


Pruning and Training

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What to use...



Saw – 2"+ large branches



Hand Pruners – ½"-1" branches



Loppers – 1 ½" branches

The Four W's

When is the best time?

What do we prune off?

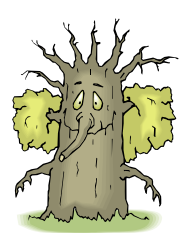
Where do we make the cuts?

Why do we prune?


When to Prune?

-Trees & Shrubs-

- Winter or early spring is best
 - Easy to see the form
 - Plants are dormant
- Shrubs that bloom before June 1st
 - Prune after bloom
 - Forsythia, Lilac, Mock Orange
- General rule of thumb
 - Prune in months that don't end in "R"




Prune These Anytime



- Dead
- Damaged
- Diseased
- Hanging
- Crossing / Rubbing
- Watersprouts
- Suckers

Two Basic Pruning Cuts

1. Heading cuts
2. Thinning cuts



Heading Cuts

- 1- Heading cuts
 - "Iffy" language
 - Done at internodes
 - Forces lateral growth
 - Topping (hat-racking)
 - Shearing



Cuts

- Heading cuts
 - Cutting a branch back to a smaller branch or bud
 - allows cut to seal over as fast as possible
 - less desirable than thinning due to re-sprout potential



Cuts

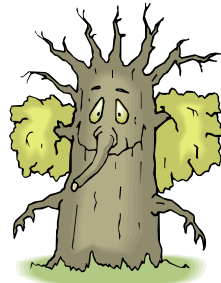
- Make heading cut carefully
 - too far away, wood will die back and leave stub
 - too close and bud will die as wood dies back

Too steep



Topping / Hat-racking

- Very damaging
- Water sprouts
 - Weak angles
 - Decay



Pollarding

Don't Leave Stubs!

Thinning Cuts

2 - Thinning cuts

- Best cut
- Total branch removal
- Cut smaller branch back to the branch collar

Natural Target Pruning

Correct Incorrect

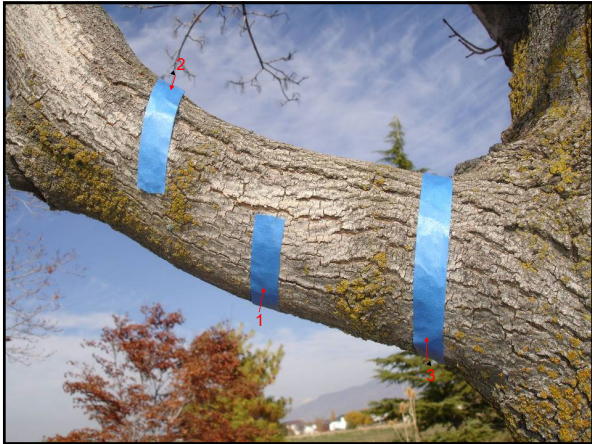
Bark Ridge →

Branch Collar →

Thinning Cuts

Flush Cuts

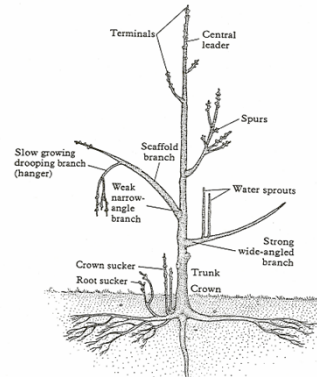
- cuts into branch collar
- creates larger wound, slow to heal
- no practical reason to use this cut



Things to Avoid



Anatomy



- Graft union
 - Scion
 - Rootstock
- Leader
- Suckers
- Water sprouts
- Spurs

Scion
Fruiting cultivar
Rootstock



Why Prune Fruit Trees?

- To produce high quality fruit
 - Maximum solar exposure
- To maintain fruiting wood
 - Reduce shading from interior
- To tell a tree where to grow!



When



- During the dormant season
- After the coldest part of winter
- Late February – bud swell

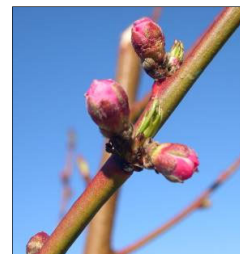


Pruning...as simple as 1-2-3

- 1- Remove the obvious
 - broken / diseased
 - rubbing
 - hangers
 - suckers
 - water-sprouts (early summer when 2-4")
- 2- Know where the fruit grows
- 3- Let the light in
 - training systems

Peaches and Nectarines

- **Fruit on last years wood.**
- 3 mixed buds
 - 2 fruit buds
 - 1 leaf bud
- Heavy annual pruning (50%)
 - Generally a 12" shoot can produce 2 peaches
- Apricots, cherries and plums produce fruit anywhere.



