

# Edible Landscaping



## Combining Form & Function

<Shasta Master Gardeners>

# Overview

## *Definition:*

Edible landscaping is the use of food plants as design features in a landscape. These plants are used both for aesthetic value as well as consumption.

## *Important Note:*

Edible landscapes encompass a variety of garden types and scales but do not include food items produced for sale.



# Edible Landscape vs. Traditional Landscape

## *The Pros*

- Environment – decreased food miles, reduced reliance on fossil fuel supported calories
- Health - food security, horticulture therapy, healthy food choices



In general, edible landscaping promotes sustainable gardening practices that maximize water efficiency, support wildlife and reduce the use of chemicals in the landscape.

# Edible Landscape vs. Traditional Landscape

## *The Cons*

- Time – increased maintenance requirements, seasonal planting, regular garden planning
- Inputs – increased water needs
- Practices - increased plant waste typically requires healthy compost pile





# Planning & Design

Edible  
Landscaping

# *Edible Landscapes Defined:*

- The use of food plants as design features in a landscape. These plants are used both for aesthetic value as well as consumption.
- It is the integration of the function of food-growing within a landscape with alternative forms & functions, including aesthetic, recreational, and other landscape functions; often requires balancing these approaches.
- It does not include food items produced for sale.



Image Sources: "Carrot City" by M. Gorgolewski, SWA Group, & C. Napawan

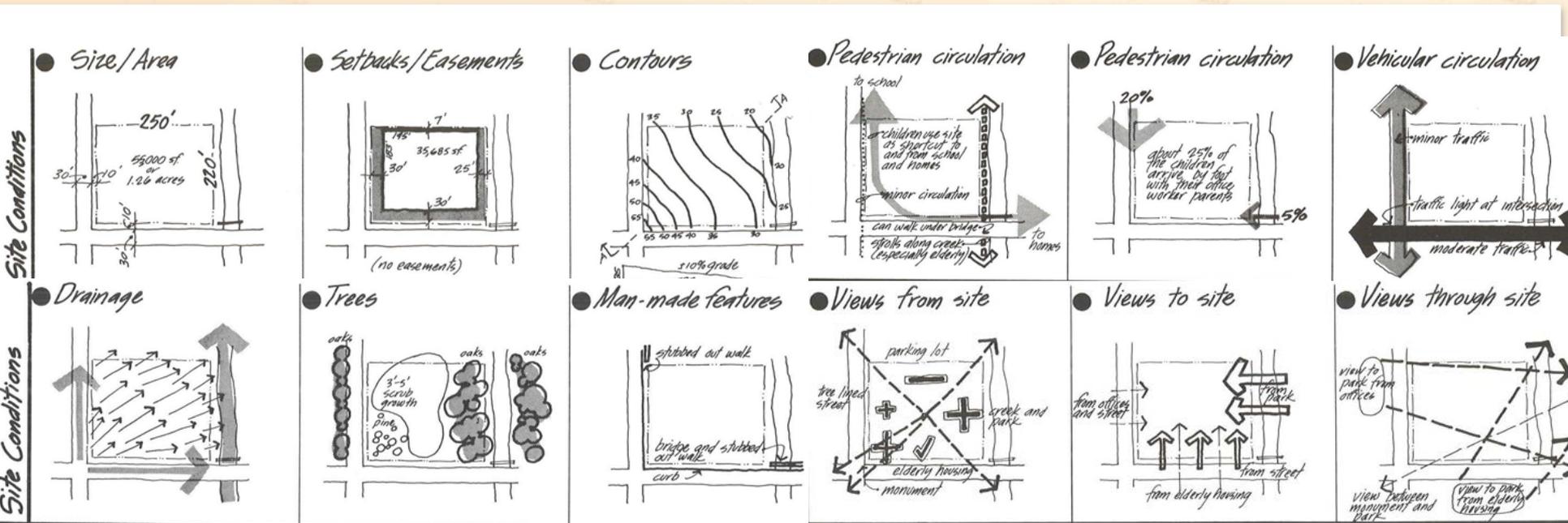
# History of Edible Landscaping:

- Precedents for the integration of food-growing with alternative landscape uses exist in examining victory and community gardening in the US
- Three most influential landscape styles from Europe have their roots in food-production: *Italian Renaissance* gardens, *French Baroque* gardens, and *English Picturesque* landscapes.
- Most significantly, the *Ferme Ornee*, or ornamental farm, represents a period of popular landscape design that sought to balance food-producing with ornamental planting techniques.



# Design & Planning of Edible Landscapes

- **Site Assessment** includes analyzing physical attributes such as site location & adjacencies; growing region, climate, & microclimate; and resource availability such as water, soil, and solar energy.
- **Client/User(s) Assessment** includes understanding the needs/desires, the existing or intended patterns of use, and the maintenance capabilities of the client/users.
- **Programmatic (or functional use) Assessment** includes recognizing the functions attributed to the landscape other than food-growing.



# Designing for Form as well as Function:

Because a landscape loved is a landscape likely to endure.



