

Gardening in Small Spaces

R.E. Durham and D. B. Hill

Extension Specialists

Department of Horticulture and Department of Forestry

Gardening, in one form or another, is often described as one of the most popular hobbies in the United States. And rightly so. Involvement by people in gardening activities helps promote healthy habits. At a time when Americans are overweight and under-exercised more than ever before, consider that a 150-pound person working in the garden will burn approximately 350 calories per hour. That's roughly equivalent to doing low-impact aerobics, playing softball, pulling a cart while playing golf, walking at a very brisk pace, or playing vigorously with children. Of course, consuming home-grown vegetables is good for health as well. Fresh vegetables are loaded with vitamins, antioxidants, and fiber, all of which play a role in cancer prevention and general good health. And when you grow your own vegetables, you know exactly how they were grown and where they originated—issues of food safety and security that are becoming more and more important to our society.

So, most would agree that gardening is a worthwhile endeavor. However, when most people think of a garden, they imagine a large field that has been plowed with long neat rows spaced 3 or 4 feet apart to allow cultivation by a tractor or tiller. Gardening on such a scale is impossible for city dwellers, considering that residential lot sizes continue to decrease and more and more people are choosing to live in town homes, condominiums, or apartments. Our modern landscapes have little enough room for outdoor leisure in general, not to mention gardening. Nevertheless, you would be surprised at the amount of vegetables that can be produced in a very small area. When gardening in a small

space, there is little need for spacing plants in rows, so planting can be more efficient. Also, placing plants in a raised bed or container reduces the need to walk in or closely around your plants. This reduces the chances that soils will become compacted and need frequent tilling. And with a little planning, even residents of apartments and condominiums can grow a few vegetables on their patios. Raised-bed and container gardening may also allow those with limited mobility to garden. This publication will outline three common methods for gardening in small spaces: raised bed gardening, square foot gardening, and container gardening. In this space we can only touch on these topics lightly. For information on specific vegetable crops, the reader is especially encouraged to consult ID-128, Home Vegetable Gardening in Kentucky, and ID-133, Vegetable Cultivars for Kentucky Gardens, available from your local County Extension Office.



Cedar post and boards can be used for raised beds. They are naturally resistant to decay and will persist for several years in the landscape.

Raised Bed Gardening

Raised bed gardening has several advantages. Soils in raised beds are usually better drained than the surrounding area so installing raised beds offers a solution for poorly drained sites. Better root growth from improved soils usually results in higher yields from plants grown in raised beds. Raised beds require less stooping during weeding, watering and other activities. Raised beds can also be installed in areas that are difficult to garden conventionally, such as sites with shallow soil (over rock), steep slopes, or poor soil quality.

The garden beds are usually raised off the ground surface to a height of at least 6 to 8 inches. A frame to support the soil may be constructed from wood, stone, concrete block or brick, even old rubber tires, or the gardener may prefer simply to mound the soil without a rigid structure. The bed size will vary according to the gardener's needs and the space available. Beds are typically constructed no more than 4 feet wide since this width allows for an easy reach into the middle of the bed from either side. An aisle of 2-4 feet is maintained between beds to allow easy access with tools and equipment (wheelbarrows, hose reels, chairs or stools, wheelchairs).

Tire Towers

Tire towers are stacks of old tires that can be used for growing a variety of crops, but are particularly useful for root crops like potatoes or sweet potatoes. Make sure you have a relatively flat spot on which to place the tires. Place the bottom tire where you want the stack to be and fill it with crushed plastic gallon milk cartons. Make sure you get them well packed into the rims of the tire. Cover the cartons with some kind of mulch (woody material is fine). Carefully stack two or three more tires of the same size on top of the base tire and fill them with your planting mix, continuing to be careful to pack the mix tightly into the rims of the tires. Plant one or two plants of potato or sweet potato in the open circle of the top tire, and then treat it like any other container. The potatoes will grow inside the tires, so when you want to harvest them, you can simply cut off the plant at the top (and recycle it into your compost) and remove the tires, one by one, harvesting the potatoes as you work your way down to the bottom.

Selecting a site: Vegetable gardens will be most productive when planted in full sun. However, many vegetables will thrive and produce a good crop if they receive 4 to 6 hours of direct sunlight a day. Locate the garden away from trees if possible so that tree

roots will not compete with the vegetables for water and nutrients. It is especially important that gardens not be located close to black walnut (*Juglans nigra*) trees since walnuts produce a compound in their roots, shoots and leaves that is toxic to many plants including several vegetables. Locate your beds in a location where water is readily available since raised beds will dry out more quickly and require more frequent watering than conventional gardens.