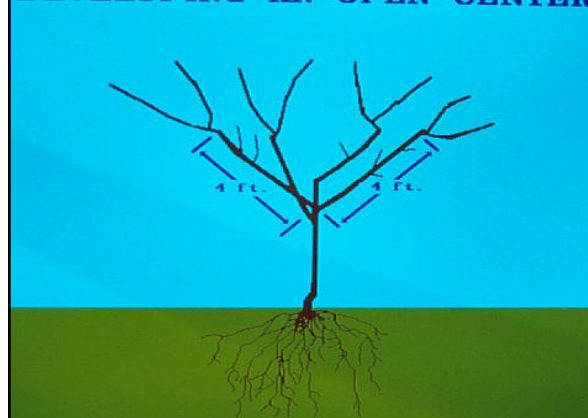
Open Vase (Open Center)

(Peaches, Apricots, Nectarines, Japanese plums, Sour cherries)

- Select 3-4 primary branches
 - About 18-24" from the ground
 - Distributed in a whorl.
 - 6-8" apart vertically
- Remove any growth 6" from the trunk
- Allow 2 secondary branches to form when primary branches are 4 feet long




DEVELOPING AN OPEN CENTER





Apples, Pears, Apricots, Plums



- Fruit on spurs that are 2-5 years old.
- Buds differentiate (mid June)
- Alternating years
- Prune lighter once primary branches are formed.



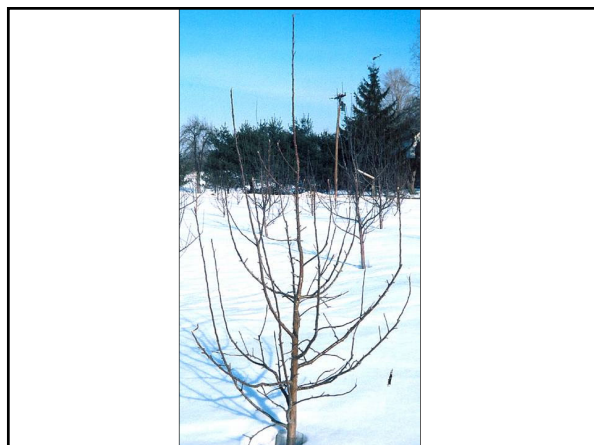
Modified Central Leader

(Apples, European plums, Sweet cherries, Pears)

- Select 4-5 primary branches
 - About 24-36" from the ground
 - Evenly distributed in a whorl.
 - 4-6" apart vertically
- Head the terminal above 2nd whorl of primary branches
- Select 3-4 more primary branches
 - About 24" from the first whorl
 - 4-6" apart vertically
- More horizontal branches control vigor
- 45-60 degree angles are optimal



Young modified leader



Young modified-leader orchard



Fruit Thinning – Why?

- Produces better *quality* fruit
- Promotes annual bearing
- Late May – Early June
 - after "June drop"
 - fruit = pea – dime size
 - 1 peach every 5-6"
 - 1 apple every 5-6" or every 2-4 spurs



Pruning Unruly Trees

- Decision time... perhaps 1 cut at ground level?
- Never prune more than 1/3 of the tree at one time.
- Don't fertilize the tree during corrective pruning
- Remove most water sprouts in June
- Plan on 5 years of corrective pruning



Pruning Fruit Trees: Clip with Confidence!

