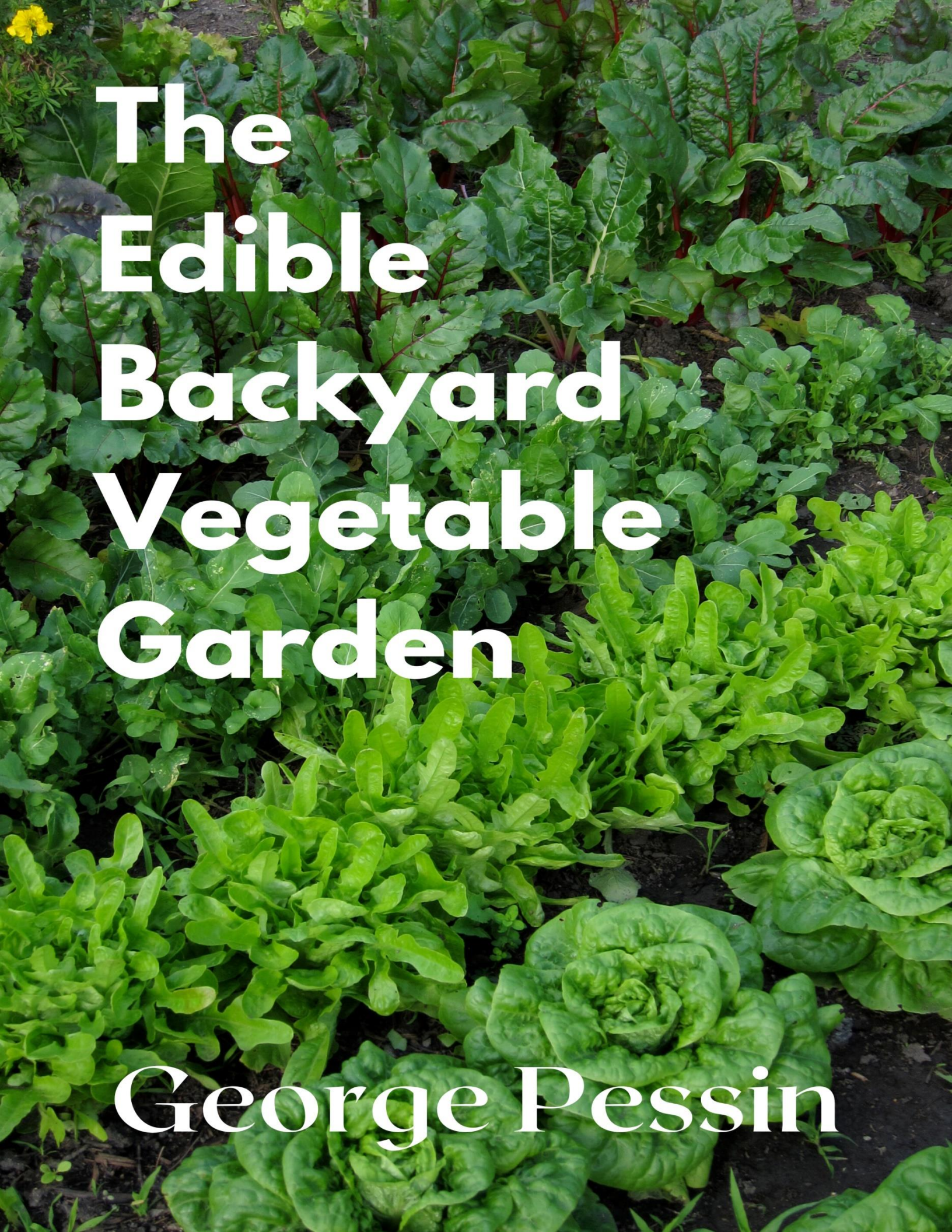
The Edible Backyard Vegetable Garden
George Pessin

The Edible Backyard Vegetable Garden

(Including 35 Recipes)

By
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Second Edition

TABLE OF CONTENTS

INTRODUCTION

In Southern California we are blessed with year-round sunshine and mild winters. If you know what you're doing, have enough space, and plan accordingly, you could be harvesting something from your garden every day.. That is the goal of this book. Fresh produce from your garden every day.

For those without mild winters, get a greenhouse. Prices have dropped considerably and are now affordable for the home gardener.

If you don't think you have the space, think again. Today there are vertical gardens, window gardens, roof gardens and container gardens, all available for those who are space-challenged. With only a few well-managed containers you can keep yourself in herbs (rosemary, thyme, mint, sage, oregano, etc.) all year. It's that simple.

Gardening is a great activity for an individual, a couple, or an entire family. If you're struggling to get your children to eat vegetables simply have them grow their own. It is a well-known fact kids who grow broccoli eat broccoli.

Gardening is also a great way to express your creativity and to showcase your identity. You make every decision. You control everything. Its like a 3D painting and you're the creator. The tools are your brushes, the plants are your colors. And then you eat your creations. How cool is that! Add fertilizing with your own compost and the cycle is complete.

Tomorrow morning, wake-up early and look for all the places you can grow something. Notice where you are on the planet. Where does the sun rise, where does it set? Ideally you are looking for southern exposure.

Gardening is very therapeutic in more ways than we are aware. The rewards are so much more than the harvest itself. I hope you all get that.

CHAPTER 1
BASICS

Choosing your Location - The ideal garden location will be level, with good drainage, and southern exposure. Southern exposure receives sunlight all day. Plants need sunlight to thrive. Through the process of photosynthesis plants transform sunlight into sugars and other organic compounds, which in turn gives them the energy to grow and thrive. If southern exposure is not available then choose an area that gets at least 6-8 hours of sunlight. Western exposure would be a second alternative, eastern exposure a third alternative and northern exposure a last resort. If you get less sunlight than 6-8 hours you can still grow edibles however you're limited to varieties that do not fruit (i.e. lettuce, spinach, herbs). Fruiting vegetables like tomatoes, squash, melons, etc. require maximum energy output from the plant to create and mature the fruits. This can only be achieved with a minimum of 6-8 hours of sunlight.

Next, what's your water source? How close is it? Is it within range of a 50ft hose, a 100ft hose? Are you going to irrigate manually, use overhead sprinklers, soaker hoses, or a drip irrigation system? There are those who prefer the direct connection of watering by hand and then there are those who like the convenience of an automatic system. Whatever you choose plan for it now. Do not wait until your garden is in place only to realize your water source is on the far side of the house.

Will you be planting directly in the ground, in raised beds, or in containers?

Those who have a lot of land would probably sow seeds directly in the ground using traditional row planting. Those with patios and balconies are going to want to use containers or pots. Those with less than ideal soil conditions or those who like their gardens neat and tidy are going to want to use raised beds.

Those who are ambitious and have the space will do all three. Lets discuss each one separately.

Planting directly in the ground - Say you have a huge backyard and you want to turn it into a mini farm. In-ground traditional rows would then be a good option for optimal yields.

You will first need to remove the grass. One option, called soil solarization, involves laying black or clear plastic over an area for a minimum of 4-6 weeks. This can effectively kill, weeds, roots, and if hot enough pathogens as well. If you live in a warm climate with hot summers use clear plastic. If you live in a cooler area, use black plastic.

Once cleared, you would then spread on your amendments and work it into the soil. You can do it by hand with a garden fork or you can rent a rototiller. A rototiller is a motorized cultivator with rotary blades that churns up your soil to a depth of about 6-8 inches. They're about $100/day to rent and great for cultivating large areas.

You can also build your garden directly on a lawn space using a method known as "sheet mulching." A very popular book, "Lasagna Gardening," by Patricia Lanza is based on this method. This is a no-till; no-dig gardening method that mimics what nature does in a forest. Basically, you build your bed right on top of the grass.

First, water the area you want to use then lay cardboard over it. Next, pile compost on top of that to a height of about 6 inches. Water again then finish with a layer of mulch. Wait a few weeks then plant directly into the pile.

Containers - Anything can be grown in containers from apples to zucchinis. The actual container is traditionally made from clay, plastic or wood, but creative gardeners have also been know to use the following items to grow vegetables: a bathtub, an old suitcase, a wooden set of drawers, even an old pair of shoes.

Whatever you choose, all containers need to have the following characteristics:

- They should be light-colored. Black containers in the summer can get too hot and fry the roots.
- Have a hole at the bottom for drainage and a tray underneath to collect water. The water tray should be about 1-2 inches deep depending on size. Containers resting on soil do not need a tray underneath.

When you water container plants you want to water deeply till the water collects in the tray and then allow the plant to soak it up. After an hour or so if there is still water in the tray, remove it with a turkey baster. Do not allow your plants to sit in standing water. Allow potting soil to dry between watering. Check moisture by probing with your finger. It should be dry at least 3 inches deep before watering.

Containers need full sun, a minimum of 6 to 8 hours every day so the plants may grow and develop.

Bigger is Better. Two reasons: first, the larger the root structure the bigger the plant so the more space your roots can develop the larger and healthier your plant will be. Second, we can combine different plants. In one 15-gallon container, we can grow both tomatoes and basil.

Smaller pots tend to dry out more quickly and on hot summer days they will need to be watered nearly every day depending on how small they are. For fruits and vegetables a 5-gallon pot should be the minimum.

If reusing an old container clean it out with a solution of 1 part household bleach to 9 parts water and rinse thoroughly.

Container Soil - Do not use soil from your garden. It is too dense and may have disease or weed seeds in it. Container soil should be loose, porous, and sterile. In stores it is called "potting soil."

If you'd like to mix your own potting soil try the following recipe:

4 parts hydrated coir brick
4 parts worm castings
1 part perlite
1 part vermiculite

Coir brick is made from coconut fiber. When submerged in water it will increase in volume 8-9x. Worm castings are the nutritious end product of the breakdown of organic matter by worms. Perlite is made from volcanic matter and provides aeration. Vermiculite is a natural material and provides moisture. Use the above as a starting point, you may wish to make it denser or looser depending on your needs. To make it denser add more coir and worm castings. To make it looser (like for seeds starting) add more perlite and vermiculite.

When filling your containers, leave at least an inch of space from the top for watering so the soil doesn't splash out.

Container plants need to be fertilized on a regular basis, approximately once a week or at least every other week. Over the course of a season the plant itself will use up all available nutrients quickly. Liquid fish emulsion, sea kelp, or "worm tea" are all good organic fertilizers.

Whenever fertilizing in containers it is important to read the directions carefully. Over-fertilizing can kill a plant overnight. If by chance you do over-fertilize and your

plant looks withered and bent over the next day try leaching the soil with water, let water run through it for a good 5-10 minutes to rid the soil of the excess salts.

Raised Beds - In many backyard situations raised beds are preferred because there is more control over the growing environment. The soil is imported, drainage is better, and the beds could be higher for easier access and even with a place to sit.

Many backyard gardeners are plagued with clay soil. Clay is very fine; it sticks together tightly, which makes for bad drainage and lousy aeration. By using a raised bed you get to use an ideal soil structure that is porous, well aerated and rich with nutrients.

A standard sized raised bed is 4 ft x 8 ft. 4 feet is wide enough for adults so that you can have multiple rows but not too wide that you can't access from both sides. 8ft is a good length for long rows yet not too long that you have to walk a great distance to get to the other side. Also most lumber comes in standard 12 ft lengths so cutting into 8 and 4 ft pieces is easy.

You could also make a 12x12 foot bed and put stones in vertically and horizontally (2 rows each way) and create (9) 4x4 foot beds. Design is totally up to you.

Depth of raised bed should depend on your soil. Minimum should be 6 inches. That's a standard size and fine for most situations. If the soil is really bad use an 8"-12" depth.

Material for raised bed includes plastic lumber, which is pricey but lasts the longest and wood such as cedar or redwood. Bricks, rocks, or cement blocks can also be used, just no treated wood.

Soil for raised bed should be approximately 50% potting soil or topsoil and 50% compost or manure. When you add your soil your going to mix it in thoroughly with your existing soil with a garden fork. Then each season, you will want to add more compost or manure and replenish the soil with the nutrients that were lost during the last growing season.

Once your location is decided upon it may be a good idea to make a simple drawing to map out what is going where. At this time it is also advisable to decide whether you'll be growing from seeds or transplants, annuals or perennials.

Seeds or Transplants - Transplants are easier and more expensive. Seeds are more exciting and offer more options.

If we're planting a row of tomatoes a seed package with at least 25 seeds will cost about $2-3 dollars. A tomato transplant can be $2-3 dollars each. Also you'll be hard-

pressed to find a wide variety of heirloom tomato transplants at your local big box nursery.

The advantages of transplants are if you want to try something new or you only want one or two plants of something like a specific herb. You probably don't want to grow a whole row of oregano but one or two plants would be perfect. Transplants then are a better way to go.

Annuals or Perennials - Annuals are plants that germinate, flower, seed, and expire in one season or one year. Biennials germinate, flower, seed, and expire in two years. Perennials live at least two years, some much longer. The majority of edible varieties are annuals while most herbs are perennials. It is advisable to plant all your perennials together in one bed.

Seed Starting - With both warm weather and cool weather crops we can start seeds indoors to get a jump on the season. Also, in certain cases, where seeds are very small like many herbs, starting seeds indoors is preferable to direct sowing in the ground.

Seeds come in many shapes and sizes and yet they all have three things in common:

1. Hard protective shell outside
2. Dormant embryo inside
3. Nutrition and moisture to keep it viable. When a seed does not germinate it is said to be "not viable." This usually means that the nutrition and moisture inside the seed have been used up.

Environmental Factors Affecting Germination include:

1. Moisture - Germination begins with the absorption of water. It ends when the seedling is self-sustaining. During that period, the growing medium should stay evenly moist (like a wrung-out sponge).
2. Temperature – Seeds like warmth. Generally, 65-75 F is best for most plants. The back of the seed pack will list the desired temperature range.
3. Oxygen – Respiration takes place in all viable seeds. During germination, the respiration rate increases. Soil or growing medium needs to be loose and well aerated.
4. Light – Some seeds require light, some seeds require darkness, and for some seeds it doesn't matter. The back of the seed pack will list any special lighting requirement.

From egg and milk cartons to pie pans and plastic trays, containers to sow seeds are plentiful. Just remember to create holes in the bottom for drainage.

Soil to start seeds should be of a fine and uniform texture, well aerated and loose, and free of insects and disease. The soil recipe mentioned earlier for containers can also be used for seed starting. Do not use garden soil. Purchase a specially prepared seed starting mix or potting soil.

Seed Planting Tips

- Depth matters. Sow seeds to a depth of approximately 2-3 times the smallest dimension. Do not plant seeds too deep for they will have to work real hard to reach the surface and some might not make it. Better to be too shallow than too deep.
- In soil or in a pot? Sow big seeds like sunflower, nasturtium, corn, peas and beans in soil where they'll grow. Sow small seeds like lettuce, broccoli, or cumin in containers and transplant.
- How long will it take? Some seeds like parsley and carrots will take up to 3 weeks to germinate. Seeds in the Brassica family like broccoli, kale and arugula could take as little as three days. Most take under a week.
- Keep the soil moist. No matter how long seeds take to germinate remember to keep the soil medium moist (like a wrung out sponge) throughout the germination process. Once the process begins it cannot stop and restart. During hot weather this means watering every day. Since the seeds are so close to the surface the soil will tend to dry out quickly. As the plant begins growing you can then cutback the watering.

How to Read a Seed Packet - The back of seed packet includes very important information that will direct you on how best to sow the seeds and grow the plant. Information will include:

a. When to plant, is it a cool weather crop or a warm weather crop
b. Location - full sun or part shade
c. Planting depth - how deep to sow seeds in the ground
d. Seed spacing – how far apart to space the seeds
e. Plant spacing – how far apart to space the plants once the seeds germinate
f. Days to germinate – how long the seeds take to germinate
g. Days to maturity (harvest) – how long before the first harvest. Some start from the day the seed is planted, some start from when seedlings are planted.

In my experience days to maturity begins when the seedling is put in the ground not when you start from seed.

Thinning - Thinning is the process of removing plants that are growing too close together. When planting from seeds it will become necessary to thin out your plants as they grow. We thin plants for the same reason we weed - to reduce competition for sunlight and the finite amount of water and nutrients in the soil. You will quickly notice that plants that are not thinned will grow leggy as they compete for the sun.

Another reason to thin your rows is to allow good airflow around your plants, which will reduce the likelihood of disease.

Read your seed packets to determine the final proper spacing between plants. You do not need to thin your rows all at once. When growing lettuce, for example, we will thin the same row on a continuous basis as the plants mature, eating the thinnings as we go.

Transplanting - Most plants transplant very easily however the exceptions are: beans, beets, chard, carrots, potatoes, and corn. These should be planted directly in the ground.

The important factor in transplanting is to disturb the roots as little as possible. Keep the soil around the roots intact. This is best achieved if the soil is a little moist as opposed to bone dry, which causes the soil to break apart.

Time to transplant is when first true leaves have developed or after you bring them home from the nursery. True leaves are not the first set of leaves that form after germination, but rather the second set. With careful observation you will easily be able to tell the difference.

Before removing the transplant from its pot, figure out where it's going and dig the hole first. Then support the plant through your fingers with one hand and tap on the bottom with the other hand. Place the entire contents into the hole at the same depth they grew in their containers. Firm the soil gently. And water deeply.

For tomatoes, cut off all but the top several leaves of the plant then dig a hole deep enough to plant the tomato seedling up to its top leaves. All those fine hairs on the side are actually roots. In the soil they will grow and develop and allow more nutrients to be taken up by the plant.

Irrigation - All plants need water, some more than others. Vegetable plants happen to need a lot of water; they don't call it watermelon for nothing (watermelons are over 90% water). In fact plants with long growing seasons require the most

amounts of water not just because the seasons are longer, but because of the fruits they develop i.e. tomatoes, melons, pumpkins, etc.

In general vegetables plants need an inch of rainwater per week, however in dry, arid climates, two inches is more the norm. One can measure the amount of rainwater or sprinkler output with a carefully placed measuring device. This way you can determine how long to keep your sprinkler or drip system on for.

Careful observation will let you know when your plants need watering. You do not want to stress your plants by giving them too little water so if you see your plant leaves are wilting after 4 days you know that you should water every three days.

Overwatering can be just as stressful as under watering. Too much water will suffocate the roots and eventually cause them to rot. Do not water if the soil feels damp to the touch.

The best time to water is in the early morning. This will not only prevent water loss due to evaporation but will also allow the leaves to dry off before sunset, which will prevent fungal diseases.

Drip Irrigation is one of the most efficient methods of irrigation. Watering roots only avoids mildew on the leaves. Also not irrigating outside of targeted areas will keep weeds from growing.

Another method of saving water is to use mulch. Laying a two-inch layer of mulch around your plants can cut down watering by preventing evaporation and holding in moisture. See Chapter 6 for more info about mulching.

What tools are we going to need?

The following is what we use the most:

Garden Fork - for amending and turning soil, turning compost.

Shovel - for digging holes, or for moving soil, sand or gravel.

Spade - for digging out sod, edging our beds, chopping roots, and breaking up clods.

Hoe - for weeding, or digging a shallow trench for seeds.

Square Hoe - also for weeding

Garden Rake – for spreading soil amendments, leveling and smoothing the soil, gathering up stones and other debris.

