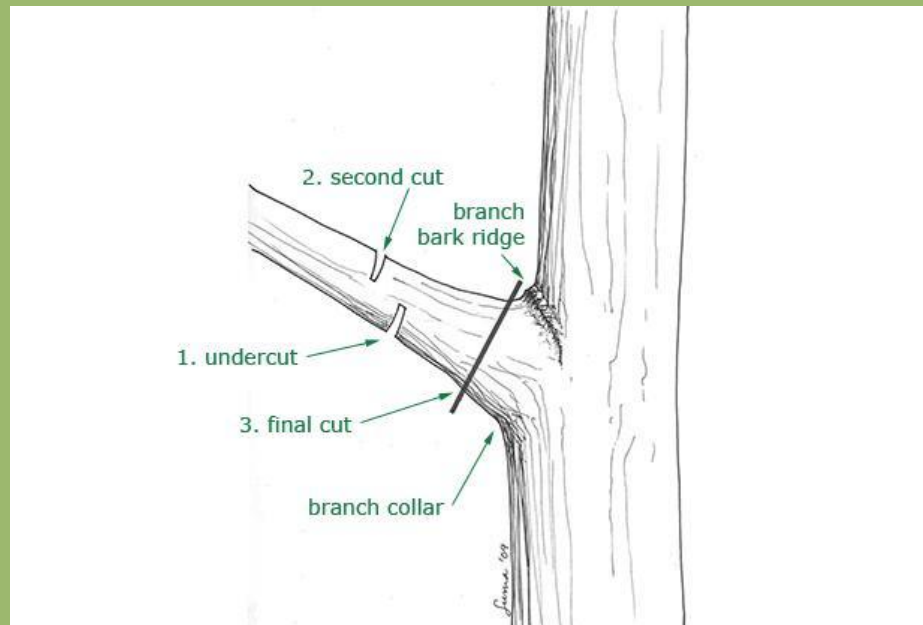


- 4 Walls
- Branch collar – avoid with EVERY CUT
- Interlocking vascular tissue
- Rate of compartmentalization

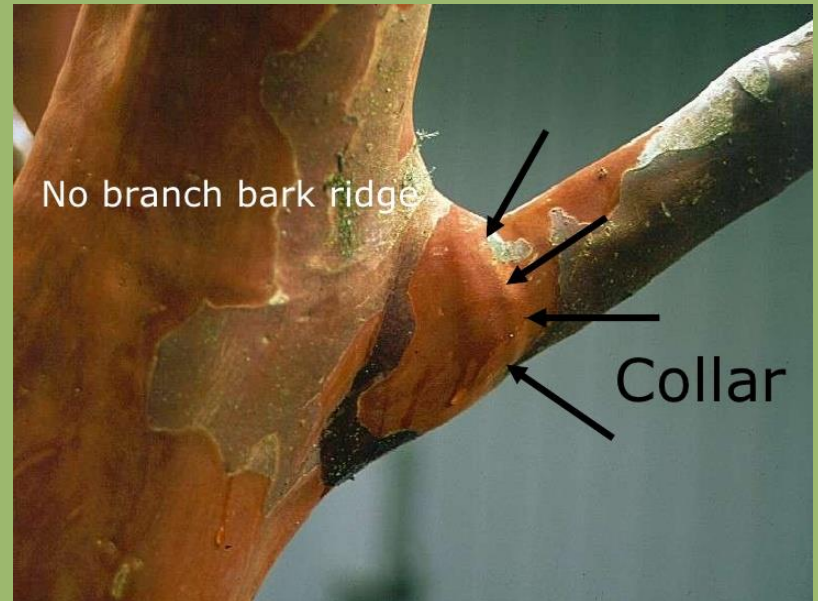
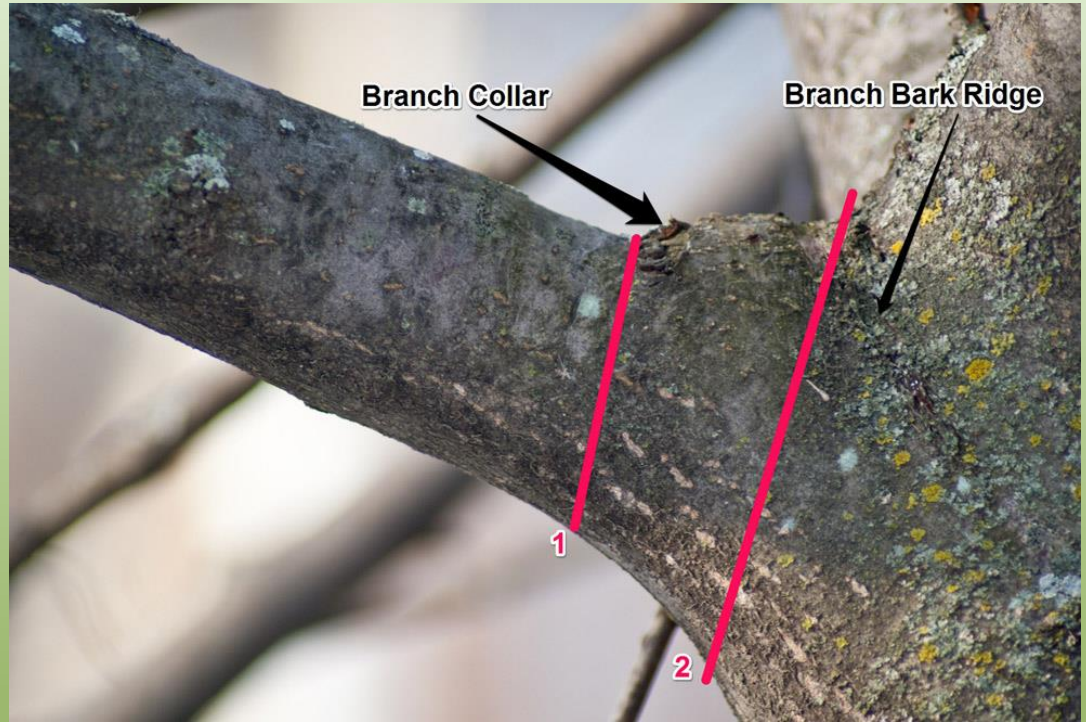


