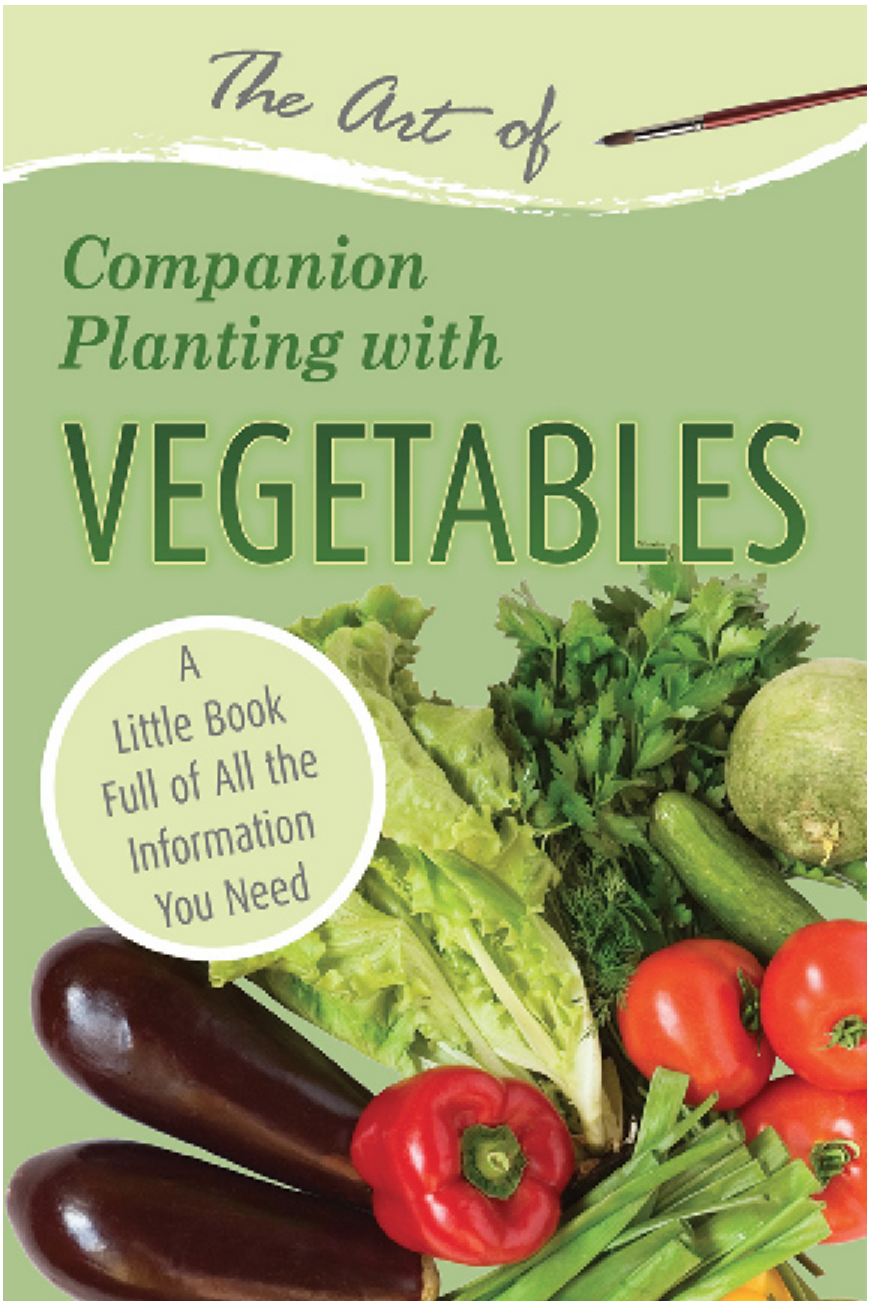
The Art of

Companion Planting with VEGETABLES

A Little Book Full of All the Information You Need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1210 SW 23rd Place • Ocala, Florida 34471
Phone 800-814-1132 • Fax 352-622-1875
Web site: www.atlantic-pub.com • E-mail: sales@atlantic-pub.com
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A few years back we lost our beloved pet dog Bear, who was not only our best and dearest friend but also the "Vice President of Sunshine" here at Atlantic Publishing. He did not receive a salary but worked tirelessly 24 hours a day to please his parents.

Bear was a rescue dog who turned around and showered myself, my wife, Sherri, his grandparents Jean, Bob, and Nancy, and every person and animal he met (well, maybe not rabbits) with friendship and love. He made a lot of people smile every day.

We wanted you to know a portion of the profits of this book will be donated in Bear's memory to local animal shelters, parks, conservation organizations, and other individuals and nonprofit organizations in need of assistance.