Trowel - hand shovel, good for transplanting.

Hand Cultivator - for weeding and breaking up clods of dirt.

Pruners - for cutting stems and harvesting.

Lopper – a long handed pruner that requires two hands – used for cutting thick stems and branches, and a pruning saw for what loppers can’t handle.

Some additional tools to always have around: Scissors, string, plastic tape for tying limbs together (string can dig into the stem, tape won't), washers (for your hoses), watering can, harvest basket, hammer, wooden poles (for support), bird netting, and first-aid kit.

Tool Safety - Some simple rules to follow especially if you're going to be gardening with children:

1. Never run with tools.
2. Never leave tools lying around the garden.
3. When carrying your tools always walk with blade side down.
4. Do not bring hand cultivators up over your shoulder.

Lastly, take good care of your tools and they will last for a long time. Clean off dirt after use. Dry them off. Sharpen blades when necessary.

CHAPTER 2
SOIL

Most vegetable plants like loose, well-drained soil full of nutrients that they can draw from.

Soil structure is made up of four basic ingredients: parent material (decomposed rock), organic matter, air and water. The proportions are about 40% parent material, 10% organic matter and 50% air and water. The parent material is made up of clay, sand, and silt.

Clay is very fine, silt is medium/fine and sand is coarse.

Because the clay soil is so fine it binds together and can become very hard. Nutrients hold well in clay soil however drainage is terrible and it is poorly aerated. In sandy soil, because the particles are so course water goes right through it, which in turn leaches all the nutrients out of it and plants dry out very quickly.

Loam is the ideal mixture of sand, silt and clay. It remains crumbly, holds water well, is well aerated and considered ideal for gardening and agricultural uses.

Soil also contains many living microscopic and macroscopic plants and animals such as insects, earthworms, fungi, protozoa and bacteria. These living organisms contribute organic matter and nutrients to the soil. The more bioactive your soil is the better.

An easy test for soil texture is to make a ball of damp garden soil. If it breaks apart easily, it's sandy. If you can press it between your thumb and finger and make a ribbon, it's clay.

pH Value - Another property of soil is called the pH factor. The soil pH value is a measure of soil acidity or alkalinity. The pH scale ranges from 0 to 14, with 7 as neutral. Numbers less than 7 indicate acidity while numbers greater than 7 indicate alkalinity.

The pH scale is logarithmic like the Richter scale. As a 4.0 earthquake is 10x more powerful than a 3.0 earthquake, soil with a pH of 5.0 is 10x more acidic than soil with a pH of 6.0. Most vegetables like slightly acidic soils, in the range of 6.2-6.8.

The importance of pH is how well vegetables will absorb nutrients from the soil. If an acidic plant is grown in an alkaline environment or vice versa then the plant will not easily absorb certain nutrients.

In humans, nutrients are absorbed in the small intestines. If that pH is off then we will be unable to take in the nutrients we need. Plants and humans are similar in that respect.

To lower the pH one should add garden sulfur *aka* flowers of sulfur. To make soils less acidic, the common practice is to apply a material that contains some form of lime (i.e. limestone). Wood ashes can also be used to raise the soil pH.

When changing the pH be very careful about not adding too much amendment. Always use the package guidelines and error on the side of caution. It is usually recommended to add your amendments at the start of the season when the beds are empty.

How to check pH for soil? Buy a simple meter. All the garden centers have them. Dig a small hole about six inches and fill with distilled water, which is pH neutral, let it get a little muddy then insert the sensor.

Lastly, by simply amending your beds each season with compost or manure we are in effect adding nitrogen to the soil, which increases bacteria activity and in doing so makes the soil more acidic. This alone should keep your soil in the correct pH for your vegetable plants.

Nutrients – Like humans and animals, plants need a balanced diet for healthy growth. For plants a balanced diet means a combination of nutrients divided into three categories: primary, secondary and micronutrients.

Primary nutrients are needed in larger quantities compared to the other plant nutrients. Primary nutrients are Nitrogen (N), Phosphorus (P) and Potassium (K) (sometimes called Potash).

Secondary nutrients are required by the plant in lesser quantities than the primary nutrients but are just as essential. Secondary nutrients include: Calcium (Ca), Magnesium (Mg) and Sulfur (S).

Micronutrients are required by the plant in very small amounts. Micronutrients include: Boron (B), Copper (Cu), Chlorine (Cl), Iron (Fe), Manganese (Mn), Molybdenum (Mo), and Zinc (Zn).

Primary nutrients can be added to the soil in the form of fertilizers. Secondary nutrients and micronutrients are readily available in soils that are amended with compost. If your plants are not getting enough secondary or micronutrients it is usually a function of the pH value. By keeping your soil at an optimum pH level a plant will have no problem absorbing secondary nutrients and micronutrients.

When purchasing fertilizer you will see three numbers like 5-5-5 or 2-4-2 or 10-10-10. These numbers represent the percentage by weight of the three primary nutrients required for healthy plant growth, always in the same order, Nitrogen - Phosphorous - Potassium. The reason it doesn't add up to 100 is because there are other nutrients or fillers added.

To amend both clay and sandy soil, to improve its texture and increase its nutrient level we add organic matter; this can be in the form of compost or manure and/or other organic fertilizers.

In clay soil, amendments are added to help break up the clay particles resulting in increased air space, better drainage and improved root penetration.

In sandy soils, amendments adhere to sandy particles increasing the water holding capacity and keeps nutrients from being washed away.

Amending a Garden Bed - The method we use will be the same whether we amend a raised bed or an in-ground bed.

First, layer the compost or manure onto the garden bed along with any other soil amendments such as organic fertilizers (see below). Use a rake to spread it out evenly so the amendments are approximately 2-4 inches thick.

Next, using your garden fork, start at one end and slowly and methodically turn the soil. The soil at the bottom (6-10" deep) should come to the top and the compost/manure at the top should mix thoroughly with the existing soil. Break the big clumps with your cultivator. Then rake so the surface is flat and even.

After tilling, water thoroughly then wait 1-2 weeks so the organic matter can be incorporated.

IMPORTANT: Do not walk in your raised bed after its been turned. You will cause this loose, well-aerated soil to compact worse than when it started. If you have

turned a large area spread a long aboard across it and walk on the board. The board will distribute your weight and not cause the soil to compact.

Organic Fertilizers include naturally occurring organic materials such as: manure, guano, fish emulsion, worm castings, compost, and green manure.

1) Manure is organic matter made from animal waste, specifically: chickens, rabbits, horses, cows (and steer) sheep, and goats. Manures contribute to the fertility of the soil by adding organic matter and nutrients.

Chickens, rabbits and horses, have higher nutrient levels than cow or steer manure so if you have access to it, use it. Just make sure you age it first, never use fresh manure, its not healthy for the plants (too salty) and could be harmful to humans if they contain any pathogens. Manure bought commercially will specify, "aged or composted." Aging raises the heat level and kill any pathogens. Depending on the animal and the method it can take anywhere from a few weeks to a few months.

2) Guano is the excrement of seabirds and bats. It's a very effective fertilizer due to its high levels of phosphorus and nitrogen and its lack of odor. It also has a higher nitrogen level than manure.

3) Fish Emulsion is produced as a byproduct of the fish oil and fishmeal industry. In addition to having a typical N-P-K analysis of 5-2-2, fish emulsion also adds micronutrients. Native Americans used to plant fish heads with their corn seeds for this reason.

4) Compost is the one of the best organic fertilizers there is and you can make it in your own backyard. It is a mixture of decaying organic plant matter, and is used to improve soil structure and provide nutrients.

5) Worm Castings is the end product of the breakdown of organic matter by worms, usually red wigglers. Like compost, worm castings can be easily produced by the backyard gardener.

6) Green Manure or Cover Crops - Green manure is grown primarily to add nutrients and organic matter to the soil. Typically, a green manure crop is grown for a specific period, and then plowed under before reaching full maturity and incorporated into the soil.

For the home gardener, cover crops would make sense if you were looking to amend a very large area.

I once had the pleasure of managing a kitchen garden for a restaurant. It was in a vacant lot behind the restaurant. Initially we were only using 20% of the entire lot

because the soil was so bad. When the restaurant was being built the empty lot was used to bring all the materials in and out and the soil was compacted beyond use. I couldn't get a garden fork into it more than an inch deep.

So what we did was to plant cover crops. We rented a rototiller to break up the soil as best we could and then purchased cover crop seeds from Peaceful Valley Farm Supply. The seeds included a combination of oats, vetch, peas and beans. The oats and vetch supply mass (organic matter), while peas and beans provide nitrogen to the soil. In Southern California we plant these in September and allow them to grow throughout the winter. The amount of green mass you get is amazing; it is like looking out onto a green ocean about 3-4 ft tall and extremely dense. Then in late February before it goes to seed, we mowed it down, left it to whither and brown in place then rototilled it again in early April approximately two-three weeks before planting. We did that for two straight winters. By the following spring we were planting the entire lot. It is that effective.

Soil Test – The best way to discern the health of your soil is through a soil test. There are certain signs of deficiencies like yellowing leaves which could mean a lack of nitrogen, but it can also mean a magnesium deficiency, or in the case of melon, verticillium wilt. To be sure its best to do a professional soil test at the outset.

Amending with organic compost and/or aged manure at the start of each season will take care of most of our fertilizing needs. However there will be certain cases when extra fertilizing will be necessary. In most cases it will be plant specific.

For example, beans fix their own nitrogen, no need to fertilize them. And too much nitrogen on tomatoes will prolong their vegetation and can sometimes cause them to not flower at all.

Certain crops that enjoy a little extra fertilizing during the season include the brassica family, the cucurbit or melon family, and the grass family (corn).

CHAPTER 3
MAXIMUM YIELDS

For many home gardeners, growing tomatoes during the summer is the extent of their gardening. However can you imagine having pasta pesto in September, pumpkin soup in October, fresh peas and carrots for the holidays and mixed green salads all year round?

Here in Southern California we are blessed with year-round sunshine and days of frost you can count on one hand. If you know what you're doing and have the available space there is no reason why you can't be picking something every day. The trick is knowing what to plant, when to plant it, and, maximizing your garden space.

If you live in a cold winter environment do not be disheartened. Using these same methods in a greenhouse or hoop house can increase your yields tremendously.

First, how much space are we talking? The answer to that is how ambitious do you want to be? If you only want to pick some herbs like mint, rosemary, chives, and thyme (all perennials) a few clay pots on your patio or balcony will be fine. However if you are interested in feeding your family obviously you will need a lot more space. 10 raised garden beds each measuring 4ft x 8ft laid out one next to another with 2ft pathways in-between will cover an area of 464 sq. ft. If you own your own home this is doable. With 10 beds we can lay out 3-4 rows in each bed depending on what we're growing. We then can conceivably plant a couple rows of lettuce every month and be picking salad all year. This is known as **stagger planting**. It's one method we use to maximize yield. Instead of planting all our seeds at once we stagger the planting over a pre-determined length of time. There are many vegetables that can be stagger-planted besides lettuce, including: arugula, basil, carrots, cilantro, spinach, radishes, bush beans, and tomatoes.

However we want to maximize our garden space and use it to grow as many vegetables as possible. How do we do that?

First, good planning. Make a simple sketch of your garden and figure out what is going where and how much space you will need for each row depending on the amounts you want to grow. Seed packets will have that information as well as information on what they call days to maturity. This is how long a plant takes to grow from transplant to harvest. It's a good idea to get a sense of how long something takes to grow so you can plan on what to put in next once it matures.

Ideally you want something growing all the time. When one crop is finished, another takes its place. This is called **successive planting**. In one bed we plant cabbage in the fall and then beans in the spring. In another we follow broccoli in the fall with zucchini in the spring, or peas in the fall followed by tomatoes in the spring. Successive planting relies upon good planning.

Also a little tip about garden planning: rows should be laid out perpendicular to the arc of the sun, so the sun gets both sides equally. Also, taller plants should be positioned at the northern end to avoid shading other plants.

Another gardening method we use to maximize space is called **intercropping.** Intercropping is the growing of two or more crops together. This involves planting fast and slow growing vegetables together in the same row or between rows. For example Broccoli and Cabbage both need about 18-24" of space when mature. They also need anywhere from 75-110 days to mature depending on the variety. However when first planted there's a lot of empty space between plants and between rows that could be used to grow fast maturing crops like arugula, radishes, or lettuce. When these plants mature in 30-60 days we harvest them and soon the cabbage and/or broccoli will grow and fill in that space.

Tomatoes need about 24" of space. Between rows of tomatoes we can plant basil, which happens to be a good companion plant in the garden and on the table.

Intercropping is also sometimes referred to as **interplanting**. Some gardeners believe that certain plants when grown together perform better. This is known as companion planting. A classic example of this is a Native American method of planting known as the Three Sisters. Beans, Corn and Winter Squash are all grown together within the same space. The corn is used as support for the beans, which in turn supplies nitrogen to the corn and squash. The squash vines cover the ground preventing weeds from growing and preserves moisture in the ground.

Trellises - Another method to maximize garden space is Trellises. Any structure that supports a plant growing vertically is a trellis. Tomato cages act as a trellis. Beanpoles are a trellis.

Whenever you can, grow vertically- it takes up less space to grow up than out. Beans, peas, cucumbers, chayote, melons, squash, and tomatoes can all be grown using trellises. Trellises can be as simple as a wooden pole or as complex as a sculpture of tied branches. The idea here is to be creative.

Recycled items make good trellises. I found an old red door once that someone was abandoning and hung string from the top and grew beans up the string. The green vines against the red door made for a very dramatic effect. An old ladder is also a great trellis.

Note: When using these intensive vegetable gardening techniques we need to take extra care of our soil. Every season we need to add amendments to the soil in the form of organic compost or aged steer manure. There's an old saying – Feed the soil not the plants. However for some vegetable varieties (i.e. broccoli, cabbage, melons, onions, peppers, spinach) additional fertilizing with an organic additive like fish emulsion, compost tea or worm tea is advisable.

CHAPTER 4
WHAT TO GROW AND WHEN TO GROW IT

In Southern California, like other mild-winter environments, we have two main growing season, the fall/winter and the spring/summer. Fall/winter begins around September/October and Spring/Summer begins around March/April. In the fall we plant cool weather crops, in the spring we plant warm weather crops. In both seasons we can start weeks earlier by starting our seeds indoors.

For the rest of the country cool-season crops are usually planted in early spring as soon as the ground thaws and the risk of frost has passed or in late summer. Those gardening in these areas would also do well to start plants indoors to get a jump on the season.

Cool season veggies do best when temperatures are 55-75 and will usually tolerate light frost when mature. Warm season veggies require long hot days and warm soil to mature. The difference between a long summer day and a short winter day is an extra 40% of light. That extra light through photosynthesis gives the plant the energy to do it. They grow best at temperatures from 65-95 and are very intolerant of frost.

It is very important to plant your vegetables during the right season. Plants that are grown out of season become stressed quickly which invites pests and diseases.

You can prolong long standing annuals into the next season but figure, on average, most plants will be harvested within 6-months. With certain quick-growing vegetables like beans, radishes, arugula and lettuce you can get multi-crops within one season.

Vegetable Families

The majority of edible plants in a backyard garden are members from one of ten Vegetable Families. Families are the way vegetables are classified in the plant world. Each family is unique in the way that they flower and fruit (carry their seed).

It is good practice to plant all varieties of one family together in one bed. The reason is two-fold:

1. What's good for the goose is good for the gander, or in other words, what's good for the broccoli is also good for the cabbage. Plants varieties of one family usually share the same sun requirements, water requirements, and nutrient requirements.

2. Planting your family varieties together facilitates crop rotation. We rotate crops in order to not plant the same plant in the same place year after year. The reason is so soil born insects and pathogens do not congregate and cause harm to the plant. By rotating the plants you are effectively taking away the pests' food source.

The list below contains the names of the ten families along with the more popular varieties. Cool Weather Families are listed first, the remainder are Warm Weather Families. (Italics) are contrary to the rule, which means they are grown in the alternate season.

Cool Weather Families

Botanical Name: ***Alliaceae***
Common Name: Allium or Onion family
Edible Members: chives, onions, scallions, shallots, garlic, leeks

Botanical Name: ***Amaranthaceae***
Common Name: Amaranth or Beet family
Edible Members: amaranth, beet, chard, epazote, spinach, quinoa

Botanical Name*:* ***Apiaceae***
Common Name: Carrot or Dill family
Edible Members: angelica, anise, caraway, carrot, celery, celeriac, chervil, cilantro, cumin, dill, fennel, lovage, parsley, parsnip

Botanical Name: ***Asteraceae***
Common Name: Aster family
Edible Members: artichokes, cardoons, chicory, dandelions, endive, escarole, lettuce, radicchio, (sunflowers), (Jerusalem artichokes)

Botanical Name: ***Brassicaceae***
Common Name: Brassica or Mustard family
Edible Members: arugula, bok choy, broccoli, Brussels sprouts, cabbage, cauliflower, collard, kale, kohlrabi, mustard, radish, rapini, rutabaga, tat soi, turnip

Botanical Name: ***Fabaceae***
Common Name: Legume family
Edible Members: (beans), peas, (peanuts), fava beans, (soybeans), lentils

Botanical Name: ***Lamiaceae***
Common Name: Mint family
Edible Members: (basil) mint, rosemary, sage, marjoram, oregano, (shiso), thyme

Warm Weather Families

Botanical Name: ***Cucurbitaceae***
Common Name: Squash family
Edible Members: cucumber, chayote, melon, pumpkin, squash, watermelon

Botanical Name: ***Poaceae***
Common Name: Grass family
Edible Members: barley, bamboo, corn, rice, rye, sugarcane, wheat

Botanical Name: ***Solanaceae***
Common Name: Nightshade family
Edible Members: eggplant, (potato), tomato, pepper

The following are some general characteristics of each family. In Chapter 12 we'll discuss each vegetable variety individually.

Allium family - Alliums take a long time to mature. Onions can take 4-6 months; Garlic can take up to 9 months. Chives are fairly quick and great for containers. Garlic is planted from cloves not seeds, pointy side up. Shallots, onions, leeks and chives can be grown from seed. Seeds do no remain viable as long as other families. The Allium family also contains many ornamental plants that may be toxic to humans. Always use caution when in doubt.

Beet family – Beets and Swiss chard have long taproots and are good for breaking up clay soil. Beets and chard do not like to be transplanted and are best sowed directly in the ground.

Dill family – Seeds of this family can take up to three weeks to germinate. For all you cooks out there, between the onions and garlic of the Allium family and the aromatics of the Dill family, you're half way through French, Italian and other

gourmet cuisines. Most sauces start with a mirepoix (or some derivative thereof), which is a combination of celery, onions and carrot. This family is also known for its flowers attracting beneficial insects, in particular, wasps. A carrot flower looks similar to Queens Anne Lace, also a member of this family.

Aster family - Chicory, endive, escarole and radicchio are all a little on the bitter side, but excellent when mixed with other lettuces. Lettuce is one of the easiest vegetables to grow, just needs water. It will bolt in hot summer months so if growing then a little late afternoon shade or misting would be helpful.

Bolting means the plants sends up a central stalk in order to flower and seed. Once a lettuce bolts its over. It becomes very bitter at that point.