Treated Wood

The use of treated wood in gardening situations is quite controversial. The advantage of treated wood is that it resists decay and insect activity for many years and so is a more permanent addition to the landscape than most untreated woods. Prior to 2004, the primary wood treatment involved chromated copper arsenate (CCA). While this product was approved for use in landscape situations, the use of CCA treated wood was phased out in 2004. If treated wood is to be used in raised bed gardening, the gardener is encouraged to obtain a product data sheet regarding the type of wood treatment used and limitation to the use of such wood in the landscape. The gardener may also wish to contact the Environmental Protection Agency for current information regarding the safety of wood treatments. Alternatives to treated wood include the use of woods naturally resistant to decay (cedar, redwood, black locust), synthetic products (TREX, recycled plastics), rock, or masonry block. All of these provide sturdy structures that should persist for some time in the landscape. One could also choose to use untreated wood with the understanding that it must be replaced in two to three years.

Preparing the soil: One of the reasons that raised bed gardening is so productive is that the gardener has control over the soil used in the bed. In traditional gardens, soil becomes compacted from tractors, tillers, or people moving across the surface. Adding components such as organic matter and porous material to raised beds will improve soil structure (see below for directions on making your own compost - it will ultimately save you time and money, and it recycles things and keeps them out of our landfills!). Soil compaction is also avoided by not walking in the beds. An ideal soil for raised beds would consist of equal volumes of garden soil, organic matter (compost, peat moss, composted manure), and porous material (vermiculite or perlite). If good quality garden soil is not available, substitute additional organic matter. Add lime and fertilizer as recommended by a soil test of the finished soil mix. In the absence of a soil test, 1-2 pounds of a complete fertilizer such as 10-10-10 per 100 square feet is usually adequate.

Planting: There are several ways to plant your bed. You may also choose to plant in rows within the bed, or simply group similar plants together by maturation time or height. When choosing what to plant keep in mind that diversity in plants will promote a more stable ecosystem. Plant diversity tends to encourage more beneficial insects and microorganisms in the planting area. Monoculture, or grouping together of the same or closely related crops, may encourage more pest and disease issues. You may even want to include a few flowers in your garden to increase the diversity of plants being grown. Some flowers (marigold, nasturtium, pansy) are also edible.

Also have a plan for intensively gardening the space. Remember that certain vegetables like spinach, lettuce, cabbage, broccoli, and others, grow well in spring and can be planted relatively early (late March or early April). These crops are often harvested by mid May when summer vegetables (tomatoes, beans, peppers, squash, corn, etc.) are planted. Some of these crops mature very quickly (see ID-128) and it may be possible to make two or more plantings in the summer garden. For example, beans planted in mid May will likely mature by mid July. A second planting of beans can be made in mid July to be harvested in mid September. Many summer vegetables will be finishing up by late August to early September, just in time for a planting of fall vegetables (many of the same crops that were grown in the Spring garden. By preparing for three gardening seasons (Spring, Summer and Fall) and planting in succession (one crop goes in as another is harvested), the most intensive and efficient use of your garden space will be achieved.

Another way to garden intensively is to train plants vertically when possible. This both saves space and often results in higher quality produce. Tomatoes should be staked or caged to support vertical growth. Viney crops such as cucumber, squash, or even melons can be trained to a trellis rather than allow them to sprawl across the ground. In the case of melons and squash that have large fruit, individual fruit may need to be supported by a sling of plastic mesh or nylon hose.

Finally, as you plan from year to year, remember that it is good practice to move plants around if your gardening space allows. For example, if you have multiple beds, don't grow tomatoes (and related crops like potatoes, peppers, and eggplant) in the same bed for more than 2 or 3 years. Give the soil a break from tomatoes (and related crops) for a couple of years by moving them to another bed,

growing them in containers, or not growing them at all. This will prevent soil pests from building up to high numbers that will eventually impact the performance of your plants.



Concrete blocks are heavy, but they can be laid in place with minimal or no anchorage.