– Douglas & Sherri Brown

PS: We have since adopted two more rescue dogs: first Scout, and the following year, Ginger. They were both mixed golden retrievers who needed a home.

Want to help animals and the world? Here are a dozen easy suggestions you and your family can implement today:

- *Adopt and rescue a pet from a local shelter.*
- *Support local and no-kill animal shelters.*
- *Plant a tree to honor someone you love.*
- *Be a developer — put up some birdhouses.*
- *Buy live, potted Christmas trees and replant them.*
- *Make sure you spend time with your animals each day.*
- *Save natural resources by recycling and buying recycled products.*
- *Drink tap water, or filter your own water at home.*
- *Whenever possible, limit your use of or do not use pesticides.*
- *If you eat seafood, make sustainable choices.*
- *Support your local farmers market.*
- *Get outside. Visit a park, volunteer, walk your dog, or ride your bike.*

Five years ago, Atlantic Publishing signed the Green Press Initiative. These guidelines promote environmentally friendly practices, such as using recycled stock and vegetable-based inks, avoiding waste, choosing energy-efficient resources, and promoting a no-pulping policy. We now use 100-percent recycled stock on all our books. The results: in one year, switching to post-consumer recycled stock saved 24 mature trees, 5,000 gallons of water, the equivalent of the total energy used for one home in a year, and the equivalent of the greenhouse gases from one car driven for a year.

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INTRODUCTION: Overview on Companion Planting

Companion planting is a phrase that has taken on many meanings for today's gardeners. Within the scientific community, companion planting is also called **intercropping** and is a form of **polyculture**, which describes a method of planting species of plants together for mutual benefit, usually in agricultural situations.

For the layman, **companion planting** is best described as the practice of planting two or more plants together to enhance the growth and quality of nearby plants; to provide maximum ground cover; and, when possible, to improve the soil. This approach to gardening offers many benefits, with the trade-off being that more thought needs to go into the garden planning stage when deciding which plants should go where. Although there is no scientific explanation as to how or why the plants benefit one another, when planted in "companionable ways," much has been learned over the years — with a great deal of success.

Some of the successful companion planting relationships are due to the release of chemical secretions at the roots, which may affect other plants or have an effect on organisms in the soil. It has been theorized that companion planting benefits may result from the plant releasing certain

gases or odors that can repel pests from either the roots or the above-ground parts of the plant. With certain predators (notably insects that damage the plants) out of the way, the plants can flourish. The same goes for other potential pairings. One plant may have the ability to do something like provide structure, add nitrogen to the soil, or offer shade in such a way that makes another plant flourish without hurting itself.

There have been lab studies where scientists have tried to replicate the results of companion planting — with mixed results. By adding the juices of pairs of plants to a 5 percent copper chloride solution and allowing it to crystallize slowly on a glass plate, Dr. Ehrenfried E. Pfeiffer and Dr. Erica Sabarth of the Bio-Dynamic Association were able to predict which plants would be companions and which would be antagonistic from the resulting crystallization patterns. Their findings, along with the trial and error of numerous gardeners, were summarized in a pamphlet by Richard Gregg in 1943 called *Companion Plants and How to Use Them.* Today, similar studies use paper chromatography techniques for related tests.

The companion vegetable suggestions in this book should be used as a basis for your own experimentation, not as a proven guide to success. One of the most important considerations when you look at choosing your own companion vegetables is to not lock yourself in by this book's information. Try some of the combinations out for yourself, experiment with new ones, but also play around with the spacing between the plants and the ratio of one vegetable to another.

As you become more familiar with the subject, you will eventually realize there is conflicting information — partly due to everyone's individual experiences based on geographical location, climate, and garden conditions. Therefore, the rule to companion gardening is simple: Try it out for yourself. Keep a record of your attempts and have fun with it. Plant basil in among your tomatoes and watch them grow like mad. Try basil in with the

peppers for a similar result. Or, try adding in parsley as it can help tomatoes grow strong and healthy.

Companion planting requires a gardener to shake off his or her idea of traditional gardening and make room for new concepts. You will need to let go of concepts that define what a weed is and consider the fact that the weed could have value. Are there stinging nettles, a common weed across the United States, in your area? Have you spent hours trying to eradicate this weed that can grow up to 10 feet tall? Well, stop because they have value. If you grow them close to aromatic herbs, they are supposed to increase the aromatic oils in these herbs by as much as 75 percent. Stinging nettles, like foxglove and lily of the valley, are reported to improve the length of time the fruit from their companion plants can be kept once picked, particularly tomatoes.