Brassica family - The Brassica family is the largest family of edibles. On the whole they are very tolerant of cool weather. Kale and Brussels sprouts in particular can take a little frost. Kale is one of the most nutritious vegetables you can eat. They contain a lot of phytonutrients. Phytonutrients are certain organic components of plants that are thought to promote human health. Unlike traditional nutrients (protein, fat, vitamins, minerals), phytonutrients are not "essential" for life, so some people prefer the term "phytochemical." Either way there's a lot of literature being written about it.

Melon family - Up till this point we're eating not only cool-weather crops but also mostly vegetation (leaves). Yes carrots and radishes are roots, broccoli and artichokes are immature flowers but mostly we are eating vegetation.

However now with the warmer weather and more importantly the longer periods of daylight we now are eating fruits. It takes a lot of plant energy to make flowers and fruits.

In the summer months when the sun rises at 6:00AM and sets at 8:00PM we have 14 hours of sunlight. Compare that with December when the sun rises at 7:00AM and sets at 5:00PM. That's only 10 hours of sunlight. Those extra 4 hours of sunlight (40%) is what enables the plant, through photosynthesis, to provide the energy to create fruits.

Botanically speaking, cucumbers, melons, pumpkins, etc are fruits. They are derived from a flowering plant and are the means by which these plants disseminate their seeds. Most edible fruits were evolved by the plants in order to exploit animals (and man to a certain extent) as a means for seed dispersal. Animals eat the fruit and pass the seeds along into their stool.

Melons, Pumpkins, Winter Squash and Watermelons all take up a lot of room. They grow on vines that can easily reach 8-10ft in length. Chayote vines can reach 25 ft. Think of all those leaves as mini solar panels collecting sunlight for photosynthesis.

Legume family - Bean and pea plants fix nitrogen in the soil through their root system. When planning your garden it's a good idea to follow a legume with a big nitrogen feeder like corn or broccoli or any in the melon/pumpkin family to take advantage of the excess nitrogen in the soil.

Mint family -This is our herb family. All are perennials but basil, all can take cool weather well except for basil (there's always one in every family). Because they are all perennials you may want to group them altogether and reserve one section just for herbs. That's also part of planning.

Mint and oregano reproduces by sending out runners. If not kept in check it can become invasive like a weed. Many like to grow it in a container for that reason.

Grass family - Corn is one of the most popular vegetables for the home gardener. Though corn requires plenty of space in the vegetable garden, it is hard to beat its taste and tenderness, especially when freshly picked. Corn can grow to a height of 7-8 ft. and should be planted at the northern end of your garden so as not to shade the other plants.

Nightshade family - Edible members of the nightshade family include: eggplants, potatoes, and peppers. The spice, paprika, is made from dried red peppers. Tobacco is also a member of the nightshade family; in fact the edible members all contain trace amounts of nicotine.

Leaves and stems from the nightshade family should not be eaten and care should be taken that pets do not eat them as well. The nightshade family is notorious for its poisonous plants including belladonna and jimson weed.

Misc. – Other vegetable families we need to be aware of are:

1. Asparagaceae, edible member, Asparagus and
2. Convolvulaceae aka the Morning Glory Family, edible member, Sweet Potato.

Make a Drawing

Now that you know what to plant and where to plant it the next step would be to make a drawing. Planting haphazardly certainly has its merits, however if you want to maximize your growing environment, careful planning is necessary. A good drawing does not have to be elaborate. It can be very simple with lines for rows and X's and O's representing your vegetables. Not only do you want to lay out what is

being planted this season, you also want to think about what is going to be planted the following season. This way there's always something being grown and always something being harvested.

Keep a Journal - You will be amazed the wealth of information gleaned from keeping good records. Info worth recording includes the following:

1. Variety of plant selected – Especially important if you're saving seeds or perhaps it was so good you want to buy the same seeds again the following year. It would be a pity if you didn't remember what you planted.
2. Date of germination – how long does germination take from the planting of the seed to the second set of leaves. This will help determine the dates for transplanting if starting from seed indoors.
3. How long from seed to maturity – Maturity is the harvest date. Is one variety quicker than another? Also good to know how long from seed to seed, from the date of germination to the date that seeds are saved. This will help plan the succession of one crop after another.
4. First day of harvest and last day of harvest – How long is the fruiting season? Is one variety longer than another?
5. Size of yield – Does one variety yield more than another? Is what you're growing substantial or should you try something else?
6. Taste factor – Is this the best variety you've ever tasted or should you try something different?
7. Any interesting characteristics – Is this variety pest and disease tolerant? Is it particularly cold or heat sensitive, or cold or heat tolerant?

CHAPTER 5
COMPOST AND VERMICOMPOST

Composting is the decomposition of organic matter into a humus-like substance. Humus refers to any organic matter that has reached a point of stability, where it will break down no further. It occurs naturally, but can be accelerated and improved by controlling environmental factors. The length of the composting process depends on aeration, moisture, temperature, carbon-to-nitrogen ratio, surface area, and pile size.

Before describing each separately let me give you a glimpse inside an active compost pile. First, when organic matter is added, microorganisms such as bacteria and fungi begin to consume the matter. A byproduct of their consumption is heat; the more they consume, the more heat is generated. Note that this heat is highest in the center of the pile.

Second wave is the macro organisms (centipedes, mites, millipedes, sow bugs, earthworms, etc). They show up when much of the carbon material has been consumed and the temperatures drop. Their job is to breakdown the organic matter further into smaller pieces. Bugs in your compost is not a bad thing, in fact it is desirable, better there than in your garden.

Once the breakdown is complete the compost can then be transferred into your garden beds.

The following are the environmental factors controlling how quickly a compost pile will break down organic matter:

1. Aeration is the introduction of oxygen into the compost pile. Regular turning of the pile will increase air movement and is essential for making the decomposition process as efficient as possible. Bacteria need oxygen to survive. In general, a pile should be turned about once a week.

2. Moisture is as necessary as oxygen for the microorganisms that break down the organic matter. The ideal moisture level is that of a wrung out sponge, moist, but not wet.

3. Ideal temperature for rapid decomposition is 90-140 degrees. Anything lower will not kill disease–causing organisms or weed seeds. To raise temperature add some nitrogen-rich, aged, steer manure to the center of your pile.

4. Microorganisms need both carbon and nitrogen to break down the organic matter. Organic matter containing carbon tends to be brown and dry, such as twigs, branches, dry leaves, dried plants, newspaper, straw, sawdust, and wood chips. Organic matter high in nitrogen is usually greener and moist, such as green leaves, grass, and all of our kitchen scraps including coffee (despite the color).

The most efficient composting occurs with a carbon:nitrogen ratio (also known as brown:green ratio) of about 30 to 1. Fresh grass clippings have an average ratio of about 15 to 1 and dry leaves about 50 to 1. Mixing equal parts by volume approximates the ideal C:N range. In practice, as a general rule of thumb we combine 50% greens and 50% browns to get the highest quality end product.

If we add too much green our pile can be become anaerobic rather than aerobic which will cause it to smell. If we add too much brown our pile will not heat up sufficiently and it will take much, much longer to break down.

Grass clippings alone will create an anaerobic condition in your compost pile. They should be mixed well with other browns (like leaves or newspapers) or should be spread out and dried and then added to the pile.

When adding fresh kitchen scraps to your compost pile it is best to add to the center of the pile rather than lay it on top. The center is where all the heat is and where the quickest decomposition takes place. Also, if it's buried, pest animals will not find it.

5. Surface area. Ideally, contents added to the compost bin should be no larger than a couple of inches. The larger the surface area the longer it will take to break down.

6. Pile Size. Minimum size is 3ft x 3ft x 3ft, anything smaller, temperatures will not be able to get high enough to be effective. You want your pile to be manageable, which means you need room and space to turn it. When turning compost you want to bring the outside of the pile to the inside and the inside of the pile to the outside.

Compost Tips

When choosing a location for compost its best to have it near a water source so it can be doused regularly.

If you have a lot of green waste and a big urban farming operation than maintaining three bins may be useful. One pile (or bin) would be used for fresh green waste, the next for actively decomposing green waste, and the third for finished product.

If possible, start with a layer of lightweight brown material, such as leaves or shredded newspaper to help keep enough air near the bottom.

Avoid composting bread, pasta, and cooked food. The following items should also be avoided: bones, meat of any kind, fish, fats such as oil and butter, cat litter, pet (dog and cat) or human feces, weeds that have gone to seed and diseased plants.

Harvest your compost - If all goes well, in about 3 months you will have a layer of good compost at the bottom of your bin. Remove this and spread it on or dig it into your garden beds. You may wish to sift it through a coarse mesh screen first to remove any larger chunks that haven't yet broken down.

Purchase a compost bin. Composting in a pile on the ground will work but a bin will be neater and be able to heat up quicker.

Troubleshooting

1. If you have an ammonia odor, you have too much nitrogen and need to add more browns.
2. If you have a rotten odor there is poor air movement and maybe too wet, or too green, add more brown, turn pile and let it dry out.
3. If temperature is too low add more green, a little manure, and make sure your pile is not too small.

Worm Composting aka Vermicomposting is the process of using worms to convert food scraps into dark brown, nutrient rich humus. When done properly, worm composting smells fresh and has no objectionable odor.

To get started you will need a worm composting bin, bedding material, worms and worm food (food scraps).

Red worms or red wrigglers are preferred to earth worms because even though earthworms are great in a garden setting, they would not do well in the confined conditions of a worm bin. In a normal size worm bin, 1-pound of worms would be a good amount to start with.

The bedding material acts as a home for the worms and the kitchen scraps, and helps in retaining moisture and aeration. Shredded newspaper is totally acceptable however the best material is coir brick. These are made from coconut fiber and can

be purchased on the Internet for about $3.00/each. Add 1 brick to about 2 gallons of water and wait about 15 minutes for the brick to hydrate.

For worm food use the same guidelines as composting "greens", organic fruits and vegetables are great. No meats, oils, dairy and acidic food such as lemons. Foods such as garlic, onions and brassicas (broccoli, cauliflower, etc) should be used sparingly as they can become odorous. A crushed eggshell every other week is good for worm digestion, cleans out their insides.

When your bedding material turns completely dark brown about 8 weeks, its time to change the bedding material and harvest the worm castings. We do that by simply putting the worm food down at one end where all the worms will gather and then removing the other end.

Use worm casting as you would compost. It is going to be stronger than compost so for potting soil limit it to 25%. For planting in the garden, mix with your existing soil up to 50%.

Worm Tea

Worm tea is not the liquid that collects at the bottom of your bin that is called leachate. Leachate is the moisture from the vegetable scraps and worms. Some will dilute it approximately 1:10 and use it on ornamental plants however I do not recommend using leachate in your vegetable garden. Leachate could contain pathogens due to its anaerobic condition.

Worm tea is an organic fertilizer made from the blending of worm castings with oxygenated water. The water is oxygenated to increase the original number of microbes present in the worm castings.

Combine approximately 3 cups of worm castings into 2 gallons of water. Oxygenate with an aerator for 24 hours.

Use worm tea immediately as the microbes will die off in a few hours.

CHAPTER 6
MULCH

Mulch is a protective layer that covers the ground. Mulches can either be organic such as grass clippings, straw, dried leaves, bark chips, compost, and chipped wood, or inorganic, such as stones, bricks, and plastic. Inorganic mulches may be used on pathways and garden borders. Only organic mulches should be used in garden beds.

Both organic and inorganic mulches have numerous benefits:

- Prevents weed growth
- Protects the soil from erosion
- Reduces compaction due to heavy rainfall
- Conserves moisture by decreasing evaporation, reducing the need for watering
- Maintains a more even soil temperature
- Keeps fruits and vegetables off the ground away from insects
- Provides a "finished" look to the garden

Organic mulches can also improve the condition of the soil. One common method is to lay down a layer of newspaper or cardboard thick and cover with a mixture of compost, straw, dried leaves, and chipped wood. As these mulches slowly decompose, they provide organic matter which helps keep the soil loose. This improves root growth, increases the infiltration of water, and also improves the water-holding capacity of the soil. Organic matter is also a source of plant nutrients and provides an ideal environment for earthworms and other beneficial soil organisms. This method is often used between rows to deter weeds from growing and add nutrients throughout the growing season.

While inorganic mulches have their place in certain landscapes, they lack the soil improving properties of organic mulches. Inorganic mulches, because of their

permanence, may be difficult to remove if you decide to change your garden plans at a later date.

Things to remember when mulching:

1. You need to use at least 2 inches to be effective and replenish it when it gets thin.
2. Leave room around trees and stems to ensure good air circulation.
3. Water the area to be mulched first before applying mulch.
4. If you are using mulches in your vegetable garden or flower garden, it is best to apply them after the soil has warmed up in the spring.

CHAPTER 7
INTEGRATED PEST MANAGEMENT (IPM)

IPM is a broad approach to controlling insects and pests and relies on various techniques. Before we get to them it is important to note:

1. Frequent monitoring of your plants is one of the basic components of IPM. This includes checking the underside of the leaf.
2. Don't let a little problem become a big problem. A few aphids on the tip of your fava beans are not going to much damage, however if left unchecked they will take over and render the plant useless.
3. Not all bugs are bad. Only a few insects in the garden are harmful and familiarizing yourself with them will enable you to have a better idea about how to control them and how to differentiate them from the "good" bugs.

IPM uses 5 basic methods, they are:

Plant Selection – We already mentioned growing warm and cool weather crops in the correct season, when growing something out of season the plant can become stressed and will not be as healthy as when grown at the proper time. A healthy plant is better able to withstand pests than one that is stressed by improper fertilization, irrigation or sunlight.

Planting of Specialized Crops - Some plant varieties are more susceptible to pests and disease than others. However one can plant specialized varieties that are resistant to certain diseases. For example tomatoes labeled with a VFN designation are better able to resist the diseases caused by Verticillium, Fusarium (both fungi) and Nematodes (microscopic worms that feed on plant roots). Check the seed catalogs for disease resistant varieties.

Another method to control plants in the planting stage is crop rotation. Planting the same crop in the same place year after year can lead to build-up of soil–borne pests.

It is best to plant another type of crop (from a different family) for at least one season before going back to the original crop.

Physical Barriers - A good example of physical barrier is a fence. If deer or rabbits are a problem in your garden the area will need to be fenced and bury the fence about one foot deep. If gophers are a problem you will need to place chicken wire below your raised beds.

Another example of a physical barrier is laying cheesecloth or commercially available floating row covers over your vegetables to keep insects off. Since the fabric is so light it is usually ok to lay the row cover directly on the plants or you can raise them slightly by using wood or PVC pipe. PVC pipe and chicken wire can be used to make cages to place over your beds to keep rodents and other small animals away.

Bird netting is another physical barrier especially for fruit trees.

Traps - Insect traps use pheromones, visual lures or food to attract pests and capture them. Pheromones are the substances female insects use to sexually attract males to them. Visual lures use colors and shapes to attract pests. A yellow sticky card that keeps whiteflies off your tomatoes is an example of a trap. Aphids and white flies as well as other small flying insects are attracted to the yellow color and are then entrapped in the glue. They are not effective in a very large area but for the home garden, very effective.

Laying a board down in your pathways to attract snails and slugs is also a trap. Raise one end slightly to give them room, then turn the board in the morning and you will see them all congregating. To kill them you can place them in soapy water or put them in a bag, squish them, then bury them, they're good for the soil.

Biological Controls - relies on the use of living organisms called natural enemies or "beneficials" to eat or kill the pest, or in other words getting someone else to do the dirty work.

Three well-known beneficials are ladybugs, wasps, and green lacewings. These are for sale at most nurseries and on the Internet at places like http://www.arbico-organics.com/ or https://gardeningzone.com/

Ladybugs love to eat aphids and are best released at night. Do not introduce ladybugs unless there is a food source (aphids) for them already available, if not they will fly away.

Beneficial insects such as wasps are attracted to flowers of the Umbelliferae family. These include: carrots, cilantro, and fennel. Allow one or two plants go to seed and wasps will be attracted to them.

Another biological control worth considering is attracting birds to your garden. Sunflowers and bird feeders will attract birds that will feast on many insect pests. Bluebirds in particular love grasshoppers and moths.

Organic Pesticides – Pesticides are used as a last resort. If you must use a pesticide, choose the least toxic yet most effective product that targets the pest but does not also kill natural enemies or is harmful to pets and other animals. Insecticidal soaps usually fit this bill.

Insecticidal soap main ingredients are sodium or potassium salts combined with fatty acids. They are diluted with water and used as a spray. It is one of the safest pesticides available, non-toxic to animals, no residue and can be used safely on vegetables up to harvest.

Insecticidal soap must come in direct contact with the insect. It is no longer effective once it has dried. It works by penetrating the insect's outer covering and causing the cells to collapse.

It is recommended that spraying not take place in full sun or high temperatures to minimize damage to leaves.

Insecticidal soap can be made at home by combining 1 tablespoon liquid soap in 1 quart of water. Do not use detergent. A product like Dr Bronner's liquid soap is very good for this purpose.

Insecticidal soaps work best on soft-bodied insects such as aphids, earwigs, leafhoppers, mealy bugs, mites, thrips, and whiteflies. They are not effective on caterpillars and worms. For these pests we use Bacillus thuringiensis (BT).

BT is a microorganism that occurs naturally. It is very effective with worms and caterpillars that congregate on the underside of leaves. It is especially effective on plants of the Brassica family, which cabbageworms love to munch on.

BT is diluted with water and sprayed onto the underside of leaves. When a caterpillar eats the leaves the BT attacks their innards and they expire from the inside out.

To some BT is a skin irritant so you may want to wear gloves when using it. If you cannot find BT at your garden center look for a product like "worm-away" and you will notice that the active ingredient is BT.

To learn more about pesticides see National Pesticide Information Center

Common Garden Insect Problems and their Solution

1. Snails and Slugs

Snail and slugs are notorious for attacking seedlings. If your seedlings are alive and well one day and then cut off at the base overnight, you can be pretty sure it's a snail or a slug.

They come out at night and leave a small slimy trail behind them. They do not hide in the plant they are attacking but someplace close by. They don't like daylight so look for hiding places between walls and plants, or under side of rocks, or anywhere shady.

The following are solutions for snails and slugs:

a. Eggshells. Place a ring of eggshells around the stem of your plant. Snails and slugs will not cross.

b. Beer Traps. Bury a saucer in your bed so the lip is even with the soil line and fill with beer. Snails and slugs are attracted to the fermented yeast. They will fall in and drown. Make sure the beer is not diluted by overhead watering.

c. Diatomaceous earth (DE). DE is a powdery substance made from the fossilized remains of hard-shelled algae. Under a microscope it looks like shards of glass. When a snail or slug crosses over it, the DE cuts their undersides causing dehydration.

d. Hand picking. Go out at night with a flashlight or ask a neighborhood kid to do it. Pay him 5 snails for a dollar, very effective.

Do not eat them. If they ingested something poisonous it can affect you adversely.

2. Aphids

Aphids are small green, red or black insects that tend to congregate together in groups on the tips of plants or flowers. A few aphids can be tolerated. Knock off aphids with a sharp jet of water frequently until populations are tolerable. Hand squishing works for the unsqueamish. Aphids are easily controlled by beneficial insects like Ladybugs that eat them. Use non-toxic insecticidal oils and soap sprays as a last resort.