# 3 Cut Method

- Used on branches at least 2" thick
- Most types of cuts rely on this method
- Ensures clean and safe cuts







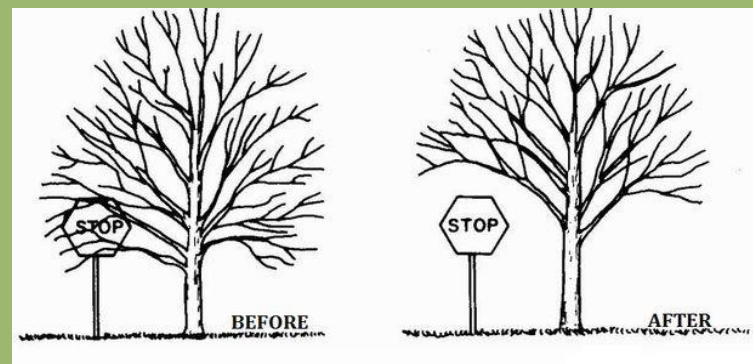
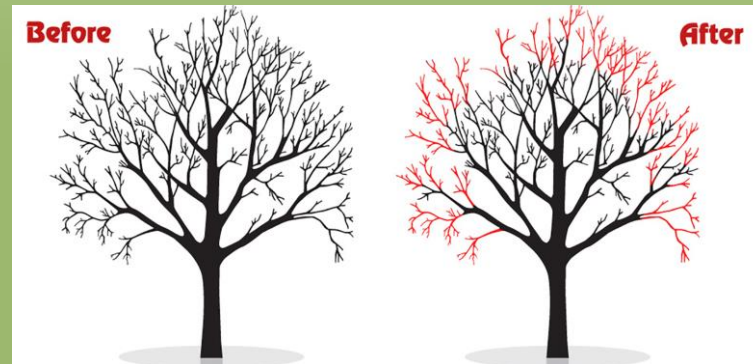
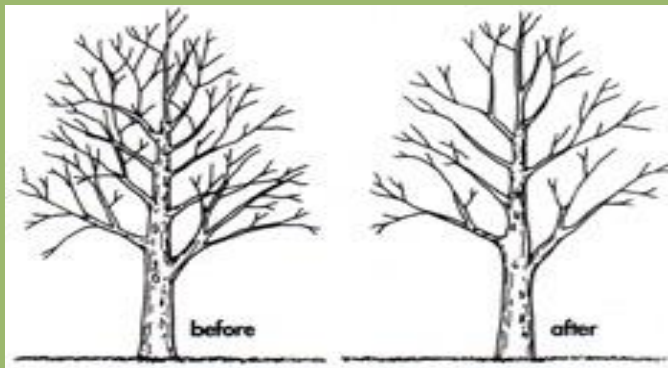