Scientific research supports companion planting in the agriculture industry in terms of intercropping and crop rotation, the process of rotating crops for healthier soil and plants. Companion planting applies to prevention or protection from pests and diseases, as well as attracting the right type of insects for pollination and for soil improvement. It is important to note that just as some plants will benefit from being close together, other plants will suffer from the pairing.

There are a few rights and wrongs to take note of, such as realizing that not much will grow under the black walnut tree, which it found across most of the United States and Canada. This tree releases a chemical into the soil that ensures nothing near it can compete with the nutrients and moisture that it needs, making it an undesirable plant to choose in companion planting. Marigolds are planted all over the world to repel all kinds of pests. If you take the dead marigold plants and **dig them under** in the fall (meaning, leave the plant in the ground and turn the dirt and soil over, chopping the plant and roots as you do so), almost nothing will grow where they grew,

and as the plant pieces decay, they will kill anything you plant. But by spring, the soil is safe for planting again. Companion planting allows you to take advantage of the systems already in place in nature to make the most of your garden.

Companion planting can increase your yield of vegetables and even enhance the flavor of some if planted with specific herbs. Beneficial plants to have in your vegetable garden are wild rose, elderberry, buddleia, privet, golden rod, and mustard. With this type of system, it is easy to combine flowers, shrubs, trees, and vegetables for larger and better-tasting yields. If you are short on space, consider planting to maximize the space available such as by planting runner beans with dahlias or pairing curly parsley with cosmos. Another combination that can work well are clematis flowers with apple trees as the clematis can climb the trees and utilize the space under the tree that is often wasted.

While companion planting is a lot of fun, it also makes the vegetable garden more attractive, both to the eye and to the nose, and offers practical solutions to common gardening problems.

It can intensify the beauty of flowers by combining them with plants of contrasting shapes, color, and height. This type of system can be used to provide practical needs like shelter from wind, shade, or help prevent soil erosion. It allows a gardener to combine all the elements of a backyard garden into a small space without sacrificing yields or beauty.

Companion planting has guidelines but no rules. It offers suggestions, but ultimately allows you to create a garden that will work for you in the space you have available. This type of system will work for any level of gardener, who takes the time and put in the effort to find what works best for their area.

This book will introduce you to the art of companion planting with vegetables. As a bonus for all types of companion planting, there is special section on feeding your garden properly to ensure it grows big and healthy, and a chapter on garden maintenance. Case studies of real stories from real people along with a list of resources to help you learn more about companion planting in general are also included.

Happy planting and be sure to check out the other books in this series:

- The Art of Companion Planting with **Herbs**: A Little Book Full of All the Information You Need
- The Art of Companion Planting with **Annuals**: A Little Book Full of All the Information You Need
- The Art of Companion Planting with **Perennials**: A Little Book Full of All the Information You Need
- The Art of Companion Planting with **Wildflowers and Weeds**: A Little Book Full of All the Information You Need
- The Art of Companion Planting with **Bulbs, Tubers, and Rhizomes**: A Little Book Full of All the Information You Need
- The Art of Companion Planting with **Shrubs, Bushes, and Vines**: A Little Book Full of All the Information You Need
- The Art of Companion Planting with **Fruits**: A Little Book Full of All the Information You Need

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CHAPTER 1: The Art of Companion Planting

Companion planting is a system that lends itself to trial and error. Over the centuries, gardeners have planted certain plants in close proximity and they have noticed the end results. Plants naturally take in air and minerals and release chemicals through their own secretions or root excretions. For example, a plant that excretes nitrogen into the ground can make this element available to others that need a nitrogen-rich soil.

Some plants are found to lift many trace minerals from the soil in which they grow. Plants like these can be especially useful when turned into compost or mulch because they will then feed other plants with these valuable minerals. Allow the plants to grow to a mature size, then turn them under for green mulch or harvest them and bury them in the compost pile.

History

Historically, there is no one point where we can say that companion planting actually started or at what geographical location in the world it originated. Many agricultural practices have been used for centuries with the origins lost – companion planting is just one of them.

In North America, the search for the origin of companion planting leads us back to American Indians and their companion planting practice called “Three Sisters.” The Iroquois of the Northeastern United States and Canada primarily used this practice and it involved planting corn, beans, and squash. These crops were the mainstay of the Iroquois’ diet and were believed to be special gifts from the Great Spirit; as such, they were under the protection by the spirits called the Three Sisters. They were planted as a mainstay crop for the people and their system of planting was revered.

The Iroquois planted the three crops together. Corn gave structure and support for the bean plants to climb up; the beans replenished the soil with nutrients for both the corn and squash; and the large multiple leaves of the squash vines offered a protective mulch that helped the plants conserve water while providing weed control for all three plants. When planted in this special way, the plants thrive in a small space and are capable of producing high-quality yields with minimal to no environmental impact.