Containers



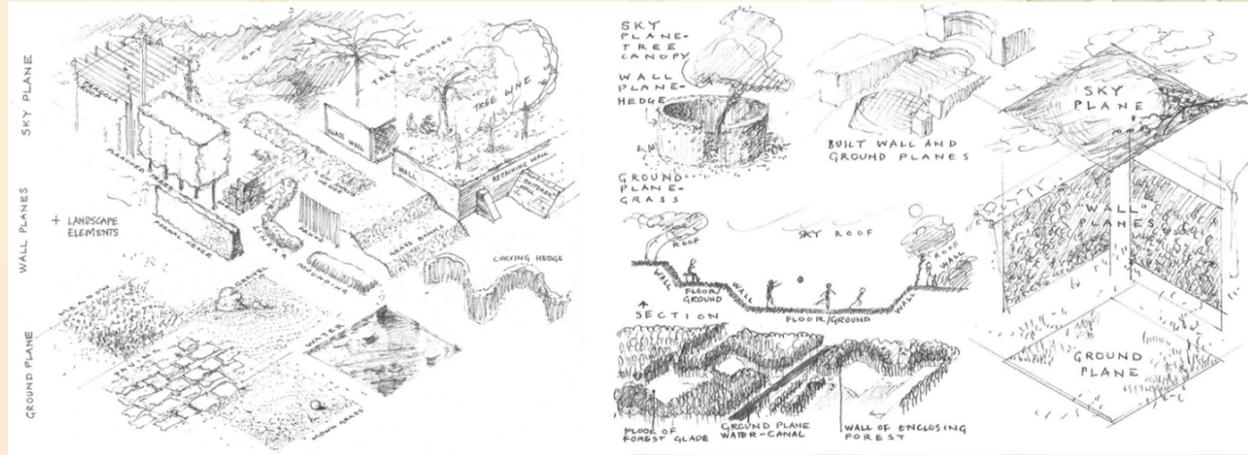
Carpets



Hedges/Walls



Canopies/Column



vs.



Image sources: "Form & Fabric in Landscape Architecture," by C. Dee; & C. Napawan



# Planting & Maintenance

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# Diverse & Complex Plant Systems

- Increases diversity
- Eliminates monoculture
- Creates habitat for beneficial organisms
- Crops selected for yield and aesthetics





# Sun and Shade Effects

- Affects performance and yield of food crops
  - Need at least 6 hours of sun per day
- Plan for seasonal variation in shade and sun angle



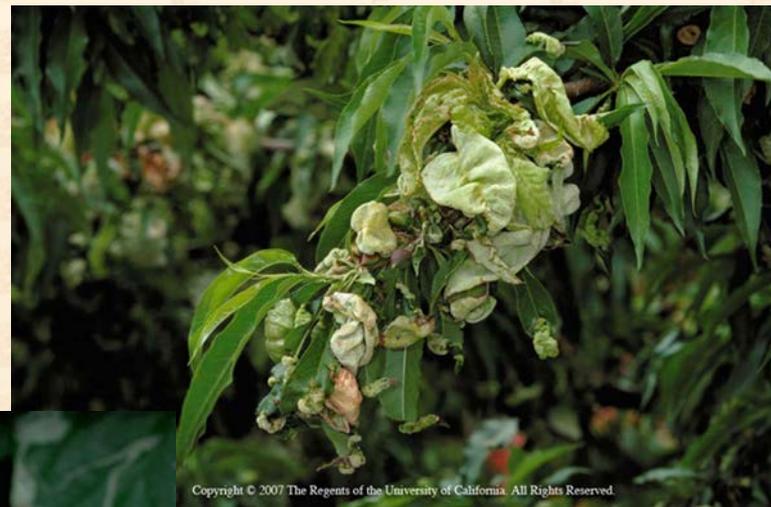
# Inputs Required

- Time and labor
  - Attention, training, maintenance
- Fertilizer
  - Frequency and nitrogen
  - Organic vs. synthetic
- Water
  - Amount
  - Variation in application methods



# Pests and Weeds

- Pest management often more demanding with edibles
- IPM more complex





# Soil Management Considerations in Edible Landscaping

- Routine replanting annual crops
  - Dedicate bed space if possible and amend with OM or perlite before planting.
- Inter-planting edible crops into existing landscape areas
  - Cultivation and root disturbance of permanent plants pose problems.



# Soil Management in the Edible Landscape

- Fertilizer management for edibles vs. ornamentals
  - Edibles often require more fertilizer, especially N
  - Consider using slow-release N
- Container growing
  - Avoids soil management issues
  - Requires good drainage and must leach potting media before planting



# Water Use in the Edible Landscape



- Crops are not in uniform rows
  - Consider hydrozoning and schedule irrigations based on plant needs
  - Drip irrigation is a good way to conserve water
- Higher planting density = greater water requirement
  - Use soil amendments and mulches effectively to help with soil water retention