REASONS TO PRUNE

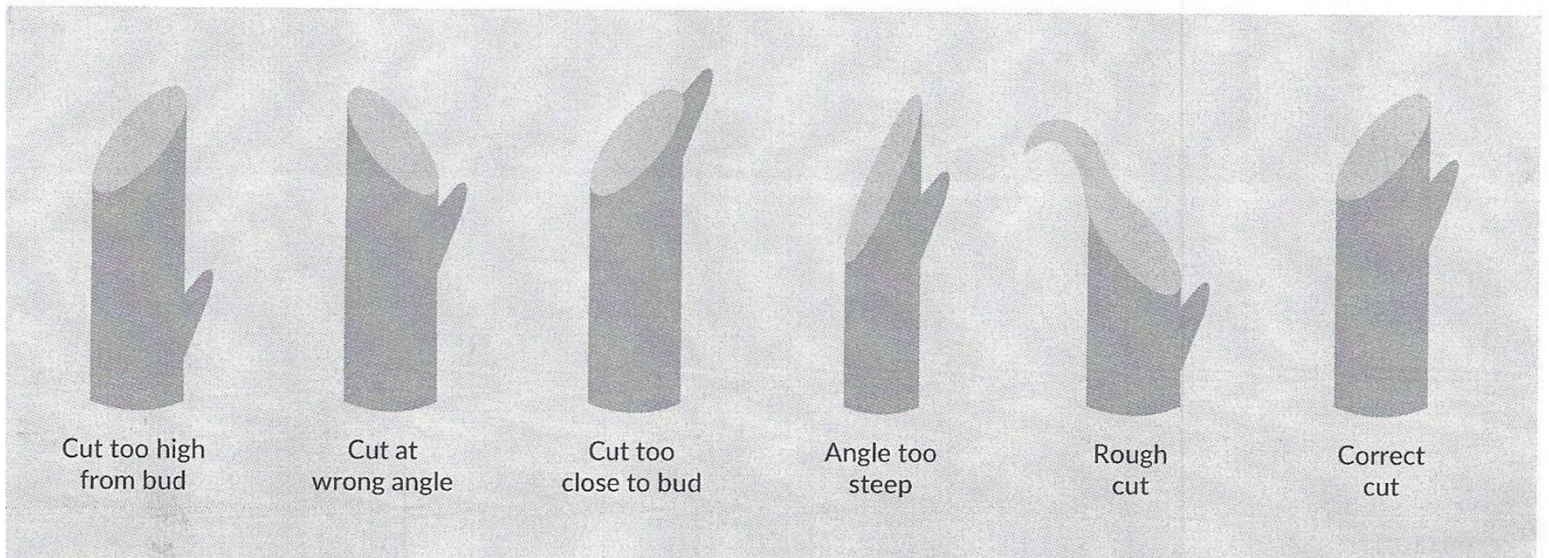
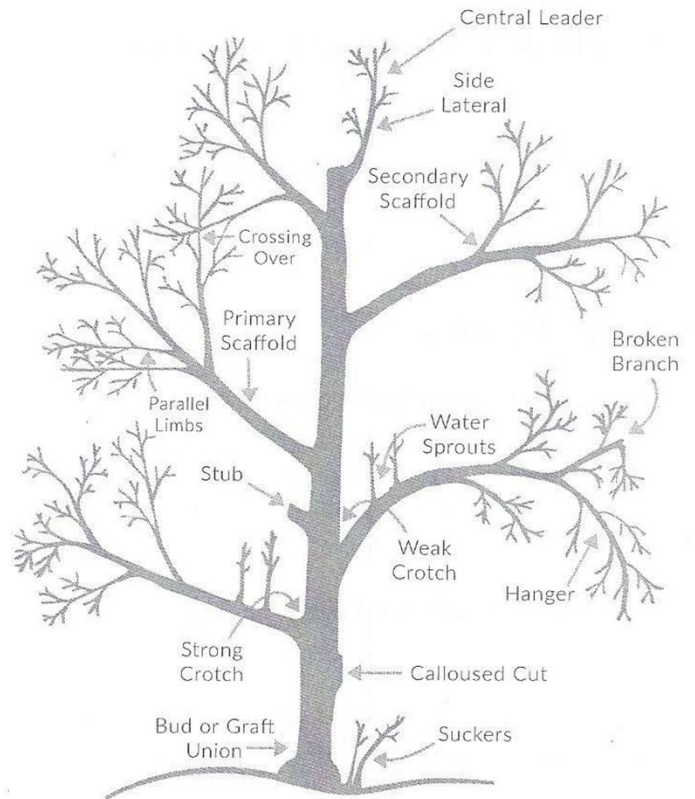
- a. Maximize sun and air exposure to fruiting wood
- b. Improve fruit size and quality of fruit
- c. Maintain vigorous, healthy trees
- d. Manage tree size and shape for ease of harvesting and spraying
- e. Maintain fruiting spurs or grow new wood for next year's fruit

WHEN AND HOW TO PRUNE

- a. New trees—the day they are planted
- b. Established trees—every year while the tree is dormant (late winter/early spring)
- c. Remove branches that are dead, diseased, damaged, hanging, rubbing; water sprouts, and suckers—as soon as noticed at any time of year
- d. Remember pruning stimulates a tree to break dormancy and start growing in the spring

HOW TO PRUNE AND WHERE TO CUT

- a. Cuts are made outside of the branch collar (swollen area where limb meets the tree)
- b. Heading cuts—shortening a branch/shoot to encourage lateral growth
- c. Thinning cuts—removing entire branch/shoot back to a lateral branch to control direction of growth