Care and Maintenance: One of the benefits of raised beds is that the plants have been elevated above the walkway and less stooping will be required for maintenance and harvest of vegetables. However, because the soil is raised it tends to drain water faster and may dry out more rapidly than conventional gardens. One way to slow soil drying is to mulch. A layer of organic or inorganic mulch will reduce weed growth (and competition between weeds and crops for moisture), and reduce water loss to evaporation. A 1 to 2 inch layer of organic mulch such as compost, straw, or grass clippings, will slowly break down and contribute beneficial organic matter to the soil. A few layers of newspaper beneath organic mulch will help to prevent weed germination.

Plastic film, usually black, is the most common type of inorganic mulch. The film is stretched over the bed in early spring after the soil has been prepared and anchored along the sides. Holes are made in the film where seeds or transplants will be placed. These holes will also provide entry sites for additional water during the growing season and allow for sufficient air exchange in the soil. Soaker hose or drip irrigation lines may be installed under the plastic to allow routine irrigation or supplemental irrigation during drought. Black plastic film will prevent weed growth by blocking sunlight, significantly reduce evaporation of moisture from the soil surface, and will also promote warmer soil temperatures in spring which will hasten

development of most vegetable crops. The plastic film is usually replaced after each growing season and application of supplemental organic matter is more crucial with inorganic mulch than with the use of organic mulch. An added benefit of mulch (either organic or inorganic) is that the produce is usually cleaner at harvest.

As mentioned earlier, raised beds are more prone to drying out than conventional gardens. At least one inch of rainfall or supplemental irrigation per week will usually be necessary to mature a vegetable crop. If supplemental irrigation is applied, it is best to use drip or soaker hose irrigation since these tend to direct water to the root system and not onto the plant itself. Watering the entire plant, especially late in the evening, will allow water to remain on the foliage for several hours. In certain instances this may promote disease problems. Therefore, it is best to water in the morning if it is necessary to use some type of sprinkler that wets the entire plant.

Specific needs of individual crops as well as pest management is covered in other publications, especially ID 128, Home Vegetable Gardening in Kentucky.

Season Extenders: As spring approaches, many of us will want to start work in our vegetable gardens. And who wouldn't want to get a jump on spring and have the first ripe tomato of the neighborhood? Or on the flip side of the coin, what if you could extend the growing season and produce leafy greens like spinach and lettuce well into the fall and winter? Row covers may allow you to do either. Row covers or low tunnels as they may be referred to by commercial growers, are made of clear plastic film that is supported by wire hoops. The covers run the length of the row and are covered on the sides by soil. The ends are often attached to a wooden frame to allow opening of the ends on warm, sunny days. The covers usually stand 18 to 24 inches tall. Commercial growers use another version of this technology called high tunnels which are large enough to walk under.

The advantage of row covers is that they protect plants from frost. On cool nights the warm soil radiates heat that is trapped by the covering and so offers the plants some protection from cold temperatures. Cold sensitive plants, such as tomatoes and peppers, can be transplanted to the garden 3 to 4 weeks earlier when using row covers. Once warm temperatures prevail, the covers are removed and the

plants grown normally. Cold tolerant plants, such as spinach, make a great fall and winter crop under row covers and can be grown nearly winter-long. Another advantage is that plants grown under row covers often have fewer insect problems. On warm days, temperatures under the row covers can become quite hot to the extent that plant damage may occur. If warm sunny conditions are expected, open the ends of the row covers to allow some ventilation, then close them again at night to conserve heat.

One problem people encounter with row covers is that weeds like them as well. When you consider that the covers are in place for 3 to 4 weeks and that little cultivation can be done during this time, it's easy to see why weeds may become a problem. One solution is to put black plastic sheeting on the soil before planting. Holes only large enough to insert the transplants are made in the black plastic and the remainder of the area is covered by the plastic to suppress weed growth. The black plastic will also help to conserve soil moisture and will trap more of the sun's energy to warm the soil and provide heat to the plants on cold nights. When the row covers are removed, the plastic weed barrier is usually left in place to give season-long weed control.

Square Foot Gardening

Square Foot gardening, developed by Mel Bartholomew, is a special type of raised bed gardening. The bed is divided into one-square-foot grids, with each section planted in a defined number of transplants or seeds depending on what crop is being grown. The Square Foot approach also emphasizes the use of recycled materials for bed construction, and relies heavily on compost as a major component of the growing medium. The use of synthetic fertilizers and pesticides is also discouraged in Square Foot Gardening. Because of the emphasis of compost and other organic materials in the growing medium, supplemental fertilizer may be unnecessary in Square Foot gardening.