# Compost

## How to Amend Soil with Compost

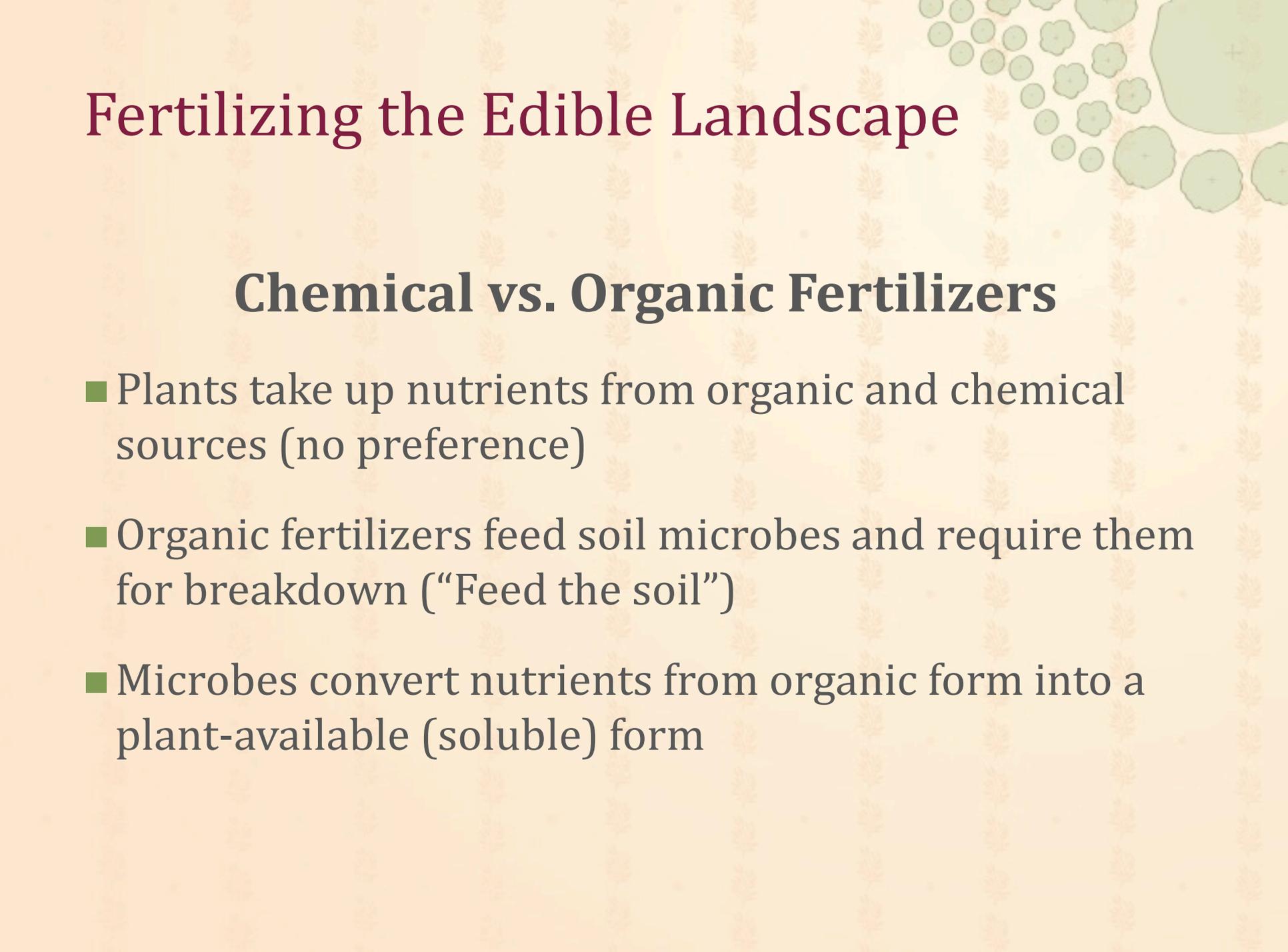
- Amend entire planting site or bed when possible, adding at least 30% compost (by volume) to original soil
- Thoroughly mix compost 6 inches to 2 feet deep (depending on depth of expected root zone)
- Seed edibles directly into garden soil amended with compost or transplant seedlings/container plants into amended soil at same depth they were in their containers
- Irrigate immediately and maintain a moist root zone through establishment

# Mulch

## How to Amend Soil with Mulch

- Apply 2.5-3.5 inches of mulch on top of the soil
- Carefully spread compost around the base of plants using a shovel or rake
- Avoid applications around tree trunks
- Apply outward toward dripline of trees

# Fertilizing the Edible Landscape



## Chemical vs. Organic Fertilizers

- Plants take up nutrients from organic and chemical sources (no preference)
- Organic fertilizers feed soil microbes and require them for breakdown (“Feed the soil”)
- Microbes convert nutrients from organic form into a plant-available (soluble) form

# Chemical vs. Organic Fertilization

## ■ Chemical fertilizers:

- Provide precise nutrient amounts quickly and simply at low cost
- But they are made from nonrenewable fossil fuels, they may not promote soil health, and it's easy to overfertilize

## ■ Organic fertilizers:

- They are renewable and biodegradable, they may improve soil structure, slow release of nutrients so it's not easy to overfertilize, and they can utilize waste
  - But nutrient content is often lower so they're bulkier, correcting deficiencies may be slow, the nutrient content of manures and compost is often unknown, and they are often more expensive
- The goal should be to improve soil nutrition with products that are natural, renewable, and not-too-distant at the lowest cost and effort.

# Organic Fertilizer Categories

## ■ Animal-based

- Animal killed (blood, bone, & feather meals and fish products)
- Animals not killed (bat guano, manures)

## ■ Plant-based

- Alfalfa, cottonseed, and soybean meals, kelp/seaweed

## ■ Compost

- Usually considered a soil amendment, not fertilizer

## ■ Mined organic fertilizers

- Phosphorus: Soft rock phosphate
- Potassium: Muriate of potash, sulfate of potash, greensand

# Edible Landscaping

*Vegetables*



# Incorporating Vegetables into your Landscape...

Make a list of edibles you like and that grow well in your climate (table 2.3 & 3.5)

- Identify the cultural needs of each
  - Sun vs. shade
  - Soil ph
  - Water requirements
  - Nutrient requirements
- Realize that some plants may not be compatible with certain areas or existing plants
- Be aware of overall form
  - Size, shape, color, flowers, fruit
- Identify any pests/diseases that are common

# Choosing Varieties That Best Suit your Needs

- Some plants have varieties / cultivars that are better suited in your landscape
  - Drought tolerance
  - Salt tolerance
  - Disease resistance
  - Pest resistance
  - Striking or more profound colors



<http://gurneys.com>

# Site Selection

- Vegetable crops perform best when well irrigated and receive at least 6-8 hours of sunlight
- Vegetables can be used as
  - Ground covers
  - Annual low border bedding plants
  - Visual screens
  - Trellis vines
  - Hanging baskets/containers





# Edible Ground Covers

Alpine strawberry

Blueberry (lowbush)

Chamomile

Cranberry

Cucumber

Lingonberry

Mint (creeping)

Natal plum (dwarf)

Oca

Peanut (temporary cover)