PEACH, NECTARINE, APRICOT, JAPANESE PLUM, SOUR CHERRY

1 Open Vase

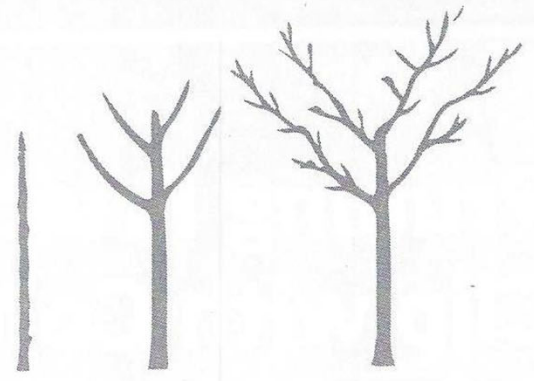
- Remove central leader
- Select three to four primary scaffold branches to leave for growth
- Branches should start about 18-24" up from the ground
- All scaffold branch angles should be angled 45-60 degrees from trunk

2 Know Where the Fruit is Found:

- Buds form on 1-year-old wood (branches produced the previous year)
- Peaches and nectarines usually have a triple bud arrangement of two fruiting buds on the outside and one leaf bud in the center

3 Prune off about 60 to 80 % of last year's growth

- This will stimulate new growth for next year's fruit production
- Let the light and air in to improve fruit color and provide good air circulation around fruit
- Choose pencil sized diameter 1-year-old wood to leave on the tree for fruit production and shorten these to 6-8" long.



APPLE, PEARS

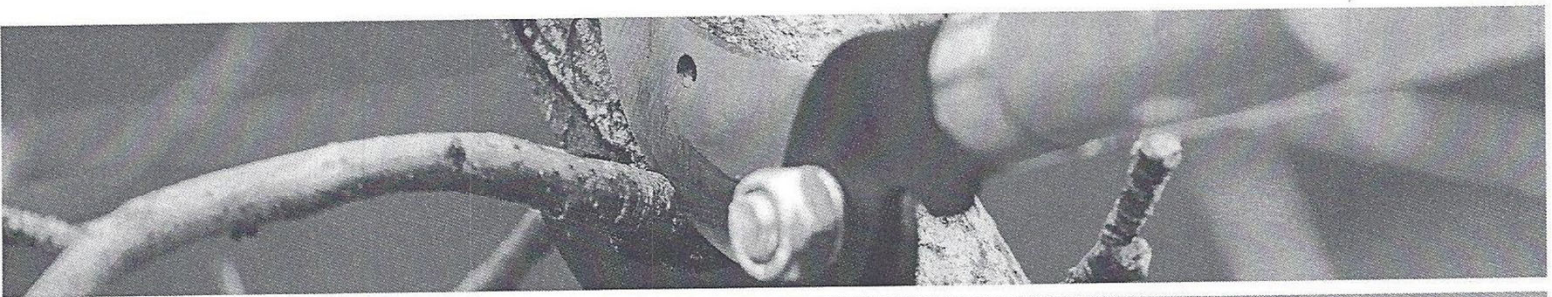
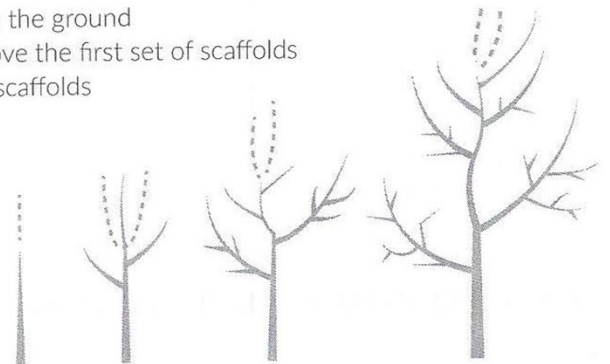
1 Central Leader/Modified Central Leader:

- Select three to four lower primary scaffold branches about 20-30" up from the ground
- Select three to four upper secondary scaffold branches that are 18-20" above the first set of scaffolds
- Try to place the secondary scaffold branches at right angles to the primary scaffolds
- All scaffold branch angles should be angled 45-60 degrees from trunk

2 Know Where the Fruit is Found:

- On spurs that are 2 years and older—do not prune off fruiting spurs

3 Prune to let the light and air in to improve fruit color and provide good air circulation around fruit



ADDITIONAL RESOURCES

- Pruning the Orchard: tinyurl.com/pruningtools
- How to Prune Apple Trees: tinyurl.com/peachtreepruning
- How to Prune Peach Trees: tinyurl.com/pruningappletrees
- How to Select Pruning Tools: tinyurl.com/pruningtheorchard

EXTENSION 
UtahStateUniversity

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spring and the fall, and day neutral strawberries bear similarly to ever-bearing strawberries in some areas of Utah. Day neutral strawberries do not fruit when daytime temperatures consistently exceed 85°F. For many areas in Utah, including the Wasatch Front, gardeners can expect poor fruit production with this type. It is this author's personal suggestion to experiment with a few plant types for great season-long picking!