Constructing Boxes: In the United States, a square foot garden is usually 4 feet by 4 feet, providing 16 individual square foot areas for planting your vegetables, herbs, and flowers. If possible, find 4 recycled (but not treated) boards that are 1 inch thick, 6 inches wide, and 4 feet long. Drill holes in the ends and sides so that you will be able to screw

the boards together to form a box. Use 3-inch screws to hold the boards together. Depending on how much space you have to use, or whether you would like your children to have their own gardens, you can also make square foot gardens that are 3 feet x 3 feet or 2 feet x 2 feet. The size is dependent on whatever distance is comfortable for you to reach across from any side to tend the garden - smaller sizes for smaller people.

If you are going to place your square foot garden on the grass or on an old garden plot, place newspapers or corrugated cardboard on the bottom to form a “floor.” The newspapers should be several layers thick, and are placed with edges overlapping by about a third. Cardboard is a single layer, but also overlapping by about a third. Once you have formed the floor for the garden, soak it thoroughly with water, so the papers or cardboard become soggy.

If you are going to place your square foot garden on concrete or asphalt or another solid surface, use 3/4 inch plywood - a single sheet - for the base, and screw the plywood onto the frame. You also need to drill a few drainage holes (4-6) in the plywood base.



Boards made from recycled plastics are available and are resistant to decay.

Soil Mix: The soil mix for a square foot garden is equal **volumes** of peat moss, coarse vermiculite and compost. A 4 x 4 square foot garden will require 8 cubic feet of the mix. Peat moss often comes in 3 cubic foot bales, and the big bags of coarse vermiculite also are 2 or 3 cubic feet. Mix the three in a wheelbarrow or other big container and fill the box up to the edges. This mix is high in nutrients because of the compost, and is very loose and friable, making it easy for plant roots to grow and obtain all the nutrients and water that they need. Both the peat moss and the vermiculite help to hold water in the soil for the use of the plants.

Grid: Now you need to mark off your squares. There are 16 squares in a 4 x 4 foot garden. Use either nails with twine or string to mark off the squares, or, for a more permanent grid, use narrow wooden laths or recycled 4 foot venetian blind slats. If you are using a more permanent grid, the ends of the grid sections should also be screwed to the boards that edge the garden.

Planting: When planting your square foot garden, you may use either bedding plants or seeds. This kind of garden is very conservative of seeds, as you will be placing the seeds or plants in the final spacing that is recommended for each type of plant on its seed packet. For each square foot, you will plant either 1, 4, 9, or 16 plants. The ones that have only a single plant are ones that should be planted one foot apart, like tomatoes or cabbage. The ones that are 4 per space, like chard or lettuce, are ones that need to be 6 inches apart. The ones that are 9 per space, like beets or spinach, are ones that need to be 4 inches apart, and the ones that are 16 per space, like radishes or carrots, are ones that need to be only 3 inches apart.

To emphasize diversity, and get the most from your garden, plant different things in each square—some can be reserved for flowers (most flowers end up in the 4 per square category). If you want to grow things that form vines, like cucumbers or squashes (usually 1 per square), put them on the north side of your garden (so they won't shade the others), and use poles or electric conduit, or pvc pipe to make a trellis for them to climb. You can use chicken wire or other mesh products (like deer fencing or bird netting) across the uprights to give the climbers lots of places to wind their tendrils.

When using seeds, pour only a few from the packet into your hand and then place only one or two seeds in each hole. If you keep your leftover seeds in a cool and dry place, many of them will survive to make new plants for you for several planting seasons. When using bedding plants, make a shallow, saucer-shaped depression where the plant will be placed. This will help direct water to the root system.

Some of the things you will plant grow very quickly and will be harvested in a month or so. There are three major types of plant that you will have in your garden - ones that we eat the root (carrots, beets, parsnips, radishes), ones that we eat the leaves (lettuces, chard, spinach, cabbage), and ones that we eat the “fruits” (tomatoes, beans, peas, squashes). When you harvest something from one

of these categories (radishes - a root, for example), replace it with something from one of the other two categories (spinach as a leaf or beans as a fruit, for example). If you start in the spring, you might be able to grow all three types in each square over the whole growing season.

Each time you make a change in a square of the garden, you add another trowel full of compost and mix it into the soil in that square before replanting or reseeding. This addition of compost will resupply the growing medium with nutrients.