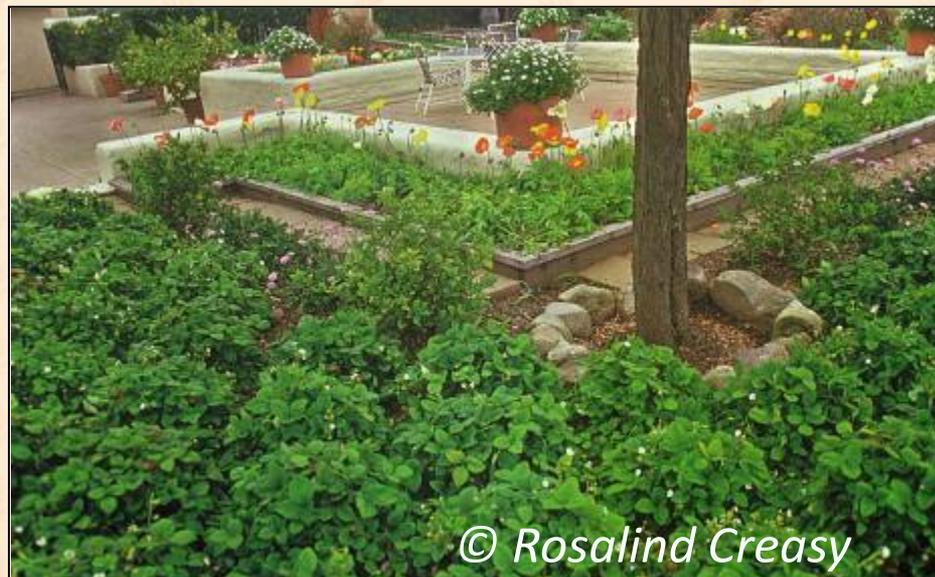
Rosemary (trailing)

Sweet potato (temporary)

Sweet woodruff

Thyme

Wintergreen



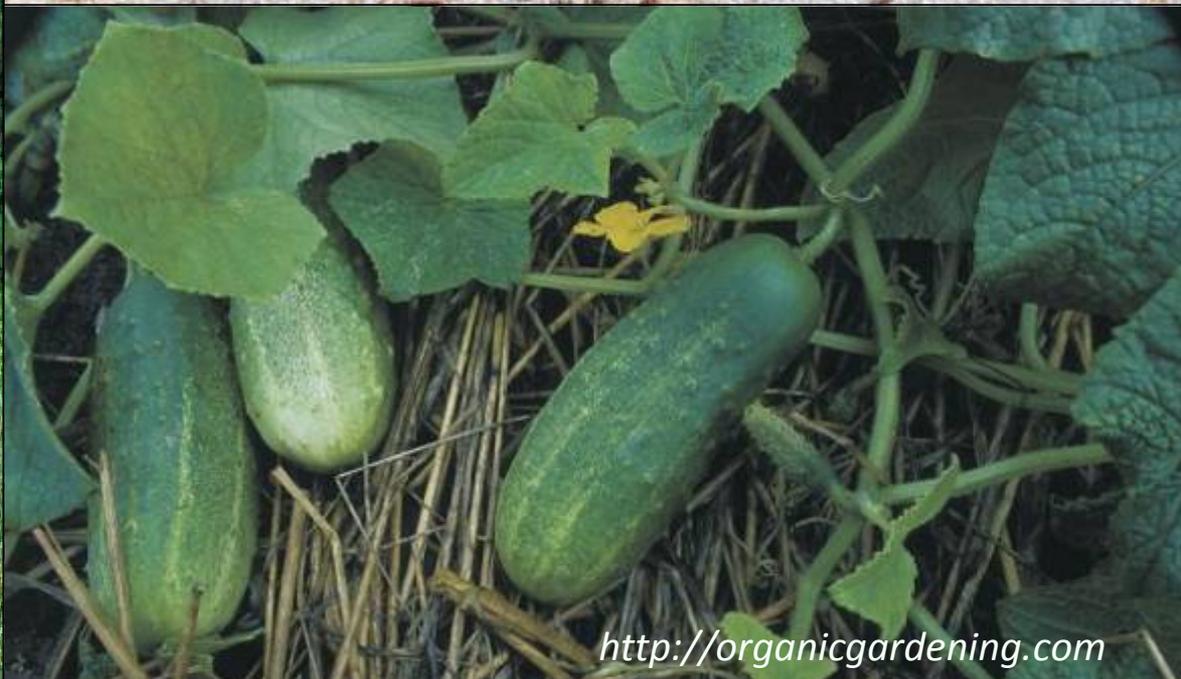
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<http://organicgardening.com>



# + Edible Herbaceous Borders

Alpine strawberry

Angelica

Anise hyssop

Artichoke

Arugula (perennial)

Asparagus

Basil

Beet

Borage

Broccoli

Cabbage

Cantaloupe (bush)

Celery

Chard

Chives

Collards

Corn

Cucumber (bush or trellis)

Edible flowers

Eggplant

Endive

Kale

Lavender

Lettuce

Licorice

Lovage

Marjoram

Mitsuba

Mizuna

Nasturium

Okra

Orach

Oregano

Parsley

Pea

Peanut

Pepper

Poppy (breadseed)

Rhubarb

Rosemary

Safflower

Sage

Scented geranium

Sea kale

Shallot

Squash (summer)

Tarragon

Tomato (determinate)



# Edible Herbaceous Borders



© Rosalind Creasy



# + Edible Flowers

Anise hyssop  
Apple  
Arugula  
Basil  
Bee Balm  
Borage  
Broccoli  
Calendula  
Chamomile  
Chervil  
Chicory  
Chives  
Chrysanthemum  
Citrus

Daylily  
Dianthus  
Dill  
Elderberry  
Hibiscus  
Hollyhock  
Johnny-jump-up  
Lavender  
Lemon verbena  
Lilac  
Marigold  
Mint  
Nasturtium