3. Whitefly

Whiteflies secrete honeydew like aphids, attract ants and can be found on the underside of leaves. They suck out the sap from leaves and stems and cause leaves to turn yellow. Knock off whiteflies and their eggs with a sharp jet of water frequently to discourage them. Plant a diversity of plant materials to attract the beneficial wasps and insects that will prey on these pests.

Plants in the Umbelliferae family (fennel, carrots, parsley) attract these whitefly predators. Plant them in the fall and let a few of them flower. Bees and wasps love them. Yellow traps are effective against whiteflies. Hibiscus, citrus and begonias are some of the whitefly's favorite host plants.

4. Thrips

Thrips like lettuce, cabbage and spinach. Use plant materials that are not susceptible to thrips. Discourage thrips by spraying the undersides of leaves with a sharp jet of water frequently. Drought and weeds increase thrips populations. They like dry conditions. Make sure your plants are well watered. Best managed by row covers, insecticidal soaps and green lacewings, which are a natural enemy.

5. Caterpillars (also Cabbage Worms and Hornworms)

Identify caterpillar eggs and remove them. Eggs are often found underneath leaves and on plant buds. Hand pick caterpillars. Plant a diversity of plant materials to attract the beneficial wasps and insects that will prey on these pests. For high populations, target caterpillars using Bt (Bacillus thuringiensis), a non-toxic microbial product. Use row cover fabric when practical.

6. Nematodes

Microscopic worms that damage root systems. Symptoms include: stunting plants, mid-day wilting, leaf drop, curling or twisting of stems and leaves. Solarization uses heat from the sun to kill nematodes and other pests. Soil should be moist, not wet. Cover with clear plastic and bury the edges. Leave the plastic on 4-6 weeks. Also plant marigolds around the garden. They deter nematodes.

Diseases: Bacterium, Fungi, and Viruses

When a plant becomes diseased it is one of three reasons: a bacterium, a fungus, or a virus. They are all microorganisms aka microbes.

Bacteria are single-celled microorganisms and among the first life forms to appear on Earth, more than 3 billion years ago. Fungi can be single celled organisms like in

yeast or multi-cellular like in mushrooms. Virus has no cells. It is made up solely of DNA and a protein layer for protection.

Not all are killers. There is good bacteria and bad bacteria, there is good fungi and bad fungi. Viruses are always bad.

When one of them causes a disease it is then classified as a pathogen. In all living things anything that causes a disease is a pathogen. Plant pathology is the scientific study of diseases in plants.

On plants (and humans) the visible effects of pathogens are called symptoms. On plants these will include: change of color, change of shape, stunted growth, limp stems and leaves, and fruit is mottled or deformed. Yields on diseased plants will also be noticeably less. There will be a discernible change in looks as opposed to leaves that are eaten by insects or animals which will look different

One of the tenants of plant pathology is the **disease triangle**. In the disease triangle, three factors must interact simultaneously for a disease to fester: a vulnerable host plant (in any organism where the microbe resides is the host), a pathogen, and a favorable environment. All three are necessary for the development of a plant disease; therefore a disease can be affected by altering any of the three factors.

For example, the host plant can be changed by growing disease-resistant varieties. The pathogen can be removed by tilling residue, rotating crops so that pathogens do not survive year to year on the same crop, controlling insects that carry pathogens to plants, or using fungicides to kill the pathogen. Finally, the environment can be managed so that it is less favorable for disease, such as by changing row spacing (or thinning) to allow for more air flow, or draining low areas, watering only in the morning.

Bacteria (Bacterium is singular, bacteria is plural)

Bacteria are single-celled microorganisms and among the first life forms to appear on Earth, about 3 1/2 billion years ago. Plant pathogenic bacteria cause much fewer problems for plants than fungi or viruses.

Bacteria are actually more familiar to us as the cause of human diseases such as tuberculosis, pneumonia, tetanus, typhoid fever, syphilis, cholera, and food borne illness such as listeria.

According to the CDC Listeria is really hard on adults with weakened immune systems. Its similar with plants. A strong plant can withstand pests and disease better than an unhealthy plant. An unhappy plant is usually caused by stress. Stress

occurs when the plant does not get the proper water, nutrition, and sunlight . Sometimes its genetic but not often.

Most bacteria are harmless and many are even beneficial, such as the nitrogen-fixing bacteria present in the roots of the legume family and the bacteria that breaks down organic matter in the compost pile and the bacteria that resides in our guts that help us break down our food into nutrients that we can absorb.

Bacillus Thuringiensis (BT) is a good bacterium that is used as a pesticide.

The advent of antibiotics like penicillin has greatly reduced the number of deaths due to bacterial infections. Ironically penicillin is made from mold – a member of the fungi family.

Nonetheless, bacteria can be a destructive plant pathogen. Typical symptoms of bacterial diseases include leaf spots, water soaking, and soft rot of plant tissues.

One of the worst bacteria pathogens in the Southern California area, and others, is the Citrus Greening Disease known as HounglongBing (HLB). It is better known by the vector that carries it - the Asian citrus psyllid. Once a tree is infected with HLB, there is no cure and the tree will die. The best way to prevent the disease from killing citrus trees is to stop the Asian citrus psyllid, which is the vector that carries the diseases. Biocontrol for ACP is parasitic wasps. Insecticides are also used (foliar pyrethroid).

Fungi – Fungal and fungal-like organisms (FLO) Diseases – Fungal spores

Of bacteria, fungi and viruses, fungi (and fungal-like organisms) cause more plant disease than bacteria or viruses.

Fungi has DNA and cells but their cells are made of another substance called chitin, which is why they're in their own kingdom. Not as old as bacteria, fungi is still about 1.5 billion years old.

Like bacteria, there is good fungus and bad fungus. Good fungus includes penicillin, which is a common blue mold that grows on fruit and kills all the bad bacteria we just mentioned.

Bad fungus include one of the worst historical cases of plant disease in recorded history - the potato blight in Ireland and Scotland in the mid 19th century which was caused by an airborne fungus originally transported in the holds of ships traveling from North America to England. Scientists believe it originated in Mexico. This single organism caused the death of more than 1 million people by starvation and initiated another 2 million people to emigrate.

Fungal diseases that you may find in your own backyard include: Fusarium and Verticillium wilt, Downy mildew, and Powdery mildew.

Powdery mildew affects many backyard gardens in the summer when nighttime temperatures are warm. Telltale sign is powdery white spots on the leaves. You can try cutting off infected leaves if you catch it early. You can also spray with a fungicide. Safer Brand has a product called Garden Fungicide (active ingredient, sulphur) that inhibits the spores from growing.

To prevent fungal diseases, space your plants well enough apart to allow for good air flow around them., don't crowd them.

Viruses

Structurally all viruses are the same. Whereas Bacteria and Fungi contains DNA and cells. Viruses contain only DNA, no cells. They replicate themselves inside the living cells of other organisms.

Viruses can infect all other types of life forms including animals, plants, humans, and microorganisms such as bacteria. Imagine a bacterium getting the flu.

Human viruses include: influenza, hepatitis, HIV, and Covid-19

Viruses "hack' a new host cell in order to make proteins for itself rather than the proteins the cells usually make. This is true for both plant s and human.

Plant viruses are harmless to humans and other animals because they can only reproduce in living plant cells.

First plant virus recorded was tobacco mosaic virus in 1892.

Typical viral symptoms include mosaic patterns on leaves, leaves with irregular color patterns, strange circular patterns on the skin of fruits, stunting, seed discoloration, and reduced yield. Leaves may cup or twist, and develop mottling, streaking, or ring-shaped spots. Identification is often the elimination of all other possible causes.

Purchase certified plants to avoid problems. Control insects that spread viruses. Remove and burn all plants with viral disease to prevent the disease from spreading.

Some things you need to know about viruses:

1. Outside a plant, viruses can do nothing. They have no effect on the health of people or animals. You probably all have eaten virus-infected fruits or vegetables and never knew it.

2. Viruses have no means of self-propulsion; they cannot move or enter plant cells on their own. They usually catch a ride into a plant cell by an insect, for example, with an aphid or a thrip because of the way they pierce the other parts of the skin to suck out the sap. The tiniest wound can be receptive to a virus.
3. After handling a virus-infected plant, you probably have it on your fingers some virus-laden sap, which you can spread to healthy plants. Wash your hands and throw away the affected plants. Get rid of them quickly before they spread. Don't compost. They go directly to the trash.
4. Some viruses, such as tobacco mosaic virus (TMV), are extremely resilient. TMV can withstand the curing of tobacco and its processing into cigarettes. Smokers could pass it on just by touching a plant . Smokers should always wash their hands thoroughly before handling plants.
5. Any part of a virus-infected plant may be infected including the leaves, tubers, fruits, or even the seeds within the fruits, so seeds must not be saved from infected plants or the virus can be passed on.
6. Weeds can carry many common viruses, which is another good reason to weed regularly or to mulch.

CHAPTER 8
HOME ORCHARD

A backyard home orchard is a great addition to a backyard vegetable garden.

Within fruit trees we have two basic families:

Stone fruits are in the Rosaceae family and belong to the genus Prunus. They include peaches, plums, apricots, and cherries, almonds are also in this family. Apples are also in the Rosaceae family and belong to the genus Malus. Pears are also in the Rose family and belong to the genus Pyrus. Nectarines are a sub-genus of peaches.

Citrus plants are in the Rutacaeae family and belong to the genus citrus. They include orange, lemons, limes, kumquats, mandarins, and grapefruits. Tangerines are a variety of mandarin.

Two most popular orange trees are Valencia and Navel. Valencia is a juice orange and has a long harvest season. Navel is an eating orange and has a shorter growing season.

Lemons also come in two main varieties: Eureka is the sour kind you find in most supermarkets. Meyer lemons are a cross between an orange and a lemon and produce a sweeter fruit.

Other fruit trees to consider include: avocado, fig, papaya, pomegranate and banana.

Basic Guidelines

1. Grow what you eat; what you like, you're going to have a lot of it. Just because kumquats are on sale doesn't mean you have to buy them.
2. Keep the tree size short and manageable. It will make it easier to prune and harvest.

3. Stagger your varieties. Do not buy fruit trees that will produce all at the same time. You can get apples in September, plums in July and oranges in January. Fruits are described as early, mid and late. You can get both early season peaches and late season peaches to ensure a longer harvest season.

Location - Location for a fruit tree is similar to our vegetable gardens: southern exposure, full sun or at least 6-8 hours, good drainage.

Spacing will depend on the layout of yard, but generally allow 6-8 feet square. However you can plant more than one tree in each square. One method is to plant up to four trees 12-18 inches apart. With this method you can plant one peach, one apricot, one nectarine and one plum all in the same area. Or you can plant four apples trees that all fruit at a different time. (Note: when using this method all fruit trees should be from the same family and similar rootstock, either regular or dwarf because if you mix them the regular will grow larger and eventually shade the others. Dwarf and semi-dwarf are about 1/3 the size of regular trees and are recommended for home orchards).

Rootstock - Rootstock is the base of the plant. All fruit trees are started from grafts not seeds. The part that is grafted is called a scion. Rootstock is chosen for soil types, pest resistance, and size.

It is possible to graft different varieties onto one tree. For example one branch will be peach, another, apricot, another plum. Best to keep your families together.

Espalier - Another planting method that allows fruit trees to be trained to grow horizontally along walls or fences. It is done through selective pruning and ties. Branches should be pruned at 8-10" intervals and made to grow horizontally rather than vertically. Ties should be plastic ribbon rather than string or metal so branches are not damaged.

Buying your tree - There are two ways to purchase a fruit tree: you can buy it bare-root for the best selection or you can buy it in a container for convenience.

Freshness is important and bigger is not better. Usually they come in 5 or 15 gallon containers. Ask how long the tree has been at the nursery. You do not want one that is root bound. If you see roots protruding from the bottom, look for another one.

Bare root trees, are usually available in winter. They're less expensive than potted plants and equally as good. The only thing you have to remember is to get them in the ground immediately. You should not allow the roots to dry out.

Chill Hours - When buying your tree we need to take into consideration “chill hours.” A chill hour is considered to be those hours in late fall or early winter below 45°. We consider low chill in southern California as five hundred hours or less.

Chill hours are most important in the late fall and early winter when trees are going into dormancy. Early winter Chill Hours are more important than mid-to-late winter, when the trees are beginning to push and break dormancy.

In Southern California, our winters can be short, often times lasting less than two months. So it's very important that we choose varieties that are "low chill".

Most fruit trees self-pollinate, however certain varieties like some plums and apples do not. They need a second tree as a pollinator. Make sure all your trees are self-pollinating.

Planting your tree - Dig a hole a little bigger than the size of the pot it came in, about two inches deeper and about 6-8” wider. If your planting a bare root tree spread the roots out wide and back fill.

If your planting a potted tree plant it at the same depth it was in the container. Do not bury the trunk. The top of the rootball should be barely visible.

Irrigation. For in-ground trees water deeply once a week. For outdoor containers water deeply once or twice a week. Use the finger test to determine dryness.

Water should drain away from the trunk (Citrus trees are prone to bark and trunk diseases if kept constantly moist). When building a moat around your tree make it wide and allow it to drain away from the tree (not inward into the trunk).

Mulch - Once your plant is in the ground mulch the entire area to the canopy line. This will keep soil temperature cool in the summer and warm in the winter. It will keep weeds form growing, provide nutrients, and will cut down on irrigation by approximately 50%.

Fertilize – For in-ground trees no more than 3x a year and 2x is actually recommended: once in January, once in April, maybe again late summer-early fall. You do not want to fertilize too late in the season. In the winter the plants go dormant. It’s like drinking coffee before you go to bed, not advisable.

Young trees 1-2 years older should be given fertilizer that is high in nitrogen like 12-3-3, older trees, low nitrogen 3-12-12. The reason for this is nitrogen promotes growth and vigor, but not flowering.

Pruning - Pruning is done mainly to control growth, remove dead or diseased wood and to stimulate the formation of flowers and fruit buds.

Two kinds of cuts. A heading back cut is made along the length of the branch between nodes. A targeted cut removes an entire branch leaving a small section near the primary branch.

One of the things we look for in pruning is tree structure and airflow. We don't want our trees to get too dense. It builds up moisture, which in turn can turn to disease. When pruning your tree think of it as light management. The more sunshine the leaves get the more energy the tree can expend to make fruit.

Notes for fruit trees in containers:

- Use light-colored pot that reflects sun.
- If possible get rootstock that is made for containers
- Use loose potting soil not garden soil
- Fertilize every 6-8 weeks
- Water thoroughly till it comes out the bottom, once a week, maybe twice a week in the summer.
- Keep the canopy the same size as the width of the container.

CHAPTER 9
HARVEST

Harvesting is enjoying the fruits of your labor. Knowing when to harvest your vegetables for maximum flavor is as important as the whole process of getting there. Each vegetable has a window of opportunity. Some are longer than others. Your seed packets will give you an estimated maturity timetable however counting days to maturity cannot always be relied upon as growth depends on many factors, including precipitation, temperature, and soil fertility. The best way to determine when a vegetable is ready to harvest is from the characteristics of the plant itself. These signs can often be subtle and it takes practice to familiarize yourself with them. You can read about some below.

Two Main Rules - Pick early, pick often.

Harvest fruits and vegetables as early in the day as possible, especially if they are not to be eaten that day or will be refrigerated. As soon as the sun hits the produce, the pulp temperature begins to rise. The lower the temperature we pick it the longer the shelf life. Tomatoes, in particular, develop a mushy texture and loss of flavor when they are cooled after being harvested when warm.

Keep vegetables picked often. When a plant is not harvested and has put out enough leaves for the energy needed to create flowers and seeds a chemical reaction occurs to inhibit further blossoming. Check your plants often.

If you have kept plants well-picked, but fruiting has stopped suspect hot weather.
If fruits are not setting and dieing on the vine thats usually poor pollination.

Toward the end of the summer, pinch off the last blossoms of eggplants, peppers, melons, squashes and tomatoes. Plant energy will be directed towards fruit currently growing.

Guidelines for harvesting vegetables

Asparagus - Harvest the spears when they are at least 6 to 8 inches tall by snapping or cutting them at ground level. Up to 8 spears per plant may be harvested the second year after planting. A full harvest season will last 4 to 6 weeks during the third growing season.

Beans, snap - Start harvesting before seeds develop in the pod (about the diameter of a pencil). Beans are ready to pick if they snap easily when bent in half.

Beans, lima - Harvest when the pods first start to bulge with the enlarged seeds. Pods must still be green, not yellowish.

Beets: You can harvest and eat the green tops that you thin out of the rows. Beets are really a matter of personal preference when it comes to the right size for harvesting. They are ready any time after you see the beets shoulders protruding at the soil line.

Broccoli - Harvest the dark green, compact cluster or head (about 6 inches in diameter) while the buds are tight, before any yellow flowers appear. Smaller side shoots will develop later, providing a continuous harvest.

Brussels sprouts - Harvest the lower sprouts (small heads) when they are about 1 to 1-½ inches in diameter by twisting them off. Lower leaves along the stem may be removed to hasten maturity.

Cabbage: The cabbage head will feel solid when gently squeezed. Cabbage needs to be harvested when it reaches maturity or it will continue to grow and split open.

Carrots: Carrots can be hard to judge. The tops of the carrot will show at the soil line and you can gage when the diameter looks right for your variety. If the diameter looks good, chances are the length is fine too. But you will need to pull one to be certain. Carrots can be left in the ground once mature. A light frost is said to improve and sweeten the carrot's flavor.

Cauliflower - Exclude sunlight (blanch) when the curds are 1 to 2 inches in diameter by loosely tying together the outer leaves above the curd (head) with a string or rubber band. Harvest the curds when they are 4 to 6 inches in diameter but still compact, white, and smooth. The head should be ready 10 to 15 days after tying.

Collards - Harvest older, lower leaves when they reach a length of 8 to 12 inches. New leaves will grow as long as the central growing point remains, providing a continuous harvest. Whole plants may be harvested and cooked, if desired.

Corn, sweet – Silks begin to turn brown and dry out as the ears mature. Check a few ears for maturity by opening the top of the ear and pressing a few kernels with a thumbnail. If the liquid exuded is milky rather than clear, the ear is ready for harvest. Harvest ranges from 18 to 21 days after the silk appears.

Cucumbers – Harvest when the fruits are deep green, before any yellow color appears. The length should be 2 to 3 inches for sweet pickles, 5 to 6 inches for dill pickles, and 6 to 8 inches for slicing. Pick many times per week to encourage continuous production. Mature cucumbers left on the vine will stop production of the entire plant.

Eggplant – Harvest when the fruits are 3 to 5 inches in diameter and their color is a glossy purplish black. Different varieties will have different sizes and colors. The fruit is considered past its prime when the color starts to dull or become bronzed. Because the stem is woody, cut, do not pull, the fruit from the plant. A short stem should remain on each fruit.

Garlic: The garlic tops will fall over and begin to brown when the bulbs are ready. Dig, don't pull, and allow to dry before storing. It's best to simply brush off the dirt, rather than washing. Do not store wet bulbs.

Kale – Cut he outer, older leaves when they reach a length of 8 to 10 inches and are medium green in color. Heavy, dark green leaves are over mature and are likely to be tough and bitter. New leaves will grow, providing a continuous harvest.