SMALL FRUIT MAINTENANCE

Small fruits vary in their care from irrigation to fertilization and pruning needs. In general, irrigate small fruits when the top 2 to 3 inches of soil has dried out. Do not irrigate wet soil because plants will grow poorly and become vulnerable to pests if they are overwatered. As with tree fruit, it is essential to familiarize yourself with common pests of small fruits and respective organic controls. This information is available in the fact sheets referenced below and Chapter 5 "Garden Pest Control" section of this guide. In general, fertilize small fruits as recommended by a soil test; most small fruits grow well with little additional fertilizer. See the "Soil Fertility" section in Chapter 4 of this guide for more information on garden nutrient needs. Most small fruits

GROWING FRUIT IN WASHINGTON COUNTY

Rick Heflebower, *USU Extension Horticulture Faculty (Washington County)*

A wide variety of tree fruits and small fruits can be grown in Washington County. Be sure that you have a good irrigation system to keep plants adequately irrigated during the heat of the summer. For a list of suggested fruit varieties and helpful growing tips, go to: dixiedgardener.org/html/fruits.

benefit from a layer of mulch from an organic source (wood chips, straw, etc.). Grapes are an exception; grapes require less annual irrigation (20 to 25 inches) than fruit trees (30 to 40 inches) and should only be fertilized in the case of a nutrient deficiency. Grapes are highly susceptible to iron chlorosis. The following fact sheets give suggestions on soil, planting, fertilization, pruning and variety selection for grapes, raspberries and strawberries: *Colorado Grape Grower's Guide*, *Red Raspberry Production in Utah*, *Strawberries in the Garden*, and *Pruning the Home Orchard*.

ADDITIONAL CONSIDERATIONS

Before you plant an orchard it is essential to ask yourself; do I have time to care for the plants? It is likely that unmanaged fruit will harbor pest problems that may invade neighbor's plants or a commercial orchards. If you are unable to grow plants yourself, you can still take advantage of local fresh fruit. Purchase seasonal fruit from a commercial grower or visit a U-pick farm. See the "Buying and Eating Local is as Easy as 1-2-3" section in Chapter 1 of this guide for additional ways you can enjoy fresh local fruit.

PRUNING FRUIT TREES AND SMALL FRUIT

INTRODUCTION

Pruning fruit is both an art and a science. Pruning is art because each plant has unique branching characteristics and therefore your plant will not look exactly like the examples illustrated in this guide. Furthermore, a fruit tree located in a gardener's front yard or manicured landscape must maintain aesthetic appeal; who wants to show off an ugly plant? Pruning is a science because plants respond to pruning with new growth; it is a gardener's goal to control the direction of new growth. The general purpose of pruning is to remove unwanted branches and improve fruit production, while the term training refers more specially to directing plant growth of a young tree into a well-developed structure. Pruning can be intimidating at first, but once it is mastered, it is a skill that becomes second nature. Start by studying pruning basics and then dig in and try! Observe where you made previous cuts and how your trees or small fruits responded to your pruning cuts. Do not be afraid to try your hand at pruning; plants are usually very forgiving and will recover and fill in from most mistakes.

Goals of this Section:

- Learn the basic tools needed for pruning
- Learn the basic training systems for tree fruit
- Learn how to prune small fruit such as berries and grapes

PRUNING TOOLS

Basic pruning tools include by-pass hand pruners, loppers, hand saws and curved saws. By-pass pruners should be used for branches with a small diameter, loppers for slightly wider branches, hand saws for large

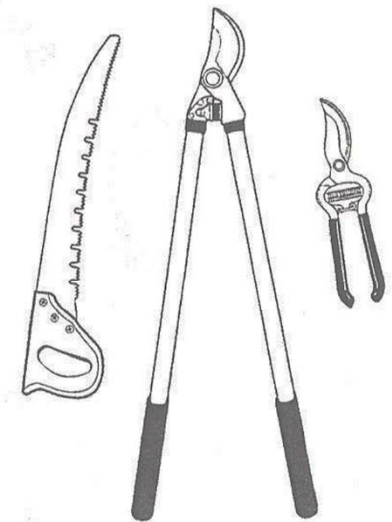


Figure 29: Basic pruning tools

branches or small trunks and curved saws for large diameter trunks. Chain saws are useful tools for large jobs; however, make sure you are comfortable handling a chain saw as it can be dangerous if used improperly. If a job is large enough to warrant use of a chain saw, consider calling a certified arborist. Never work around power lines. Hiring an arborist will always be less expensive than a trip to the emergency room! Local certified arborists can be found by visiting the International Society of Arboriculture (ISA) and searching within your local chapter (www.isa-arbor.com). Always wear protective equipment appropriate for the job (close-toed shoes, gloves, eye protection, ear protection, long pants) and remember,

if you have to fight back nasty words, you probably need to select a better tool for the job!