Okra  
Passion flower  
Pineapple guava  
Redbud  
Rose  
Rosemary  
Sage  
Scented geranium  
Squash  
Sunflower  
Sweet woodruff  
Thyme  
Tulip  
Violet





# Planting Your Edible Landscape

- Seasonal temperatures are very important
  - Warm season crops germinate best when soils is between 65 to 80<sup>0</sup>F
  - Cool season crops germinate best when soil is between 60 to 60<sup>0</sup>F
- Plants can be direct seeded, transplants, or self seeding
  - Use direct seeding for large seeded plants: corn, melons, squash, beans and peas; and for root crops: carrots, radish, beets, turnips, and parsnips
  - Use transplants for crops that you want to get an early start by growing them in the house, a cold frame or greenhouse
    - Follow Table 3.5 in the Edible Landscape Handbook



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<http://myyouthandfood.msu.edu/projects/index.html>

Best of both worlds –  
edible & ornamental

Inter-planting reduces  
pests

New textures, forms,  
colors

Grow what you like best

Fun for everyone

Great conversation piece

# Edible Landscaping

*Fruit Trees*

# Fruit Tree Considerations in Edible Landscapes

- Allow enough room to prune, thin, & harvest
- Roots will spread 2-3 times the width of the canopy
- Consider effects of sprays on adjacent plants
- Consider clustering fruit trees and keeping them small
  - Similar irrigation, bird netting, mulching, pollination

# Low-Maintenance Fruit Species

- Cane berries & blueberries
- Citrus (for now)
- Figs
- Jujubes
- Persimmons
- Plums & pluots
- Pomegranates



# Serious Problems with Some Fruit Trees

- Apples & pears – Fire blight, codling moth
- Apricots – Brown rot, bacterial canker
- Cherries – Spotted-wing Drosophila
- Citrus – Asian citrus psyllid, citrus greening, scale insects, frost
- Peach/nectarines – Peach leaf curl
- Grapes – Powdery mildew
  
- Practical solutions to several of these pests have been developed



# Site Selection

- 6-8+ hours of full sun
- Shelter from high winds
- Some trees may benefit from warm south wall
- Avoid planting where fruit falls on walks or driveway
- Soil should be at least 2-3 ft. deep



# Crop Specific Information

- Selected planting and training methods are discussed



# Policy

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# Your Local Community

- Local Regulations or Policies
  - Water Use
  - Land Use
  - Food Safety



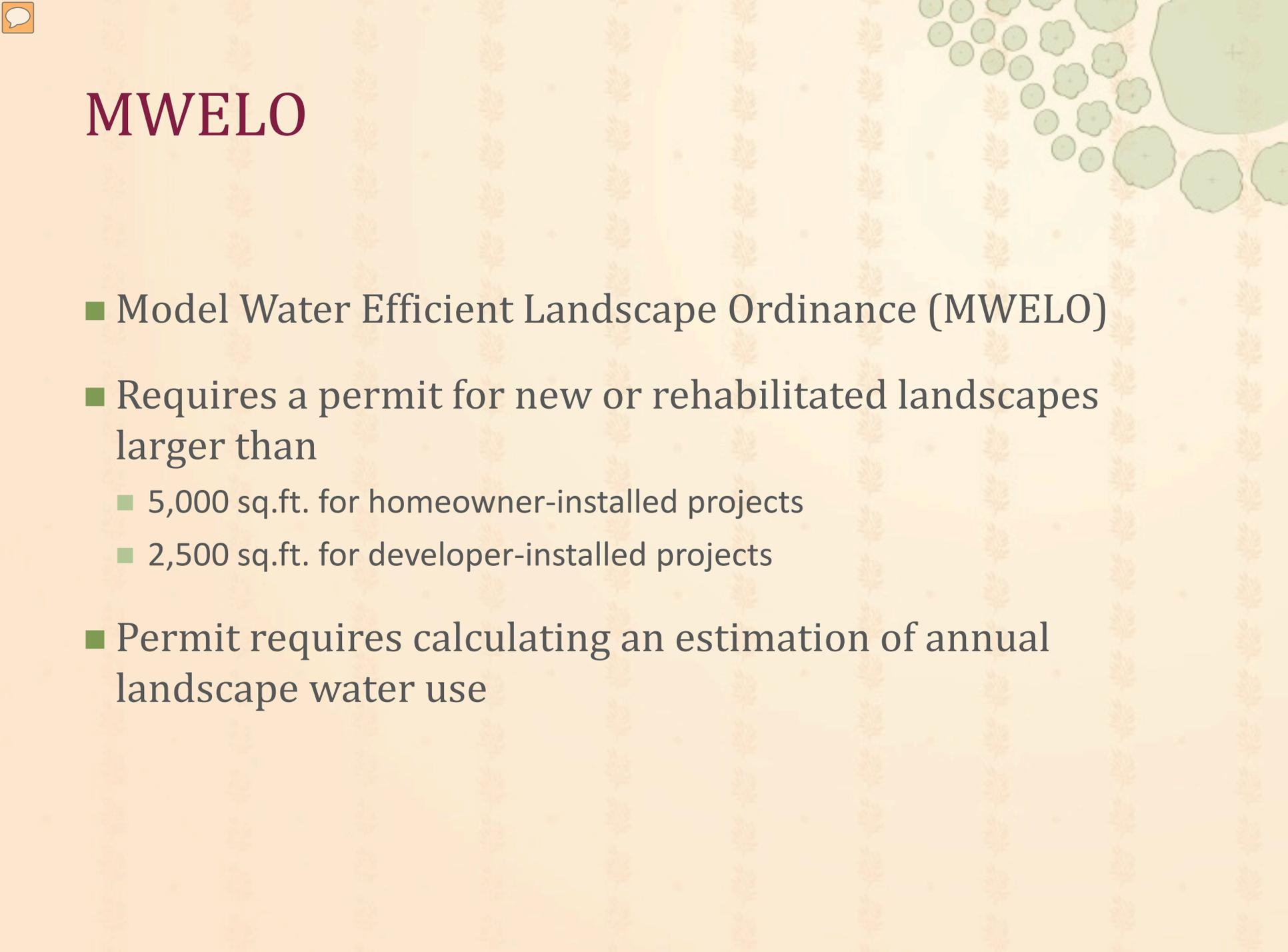
# Water Use

- Policies related to water use may address:
  - Budget
  - Allocation and Pricing
  - Water Capture and Conservation
  - Rainwater collection systems
  - Greywater systems