Kohlrabi – Harvest when the thickened stems or bulb (the edible part) is 2 to 3 inches in diameter by cutting off the plant just below the bulb. Stems become woody if left too long before harvest.

Leeks: Harvest leeks when they are about 1 inch in diameter.

Lettuce – Harvest the older, outer leaves from leaf lettuce when they are 4 to 6 inches long. Harvest heading types when the heads are moderately firm and before seed stalks form.

Muskmelons (cantaloupe) – Harvest when the stem slips easily from the fruit with a gentle tug. Another indicator of ripeness is when the netting on skin becomes rounded and the flesh between the netting turns from a green to a tan color.

Mustard – Harvest the leaves and leaf stems when they are 6 to 8 inches long. New leaves will provide a continuous harvest until they become strong in flavor and tough in texture from temperature extremes.

Okra – Harvest young, tender pods when they are 2 to 3 inches long. Pick at least every other day during the peak growing season. Overly mature pods become woody and are too tough to eat.

Onions – Harvest when the tops fall over and begin to turn yellow. Dig the onions and allow them to dry out in the open sun for a few days to toughen the skin. Then remove the dried soil by brushing the onions lightly. Cut the stem, leaving 2 to 3 inches attached, and store in a net-type bag in a cool, dry place.

Peas – Edible, podded cultivars should be harvested when pods are well rounded but before seeds are more than one-half of their full size. Harvest regular peas when the pods are well rounded, seeds are fully developed but still fresh and bright green. Pods are past their prime when they lose their brightness and turn light or yellowish green.

Peppers – Harvest sweet peppers when the fruits are firm, crisp, and full sized. Green peppers will turn red if left on the plant. Allow hot peppers to attain their bright red color and full flavor while attached to the plant; cut and hang them to dry.

Potatoes – Harvest the tubers when the plants begin to yellow and die down. Store the tubers in a cool, high-humidity location with good ventilation, such as the basement or crawl space of the house. Avoid exposing the tubers to light. Greening, which denotes the presence of dangerous alkaloids, will occur even with small amounts of light.

Pumpkins – Harvest pumpkins and winter squash before frost and after the vines dry up, the fruit color darkens, and the skin surface resists puncture from your thumbnail. Avoid bruising or scratching the fruit while handling it. Leave a 3- to 4-inch portion of stem attached to the fruit and store in a cool, dry location with good ventilation.

Radishes – Harvest when the roots are ½ to 1 ½ inches in diameter (Chinese radishes grow much larger). The shoulders of radish roots often appear through the soil surface when they are mature. If left in the ground too long, they will become tough and woody.

Rutabagas – Harvest when the roots are about 3 inches in diameter. The roots may be left in the ground during winter and used as needed if properly mulched.

Spinach – Harvest by cutting all the leaves off at the base of the plant when they are 4 to 6 inches long. New leaves will grow, providing additional harvests.

Squash, summer – Harvest when the fruit is soft, tender, and 6 to 8 inches long (3 to 4 inches across for patty-pans types). The skin color often changes to a dark,

glossy green or yellow, depending on variety. Pick every 2 to 3 days to encourage production.

Squash, winter: Maturity can be roughly determined by pressure from the thumbnail on the fruit skin. Mature fruit will be hard and impervious to scratching. Harvest squash before the first hard frost with a sharp knife, leaving at least 1" of stem attached. Fruit picked without the stem will soon decay around the stem scar. Cure in a dry, well-ventilated area for 10 days at 75 F to 85 F.

Sweet potatoes – Harvest the roots when they are large enough for use before frost. Avoid bruising or scratching during handling. (Damaged sweetpotatoes rot easily in storage.) Ideal storage conditions are a temperature of 55°F and a relative humidity of 85%. The basement or crawl space of a house may suffice.

Swiss chard – Harvest by breaking off the developed outer leaves 1 inch above the soil. New leaves will grow, providing a continuous harvest.

Tomato: Harvest when fruits are uniformly red, but before end softens. Ripe fruit sinks in water. Vine-ripened tomatoes are sweetest, but tomatoes will ripen off the vine if picked green. Gently twist and pull from the vine. Leaving a small stem on tomato is desirable. It keeps the fungi away which can create mold.

Turnips – Harvest the roots when they are 2 to 3 inches in diameter but before heavy frosts occur in the fall. The tops may be used as greens when the leaves are 3 to 5 inches long.

Watermelons – Ripe watermelons produce a dull thud rather than a sharp, metallic sound when thumped. Other ripeness indicators are a deep yellow rather than white color where the melon touches the ground, brown tendrils on the stem near the fruit, and a rough, slightly ridged feel to the skin surface.

CHAPTER 10
POLLINATION AND FLOWERING

When we speak about the Birds and Bees we are speaking of pollination and pollinators, those that facilitate sexual reproduction in plants. It occurs during the flowering stage of the plants lifecycle.

To best understand what occurs when, let's review the life cycle of a plant.

The **First Stage** is **Germination**. A dormant seed with an embryo inside containing the DNA of the male and female parent begins to take on moisture. The hard outside protective shell is softening which then sends a signal to the embryo inside and says, Lets get growing!"

The first set of leaves that appear are embryonic which means they were present in the seed prior to germination. The second set of leaves are the true leaves, which are now performing photosynthesis. The plant is now living on its own, germination ends.

First the dormant seed with a life inside waiting to happen.

Stage Two – The Vegetative Stage

During the vegetative stage the plant is putting out a lot of green leaves. With each new leaf produced the plant can take in more and more nutrition though photosynthesis. At a certain point the plant is taking on so much energy that it "bolts." It sends up a central stalk that becomes the support for the flower or flowers. With some annuals like lettuce and radishes once a plant bolts the vegetative stage is over. Lettuce gets bitter after bolting. Radishes get woody if left in the ground too long. Some plants like tomatoes will continue to put out leaves along with new fruits.

Stage Three – Flowering

Unlike animals and humans, most plants carry both male and female reproductive organs and often within the same flower (like lettuce and tomatoes) Corn and squash plants have separate male and female flowers on the same plant.

The male portion of the flower is called the stamen and consists of one or more hair-like filaments, each of which has a pollen-producing sac at its tip called an anther. The anthers gradually ripen and split open exposing the pollen grains.

The female portion of the flower is called the pistil and consists of a stigma, a style, and an ovary which contains one or more ovules (egg cells)

The stigma is that portion of the style that is receptive to pollen. It can vary in shape and size from just a small tip of the style as in a tomato or to a single strand of corn silk, which is receptive along its entire length.

In order to remember those parts of the plant when I lecture I came up with a poem, it's called the *Honey Bee Poem*

From an anther on a stamen, to a stigma on a style
Is the pathway of a honeybee, that's been pollinating awhile.

When a fertile grain of pollen touches a receptive stigma, the pollen grain begins to form a pollen tube, which grows down through the style until it reaches and fertilizes the ovules within the ovary. The ovary eventually develops into the fruit or seedpod, while the fertilized ovules become the seeds for the next generation.

In vegetable families that have separate male and female flowers like the squash family or Almond trees, bees and pollinators are essential to facilitate the transfer of the male pollen to the female stigma.

The flowering stage of plants can also be very uncomfortable for allergy sufferers. Horticulturist, Thomas Ogren wrote two wonderful books on the subject, Allergy-Free Gardening, and Safe Sex in the Garden.

One problem that allergy sufferers have besides being allergic is that they get no help from city government. Municipalities in general plant male trees only because they down want fruits and seeds messing up their streets. When pollen is released it has nowhere to go. Certain cities and towns in Nevada and Arizona have city codes that forbid male only trees. Google pollen-free cities.

Stage Four – Fruiting

Once the ovules have been fertilized the ovary now enlarges securing the developing seeds inside. The ovary becomes the fruit.

If you have a lot of tomato flowers but very few tomatoes then you have a pollination problem. If you growing watermelon or pumpkin and what you thought was a baby melon or squash died on the vine turned yellow or brown. It was never pollinated.

Stage Five – Seed Making

Once the plant has made seeds and they are fully mature the plant naturally dues back and expires. The leaves will turn yellow and brown starts dying back you can be assured the seeds are fully mature and can be harvested for seed saving.

Once the seeds have been produced an annual plant will begin to expire. The leaves will turn yellow and brown. Which is why for fruiting plants like zucchini cucumbers and tomatoes you want to keep them well picked to trick them into putting out for fruit.

CHAPTER 11
SEED SAVING

Once the seeds have been produced an annual plant will begin to expire. The leaves will turn yellow and brown. Which is why for fruiting plants like zucchini cucumbers and tomatoes you want to keep them well picked to trick them into putting out for fruit.

With plants like beans and corn and pumpkins you want the plant to die back before harvesting to ensure that the seeds are fully mature. As the plants die back the seeds lose moisture and develop the hard outside shell which is for protection.

Why Save Seeds?

1. Grows well in your environment.
2. You like the variety.
3. Price. Can't beat free.

Before we get into the practice of saving seeds we need to first touch on botanical names, those impossible to pronounce Latin phrases. You'll understand the importance once I explain it.

Botanical Names

In 1727 Carl Linnaeus, a Swedish Botanist, began classifying plants using a system of binomial nomenclature, a two–word designation for each plant that belonged to the same family.

Plant families are large groups of plants that share similar botanical characteristics, typically, flower and fruit structure.

The genus is the first of the two Latin words that make up a plant's botanical designation and the species is the second word in its Latin name.

For example a zucchini squash is Cucurbita pepo. The genus is cucurbita the species is pepo. Within each genus there can be several species

Within the genus cucurbita there are several distinctive species of squash, for example Cucurbita moschata, Cucurbita maxima. These happen to be different kinds of winter squash. Example of Cucurbita maxima is Hubbard Squash. Example of Cucurbita moschata is butternut squash

Within each specie of squash there also contains a number of "cultivars" (cultivated varieties)

For example within the species pepo there are the following varieties, or cultivars: Black Beauty Zucchini, Yellow Crookneck Squash, Connecticut Field Pumpkin, Patty Pan Scallop Squash and Spaghetti Squash.

All cultivars within a specie will cross one another. Different species will not.

This is why we need to know botanical names. Another reason is that what we call pumpkin may not be what someone else in another part of the world would call it.

Our normal Halloween style pumpkin is the Connecticut field pumpkin (which are native to America) however pumpkins in France are more flattened and ribbed. One is Curcurbita pepo the other is Cucurbita maxima. In Italy they call all their winter squash pumpkins so if you send them our Ct field pumpkin (Curcurbita pepo) and they're expecting Curcurbita maxima or ç you could contaminate his prized Zucchini seeds (also Curcurbita pepo) that have been in his family for over 50 years. Heirloom seeds are those whose lineage traces back at least 50 years.

How do we go about saving seeds?

1) **Plan for it.** All seed catalogs contain botanical names. When planting your vegetables only plant one specie of each one.

2) **Select the healthiest plant or one that has the characteristics you're looking for**. If its sunflowers, maybe it's the tallest one, or the one with biggest face, if its tomatoes, maybe it's the ones that tasted the best. No diseased plants

3) **Let the plant or fruit mature fully.**

If its beans, you can't pick them when they're green, they're not fully developed. You would wait till the pod turns brown and dries out. (this would be the same if your saving seeds for soup or saving seeds to replant the following year). If it's a tomato or a pumpkin or a cucumber you wait till its fully ripe

This is the true for entire brassica family. They create small pods along the stem. I like arugula so I'm always saving seeds of arugula, the plant gets huge (like 3 ft), once the pods turn brown, then its time to save the seeds, and at that time you want to get to them before the birds do and before they split open and fall on the ground.

4) With some species like lettuce, flowers open for a very, very short time, like 30 minutes up to several hours, so saving seeds from lettuce, even when planting different varieties is easy. If you **stagger you're planting** for each variety by 3weeks to a month you can be guaranteed that you seeds will be pure.

5) With tomatoes, you can also plant different varieties and still collect seeds. The tomato flower as male and female parts within the same flower and the style happens to be very small and slight retracted within the anther tube preventing insect pollination. Most tomato varieties will set more fruit if the flowers are slightly agitated or shaken. This increases the amount of pollen traveling down the anther tube. The wind usually provides sufficient agitation, but fans are often used to simulate the wind in greenhouse situations. Daily shaking can be used to increase flower set in caged plants.

6) There are methods one can use when planting the same species but that's a little outside the scope of this class. As an example, zucchini and pumpkin and you want to save seeds from the pumpkin. One thing you can do in plant the zucchini first, wait a couple of months and then plant the pumpkin, and then once the pumpkin begins to flower (the male flowers will appear before the female flowers), pull out the zucchini. Another method is to bag the flower once its pollinated. There's a product called Reemay that can be used for bagging as well row cover.

7) Once you've collected your seeds save them in a cool dry place. In many cases you will cut the stems when they are brown and hang them upside down. Let them dry thoroughly and them separate them from the shells or pods. Store in a cool dry place.

For more information see "Seed to Seed" by Suzanne Ashworth.

Breeding Your Own Varieties

Breeding your own varieties is extremely rewarding. Many new varieties that get listed in seed catalogs are developed by home gardeners just like you, see all-americanselections.org.

Basically it is taking two varieties of the same specie and manually pollinating the male of one variety to the female of the other variety.

The first generation of seeds is known as F1. If you've seen "F1 Hybrids" that's what that means.

In order to maintain pure seed of a particular variety, pollen from that variety must reach the stigma of the plant, while contaminating pollen from all other varieties within that specie be excluded. If pollen from a different variety within that species comes in contact with the plant's stigma, resulting in fertilization, the fruits seeds will be crossed and not true to type.

So let's say a zucchini and a yellow crookneck squash cross and you're saving seeds of crookneck squash. The fruits that form will look just like crookneck squash but the seeds inside that were fertilized by zucchini pollen will carry the genetic code of both parents. If those crossed seeds (known as the F1 hybrid) were saved and replanted the following season they would produce plants that were uniquely different from the parent plants. (This is why we don't save seeds from hybrids.) A green crookneck zucchini with bumpy skin could be just one possibility. Each of the plants grown from the crossed seeds could possibly produce a new and different fruit on every plant, but all of the fruits on each individual plant would look exactly alike.

Now suppose you found one plant that you liked, you would save seed from that plant, make sure it was pure and then replant it the following season. The following season you may get a few plants that reverted back to the old variety so you get rid of those keep the ones you like and then plant those again. That process can take anywhere from 6-12 generations to become stable, and that's how you develop your own variety. To put it mildly, it takes a lot of patience.

CHAPTER 12
VEGETABLES A-Z WITH RECIPES

The following is not an exhaustive catalog of backyard edibles but rather a select list of the more popular (or interesting) vegetables suitable for the home gardener. I have also included a few simple recipes for your culinary pleasure.

When deciding what vegetables to grow ask yourself two questions?

1. What do I like?
2. What is it that I cannot get in a supermarket?

For the majority of you the answer will be a good tomato. For the more adventurous of you the answer will be something new and different. I never had fava beans until I started growing them for the sole reason of adding nitrogen to the soil. They are now an autumn staple. I never ate purple carrots or green tomatoes or yellow beets until I grew my own. In Chapter 10 is a list of seed companies. I suggest you go to their websites and peruse their catalogs. You will be amazed at the varieties offered.

I heard a commercial grower once talk about the qualities needed for selling exclusively to supermarkets. #1 consideration is appearance, #2 is how well does it travel, #3 how well does it keep, and #4 is taste. For a home gardener taste is everything.

Harvest note: As a general rule, pick early and pick often. Your plants' sole purpose is to make seeds to perpetuate its existence. If you keep picking the fruit they will keep producing it. If you do not pick the fruit they will think their job is complete and stop producing. Also, get into the habit of harvesting early in the day. As the day progresses and the temperatures get warmer, the internal temperatures of the fruits will also get warmer. Fruits picked early in the day will last longer than fruits picked with warm interiors.

Artichokes - Cynara scolymus
also Cardoon – Cynara cardunculus

"Remind me to tell you about the time I looked into the heart of an artichoke." - Bette Davis in "All About Eve"

Artichokes and cardoon are closely related and from afar look indistinguishable. Artichokes we eat the immature flower bud, cardoons we eat the central celery-like stalks. Cardoons are often blanched before eating and can be breaded and fried like they do in Italy. Both can be grown as perennials and may be used as an ornamental hedge planted 3-4 ft apart. If you let a cardoon or artichoke flower (rather than picking it), you will be rewarded with a blossom of spiky purple hair that is quite unusual and attractive.

Artichokes are most often boiled. The bracts, commonly known as leaves, are then removed one by one. You place the fat end of the bract between your teeth and scrape off the flesh. Once the bracts are removed the tender heart is revealed covered by fuzzy hairs known as the "choke". Scrape the choke from the heart, revealing the most desirable part of the artichoke.

Harvest artichokes while the blossom is tight and compact without any of the bracts spreading widely. The blossom should be size of a baseball or softball. Using a sharp knife or pruners cut the artichoke, leaving an inch or two of stem attached. The stem is edible as well.

The simplest recipe for artichokes is to boil (or steam) for approximately 30-45 minutes, drain and serve with a dish of melted butter to dip the fleshy ends of the bracts in.

Arugula - Eruca vesicaria sativa

"Arugula. I haven't had arugula in six weeks." – Steve Martin in "My Blue Heaven"

Arugula is known for its distinctive bitter/spicy flavor. It loves cool weather and bolts quickly in the heat. Seed to seed is approximately 90-100 days, however leaves can be cultivated in as little as 20-30 days. Due to its quick growing habit arugula should be sowed every three weeks for a steady supply. Keep the beds moist and thin the arugula as it grows.

In seed catalogs you will find two basic kinds of arugula: arugula selvatica and arugula roquette (aka rocket). The roquette is a lobed leaf variety with edible white flowers. The spicier variety, selvatica, has yellow flowers, and deeply cut leaves like arrows.

Picked young, arugula is a wonderful addition to salads. Older leaves are spicier than the young leaves and are best used in soups. Pick off outer leaves as needed, leaving the plant to grow. Arugula should be washed and dried the same day it is harvested and then refrigerated. A good method of washing leafy vegetables is to fill a sink with water, dump in the greens and let them soak for a few minutes. Then drain them using a colander and dry them in a salad spinner. Do not put leafy greens in the fridge wet; they will rot.

Towards the end of the season allow a few plants to bolt (go to seed) to ensure seeds for the following season. The plant will get quite large compared to its growing stage so give it room, approximately 2-3 ft all around.

When saving for seed the white (or yellow) flowers are edible and a wonderful topping to a salad though don't eat them all or the seedpods won't form. After the flowering, green pods will appear on the stems. Allow them time to fill out and the seeds to mature. Once the pods start changing color to yellow/brown, you can whack the plant at the base, tie it upside down and let it finish drying.

Best way to use Arugula is to mix it with other greens into a garden salad. One popular salad seen in many restaurants is an Arugula Pear Salad.

Arugula Pear Salad

- 3 Cups Arugula (washed and dried)
- 1 Pear
- 3 TBS olive oil
- 3 TBS lemon juice (or white wine vinegar)
- Salt and pepper

1. Julienned pear into thin strips.
2. Combine Arugula and pear in mixing bowl.
3. Add olive oil, salt, pepper and lemon juice.
4. Toss and serve

(Note: optional toppings for this salad include: roasted walnuts, pistachio nuts, crumbled blue cheese, feta cheese or goat cheese.)