# Pruning Process

1. Understanding
2. Assessing – species, age, specifications, branch structure
3. Objective/goals
4. Plan – types of cuts
5. Implement
6. Set time for next event

# Objectives

- No pruning cut shall be made without an objective
- reducing, raising, cleaning and thinning



# Types of Cuts

- Rule of thumb – never prune out more than 20-30% of photosynthetic material at a time
- Three main types:
  1. Removal cut
  2. Reduction cut
  3. Heading cut

# Removal Cut

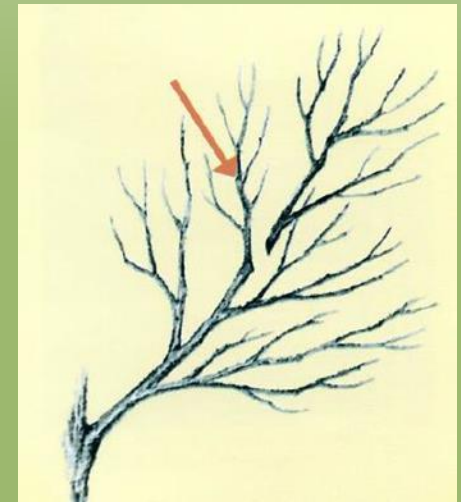
- Removes entire branch back to point of origin
- Use 3 cut method
- Objectives:
  - Establishing central leader
  - Improving clearance
  - Improving branch spacing
  - Removing dead, diseased, or broken material





# Reduction cut

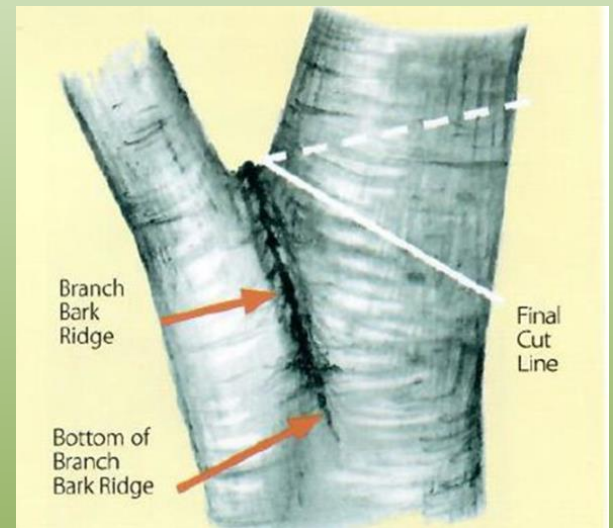
- Reduction cuts shorten a parent stem back to a lateral branch that is at least  $\frac{1}{3}$  the diameter of the parent stem
- Objectives
  - Suppress branch growth
  - Direct branch growth
  - Reducing height
  - Reducing amount of branch removed



# Reduction Cut

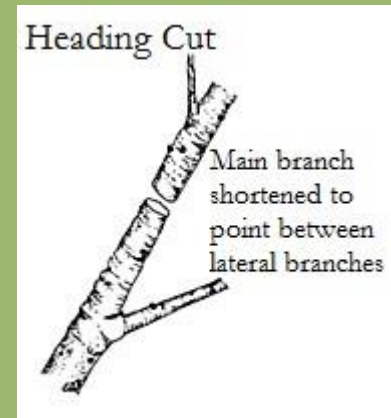
Follow three cut method

1. Determine good lateral to cut back to
2. drawing an imaginary line perpendicular to the branch bark ridge
3. make final cut divided equally in the angle created by perpendicular line



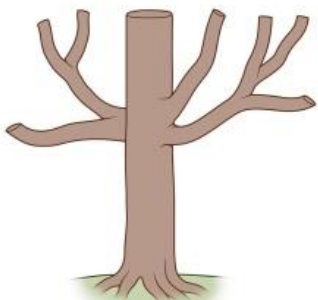
# Heading Cut

- Used when branch is to be removed at a later date
- Brings parent between two lateral branches or to lateral that does not meet the 1/3 diameter criteria
- Leaves stub between two laterals or cuts back to branch that is too small to assume dominance