# MWELO

- Model Water Efficient Landscape Ordinance (MWELO)
  - Requires a permit for new or rehabilitated landscapes larger than
    - 5,000 sq.ft. for homeowner-installed projects
    - 2,500 sq.ft. for developer-installed projects
  - Permit requires calculating an estimation of annual landscape water use
- 



# Information about MWELO

- Local ordinances may exist in place of or in addition to MWELO
  - Water provider
  - City or county water resources department
  - Department of Water Resources website
    - <http://www.water.ca.gov/>
  - CalRecycle
    - <http://www.calrecycle.ca.gov/>
  - Professional organizations (e.g., CLCA, APLD)



# Land Use

- Private policies/restrictions
  - Focus on community gardens rather than residential landscapes
- Home Owner Association
  - Restrictive Covenants
  - Covenants, Conditions, Restrictions (CCR)
  - Maintenance and aesthetics are key!
- AB 1061, Lieu 2009
  - This act provides that the architectural guidelines of a common interest development shall not prohibit or include conditions that have the effect of prohibiting the use of low water-using plants as a group.





# Food Safety Policy

- Donating produce (e.g., to food banks)
  - Organization or Institution policy
    - Check with target organization
    - Clean containers, sound product with minimum 3-day shelf life (typical)
  - Government policy
    - May be local guidance
      - Department of Environmental Health
    - Non-food safety policy may apply to preventing spread of pests (e.g., Light Brown Apple Moth, Asian Citrus Psyllid)
      - Donations may be restricted to county in which product was grown and may need to be defect free (caterpillar damage)



# Harvest & Storage

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# General Rules of Harvest

- Each crop has an optimum harvest period and method.
  - Varies based on:
    - Individual taste preferences
    - Physiological characteristics of the fruit
    - Planned use of the crop



# Stages of Ripening

- Fully Ripe-Tree Ripe
  - Full maturity and ready to eat at harvest.
  - Best for fresh eating, drying
  - Firm ripe is better for canning and freezing



# Stages of Ripening

## Physiologically Mature

- Fruit may or may not continue to ripen after harvest



# Sanitation and Harvest

- Use only clean, sanitized buckets and bins
- Wash hands prior to harvest
- Wear clean cotton gloves to reduce contaminants on fruit
- Do not stack bins/buckets