Asparagus – Asparagus officinalis

"Asparagus inspires gentle thoughts." – Charles Lamb

Asparagus is a perennial crop that grows best in areas where the soil freezes in the winter. It can take anywhere from 2-4 years to harvest asparagus from seed so it is best to buy transplants called "crowns."

Asparagus plants like loose, well-drained soil in sunny locations. Pick your location carefully for asparagus can produce for up to 20 years.

To an asparagus aficionado the best way to enjoy them is to lightly steam them 5-10 minutes until tender, then sprinkle with some melted butter and a pinch of salt.

Another simple recipe is to toss the raw asparagus spears with olive oil, add a pinch of salt then grill in an iron pan on a stove top or on a sheet of aluminum foil on your backyard barbecue. Turn once while cooking, about 5-10 minutes, then finish with a splash of lemon juice, a pat of butter, a dash of fennel pollen and/or crumbled feta cheese.

Basil – Ocimum basilicum

"A man taking basil from a woman will always love her." - Sir Thomas Moore

An annual in the mint family whose members are mostly perennial, basil is originally from India. It is popular not only in the cuisines of Southeast Asia, but also features prominently in Italian cuisine.

Basil likes the heat but not too much of it. It will tolerate partial shading.

Harvest regularly to prevent plants from going to seed. Once flowers form the plant will stop producing vegetation. Make cuts in the middle of the stem and below it you will notice two stems forming. This how you keep yourself in basil all summer.

Basil can be cut and added to stir-fries, soups and salads. It can also be made into pesto for multiple uses.

Basil Pesto

- 2 cups basil
- 2 garlic cloves
- 1/4 cup pine nuts (pine nuts are traditional but walnut or pistachio nuts can also be used)
- 1/4 cup Parmesan cheese
- 1/4 cup olive oil
- Salt and pepper

1. Place garlic and nuts in a food processor and pulse until chopped.
2. Add basil and pulse until chopped. Scrape down edges with a rubber spatula.
3. Add Parmesan cheese and pulse until well mixed.
4. Slowly add olive oil while food processor is on low.
5. Season with salt and pepper to taste

Beans – Phaseolus vulgaris

"It doesn't take much to see that the problems of three little people doesn't add up to a hill of beans in this crazy world." - Humphrey Bogart to Ingrid Bergman in "Casablanca"

Beans can be categorized in a couple of ways - they can grow as a bush or as a vine. The vine types are called pole beans; the low-growing, bushy varieties are called bush beans. In general, bush beans produce all at once, while pole beans will produce for a longer period of time as long as the beans are constantly picked.

Beans can also be categorized as snap beans or dry beans. Snap beans are characterized by their edible pods (i.e. string beans or yard-long beans). String beans are best before the seeds develop.

Dry beans are exactly that, grown to be stored in a pantry for later use in soups and stew. When grow beans fro storage it is important to allow the beans to fully develop and mature. Once the pods turn brown the bean seeds are then ready for harvest.

Bean plants do not like cold, wet soil. Wait until the ground has warmed before sowing bean seed.

Days to harvest is approximately 60 days so two plantings can usually be achieved in one season.

Seed Saver Exchange lists hundreds of varieties, some dating back over 100 years. Some Native Americans who participated in the Trail of Tears took their seeds with them along the journey and have since passed them down from one generation to the next as a way of not forgetting.

The simplest method for cooking string beans is to blanch them in boiling water for 1-2 minutes, then sautéing in melted butter or olive oil for another minute or two, adding a pinch of salt.

Another method is to roast them as seen in the recipe below:

Roasted Nicoise Salad with Fresh Grilled Tuna

- 1 bunch long beans (1 pound) chopped into bite size pieces
- 1/4 cup olive oil
- 1 pound Yukon potatoes cut into bite size pieces
- 1 onion
- 1 red pepper
- 1-4 portions of raw tuna

- 2 TBS balsamic vinegar
- 1/4 cup water or broth (optional)
- 1 lemon quartered (optional)
- 1 TBS soy sauce (optional)
- 1 hard-boiled egg yolk (optional)
- Salt and pepper

1. Wash and chop beans into bite size pieces.
2. Skin potatoes and chop into bite size pieces.
3. Cut pepper in half, remove seeds.
4. Chop onions into large chunks.
5. Add all the above to a large mixing bowl and add the oil. Toss and sprinkle with 1/2 tsp salt.
6. Transfer to baking dish.
7. Preheat oven to 350.
8. Add veggies and cook for 60 minutes, stirring every 20 minutes, if sticking add 1/4 cup water or broth. Remove red pepper after 20 minutes and chop into bite size pieces.
9. Season tuna with olive oil, salt and pepper. Grill over coals or on stovetop in a grill pan. Cook 5-7 minutes each side for medium. If you are lucky enough to get sushi-grade tuna simply sear both sides and serve rare.
10. Remove remaining veggies and transfer to large mixing bowl with red pepper. Splash with balsamic vinegar. Season to taste with salt and pepper.
11. Serve by portioning veggies to each plate and top with crumbled egg yolk and sliced tuna. Finish with a splash of fresh lemon juice and/or soy sauce.

Note: Jalapeño peppers are a nice addition with the red peppers. If you don't want them too spicy simply remove the seeds before roasting. Jerusalem artichokes can also be substituted for potatoes.

Beets – Beta vulgaris

"The beet is the most intense of vegetables. The radish, admittedly, is more feverish, but the fire of the radish is a cold fire, the fire of discontent not of passion. Tomatoes are lusty enough, yet there runs through tomatoes an undercurrent of frivolity. Beets are deadly serious." – Tom Robbins, "Jitterbug Perfume"

Beets are a cool weather, root crop, though some gardeners grow them more so for their greens. A close relative of Swiss chard, both are biennials which means they go to seed in their second year. Any Swiss chard recipe can be substituted with beet greens and visa versa. Beet greens and Chard greens are excellent raw in salads

when picked young. When fully grown, they both need to be cooked and can be used like spinach. To harvest beet greens, pick the outer leaves only, leaving the inner ones to keep growing.

Beets are harvested when their shoulders begin to bulge from the soil and their size is between a golf ball and a baseball.

Easiest way to enjoy beets is to roast them. Cut greens at the base and save for recipe below. Rinse and scrub excess soil from the beets and wipe with olive oil.

Encase in a sheet of aluminum foil and bake for 1 hour at 350. When cool scrape off outer coating with a paring knife.

Sautéed Beet Greens with Pernod Butter

- 2 bunches beet greens
- 2 TBS butter
- 1/4 cup Pernod or other anise flavored liquor

1. Wash beet greens, remove stems, and chop into pieces.
2. Melt 1 TBS butter in sauté pan, add beet greens.
3. Sauté till wilted, add Pernod.
4. Continuing sautéing till Pernod is reduced by half.
5. Add remaining butter.
6. Season with salt and pepper.

Refrigerator Pickled Beets

- 4-5 beets, tops and stems removed
- 1 cup vinegar (red wine, white wine or cider)
- 1 cup water
- 1 tsp salt
- 2 TBS sugar

1. Roast beets in foil in 350 degree oven for 45 minutes.
2. Peel off outer coating and slice into discs.
3. Combine all other ingredients and heat till sugar melts (5 minutes). Cool.
4. Add cut beets and store in glass container. Let sit one day before eating. Will keep in refrigerator for 3-4 weeks.

Bok Choy - Brassica rapa var. chinensis

"Nothing Coy about Bok Choy" – Unknown

Bok Choy thrives in cool weather and will even withstand some light frost, however it will bolt quickly under hot, dry conditions. It is a perennial that is grown as an annual. Plant in loose, well-drained soil incorporating copious amounts of either compost or aged manure.

Harvest when the plant is approximately 12 inches tall. Both stem and leaves are edible.

Do you own a wok? If not, why not? Stir-fry is a quick and healthy method of cooking utilizing a wok made popular in Southeast Asia a thousand years ago.

Bok Choy is just one of many staples for stir-frying. Other vegetables include: broccoli, Chinese cabbage, mushrooms, onions, peppers and celery. Simply chop into bite size pieces and stir-fry quickly in peanut oil, which is able to withstand higher temperatures than canola or olive oil.

Stir-Fry Chicken and Bok Choy

- 1 boned chicken breast
- 1 bunch Bok Choy
- 1 egg white
- 2 TBS Soy Sauce
- Splash White wine
- 1/4 cup chicken broth or water
- 1/4 cup flour
- 4 TBS Peanut oil

1. Cut chicken breast into bite size strips. Dust with flour
2. Combine egg white, 1 TBS soy sauce into mixing bowl. Add chicken breasts.
3. Wash and dry bok choy. Chop into bite size pieces
4. Heat 2 TBS peanut oil in wok or sauté pan. Add chicken strips, stir constantly till chicken is cooked (do not overcook) about 3-4 minutes. Remove chicken. Add splash of white wine to deglaze pan and add to chicken.
5. Heat 2 TBS peanut oil in wok or sauté pan. Add bok choy. Stir constantly till bok choy turns bright green (1-2 minutes).
6. Add 1 TBS soy sauce.
7. Add Chicken, mix together. Serve.

Broccoli – Brassica oleracea italica

"I do not like broccoli. And I haven't liked it since I was a little kid and my mother made me eat it. And I'm President of the United States and I'm not going to eat any more broccoli." George H.W. Bush, 41st President

As with all other Brassicas, broccoli is a cool weather crop best grown in early spring for northern climates or in the early fall for mild-winter climates.

Considered one of the healthiest plants we consume broccoli is known for its wealth of phytonutrients. Contains over 100% Daily Value (DV) of Vitamins C & K.

Broccoli grows into a central head. When eating broccoli we are eating immature flower blossoms. Broccoli is best harvested when the head is tight and compact before any signs of opening.

Once the head is cut many side shoots will keep growing, which can be eaten over the length of the season. As long as you keep picking them they will keep producing. Once you stop picking or if you wait to long to cut the central head, the little buds open into beautiful small yellow flowers.

Like other members of the Brassica family broccoli is considered a heavy feeder, meaning it likes nutrient-rich soil. Incorporate manure or compost into your soil before planting, then side dress with an organic fertilizer during the season, especially after harvesting the central head to keep the side shoots growing.

The simplest and most nutritious way to prepare broccoli is to steam it. After washing, cut into long spears and steam 4-5 minutes.

Broccoli can also be enjoyed as the main ingredient in a wonderful salad. Other veggies can be added such as red pepper, cauliflower, green onion, etc. Cooked rice or quinoa could also be added as well as leftover chicken or meat for a heartier one-dish meal.

Broccoli Salad with Ginger-Soy-Yogurt Dressing

- 1-pound broccoli
- 1 large thumb size piece of ginger, peeled.
- 2 TBS soy sauce
- 2 TBS lemon juice
- 1/4 cup fat-free Greek yogurt
- 1 clove garlic

1. Wash broccoli and cut into quarters
2. Blanch in boiling water for 45 seconds

3. Chop and transfer to Salad bowl
4. Peel ginger and grate into small mixing bowl.
5. Chop garlic and add to mixing bowl.
6. Add yogurt and mix thoroughly.
7. Add soy sauce and lemon juice slowly mixing as you go.
8. Pour dressing over broccoli, mix and serve.

Brussels Sprouts - Brassica oleracea gemmifera

"Mrs. Darling was married in white, and at first she kept the books perfectly, almost gleefully, as if it were a game, not so much as a Brussels sprout was missing; but by and by whole cauliflowers dropped out, and instead of them there were pictures of babies without faces." - Peter Pan by James Barrie

A cool weather crop from the Brassica family, Brussels sprouts are grown for their edible buds, which appear like mini cabbages. The way they grow you will think of them as cabbages on a stick.

When planting Brussels sprouts space them about 18" apart. Mix in some fertilizer at the outset however do not over-fertilize Brussels sprouts or they will be slow to form buds. Like kale, they can withstand a little frost. Harvest while the small heads are still tight.

Brussels Sprouts can be enjoyed roasted, steamed or stir-fried.

Roasted Brussels Sprouts

Wash Brussels sprouts, cut in half, dry, toss with 1 TBS olive oil and 1 TBS Balsamic Vinegar, pinch of salt, roast on cookie pan covered with foil 30 minutes at 400, turning once.

Cabbage – Brassica oleracea capitata

"Idealist: One who, on noticing that a rose smells better than a cabbage, concludes that it will also make better soup." – Henry Louis Mencken

"In the night the cabbages catch at the moon, the leaves drip silver, the rows of cabbages are a series of little silver waterfalls in the moon."- Carl Sandburg

Cabbages come in a number of varieties. There is green cabbage, vibrant red cabbage (which is actually purple), and Savoy cabbage, which is noted for its textured crinkly leaves. Like other Brassicas, cabbages do not like hot dry climates.

Harvest cabbage after the heads have formed and are firm when squeezed. If left in the ground too long they can split so careful observation is recommended.

Cabbages can be eaten raw or cooked.

Many, many years ago I was working the lunch shift at a burger/bar. One of my tasks was making the coleslaw. My version was so good I was asked to leave the recipe, I happily obliged.

Coleslaw

- 1 head of cabbage
- 1 cup mayonnaise
- 1/2 cup white vinegar
- 1 green pepper
- 3 carrots
- 1/4 cup sugar
- Salt and pepper

1. Cut cabbage into quarters and core the hard center.
2. Slice cabbage very thinly or use a food processor with slaw blade.
3. Dice pepper.
4. Grate carrot.
1. 5 Add to mixing bowl.
5. Add sugar first, then vinegar, then mayonnaise and mix together.
6. Season with salt and pepper.

Note: The key to good coleslaw is massaging the dressing into the cabbage with your hands.

Carrots – Daucus carota sativus

"The day is coming when a single carrot, freshly observed, will set off a revolution." – Paul Cezanne

Carrots are a root crop like parsnips, radishes, turnips, and beets. They all have similar growing requirements and do best in cool weather.

Carrots can be classified into five major groups: Miniature (round, or tapered less than 4 inches, good for containers and heavy soil), Chantenay (short, thick and tapered, good for shallow, heavy soil), Danvers (great for juicing and stores well, becomes fibrous if left too long in the ground), Imperator (main commercial carrot, long tapered roots, best for deep loose soil), and Nantes (easy to grow, medium length).

It is important to thin your carrots as they grow. Allow approximately 2-3 inches per plant. Once the shoulders appear mound soil over them so they do not turn green and bitter.

When harvesting carrots drench the bed first, which will make pulling them out easier. It is best to rock them back and forth a little to loosen them and then pull them.

Carrot plants are biennials. Their flowers look like their close relative, Queens Anne Lace and attract beneficial insects such as lacewings, ladybugs and wasps. For this reason a few carrot plants should be allowed to go to seed. If you decide to let your carrots flower make sure to give them plenty of room. One plant can grow 4-5 ft tall and 3 ft wide.

Carrot Apple Ginger Soup

- 1 pound carrots, cut in 1-inch pieces
- 1/2 pound parsnips, or potatoes cut in 1-inch pieces
- 1 pound apples, cut in 1-inch pieces
- 3 tablespoons coconut oil
- 1 teaspoon sea salt
- 1 quart water
- 1 onion minced
- 1 tablespoon fresh grated ginger, more to taste
- sea salt, to taste

Preheat oven to 400°F. Combine carrots, parsnips, onions, apples, coconut oil, salt and pepper. Toss well to coat. Spread in a single layer on a rimmed baking sheet. Roast for 12 to 15 minutes, until soft and browned. Transfer to a large saucepan and cover with broth and water. Bring to a boil, then reduce to a simmer. Stir in ginger and cook for 8 to 10 minutes longer. Remove from heat and cool slightly. Blend until smooth, using a regular blender. Season to taste with salt. Enjoy!

Carrot Apple Ginger Soup recipe is courtesy of Ana Goldseker, a whole foods coach specializing in weight loss. Get more of Ana's recipes at her blog, Mindful Nutrition.

Cauliflower - Brassica oleracea

"Training is everything. The peach was once a bitter almond; cauliflower is nothing but cabbage with a college education." – Mark Twain

Most are familiar with the white variety of cauliflower, but not many know that cauliflower is also available in green, orange, and purple. It is not the easiest

vegetable to grow, but very rewarding for those who give it the proper care and attention. Cauliflower thrives in cool, moist climates and does not like hot, dry conditions.

To preserve the white color of the curds the cauliflower head must be blanched. Blanching is the method used to prevent sunlight from entering. Sunlight will turn the curds a yellowish/green and can also cause a slight bitter taste. Blanching is done after the curds appear and are approximately 2-3 inches round. The leaves are then bunched together around the head and tied. It is important to do this during dry conditions as any moisture trapped inside can cause the curd to rot. Colored heads do not need to be blanched. The cauliflower is then harvested approximately two weeks after blanching.

Roasted Cauliflower

Cut cauliflower into bite size pieces. Toss with olive oil, balsamic vinegar, salt and pepper. Place on cookie pan in one layer and roast 45 minutes at 400 till edges are browned and pieces are tender. Toss with Ginger-Soy-Yogurt Dressing from Broccoli Salad above.

Celery - Apium graveolens
also Celeriac - Apium graveolens var. rapaceum

"I'm afraid of losing my obscurity. Genuineness only thrives in the dark. Like celery." - Aldous Huxley

Celery is a cool-weather crop known to be a bit finicky for the backyard gardener, as it does not like extreme cold or extreme hot conditions. Since the taste of homegrown celery does not differ greatly from store bought celery many home backyard gardeners eschew it. Celeriac however should be tried.

Like cauliflower, celery plants should also be blanched when approximately 8-10 inches tall, or 2-3 weeks before harvesting. String or rubber bands are used to keep the stalks together. Blanching celery keeps the inside from turning green, which gives the celery a more delicate and subtle taste, however it also less nutritious then celery that is not blanched.

Celeriac is a close relative of celery grown for its bulbous root. Not as starchy as other root vegetables, it can be eaten raw or cooked. Serving tip - slice thin with a mandolin and marinate in a vinegar brine (see Refrigerated Pickled Beets recipe), then julienne and add to salads as needed.

Green Apple Celeriac Juice Smoothie

- 3 small Granny Smith apples, cored
- 1 medium celeriac root, peeled, halved
- Push through the juicer and Voila. For those without a juicer puree in a blender.

Green Apple Celeriac Juice Smoothie recipe is courtesy of Andrea Everetts, a certified health coach.

Cilantro - Coriandrum sativum

"As a historian, I love every little detail, but whole long passages about wood paneling and journeys on horseback and every stop at every inn had to go out the window. I decided the history in the books should be like spice in a soup - a little went a long way. Like cilantro." - Deborah Harkness

Cilantro is also known as coriander, the spice. Cilantro are the leaves, Coriander are the seeds.

The entire plant is edible even the roots, but mostly it is grown for its leaves.

Cooking diminishes their flavor so cilantro is most often served raw or added to soups just before serving.

To ensure a steady supply, plant cilantro every three weeks. They will bolt in hot, dry conditions so shade them in the summer.