These gardens are so small that it is easy to protect them, whether with garden fabric to protect against too much sun, or with chicken wire or netting to protect from insects and animals, or with something like the row covers to extend the growing season. You can make your own cover supports with bent wire hangers to cover the whole garden or only a single square.

Themes: One of the things that is fun about a square foot garden is that you can design it any way you want. So if you want a pizza garden, for example, you might want to be growing onions, green peppers, banana peppers, tomatoes, parsley, basil and oregano. If you wanted a salad garden, you might want to be growing green peppers, cucumbers, spinach, cherry tomatoes and several varieties of lettuce. Use your imagination and enjoy!

Container gardening

Even if you live in an apartment or condominium with only a balcony, patio or walkway available for gardening, you can still enjoy many of the rewards of growing your own vegetables. Lack of space for a traditional garden is not the only reason to try container gardening. Switching to container gardens can be one solution to a traditional garden site that is unsuitable because of poor drainage, problems with soil-borne organisms, too much shade or too much sun. In addition, container gardens can be part of a crop rotation plan that involves moving certain crops from a backyard garden to containers to lessen the buildup of soil borne diseases for certain crops. Container gardening is also one example of assistance gardening that may be suitable for people with disabilities or limited mobility. Many container-grown vegetables also have ornamental value and can enhance your home. Using containers allows you to take advantage of the various microclimates in

your vicinity. For example, lettuce can be grown in a cool, shaded area while heat-loving plants, such as eggplant, can be located in full sun where reflections from buildings or patio surfaces add to the heat.

Choosing vegetables for containers: As a rule, nearly all leafy vegetables will do well in containers. Plant breeders have developed many dwarf or miniature varieties for container production. Crops with many fruits per plant, such as tomatoes, are good choices. Cultivars with a bush or compact growth habit also do well. Details regarding vegetables, their maturation dates, and mature size can be found in ID-126—Vegetable Cultivars for Kentucky Gardens, available from your County Extension Office.

Selecting containers: You can grow vegetables in just about any container that will hold soil, is large enough to support the crop when it is fully grown and has drainage holes. Porous materials, such as clay and wood (rot-resistant redwood, cedar or cypress are best), lose moisture more quickly in dry weather and will therefore require more frequent watering. On the other hand, it is almost impossible to overwater plants growing in porous containers when adequate drainage is present. Non-porous containers made of metal, plastic, glazed pots, glass and wood lined with plastic hold moisture longer.

Consider using barrels, window boxes and hanging baskets. Unusual and unique containers will add interest to your garden. Use caution when selecting small containers of dark colors. The root zone may become dangerously overheated when such containers are exposed to full sun.

Each container must have drainage holes in the bottom so the plant roots will not stand in water. If the container does not already have holes, make at least four small nail holes in its sides, ½ inch from the bottom.

Choose the container size to match the plant's growth requirements. Feeding and watering plants is easier if you use large containers, since smaller ones need more frequent attention.

You will also want to consider the combined weight of the container with the amount of soil that it will hold. If too light, your plants may blow over during a wind storm. On the other hand, if you will be moving your plants during the growing season, you will not want to have excessive weight to handle. You may need to choose a container made of a lighter material or place your plants on a wheeled platform for ease in re-locating.

Potting mixes: For small or a few containers it may be easiest to use a commercially prepared greenhouse potting soil mix, available at local garden centers or greenhouses. If you are going to have several large containers, it may be more economical to mix your own soil. The growing mix described for Square Foot gardens would work great, or try the soil mix recipe given below. The use of garden soil adds density that will impart added stability to containers where top-heavy crops are being grown. However, garden soil may contain weeds, insects, or disease organisms that may interfere with your container garden. You can use a conventional oven or a microwave to sterilize the garden soil for this mix. Place moistened soil in a cake pan and heat in a 200 degrees F oven for 45 to 60 minutes or, using a microwave-safe pan, microwave the soil for 15 to 20 seconds.

1 part compost or sterilized garden soil
1 part perlite
1 part sphagnum peat moss (Canadian)
¼ cup superphosphate per bushel
½ cup dolomitic limestone per bushel

Planting: For best results moisten the soil mix the day before you intend to plant. Many plant mixes contain a high percentage of peat, which requires time to soak up the water. Peat moistens faster with hot water than with cold water. A drop of dishwashing soap will help wet dry potting mixes. If you will be using a slow-release fertilizer, it should be added to the soil mix prior to planting.