# Twist Up!



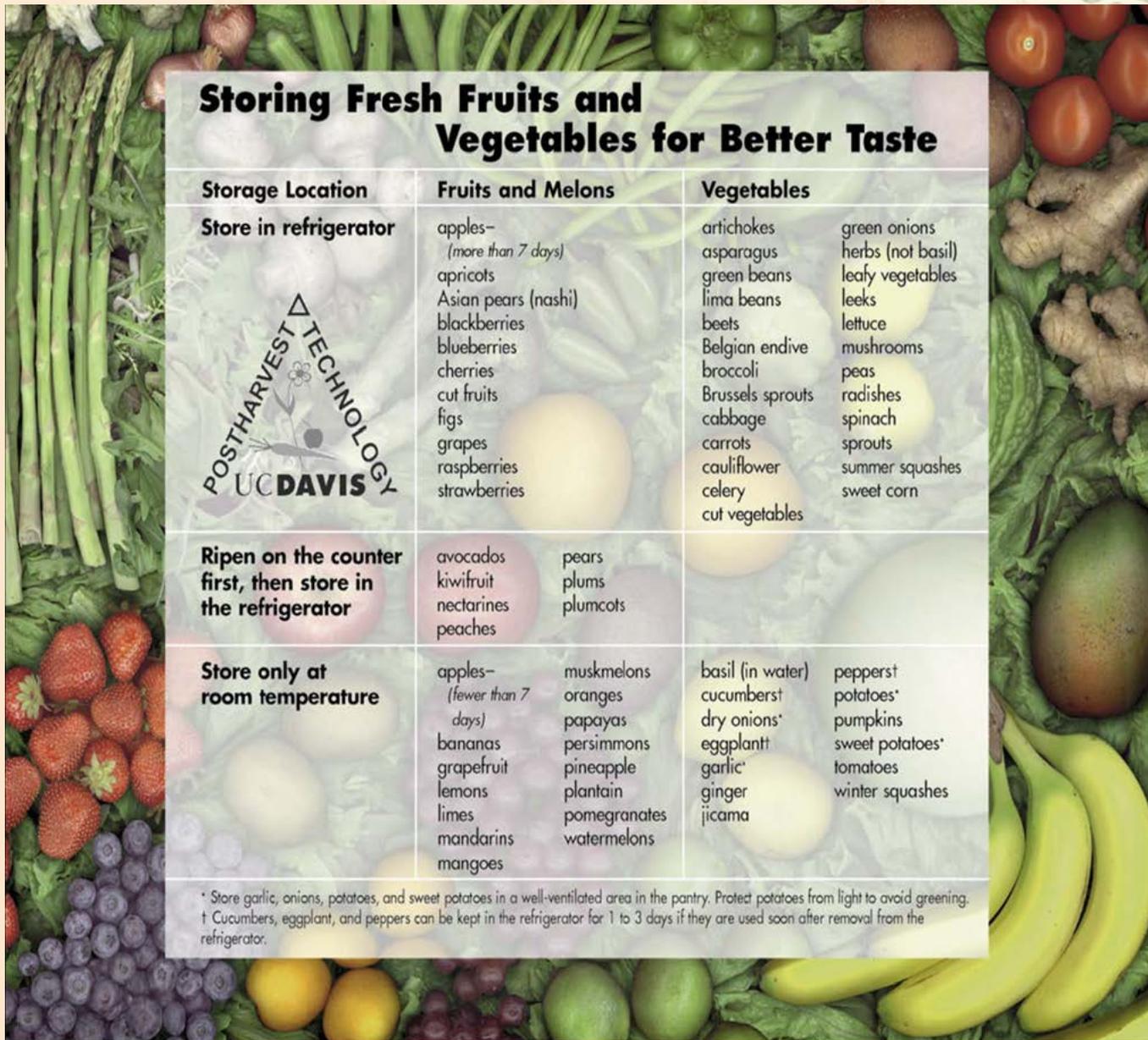
# Key Storage Requirements

Depends on Product:

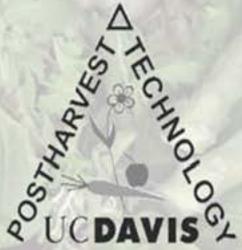
- Most ripe fruit (apples, stone fruits, fig and berries)
  - Harvest in a.m.
  - Place in refrigerator at 32-35F ASAP
  - Get fruit cold after harvest and keep cold until use



<http://ucce.ucdavis.edu/files/datastore/234-1920.pdf>



## Storing Fresh Fruits and Vegetables for Better Taste

Storage Location	Fruits and Melons	Vegetables	
<b>Store in refrigerator</b>  	apples— <i>(more than 7 days)</i> apricots Asian pears (nashi) blackberries blueberries cherries cut fruits figs grapes raspberries strawberries	artichokes asparagus green beans lima beans beets Belgian endive broccoli Brussels sprouts cabbage carrots cauliflower celery cut vegetables green onions herbs (not basil) leafy vegetables leeks lettuce mushrooms peas radishes spinach sprouts summer squashes sweet corn	
<b>Ripen on the counter first, then store in the refrigerator</b>	avocados kiwifruit nectarines peaches	pears plums plumcots	
<b>Store only at room temperature</b>	apples— <i>(fewer than 7 days)</i> bananas grapefruit lemons limes mandarins mangoes	muskmelons oranges papayas persimmons pineapple plantain pomegranates watermelons	basil (in water) cucumberst dry onions* eggplant† garlic* ginger jicama pepperst potatoes* pumpkins sweet potatoes* tomatoes winter squashes

\* Store garlic, onions, potatoes, and sweet potatoes in a well-ventilated area in the pantry. Protect potatoes from light to avoid greening.  
 † Cucumbers, eggplant, and peppers can be kept in the refrigerator for 1 to 3 days if they are used soon after removal from the refrigerator.

# What about Storing Vegetables?

<http://ucanr.org/sites/gardenweb/files/29040.pdf>

## VEGETABLE GARDENING AT A GLANCE: HOW TO PLANT AND STORE

Vegetable	Recommended planting dates <sup>a</sup>				General planting requirements				Storage conditions		
	North and North Coast	South Coast	Interior Valleys	Desert Valleys	Crop type <sup>b</sup>	Amount to plant (4 persons)	Distance in inches <sup>c</sup> between plants in rows (cm)	Distance in inches <sup>c</sup> between rows (no beds) (m)	Best temp °F (°C)	Time length to (weeks)	How to preserve <sup>d</sup>
artichoke <sup>e</sup>	Aug–Dec	May–Jul	Jul	Sep	C	3–4 plants	48 (122)	60 (1.5)	32 (0)	1–2	freeze whole, can, dry, or freeze hearts
asparagus <sup>e</sup>	Jan–Mar	Jan–Feb	Jan–Feb	Feb–Apr	C	30–40 plants	12 (31)	60 (1.5)	32 (0)	3–4	can, dry, or freeze
beans, lima <sup>f</sup>	May–Jun	May–Jun	May–Jun	—	W	15–25-ft row	6 (15) bush; (4.5–7.5-m row)	30 (0.8) 24 (61) pole	40 (4)	1–3	can, dry, or freeze
beans, snap <sup>f,g</sup>	Jul; May–Jun	Mar–Aug	Apr–May; Jul–Aug	Jan–Mar; Aug	W	15–25-ft row (4.5–7.5-m row)	3 (7.5) bush; 24 (61) pole	30 <sup>h</sup> (0.8)	45–55 (7–13)	1–2	can, dry, or freeze
beets <sup>f,g</sup>	Feb–Aug	Jan–Sep	Feb–Apr; Aug	Sep–Jan	C	10–15-ft row (3–4.5-m row)	2 (5)	18 <sup>h</sup> (0.5)	32 (0)	3–10	can, dry, or freeze
broccoli <sup>e, f,g</sup>	Feb–Apr; Aug–Sep	Jun–Jul; Jan–Feb	Dec–Feb; Jul	Sep	C	6–10-ft row (2–3-m row)	12–18 (30–45)	36 (0.9)	32 (0)	1–2	dry or freeze
brussels sprouts <sup>e</sup>	Feb–May	Jun–Jul	—	—	C	15–20-ft row (4.5–6-m row)	24 (61)	36 (0.9)	32 (0)	3–4	dry or freeze
cabbage <sup>e,f</sup>	Jan–Apr; Jul–Sep	Aug–Feb	Jul; Feb	Sep–Nov	C	10–15 plants	24 (61)	36 (0.9)	32 (0)	12–16	dry or freeze
cabbage, Chinese <sup>f</sup>	Jul–Sep	Aug–Oct	Aug	Aug–Nov	C	10–15-ft row (3–4.5-m row)	6 (15)	30 <sup>h</sup> (0.8)	32 (0)	2–3	dry or freeze



# Food Safety

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# Key points

- Fruits and vegetables are a very important part of a healthy diet
- Fruits and vegetables can be a source of foodborne illness
- Common sources of foodborne pathogens (microorganisms that cause illness) in produce include:
  - Water
  - Animals: wild and domestic
  - Soil amendments (especially animal-based)
  - People
- **Preventing contamination is key**
  - Evaluate and mitigate risks from pre-plant to harvest of the of the edible landscape.