BASIC PRUNING GUIDELINES

Contrary to popular belief, plants do not enjoy being pruned. However, gardeners may decide to prune plants for the following reasons:

- To increase fruit production and fruit size,
- To remove dead, diseased and broken branches,
- To control height and width of plants,
- To train plants to grow with an ideal branching pattern,
- To increase light penetration to all plant parts.

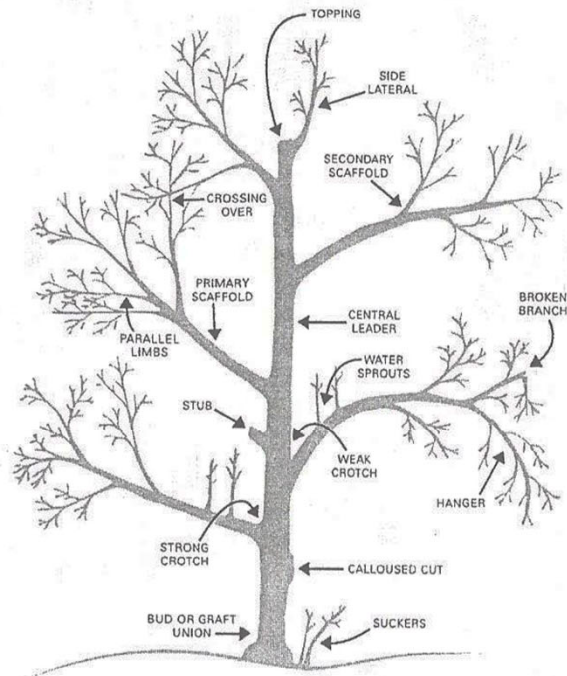


Figure 30: Basic plant framework

Some general pruning guidelines include:

- Cut branches on a 45-degree angle just outside of the branch bark ridge and branch collar
- Cut close to a bud or branch and avoid leaving long stubs
- Keep tools sharp to make clean cuts

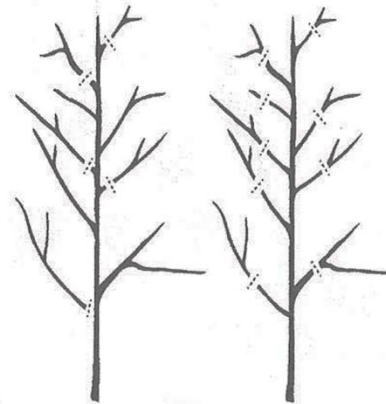


Figure 31: Basic pruning cuts
Left: Thinning, Right: Heading

HEADING BACK VS. THINNING OUT CUTS

There are two basic types of pruning cuts. The first is called heading back; with this type of cut, a branch or shoot is shortened. A heading back cut is made to encourage lateral growth (side growth) and additional branching. A heading cut can also be made to balance main branch growth or to remove a major branch that is competing with the main trunk. The second type of pruning cut is called thinning out; with this type of cut, an entire shoot or branch is removed. A thinning cut is used to

remove undesirable growth such as water sprouts (suckers located in the canopy of the tree) and root suckers (suckers located around the base of the tree) as well as competing parallel branches. Thinning cuts are also helpful to remove branches with narrow crotch angles that compete with the leader.

GETTING STARTED PRUNING

Spring is just around the corner and it is time to prune your trees. You may be asking yourself, how do I get started? If you feel confident you know what to do, get pruning! If you have questions, ask if your local county Extension service office plans to offer public pruning demonstrations. Another way to get some hands-on training is to ask a certified arborist to come and prune your trees with you. Perhaps after some one-on-one training, you will be ready to prune your trees yourself the following year. Trees are best pruned when dormant (before they grow

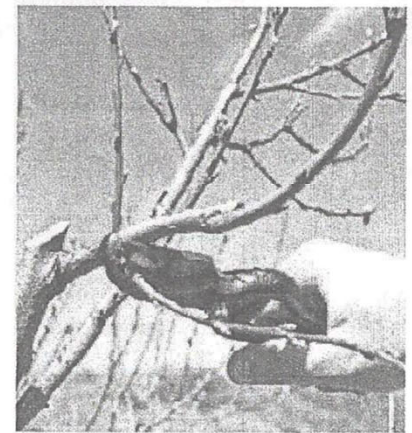


Figure 32: Prune fruit trees when buds are dormant

leaves or flowers) and with care. As a general rule, never remove more than one-third of a plant in a single season. If more pruning is required, space-out necessary pruning over several seasons. Some exceptions exist, for example grapes and stone fruits may need more aggressive pruning, but be careful not to prune too much in a single season. If you over-prune, you could harm your plant, or even worse, prune off all your fruit buds! Your local Extension agent or certified arborist can help you master pruning decisions. Here are some general guidelines to the pruning process:

- Start with the easy decisions—remove dead, broken, crossing and diseased branches.
- Remove branches or twigs growing too close together.
- Remove branches with weak crotch angles.
- Remove root suckers and water sprouts.
- Cut back main branches so they are about the same length and the tree is balanced.
- Thin and shape according to plant type and location.