Be sure the container is clean before planting. If you are using a clay pot, soak it in water for a few minutes first. Place a coffee filter, screen mesh or clay pot fragments over the drainage holes to keep the soil mix from leaking out while filling. You can add a filler, such as Styrofoam peanuts or crushed milk jugs, to the bottom few inches of an especially large or deep container. This will help reduce the amount of soil mix needed. Potting mix should be added to within ½ inch of the top of the container. Plant spacing will be similar to those in raised beds or Square Foot gardens.

Plant support: Tall or vining vegetable crops require staking, caging or trellising. This includes tomatoes, cucumbers, pole beans and other climbers. It is best if plant supports are put in place at seeding or transplanting to minimize the amount of disturbance to the plant. It may be necessary to anchor these

containers to provide additional stability during high winds.

Interplanting: While a single container can be limited to just one crop, this is not necessary. You can interplant your vegetables with herbs, bedding plants and even other vegetables. To be successful, all plants in the same container must have the same requirements for sunlight and water.

Maintenance: Pay particular attention to watering container-grown vegetables. Due to their small volume, container soils can dry out very quickly, especially on a concrete patio in full sun. Porous containers, such as clay, are especially prone to dry out rapidly and can actually wick water away from plants. Daily watering may be necessary; however do not go to extremes. Water when the soil feels dry, adding enough that water runs out of the drainage holes. The soil should not be soggy or have water standing on top of it. Water should also freely drain from the base of the container and not collect in a saucer—this may lead to a water-soaked growing medium that will foster disease problems.

Vegetables grown in containers should be fertilized regularly. Make the first application three weeks after plants have two sets of leaves. Repeat once a week using a soluble plant food at one half the label rate. If you added a slow release fertilizer to your soil mix or use a high percentage of compost in the mix, additional fertilizer may not be needed. Your plants will exhibit yellowed foliage and stunted growth when nutrients become limiting. Additional fertilizer or compost will need to be applied in such cases.

Protect plants from very high heat caused by light reflection from pavement or a building. If necessary, move them to a cooler spot or shade them during the hottest part of the day. Plants may also need to be taken to a more sheltered location during severe rain or wind storms. Remember that the root zone is prone to overheating, as well. Small, dark-colored containers should not be used in full sun.

After you harvest spring and early summer crops, you can replant the container with vegetables for the summer or fall garden.

Remove vegetable crops from their containers once harvest is complete or after a killing frost. It is best not to save and reuse the same potting soil the following season because the soil may be harboring disease organisms or insect pests. In addition, the soil becomes compacted and loses its structure with repeated watering and cultivation. Instead, add the used soil to a compost pile or to soil in your yard or garden.

Scrub containers with a 10% solution of household bleach before storing. Clay containers should be stored where temperatures will not drop below freezing. They are porous and are likely to crack when exposed to low winter temperatures. Non-porous containers can be stored outside.

Summary

Gardening is one of the most popular activities for people around the world. Providing food, herbs and flowers for your table and enjoyment only add to its popularity. Focusing on the small scale and adaptability of these small space gardens shows you that almost anyone can grow *some* kind of garden. People of different sizes, people with different experience in growing things, people with disabilities, older and younger people - all can manage some kind of garden. Just decide which kind you want and design it so that the gardener will be able to work in it. Have teenagers build gardens for elderly people to manage. Grow gardens with lots of scents and textures for the visually challenged. Build gardens up on tables or sawhorses so that wheelchairs will fit underneath. Get out in the sunshine and GROW!

Light needs of some popular vegetables.

Partial Sun (4-6 hours per day)*

Beets	Parsley
Carrots	Peas
Cauliflower	Radishes
Cucumber	Spinach
Lettuce	Swiss Chard
Onion	Winter squash

*Although these vegetables will grow in partial sun, best yields may be realized in full sun.

Full Sun (Over 6 hours per day)

Beans	Melons
Broccoli	Summer Squash
Cabbage	Tomatoes
Corn	
Eggplant	

Spacing of plants in conventional raised beds and Square Foot gardens.