# Good Agricultural Practices

- Focus is on RISK REDUCTION
  - Prevent contamination where possible
- 4 main sources of foodborne pathogens
  - Water
  - Wildlife or domestic animals
  - Soil amendments
    - *especially those derived from animals*
  - People

# Microbiological Safety of the Edible Landscape



## Growth(PreHarvest)

- Water
- Soil Amendments and Supplements
- Animal access



## Planning

- Site Selection
- Water Source
- Facilities: toilets and handwashing



## Post Harvest

- Washing Produce
- Food Storage and Preservation



## Harvest

- Personal Hygiene and Handwashing
- Cleaning and Sanitation



# Site Selection (community gardens)

- Know the history of the land
  - Risk assessment of prior use
- Consider the neighbors
  - Zoning in surrounding areas
  - Present/Future use
- Existing structures/equipment
  - Septic tanks
  - Plumbing
  - Toilets

# Method of Water Application

- Foliar application (spray)
  - Water in contact with edible parts
  - Use water from a safe source
- Soil application (trickle, drip)
  - May lower risk if properly maintained



Water used to mix solutions or chemicals that contact the edible plant must be potable!

# Soil Amendments

## ■ Compost

- Animal sources (manure)
  - Potential source of high levels of pathogens
  - Properly composted or heat treated
  - **Manure from pigs, dogs, and cats must not be used**
    - parasites may remain viable after composing
- Vegetative matter (no manure)

## ■ Green manures

- Plant matter grown and chopped and incorporated into soil



# Equipment and Personal Protective Items

- Check that all are clean and well maintained
- Consider designating tools/gear for certain tasks
  - Chemical use/Compost
  - Harvesting
- Wash and sanitize harvest tools (e.g., clippers, knives) and gloves
  - As you would kitchen utensils
- Keep workspace clean



Wash hands, sanitize brushes, work surfaces, cutting boards and knives.

# How to Wash Produce

Scrub or rub fruits and vegetables with a brush or hands under running water.

Dry produce with paper towels before storage.

Transfer to a sanitary container.



# Food Storage and Preservation

## Whole Fruits and Vegetables

**Storing Fresh Fruits and Vegetables for Better Taste**

Storage Location	Fruits and Melons	Vegetables
<b>Store in refrigerator</b>	<ul style="list-style-type: none"> <li>apples—<i>Some are 7 days</i></li> <li>apricots</li> <li>Asian pears (hard)</li> <li>blackberries</li> <li>blueberries</li> <li>cherries</li> <li>cut fruits</li> <li>figs</li> <li>grapes</li> <li>raspberries</li> <li>strawberries</li> </ul>	<ul style="list-style-type: none"> <li>artichokes</li> <li>asparagus</li> <li>green beans</li> <li>lima beans</li> <li>leeks</li> <li>Belgian endive</li> <li>broccoli</li> <li>brussels sprouts</li> <li>cabbage</li> <li>carrots</li> <li>cauliflower</li> <li>celery</li> <li>cut vegetables</li> <li>green onions</li> <li>herbs (not basil)</li> <li>leafy vegetables</li> <li>leeks</li> <li>lettuce</li> <li>mushrooms</li> <li>peas</li> <li>radishes</li> <li>spinach</li> <li>squash</li> <li>summer squashes</li> <li>sweet corn</li> </ul>
<b>Ripens on the counter first, then store in the refrigerator</b>	<ul style="list-style-type: none"> <li>avocado</li> <li>kiwifruit</li> <li>nectarines</li> <li>peaches</li> <li>pears</li> <li>plums</li> <li>plumcots</li> </ul>	
<b>Store only at room temperature</b>	<ul style="list-style-type: none"> <li>apples—<i>Some are 7 days</i></li> <li>avocados</li> <li>bananas</li> <li>grapefruit</li> <li>lemons</li> <li>limes</li> <li>mangoes</li> <li>mangos</li> <li>musk melons</li> <li>oranges</li> <li>papayas</li> <li>persimmons</li> <li>pineapples</li> <li>plantains</li> <li>pomegranates</li> <li>watermelons</li> </ul>	<ul style="list-style-type: none"> <li>beet (in water)</li> <li>cucumbers*</li> <li>dry onions*</li> <li>eggplant*</li> <li>garlic*</li> <li>ginger</li> <li>potatoes</li> <li>peppers*</li> <li>potatoes*</li> <li>pumpkins</li> <li>sweet potatoes*</li> <li>tomatoes</li> <li>winter squashes</li> </ul>

\*Store garlic, onions, potatoes, and sweet potatoes in a cool, well-ventilated area to the prevent rotting. Potatoes from light to avoid greening. (Cucumbers, eggplant, and peppers can be kept in the refrigerator for 1 to 7 days if they are used soon after coming from the refrigerator.)

- Short term storage
  - Room temperature vs. Refrigeration
- Long term storage
- Refer to chart for specifics

# Long-Term Storage

- Several methods of home preservation
  - Freezing
  - Drying
  - Fermentation
  - Pickling
  - Canning
  - Jams and Jellies



- UC Home Preservation and Storage Publications
  - [www.ucfoodsafety.ucdavis.edu](http://www.ucfoodsafety.ucdavis.edu)