TRAINING FRUIT TREES

Fruit trees are generally trained to one of four main structure types based on their growth and branching habits: central leader, modified leader, open center and quad V. These systems are suggestions; fruit trees will still produce fruit if alternate training systems are used. It is important to maintain well-spaced and balanced branching patterns for good light penetration and access to fruit for thinning and harvesting. Choose a

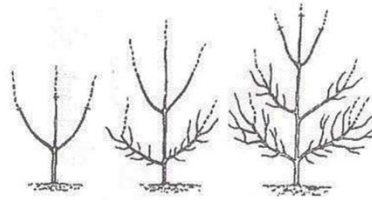


Figure 33: Central Leader

training system and proceed to train your tree immediately after you plant it.

1. In the central leader system, the main trunk is surrounded by layers of lateral (side) branches that whorl around the trunk. The first layer of whorls should start 30 to 36 inches above the ground. The next layer should be spaced 20 to 24 inches above the previous layer and so forth. When the tree reaches the desired height, the central leader (tallest vertical branch) is cut back to a short lateral branch, or in other words, the top growth is reduced. Cutting back the central leader will stimulate the tree to produce vertical growth in order to maintain the desired height, upright growth should be removed as necessary. The shape of the tree is maintained in a pyramidal Christmas tree shape. This system is used for semi-dwarf apples.

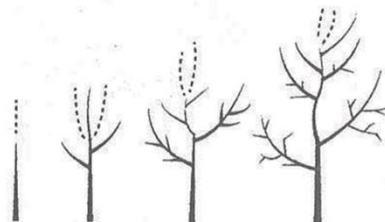


Figure 34: Modified Leader

2. The modified leader system involves selecting four to five of the best lateral branches and removing the rest. Ideally, all of the lateral branches should be spaced every 8 to 10 inches vertically along the main trunk. The top lateral branch, or leader, is left about twice as long as the next longest lateral branch. Each lateral should occupy a specific sector, or compass direction, of the tree so that it is balanced. This system is typically used for standard-size apples, pears, sweet cherry, tart cherry, apricot, walnut, pecan and European plums such as Italian prune and Stanley. This system works well for European plums because these trees grow more upright than Japanese plums.

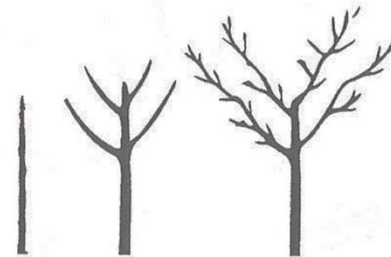


Figure 35: Open Center

3. In an open center system, three to four main lateral branches, growing at equal spacing around the trunk, are selected and pruned equal in size. Selected branches should be located 18 to 24 inches above the ground. The preferred crotch angle of the branches is 60 to 90 degrees. This system is typically used for peach, nectarine, apricot, sometimes tart cherry and Japanese plum such as Santa Rosa, which grows in a more spreading form.

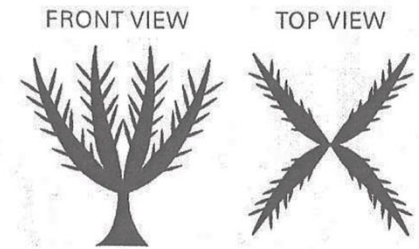


Figure 36: Quad V

4. The Quad-V system allows for higher density branching. Four main lateral branches with equal spacing around the trunk are selected. The branches are trained to grow more upright than in an open center system. Fruiting wood (branches that bear fruit) is renewed from the main branches each year. It is important to note that stone fruits, such as peaches, apricots and cherries, bear fruit on fruiting wood. Pome fruits, such as apples and pears, bear fruit on spurs. Make sure you know the difference before pruning your fruit trees. Research at the USU Extension Kaysville Research Farm has found the Quad-V system works well for training peaches. For more information on fruit tree pruning, see the USU Extension publication *Pruning the Orchard*.