1 plant per square foot* (space 1 - 1.5 feet apart in conventional beds)

Roots/Tubers

Potatoes
Sweet Potatoes
Horseradish

Leaf Crops

Broccoli
Kale
Collards
Cabbage

Fruit/Legumes

Melons Cucumber
Squash Okra
Tomatoes Peppers
Artichoke Pumpkin
Eggplant

4 per square foot* (space 6 inches apart in conventional garden)

Herbs

Parsley
Cilantro
Basil
Oregano
Mint

Leaf Crops

Bok choy
Lettuce
Chard/Swiss Chard

Fruit/Legumes

Soybeans
Fava beans
Drying beans
Corn
Strawberries

9 per square foot * (space 4 inches apart in conventional garden)

Roots/Tubers

Beets
Turnips
Garlic

16 per square foot* (space 3 inches apart in conventional garden)

Roots/Tubers

Carrots
Radishes
Onions
Green onions

Leaf Crops

Spinach

Fruit/Legumes

String beans
Peas

* To plant one per square, simply make a hole with your fingertip in the center of the square and place the seed or bedding plant right there (bedding plants should be planted into a small saucer-shaped depression in the soil).

* To plant four per square, draw a line from top to bottom of the square with your fingertip, halfway across the square; then draw a second line from side to side, halfway across the square, so you have made a big cross (like the Red Cross cross) in your square. Then make a hole with your fingertip in the center of each of the little squares and put the seed or plant in those holes.

* To plant nine per square, use your index and baby fingers to draw two lines from top to bottom and from side to side, giving you a grid like a tic-tac-toe game. Make a hole in the center of each of these little squares and put the seed or plant in them.

* To plant sixteen per square, start with the grid you did for four, then use your index and second finger to make four holes in each of the four sections, and plant your seed or plant in each of them.

Making Compost:

Compost is organic matter created by the natural decomposing process, usually of plant material, or of animal waste products from animals that are plant eaters or herbivores. Most soils have an organic matter content of 3 to 6 percent. By adding large amounts of compost to a planting mix, you can increase that percentage significantly. The organic matter is largely where the nutrients come from on which the new plants feed. Using a large percentage of compost in your planting mix means you should have a reduced need for any kind of chemical fertilizer.

You can either buy or make a container for compost. For patios and small yards, you can have either a box-like or a drum-like container, that will remain closed unless you are adding to it, or removing the compost from it. This helps avoid the possibility of pests (insects or animals) bothering your compost. In larger yards, or on small farms, you can build compost bins from old pallets or other recycled materials or with a standing circle of chicken wire or other screening.

What goes into compost?

- plant parts - fruit rinds and cores, stems, leaves, roots, pieces cut out of vegetables, flowers or fruits
- manures from plant-eating animals: rabbits, hamsters, mice, rats, horses, cows, sheep, goats, pigs, chickens, geese, ducks, guinea hens**
- human hair, fur, feathers
- clothes dryer lint
- newspaper or shredded paper (not the shiny kind)
- straw or old hay
- eggshells
- coffee grounds and tea leaves or teabags
- nut shells
- grass clippings
- leaves - fresh or dry - from trees and shrubs
- weeds (watch out for seeds! If the compost process is not thorough, seeds may escape to germinate in the garden)
- sawdust or wood shavings (in small quantities)
- soil - just a little (less than 5%) to provide some of the microorganisms that occur in the soil and are helpful in breaking down nutrients into usable forms

****Note:** Manure from grazers like cattle, horses, sheep and goats, and from the small mammals like rabbits, mice and hamsters, is considered “cool” - and can usually be used freely. Manure from poultry - chickens, geese, ducks, guinea fowl - and from pigs - is considered “hot” and should be used in very small quantities. It is rich in nitrogen, and will “burn” your plants if you use a lot of it. So, for example, if you were going to add a quart of horse manure to your mix, you would add only 1/2 cup of chicken manure to the same mix in its place.

What doesn't go into compost?

- meat or meat products
- bones
- fats or grease, oils
- baked goods - breads, cookies, cakes, pies
- dairy products - milk, yoghurt, cheeses

How to build a compost pile: Building a compost pile is like making a layer cake. You need to alternate things that are “wet” with things that are “dry”. For example, after a layer of grass clippings about 2 inches thick, lay down a layer of dried leaves or shredded paper that is also about 2 inches thick, and keep alternating until the pile is 3 or 4 feet high. The pile needs to have moisture to “work” and also needs air, so once the pile is made, it needs to be watered if we haven’t had rain, or if it is enclosed so rain can’t get in. It should be mixed frequently - once a week, for example - so that air gets into the mix. In the summer time, you should be able to create the earthy, crumbly material of finished compost that you can use for planting in a month or so. If you find some earthworms elsewhere in your garden, you can put some of them in the compost, too, or you can purchase special earthworms that make the compost pile decompose more rapidly!