Cilantro Pesto

- 1 bunch cilantro
- 2 garlic cloves (peeled)
- 1/4 cup shelled pumpkin seeds
- 1/4 cup Parmesan cheese
- 1/4 cup olive oil

1. Place garlic in food processor. Pulse for 30 seconds
2. Add cilantro, pumpkin seeds and Parmesan cheese. Pulse for 30 seconds.
3. Slowly add oil as machine turns about 1 minute.
4. Season with salt and pepper

Fresh Tomato Salsa

A basic, fresh salsa can be made with equal parts chopped tomato, chopped onion and chopped cilantro. Add a pinch of salt and a squeeze of lime juice. For a hot salsa add a diced Jalapeño pepper. Serve with scrambled eggs, tacos, grilled fish, etc.

Chayote - Sechium edule

Chayote is a perennial of the Cucurbitaceae (squash) family. It is extremely vigorous and grows well along a chain link fence. One plant can send out runners 25 ft in either direction and produce 100 pounds of fruit. For this reason alone chayote should be looked into as a productive food source. An excellent recipe to enjoy chayote involves peeling it, cutting it like french fries, seasoning liberally, and grilling them. They can also be pickled raw and used in salads.

Chayote Fries

- 2 chayote
- Seasoning mix (garlic powder, onion powder, paprika, salt, pepper, and turmeric)

1. Peel chayote, cut in half to remove pit. Cut to resemble french fries.
2. Season liberally with seasoning mix.
3. Grill on sheet of aluminum foil over coals or in grill pan on stovetop.
4. Grill about 5-7 minutes each side. Serve plain or with ketchup.

Collard Greens – Brassica oleracea

The best comfort food will always be greens, cornbread, and fried chicken. Maya Angelou

Full of nutrients collards are in the Brassica family and could benefit from a high nitrogen fertilizer.

Healthiest way to serve is steaming the leaves till tender. Then dress with oil, vinegar and hot sauce.

Corn – Zea mays

"Whoever makes two ears of corn, or two blades of grass to grow where only one grew before, deserves better of mankind, and does more essential service to his country than the whole race of politicians put together." - Jonathan Swift

Nothing says summer like fresh corn. Growing 8 ft stalks in your backyard can appear grand and act as a source of pride.

Corn needs to be spaced 12-18" apart and due to being wind pollinated, corn should be planted in blocks rather than rows. If you planting 16 corn plants you want four rows of four rather than one row of sixteen.

The best corn I ever grew was done in a raised bed where fava beans grew the season prior. Fava beans fix nitrogen into the soil, which the corn loves. Peas are another crop that you could precede corn with.

Corn Salsa

- 2 Ears of Corn
- 1 tomato
- 1 avocado, skinned and pitted
- ½ onion
- 1 lime
- 1 TBS Olive oil
- Salt and pepper
- optional: jalapeño pepper, cilantro, red pepper

1. Cook corn in boiling water for 8 minutes.
2. Rinse under cold water. Dry. Cut kernels from cob.
3. Chop avocado, tomato and onion. Add to mixing bowl with corn.
4. Sprinkle with juice of one lime, and splash of olive oil.
5. Season with salt and pepper.

Cucumber – Cucumis Sativus

"I . . . cool as a cucumber could see the rest of womankind." – John Gay

Cucumbers can be bush types or vine types. Bush types are ideal for containers. Vine types need a trellis so the fruits don't lie on the ground where they can be attacked by rodents and insects.

Prior to planting mix compost or manure into the soil. Cucumbers are hungry feeders and do well with a constant supply of nutrients (i.e. compost tea, worm tea or a side dressing of organic fertilizer) throughout the season.

Cucumbers are 95% water and may become bitter in dry conditions. Drip irrigation is an ideal system for cucumbers (as well as for many other vegetables) because the leaves remain dry and only the roots are watered. Mulching plants is also advisable to hold in the moisture.

When harvesting cucumbers use a scissor to cut the stem. The cukes should be firm, dark green and approximately 5-8 inches long depending on variety. Consistent harvesting will "trick" the plant into putting out more fruits. If the cukes are not picked the plant thinks its work is done. Remember, the only job for any plant is to make seeds.

Cucumbers are ideal for pickling. Our own USDA has published a guide for home canning entitled, "USDA Complete Guide to Home Canning, 2015 revision"

Refrigerator Pickles

Use same recipe as Refrigerator Pickled Beets above replacing beets with sliced cucumber.

Tzatziki Sauce

- 2 cucumbers peeled and seeded
- 2 tbs lemon juice
- 1 or 2 cloves garlic minced
- 1/2 tbs salt
- 1/2 tbs white pepper
- 1 tbs white vinegar
- 1/4 cup olive oil
- 16 oz plain yogurt

In medium bowl of electric mixer, mix all ingredients except yogurt. Add yogurt and beat on medium speed until mixture has a creamy appearance. Refrigerate, covered, overnight to blend the flavors. Serve with gyros or other lamb dishes.

Dandelion Greens - Taraxacum officinale

More phytonutrients than spinach, more vitamin a than broccoli, more iron than spinach Dandelion leaves are one of our most nutritious greens.

Only a tried and trued backyard gardener would dare to grow dandelion greens. The scourge of lawn owners nation-wide, dandelion greens are nonetheless extremely nutritious, over 100% Daily Value of Vitamin A and Vitamin K.

A member of the lettuce family, dandelion greens are extremely easy to grow. One could say, "They grow like weeds." The taste is slightly bitter like chicory or arugula. It is best chopped and added to a mixed green salad.

Fava Beans – Vicia faba

"I ate his liver with some fava beans and a nice chianti" –Anthony Hopkins as Hannibal Lecter in The Silence of the Lambs

Fava Beans are another one of those veggies I never ate till I started growing them. Now I grow them every year. I get these heirlooms from Morocco through one of my seed catalogs that are huge. The pods can be over a foot long.

A member of the legume family, fava beans fix nitrogen in the soil. Inoculating the seeds before planting will facilitate this process.

Fava beans are often attacked by aphids. Simply washing them off with a blast of water from a hose is the best way to get rid of them. You can also pinch off the damaged grow tip which will not affect your crop. If unattended the aphids will attack the pods themselves which will cause crop failure.

When planning your garden it is best to follow this cool-weather crop with a nitrogen-hungry warm-weather crop such as corn. Harvest fava beans when the pods are about a foot long. To enjoy, first picks the pods and shell the beans, place them in boiling water for a minute or two then cut away the protective jacket. They can then be sautéed in olive oil and garlic or cooked further in a broth and pureed into a soup.

Fave Bean Soup

- 1 pound short ribs
- 1 onion
- 2 carrots
- 3 stalks of celery
- 1 quart water
- 1 pound shelled fava beans

1. Make a stock from the first 5 ingredients.
2. Strain liquid to remove meat and veggies and save meat from short ribs
3. Cook fava beans in beef broth for about 45 minutes till soft.
4. Puree in blender.
5. Season with salt and pepper.
6. Serve in individual bowls topped with short rib meat

Sautéed Fava Beans

2 lbs. fresh fava beans, in the pod (yields about 1-l/2 cups shelled beans! Yes, 70% of the bean will become compost in your garden!!! For this recipe, I started with about

two shoe boxes full of bean pods, so it takes lots, and lots of pods for a serving of 4. It takes a while to get the hang of it.)

- 2 Tbs. olive oil
- 2 cloves garlic
- salt and pepper

1. Remove the beans from the fava pods or "shell
2. Bring salted water to a boil, and boil beans for 3 minutes
3. Put ice water in a bowl big enough to hold the beans.
4. After the beans have cooked for 3 minutes, take a slotted spoon and lift them from the boiling water and plunge them in the ice water. This will rupture the skin.
5. Peel the outer layer of the bean (which looks like a thin skin) by pinching the bean through the skin rupture.
6. Over medium heat add chopped garlic to olive oil and sauté for one minute.
7. Add fava beans, salt and pepper to the garlic and oil and sauté for 5 minutes. Serve and enjoy.

Sautéed Fava Beans recipe is courtesy of Paula Waxman - Garden Manager, Hamilton High School, Los Angeles, CA

Fennel – Foeniculum vulgare

"There's fennel for you and columbines…" – Hamlet by William Shakespeare.

Fennel, a member of the parsley family, has been cultivated since Roman times. It is grown for the bulbous lower stems, which are eaten like celery, raw or cooked, and for the seeds which are used as a spice. Either way, the distinct anise flavor is what you remember. With Fennel pollen the anise is far more subtle.

Fennel is one of those veggies I never liked till I started growing it. It has a very strong licorice flavor which when cooked becomes more subtle. Fennel pollen, which is harvested from the fennel flower, is extremely subtle and wonderful on certain veggies like cooked green beans.

Fennel pollen is the derived from the blossoming yellow flowers of the fennel umbel. You can find it on the Internet for about 30.00/oz or you can grow it yourself.

When the flowers are at their most yellow cut the stem just above the joint. Hold it over a piece of paper and gently rub your thumb over the yellow threads as you hold the heads between your index and forefinger. Collect in a small glass bowl and let dry a few days or use fresh.

Fennel pollen can be mixed with other herbs to make a spice rub for chicken or fish. It can also be used alone with vegetables, soups and sauces. Store long term in a tightly capped glass jar. Note: Do not cook it. The taste will diminish.

Please note bees are also quite fond of fennel pollen so use caution when harvesting.

Green beans with Fennel pollen

- 1 pound of green beans
- 2 TBS butter
- 2 tsp fennel pollen

1. Sauté green beans in butter. Season with salt and pepper. Right before serving sprinkle with fennel pollen.

Garlic – Allium sativum

"…eat no onions nor garlic, for we are to utter sweet breath…" A Midsummer's Night Dream by William Shakespeare

Garlic is a bulb that grows under ground. There are two main varieties: hardneck - Allium sativum var. ophioscorodon; and softneck - Allium sativum var. sativum.

Softneck garlic is more common and what you see most in supermarkets because of its long shelf life. Hardneck garlic grows a scape, which sits atop a looped stalk. Most farmers will cut the stalk off because they want larger bulbs. Home gardeners should allow the scape to grow and then harvest it alone for eating or allow it to flower and then save as a dried flower.

When planting garlic we plant the individual cloves (pointy side up). Spacing should be 6-8 inches apart.

Garlic enjoys rich, well-drained soil with plenty of compost or aged manure mixed in. Mulching is recommended to keep moisture levels constant. Approximately 2-3 weeks before harvest quit watering altogether.

Garlic takes a long time to harvest, approximately 9 months, so plan accordingly.

Roasted Garlic

- 2 heads of garlic
- 2 TBS olive oil

1. Remove just the outer layers of skin.
2. Cut off pointy ends of cloves exposing the garlic inside (about 1/4 inch)
3. Sprinkle each with olive oil and wrap in aluminum foil

4. Bake in preheated oven 30 minutes at 400.

When done let cool then cut slits in the garlic cloves and serve on fresh or toasted baguettes.

Other uses for roasted garlic include mixing into: mashed potatoes, pasta with Parmesan cheese, scrambled eggs, salad dressing, etc.

Jerusalem Artichokes – Helianthus tuberosus

Despite its name Jerusalem artichokes have no relation to Jerusalem or Artichokes.

Jerusalem artichokes are tubers, like potatoes, tubers are parts of a plant that store food for the plant underground.

Above ground they can grow to heights of 6-8 feet with small daisy like flowers. Below ground are the tubers that we know as Jerusalem artichokes or sunchokes. When harvesting save a few in a cool dark place for the following season. Those left in the ground will also return the following season so be careful to harvest all of them lest they become invasive.

Enjoy sunchokes as you would potatoes - scrub them clean, peeling is not necessary. Roasting in a pan with chicken or meat (350 for an hour) is an easy preparation.

Kale – Brassica oleracea or Brassica napus

"Kale is my best friend. I eat kale salad. I put kale in my smoothies, kale in my soup. Kale, kale, kale!" - Alanis Morissette discussing her kale obsession with Runner's World

Kale is the superman of vegetables. Noted for its nutritious qualities many argue it is the most nutritious vegetable we can eat. They are know to contain many phytonutrients which is a fairly recent coined term given to compounds found in fruits and vegetables that are healthy for us but not essential.

There are two kinds of kale:

Brassica napus which includes russian kale; and
Brassica oleraceae which includes collards and dinosaur kale

Kale is also fairly easy to grow. It is a cool-weather crop that doesn't mind a light frost. Unless picked very young kale is best eaten cooked.

If your family has not yet warmed to the idea of kale, try serving Kale Chips. Your kids will love them.

Kale Chips

Cut Kale into bite size pieces. Toss with small amount of olive oil and a pinch of salt. Transfer to a baking sheet in a single layer and cook for 10-15 minutes at 350 until the edges turn brown. They can burn quickly so keep an eye on them.

Leeks – Allium ampeloprasum

"The road to hell is paved with leeks and potatoes" - Julie Powell, "Julie and Julia: 365 Days, 524 Recipes, 1 Tiny Apartment Kitchen"

A member of the Allium family, leeks are a cool weather crop, which likes a diet rich in nitrogen.

To produce white stems that are so desirable by gourmets the leeks must be blanched. This means they need to be planted into a deep hole shored up with soil to keep the sun from turning them green.

Mulching a leek bed is a good idea to retain moisture. Leeks do not thrive in dry soil. In northern climates start leeks in late Feb or early March. In mild-winter climates start leeks in September.

Leeks are ready to be harvested when the stem diameter nears 1 inch.

Leeks Vinaigrette

- 12 leeks
- 1/4 cup olive oil
- 4 TBS vinegar, your choice
- Salt and fresh ground pepper
- 1 TBS fresh parsley, chopped

Mustard, to taste

Clean the leeks; cut off most of the green parts and wash leeks very thoroughly, split if necessary, under cold running water. If they are large, do split them lengthwise; each piece should be about the size of a large stalk of asparagus. Tie them into bundles in two places, put them in boiling salted water just to cover, and cook them slowly for 25 minutes, or until they are tender but not limp. Drain them well (and be sure to save the broth to add to a soup). The leeks may be presented in a serving dish or arranged on individual plates. Make your vinaigrette in a bowl, adding mustard to taste, and whisk the dressing well until it is almost opaque, or emulsified, and pour it over the leeks.

Lettuce – Lactuca sativa

"I worry about scientists discovering that lettuce has been fattening all along…" – Erma Bombeck

There are three basic types of lettuce:

1. Head lettuce aka crisp-head, like iceberg and butter lettuce, forms tightly grown heads. Head lettuce is harvested all at once after the heads form.
2. Leaf lettuce, like Red leaf, Green leaf, Oak leaf, etc can be harvested over a longer period of time by harvesting the outer leaves and allowing the inner leaves to keep growing.
3. Romaine. Anyone who ever had a Caesar salad in his or her life knows what romaine is. Romaine lettuce is over 5000 years old.

Lettuce is one of the easiest vegetables to grow. It is not too particular about the soil, well drained is ideal. It likes to be watered frequently and should be picked regularly. With leaf lettuce harvest outside leaves and allow inside to keep producing. This method will stretch your harvest. If you plan accordingly you could be picking lettuce every day.

I love lettuce. I eat it a lot. I always have many different varieties growing at once. Colors range from light green to deep red. Try to mix your varieties. Light green is green ice and buttercrunch. Freckles is a green romaine type with red splashes. Brunia is a large oakleaf type lettuce that has red outer leaves bronze inner leaves, and a very light colored heart. Red Leaf and Ibiz are two deep red lettuces that grow really well in mild winter climates.

You can buy lettuce as transplants, but its very easy to grow from seed, and like many other vegetable seeds, you will have many more choices to choose from.

Salad dressing is an art. Less is more. Forget "ranch" or "thousand island" or other high-calorie dressings. The best dressing can be made right in the salad bowl. First splash the greens with 2-3 TBS of olive oil, then 2-3 TBS of either lemon juice, red wine vinegar, or balsamic vinegar, or if your like me, you'll use all three. Add a pinch of salt and pepper and you're done. Anything more will only mask the essence of your greens.

George's Vinaigrette

- 1/4 tsp Soy Sauce
- 1/4 tsp Worcestershire sauce
- 2 tsp Ketchup

- 1 TBS Dijon Mustard
- 1/2 cup balsamic vinegar
- 1/2 cup olive oil
- 1 peeled garlic clove
- Optional: Add any combination of fresh herbs (i.e. oregano, basil, thyme, parsley, chives).

1. Stir together first five ingredients.
2. Slowly add up to 1/2 cup olive oil while stirring.
3. Add a clove of garlic and refrigerate overnight. Remove garlic before serving.

Parsley - Petroselinum crispum

"Parsley is gharsley." - Ogden Nash

Despite the wit and wisdom of Mr. Nash parsley is an extremely nutritious additive to soups and sauces and not just for garnish. It is very high in Vitamins A, C, and K as well as being a good source of iron.

A cool weather biennial in the carrot family, parsley is best grown in full sun, but can tolerate some shade. Like carrots the seeds can take 2-3 weeks to germinate.

There are two main varieties of parsley:

Italian flat-leaf P. neapolitanum

Curly P. crispum

Both are interchangeable in recipes.

Tabbouli is a Middle Eastern salad made from parsley and bulgur. A basic recipe can be found below.

Tabouleh

- 1 cup fine grain bulgur wheat
- 2 bunches of parsley
- 1 red bell pepper, chopped
- 2 stalks celery, chopped
- 1 bunch scallions, chopped
- 2 TBS coarsely fresh mint, chopped or 1 tsp dried mint
- 1/4 cup extra virgin olive oil
- 1/4 cup lemon juice
- 1/4 tsp allspice, ground

- 1/4 tsp cinnamon, ground
- 1 tsp salt
- 1/4 tsp black pepper, freshly ground
- 4 medium tomatoes, diced

Soak the bulgur wheat in 2 cups cold water for 15 minutes. Squeeze dry. Pick the parsley leaves from the large stems. Wash at least twice and drain very well. Mix the parsley, bell pepper, celery, scallions, and mint together, and place in a food processor with a metal blade. Pulse-chop until fine and place in a large mixing bowl.

In a separate bowl mix the olive oil, lemon juice, spices, and salt and pepper, and stir with fork or whisk until smooth. Combine all of the ingredients except the tomatoes thoroughly in the mixing bowl. Then gently blend in tomatoes. Serve immediately.

Chimichurri sauce is a parsley base accompaniment to grilled meats and fishes.

Chimichurri Sauce (makes about 2 cups)

- 1 ½ cups parsley
- 1/4 cup cilantro
- 1 tablespoon fresh oregano
- 4 cloves peeled garlic
- 1 teaspoon red pepper flakes
- 1/4 cup olive oil
- 2 tablespoon red wine vinegar
- juice of 1/2 lemon
- salt and pepper to taste

1. Puree everything in a in a food processor.

Peas – Pisum sativum

"As alike as two peas in a pod "- Unknown

Fresh peas from the garden, no recipe needed. Truth is they are usually eaten fresh from the vine before they even make it into the kitchen. We call them "nature's candy". Pass that on to your children. Maybe it will replace the sugary sweets they crave.

There are two main varieties of peas. The first is English peas, which are the delicate round immature seeds that are harvested when they are young and tender. The other is sugar snap peas, which are grown for the pod and harvested before the seeds inside have a chance to form.

Same with peas, some peas are picked for the pea itself like English peas, where as snow peas are picked for the pod, which again should be picked early before the seeds develop.