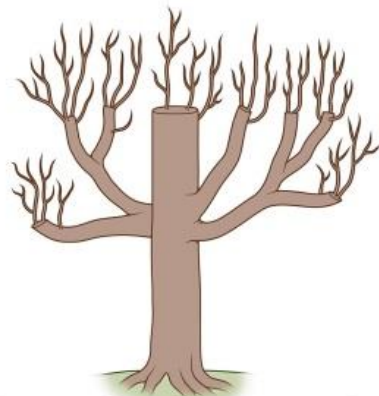


# Quick Note

- Topping – multiple heading cuts that remove branches between their nodes
- Topping can cause unhealthy sprouts and could lead to decreased vigor or death



Topped Tree



Growth After Topping







## DO's

- Remove branches in pieces
- Step back to assess your work from time to time
- Remove branches with narrow angles by cutting from the underside
- Sanitize your tools between cuts if removing diseased branches
- Have a sound method
- Prune in wintertime for visibility
- Light pruning more frequently is better than heavy pruning less often
- Hire an arborist when your tree is reaching maturity
- Avoid utility wires



## DON'Ts

- Remove more than 25-30% of the canopy
- Dress wounds
- Use ladders to reach higher branches
- Flush cut
- Damage trunk, stems, branch collar, branch bark ridge
- Use dull tools
- Leave stubs
- Top your trees
- Put yourself, others or your property in harm's way – ask a professional arborist for help



# Urban Forest

## History and Benefits

# History

- Late colonial era
- 19<sup>th</sup> century – industrial revolution
- Post WWII – roads, urban expansion
- Cooperative Forestry Assistance Act of 1978





# Urban Challenges

- Limited space
- Poor soil quality
- Water and nutrient deficiency
- Pollution
- Mechanical damage to trees
- Non-mechanical damage



Photo by S. Cochran

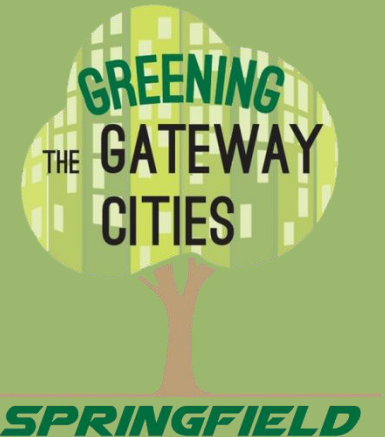
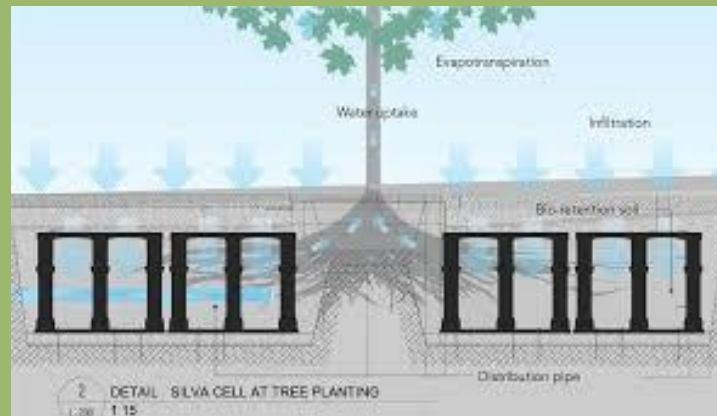


# Management Challenges

- Keeping up with tree inventory
- Maximizing tree benefit and minimizing costs
- Obtaining and maintaining public support and funding
- Establishing laws and policies for both public and private trees
- Addressing social issues

# Working Toward Solutions

- International research
- State and local government
- Organizations and Programs
- New technologies