PRUNING SMALL FRUIT

Grapes

Grapes require support from a trellis or fence. The four-cane Kniffin system is a simple training system that has worked well in Utah. Set 5 to 6 foot tall support posts and attach heavy gauge wire at 2 1/2 and 5 foot height increments above the ground. Fruit

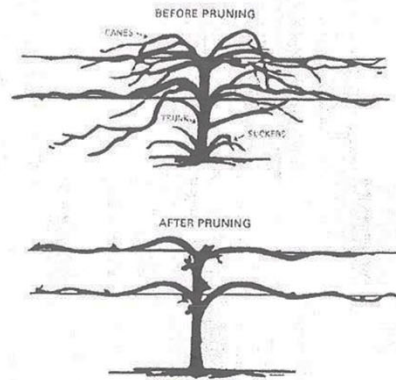


Figure 37: Four-cane Kniffin system for grapes

clusters grow on current-season leafy shoots that arise from buds which are borne on woody canes produced the previous season. The goal of pruning is to balance foliage and wood growth. Start the first year by training the main trunk. In subsequent years, attach developing side canes with plastic ties to support structure. Prune to four lateral arms or fruiting canes. Select fruiting canes that are pencil sized. A vigorous vine can support 30 to 40 buds or 12 to 15 buds per lateral. Leave fewer buds on less vigorous vines. Also leave two renewal spurs of one to two buds for each lateral arm. Select renewal buds that are close to the main trunk; fruiting canes for next season grow from these renewal buds. Proper pruning necessitates removal of 80 to 90 percent of the wood.

June-bearing Raspberries

Summer bearing (June bearing) raspberries, such as Canby and Newburgh, produce fruit on 1-year old wood. Canes grow the first year

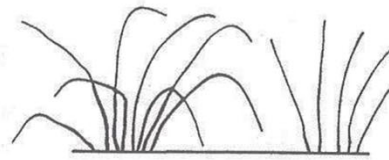


Figure 38: Pruning raspberries

without producing fruit and should be trimmed back in the fall to 4 to 5 feet high to avoid winter damage. These same canes will bear fruit the next year around June. In early spring, develop a hedgerow system by removing all canes that are growing outside of an 18 to 24-inch wide row. Then, within the row, thin out canes so there is no more than three to four canes per row. Select the larger canes and remove the smaller canes. In late summer, after the canes are done fruiting, cut them to the ground to make room for new cane growth.

Ever-bearing raspberries

Ever bearing or fall bearing raspberries, such as Heritage, Caroline and Joan J, will produce fruit in June and September. For two harvests, prune canes the same way as summer bearing varieties described above. For a fall harvest only, cut all canes to the ground in late winter. This practice reduces winter injury and may be less time consuming for the gardener.



Figure 39: Pruning black and purple raspberries

Black and Purple Raspberries

Black and purple raspberries generally do not spread much beyond the place they are planted. If needed, they can be supported by a stake or a two-wire trellis with wires at 15 inches and 30 inches above the ground. Tie new shoots to the support structure when they are 24 to 30 inches tall. Next, cut off the growing tip to stimulate side branch growth. The following spring, cut the side branches back to about 12 inches. Keeping the side branches shorter helps balance the number of buds on the plant so berries develop well. Leave 4 to 6 main canes per foot of row.

Blackberries

Upright thorn-less blackberries, such as Navajo, Arapaho and Apache, are pruned similarly to black and purple raspberries except plants grow vigorously and can be topped at 30 to 36 inches above the ground. Thin out suckers during the summer to leave three to six plants per foot of row.

Semi-erect thorn-less blackberries, such as Chester, Triple Crown, Black Satin, Dirksen and Thornfree, grow best when trained on a trellis. Allow



Figure 40: Pruning trailing blackberries

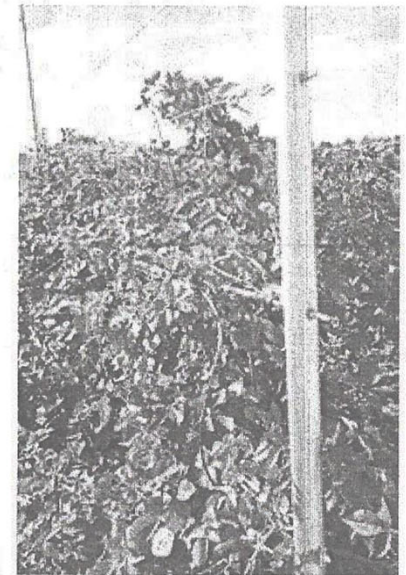


Figure 41: Semi-erect blackberries growing on a trellis

five to eight canes per foot of row to grow on a trellis that is approximately 6 feet high; thin-out all other canes. Tip the primocanes when their growth extends above the trellis.

Trailing blackberries, such as Boysen, Marion, Logan and Black Diamond, are tender and require protection most winters. An easy way to protect plants is to allow 1-year old wood to grow on the ground and then cover it in the fall with straw mulch for winter protection. In the spring, lift the canes up and tie them to a trellis or stake. Remove dead and diseased wood and weak canes. Wrap canes around the trellis wires of the support structure.