Pea tendrils are also edible and a great addition to salads.

Peppers - Capsicum annum

"What does a nosy pepper do? Gets jalapeño business." – Unknown

A member of the nightshade family peppers can either be hot or sweet. In mild-winter climates some varieties (i.e. habaneros) will keep producing all winter and actually are know to live for several years.

Peppers like warm conditions, they do not do well in the cold.

Grilled Marinated Chicken with Red Bell Pepper Sauce

- 2 boneless, skinless chicken breasts
- 2 red bell peppers
- 4 cloves chopped garlic
- 2 lemons
- 2 limes
- 2 oranges
- 4 tbs olive oil
- 1 cup chicken broth
- Dash of white wine

1. Two hours before grilling combine 2 cloves chopped garlic, lime juice, lemon juice and orange juice in a non-reactive container (use glass or plastic). Add olive oil, chicken breasts and marinate.
2. Grill chicken breasts approximately 4 minutes each side. Hold warm.
3. For Red Bell Pepper Sauce dice two peppers.
4. Add 2 tbs olive oil to sauté pan and 2 cloves chopped garlic one minute, add a dash of white whine.
5. Add chopped peppers stir one minute.
6. Add chicken broth and simmer for 20 minutes until peppers are softened.
7. Let peppers cool down, then puree in blender. Salt and pepper to taste.
8. Top chicken breasts with sauce and serve.

Potatoes - Solanum tuberosum

"What I say is that, if a fellow really likes potatoes, he must be a pretty decent sort of fellow." A.A. Milne

Potatoes are tubers they grow underground and provide nutrients for the plant. They are not planted from seed. When we plant so called "potato seed" we are planting the actual potato, or half of the potato or ¼ of the potato depending on its size and how many "eyes" there are. The potato eyes are where the stems emanate from.

Do not plant potatoes from the supermarket as these are bred not to send out roots.

Potatoes that are exposed to the sun can form green spots, which contain a toxin known as solanine. Green potatoes should be avoided or at the very least cut away the green area. Harvested potatoes should be stored in a cool dark place with good ventilation. Potatoes du best in full sun, keep the soil weed free for best results. Harvest potatoes after the foliage has died back.

Twice-Baked Potatoes

- 1 large Russet Potato
- 1 cup cheddar cheese
- 1 TBS brown mustard
- 1/4 cup milk
- 2 TBS butter
- salt and pepper
- optional: chives, bacon, sour cream

1. Heat oven to 350. Pierce potato with fork a few times then bake for 45 min.
2. Remove potato from oven let cool then cut in half the long way.
3. Gently remove potato from skin taking care not to tear the skin/shells
4. Mix potato with butter, milk, mustard, half the cheese, salt and pepper
5. Spoon back into shells, sprinkle with remaining cheese
6. Reheat in 350 oven till cheese melts about 15 minutes.

Optional: chives, bacon and sour cream can be mixed into potato mixture or in the case of chives and bacon sprinkled on top.

Pumpkins and Winter Squash – Cucurbita maxima, Cucurbita moschata, Cucurbita pepo

"I would rather sit on a pumpkin and have it all to myself, than be crowded on a velvet cushion." – Henry David Thoreau

All pumpkins are winter squash though not all winter squash are pumpkins.

Winter squash differ from summer squash in that winter squash is saved and consumed in the winter, while summer squash is eaten immediately. They are both warm weather crops.

Pumpkins are grown on long vines and need lots of room.

When saving seeds from pumpkins or winter squash the thing you want to remember is that maximas will cross with other maximas but not with moschatas or pepos.

Also squash seeds need to be dried thoroughly. If you think they're dry, wait an extra day or two just to be sure. Pumpkin seeds are very healthy.

If space is limited they can be grown vertically, using a trellis as support. Using this method the fruit also has to be secured because of its weight. Old nylons are very good for this. Everyone knows someone who knows a woman with a run in her stockings, instead of throwing them away, use it to secure pumpkins to a trellis.

Pumpkin Soup

- 1 Pumpkin
- 1 Qt Chicken broth
- 1 TBS Pumpkin Seasoning (combination of ground ginger, cinnamon, nutmeg and allspice)

1. Cut pumpkin in half and remove seeds.
2. Roast in oven 60 minutes at 350.
3. Separate pumpkin from skin.
4. Add pumpkin to broth is large pot and heat till pumpkin is soft.
5. Puree, season with salt and pepper.

Quinoa – Chenopodium quinoa

Quinoa, for those who never had it, is prepared like rice, eaten like rice, though contains much more protein than rice because it’s a seed. When we eat quinoa we are eating the seeds of the plant.

Quinoa was first cultivated by Andean people of South America thousands of years ago. Recently within the last decade Quinoa has been "discovered" by foodies and vegans everywhere. One reason for its recent popularity is the fact that quinoa is a complete protein, which means it contains all essential amino acids.

It is very easy to grow however the seeds must be rinsed many times in water to get rid of the outside layer, which is bitter.

Quinoa is best enjoyed in a salad, the ingredients of which are only limited by your imagination. Add a myriad of veggies and choose among dressings such as ginger-soy-yogurt or balsamic vinaigrette.

California Tabboulleh

- 1/2 cup quinoa
- 1 cup stock or boiling water
- 1 lb tomatoes
- 1/2 cup green onion
- 1 can black beans
- 1 can corn or 1 ear fresh corn cooked
- 2-3 cups cilantro
- 1 jalapeño diced (rib and seeds removed)
- 1/8 teaspoon cayenne pepper
- 1/4 cup citrus (equal parts lemon, lime and orange juice)
- 1/4 cup olive oil

Optional: Feta Cheese, Avocado, Grilled Shrimp or Grilled Chicken

1. Add ½ cup quinoa to 1 cup water or stock, add pinch of salt, bring to boil and simmer for 15-20 minutes.
2. Chop tomatoes and leave in a colander to drain.
3. Chop onion, cilantro and pepper.
4. Rinse black beans.
5. Mix all ingredients in large bowl.
6. Dress with citrus juice and olive oil. Season to taste with salt and pepper.

Radishes – Raphanus sativus

"There are some oligarchs that make me want to bite them just as one crunches into a carrot or a radish." - Evita Peròn

Cool weather crop of the Brassica family, Radishes should be included in every backyard garden just for the fact that they are so quick to grow, in fact the translation of the genus Raphanus means "quickly growing."

Like many other Brassicas, radishes thrive in a nitrogen rich environment. Make sure to thin radishes to 1-2 inches apart to allow them room to fully develop.

Harvest when shoulders break the soil. Like Beets, Cauliflower, and Chayote, Radishes are wonderful either brined or pickled.

Orange & Radish Salad

- 10 radishes, trim ends and cut into 1/8" thick slices
- 3 oranges peeled and cut into 1/4", thick slices
- 2 green onions and cut into 1/8", trimmed
- 2 TBS lime juice
- 1/4 cup cilantro (optional)
- 1 TBS oil
- 1 TBS white wine vinegar
- 1/4 tsp kosher salt
- 6 romaine lettuce leaves

Place radishes, oranges, and green onions in a 1-quart bowl. Toss with lime juice, cilantro (if used), oil, vinegar, and salt. Marinate for 30 minutes. Place 1/3 cup of salad on each lettuce leaf.

Spinach – Spinacia oleracea

"I'm strong to the finish, 'cause I eats me Spinach, I'm Popeye the sailor man! (toot, toot)" - Popeye (from theme song)

Highly nutritious, spinach should be included in all home gardens. It is a cool weather crop that enjoys moist, nitrogen-rich soil. Like Swiss chard it grows a long taproot. Loosen soil 6-12 inches before planting.

Use spinach on sandwiches instead of lettuce. Or even better replace bread with large spinach leaves and wrap a filling of grilled chicken, fish, or peppers. The following is my go-to breakfast meal:

Spinach/Eggs Tacos

- 2 cups spinach
- 1 clove garlic
- splash of white wine
- 1 TBS olive oil
- 2 eggs
- 1/4 cup onion chopped
- 1/2 cup cilantro chopped
- hot sauce (optional)

- 4 corn tortillas

1. Sauté garlic in olive oil
2. Add spinach and sauté until wilted.
3. Add splash of white wine to keep spinach from sticking. Water or broth can be used just as well.
4. Beat eggs and add to pan.
5. Scramble with spinach till eggs are cooked
6. Divide among tortillas and top with onion, cilantro and hot sauce.

Swiss Chard – Beta vulgaris

Swiss chard is arguably the best bang-for-your-buck-vegetable that you can plant. First off, like its close relative, the beet, it's a biennial. So for two years, you can be harvesting Swiss chard leaves every week. No other vegetable, other than maybe chayote will give you as much food per square foot as Swiss chard. It should be in every home garden.

To harvest simply cut the outside leaves and leave the inside leaves to keep growing.

Another great characteristic of Swiss chard is its long taproot. It is recommended for backyard gardens with clay soil. The long taproot breaks up the soil.

Swiss chard can be substituted for spinach in any dish (i.e. see Spinach/eggs tacos above). Swiss Chard is more forgiving and can be grown pretty much anytime of year. The beautiful thing about these veggies is how productive they are.

Swiss Chard with Preserved Lemon

- 2-3 bunchs of swiss chard leaves; ribs separated and saved for another recipe
- 3 cloves garlic
- 4 TBS olive oil
- 1 small can seeded green olives
- 3 TBS Preserved lemon chopped
- cumin
- red pepper
- salt and pepper

1. Boil water in large pot, add chard and cook until soften about 10-15 minutes, then drain.
2. Boil water in small pot, add olives add let simmer for 15 minutes to remove salt, drain and chop.

3. Sauté garlic in olive oil, add chopped chard, chopped olives, chopped marinated lemon, and stir.
4. Season with salt, pepper, cumin and red pepper.
5. Serve at room temperature.

Tomato – Solanum lycopersicum

"Just when you're beginning to think pretty well of people, you run across somebody who puts sugar on sliced tomatoes." - Will Cuppy

"Happiness is a bucketful of tomatoes." – Me

When choosing tomato plants, the first thing you want to ask is, do I want Determinate or Indeterminate varieties? Determinates are bushy, ripen all at once, and can get by without staking or trellising; Indeterminates grow long vines and best grown vertically, ripen over the course of a season, and need to be staked or trellised. Most heirlooms are Indeterminate. Determinates are ideal for containers.

It is very difficult to direct sow tomatoes, they are best started in flats then transplanted to peat pots when the second set of leaves appear, then transplanted to garden when they are approximately 6 inches.

If you're like me, and most other backyard gardeners, you're growing more tomatoes than you could possibly use within your season. One method to preserve them without canning is to roast them and then freeze.

Roasted Tomato Sauce

- 2 pounds tomatoes, halved (or enough to fill a large pyrex baking pan)
- 4 cloves garlic, smashed
- 1 large white onion, diced
- 1/3 cup olive oil
- 3 tablespoon dried herbs (i.e. basil, thyme and oregano)
- Salt and pepper

1. Arrange the halved tomatoes cut side up in one layer in a large sheet pan or pyrex pan with high sides (at least 2″ tomatoes give off a lot of liquid).
2. Sprinkle salt, pepper and herbs.
3. Spread chopped onion and garlic on top of the tomatoes.
4. Drizzle with olive oil.
5. Put in a 350 F oven for 45 minutes. You can go longer if you want sweeter onions and a more intense tomato taste. Just watch it carefully so it doesn't burn.

6. Scoop contents of the pan (there will be a lot of liquid in the bottom) through a food mill to get rid of skins and seeds. If you don't mind skins, you can just put contents into a blender. Save the liquid as it makes for a flavorful tomato broth.

Taste, and adjust seasonings. Then freeze or use immediately.

As you become more familiar with the recipe you can roast other vegetables with the tomatoes such as peppers, eggplant or fennel. They all add their own nuance to the end result.

Watermelon – Citrullus lanatus

"When one has tasted watermelon he knows what the angels eat." - Mark Twain

Watermelons like it warm and have long growing seasons. For short season summers start plants indoors in peat pots and transplant after all dangers of frost have passed.

Watermelons are over 90% water so no skimping on the watering. They don't call it watermelon for nothing.

Like other members of the Cucurbitaceae family watermelons need a large area to grow. Instead of in rows watermelons are usually grown in "mounds". They are not actually raised mounds but groupings of two to three plants within a small circular area, each plant about a foot apart. You can then train the vines to grow in a certain direction.

What is good for the watermelon is also good for the cantaloupe and the honeydew, though different species of a different genus, all three are of the same family. For this reason grow your melons together. Also, for seed saving purposes honeydew will cross with cantaloupe but neither will cross with watermelon.

Watermelons are like peas, no recipe needed, simply slice and serve.

Zucchini Squash – Cucurbita pepo

Zucchinis terrific! Like bunnies, prolific!" - Unknown

All summer squash is c. pepo. That includes crookneck squash, patty pan squash, yellow summer squash and zucchini. All have similar growing habits. They like full sun, fertile, rich soil, and medium moisture. Mulching around squash plants is recommend to hold in the moisture.

This annual vine is best planted from seed though those in northern climates can get a jump on the season by starting seeds indoors.

Summer squashes are usually bush types as compared to the vining types of winter squash. However there are exceptions. Climbing Italian Summer Squash, Trombetta di Albenga, is a vining type that must be trellised to allow the fruits to hang straight.

If they grow along the ground the fruits tend to curl.

Squash plants must be picked early and often. Zucchini is best when the fruits are about 6".

Zucchini can be roasted, grilled steamed or sautéed. It can also be used to make a wonderful zucchini bread as per my mother's recipe below.

Helen's Zucchini Bread

- 3 cups flour
- 1 tsp baking powder
- 1 tsp baking soda
- 1/2 tsp salt
- 1 TBS ground cinnamon
- 3 eggs
- 1 & 1/2 cups granulated sugar
- 2 tsp vanilla extract
- 1 cup vegetable oil
- 3 cups zucchini (grated)
- 1 cup pineapple crushed and drained
- 1 cup chopped walnuts

1. Preheat oven to 350.
2. Lightly grease medium size loaf pan (9x5)
3. In a large bowl stir together flour, baking powder, baking soda, salt and cinnamon.
4. In another large bowl beat together, eggs, sugar, vanilla and oil.
5. Add zucchini and mix well.
6. Add flour mixture and stir.
7. Stir in pineapple and walnuts.
8. Pour batter into prepared pan.
9. Bake for 50-60 minutes, or until loaf springs back when lightly touched.

CHAPTER 13
RESOURCES

Asking for Help

Cooperative Extension Office - University researched information for all 52 states on a clickable map

Plant Info

Crop INDEX A-Z - Crops are listed alphabetically by genus and common name. Courtesy of Purdue University, Center for New Crops and Plant Products.
HenriettesHerbal.com - One of the oldest and largest herbal information sites on the net and new home for King's American Dispensatory
Plants For A Future - 7000 useful edible plants - Edible, medicinal and useful plants for a healthier world

Vegetables Only

Vegetable Gardening In Containers - Courtesy of the Agricultural Program at Texas A&M University
Watch Your Garden Grow - Vegetable specific from University of Illinois Extension (also in Spanish)

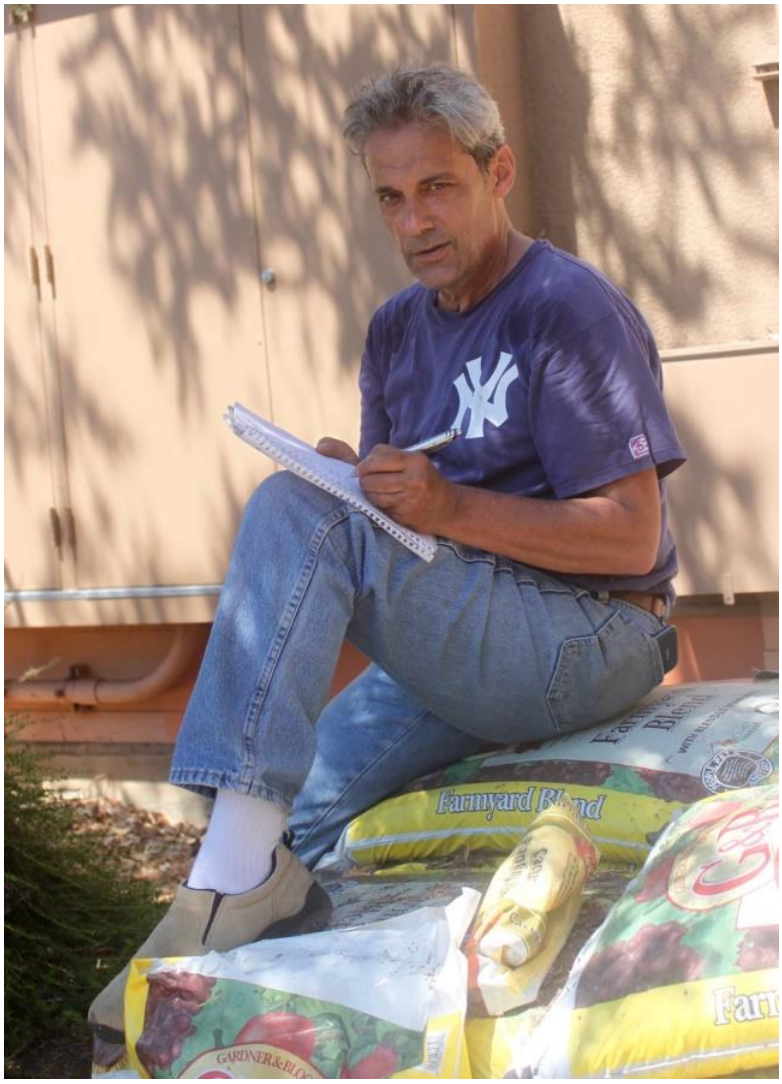
Seeds Only

Seed Saving and Seed Savers' Resources - Huge links page
SeedSavers.org - The Official site for Seed Savers Exchange, Decorah, Iowa. Become a member and be a part of the exchange, the Seed Savers Yearbook is a seed-lovers dream.

Seed Dealers

Baker Creek Heirloom Seeds
Botanical Interests
Burpee
Fedco
Heirloom Vegetable Seed Sources
J. Hudson, Seedsman
Johnny's Selected Seeds
Kitazawa Seed Co
Natural Gardening Company
Park Seed
Peaceful Valley Farm Supply - Organic Garden and Farm Supplies
Pinetree Garden Seeds
Renee's Garden
Sand Hill Preservation
Seeds for the South - Southern USA gardens-zones 7-9.
Seeds of Change - Organic Garden Seeds
Seeds Trust (High Altitudes)
Southern Exposure
Strictly Medicinal formerly Horizon Herbs
Swallowtail Garden Seeds
Territorial Seed Company

About The Author



George Pessin became a UC Master Gardener in 2004. In 2010 he began teaching the Grow LA Victory Garden Classes, a multi-session 12-hour course conceived to teach local urban dwellers how to grow their own fruits and vegetables. He is currently teaching these classes twice a year (Spring and Fall) at the Greystone Demonstration Garden in Beverly Hills, CA.

In 2009 George started SchoolGarden Weekly.com. It's a website devoted to helping parents and teachers start and maintain school gardens.

In 2019 he created the The Grow America Garden Act. It is his belief that gardening can change the world.