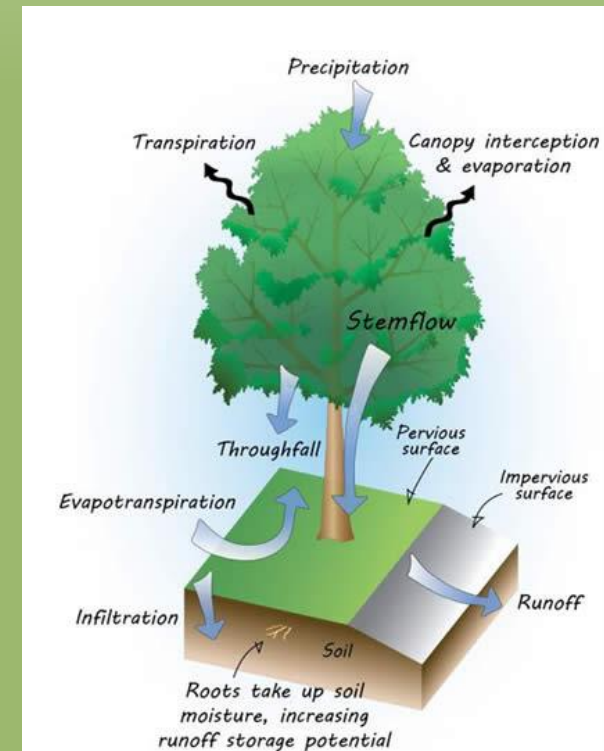






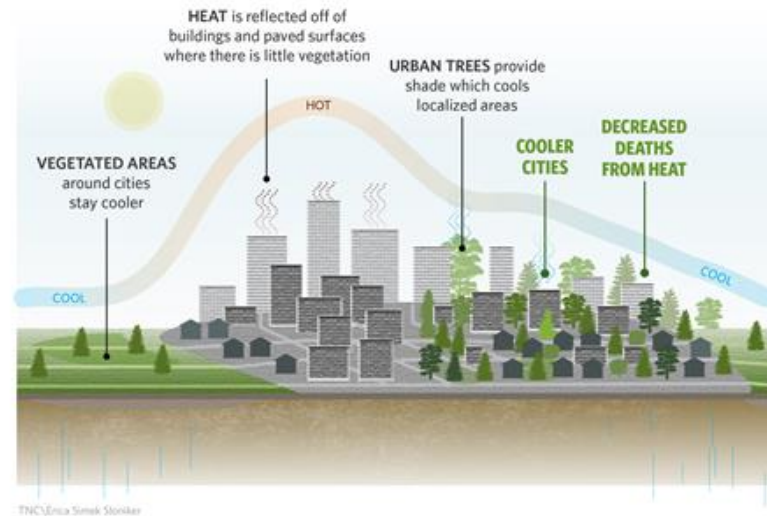
# Environmental

- reducing the effects of climate change and pollution
- controlling stormwater and reducing erosion
- improving air quality
- providing habitat for wildlife
- Reducing heat island effect



## URBAN TREES, COOLER CITIES

Pavement and concrete in cities absorb energy from the sun and then radiate that energy out, heating the air in cities more than in the surrounding countryside. Urban trees provide shade, preventing pavement and concrete from heating up, and also cool the air by transpiring water. Trees can cool neighborhoods by up to 4 degrees Fahrenheit.



TNC/Enca Simak Storker

**Sun**

**2 Smog:** Volatile organic compounds combine with nitrogen oxide and sunlight to form ozone, commonly known as smog.

**1 Pollutants** emitted by vehicles, lawnmowers, factories and other sources contribute to the toxic brown cloud hanging over metropolitan Denver.

### How trees scrub more pollution

Deciduous vegetation absorbs — through stomata pores on leaves — one-third more volatile organic pollution than previously believed.

**3 Deciduous vegetation** absorbs pollutants through stomata — microscopic pores — in leaves and uses enzymes to convert them to less-harmful compounds.

List of tree leaves that absorb smog:

- Ash
- Apple
- Birch
- Hawthorn
- Hackberry
- Maple
- Pear
- Peach

**Stomata pores**

**Cross section of stomata pore**

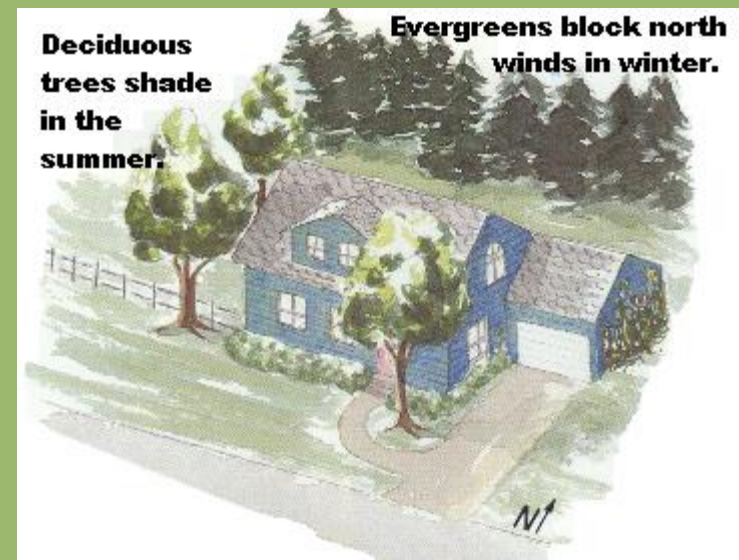
Width of human hair

Source: National Center for Atmospheric Research

Severiano Galván, The Denver Post

# Economic

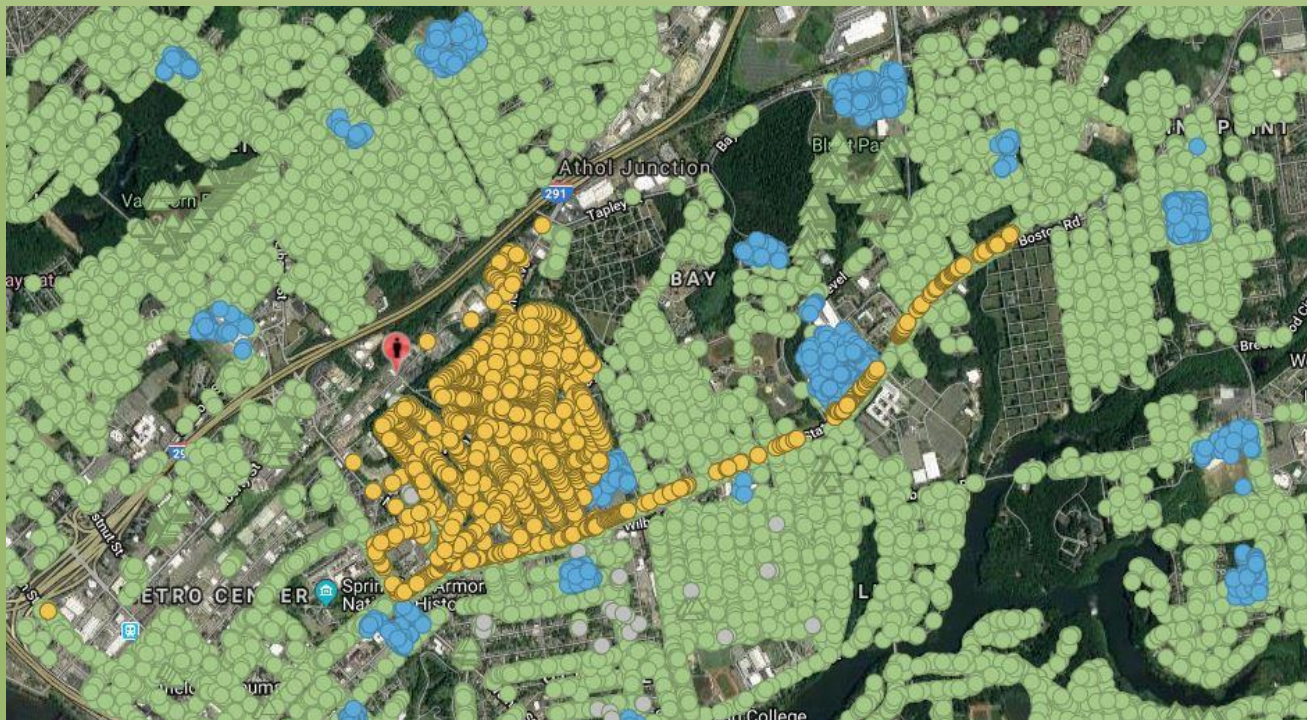
- Energy use reduction – shade, wind, heat island
- Increase home and property value
- Increase in value themselves
- Increase income to cities
- Community savings





# Benefits Example

- McKnight neighborhood benefits



**31,618** total trees

**1,451** Selected Sites

Total Yearly Eco Benefits

**\$705,307.20**

Greenhouse Gas Benefits

**\$6,220.13**

**1,177,027.34 lbs CO<sub>2</sub> avoided**

**932,910.98 lbs CO<sub>2</sub> sequestered**

Water Benefits

**\$66,538.66**

**8,317,332.66 gallons saved**

Energy Benefits

**\$298,037.28**

**467,238.55 kWh saved**

**165,182.64 Therms saved**

Air Quality Benefits

**\$50,359.63**

**8,038.94 lbs pollutants saved**

Property Benefits

**\$284,151.51**

**472,254.30 leaf surface area (sq.ft.)**



# Social

- Screens – noise and scenery
- Neighborhood safety
- Health benefits
  - Decrease in hospital visits for asthma and heat illness
  - Increased mental health
  - Increased healing time
- Community connections









 **Thank You!** 