Over time, many other companion planting combinations were tried, with varied results. Much of this knowledge was handed down from generation to generation, and some of it today may be found to be folklore of other cultures.

Plants and their identifications have changed over time, as have horticultural methods, climates, and soil content. There has also been the introduction of chemically based pesticides and fertilizers and advancement in seeds, propagation, and cultivation. All of these affected the basics of gardening but the premise of companion planting remains the same.

Biological Benefits of Combining Plants

There are specific biological effects of combining plants, such as:

- **Nitrogen Fixation** – plants that increase nitrogen in the soil

- **Pest control** – plants that repel “bad” pests or attract in “good” insects to the garden
- **Enhancing flavors** – the plants that can subtly enhance the flavors of other plants
- **Level interaction** – plants that grow on different levels to provide ground cover or work as a climbing trellis
- **Pest trapping** – plants that can attract certain pests in order to keep them away from other plants
- **Shelter plants** – plants that provide windbreaks, shade, and prevent soil erosion
- **Crop rotation** – plants can be grown and tilled into the ground to provide nutrients for the next crops or rotated from bed to bed to minimize problems

Nitrogen fixation

“Nitrogen fixation” may sound odd, but it is the term for plants such as peas, beans, and clover that can “fix” or excrete atmospheric nitrogen for their own use and for any close neighboring plants thanks to their relationship with the bacteria in the ground. This relationship increases the nutrients in the soil, making it available to other plants that are growing beside it – a perfect relationship for companion planting – one plant “helping” another. The nutrients are also available to plants grown in the soil after the legumes are pulled.

Plants that have the bacteria that can convert the nitrogen in the air into nitrogen compounds and bind them to the soil include alfalfa, red clover, and bluebonnets. These last plants are intended to be turned under at the end of the season as a **green manure**, or organic compost for the benefit of the garden.

Forage legumes are commonly planted with grasses to minimize the use of nitrogen fertilizer. Another example takes us back to the American Indians and their system of planting beans with corn. The beans helped the corn receive enough nutrients by “fixing” the nitrogen that allows it to grow and produce excellent yields.

Pest control

Companion planting is often considered part of the organic gardening philosophy as it avoids using chemicals and pesticides. Controlling pests through natural means can have many positive effects on the garden such as:

- Preventing the spread of disease through your garden
- Decreasing the damage pests cause
- Reducing the effect of chemicals you may have been using in the past

Keeping away pests can help your plants grow and flourish in ways you never thought possible. For example, planting catnip in the garden deters aphids, ants, Japanese beetles, and weevils. Mice also do not like the plant and will not stay in a garden where catnip is planted. As the plant is bushy with a light green leaf and dark purple flowers, it is an attractive yet functional addition to any garden.

This type of planting can take some time for the results to show. If you have planted marigolds to deter nematodes, the effect is not going to show itself instantly or even in the next month. Instead, it may take a full year’s cycle before the marigolds have done their job. Gardeners who claim the system has failed often have not given the plants time to work. The plants need time to take hold and the life cycle of the pests need time to die out.

Companion planting can also attract the “pests” you do want. Why would you want any pests? Some insects are helpful in the garden. Wasps, for

example, are an asset for most gardens because they eat grubs. Some insects are also pollinators. Some plants require pollination because they cannot reproduce on their own or bear fruit unless the pollen is delivered from one plant to the next. The fastest and most efficient way to do this is to have the right insects in the garden. A few beneficial pests are bees, wasps, birds, and dragonflies.

Enhancing flavor

Companion planting is not an exact science; it is a natural science. However, some combinations have proven themselves over and over again. A prime example is basil, which goes great with tomatoes in the kitchen and can also enhance the flavor of the tomato if it is grown beside it in the garden.

Most herbs have been found to enhance the flavor or fruits and vegetables that are grown in close proximity, and basil grown beside tomatoes is a prime example. Bee balm is also known to improve the growth and flavor of tomatoes. German chamomile, also called wild chamomile, has a strong aromatic odor and is believed to improve the growth and flavor of cabbages, cucumbers, and onions when grown beside them. Whether that is due to the increase in nutrients or because the plants share the common soil where nutrients and by-products are expelled and mixed, gardeners swear by the practice.

Level interactions

Level interactions, also known as **physical space interactions**, involves planting tall plants with short plants to provide shade and even structure. Tall, sun-loving plants will shelter short, shade-tolerant plants, which results in better production and can even offer pest control. A good example of this type of relationship involves the popular corn planted with squash in the Three Sisters example. The tall corn throws shade for the lower squash but

also the corn appears to stop an insect called the squash vine borer beetle. Another added benefit is the prickly vines of the squash deter the raccoons from stripping the corncobs.

When planting this way, you can plant two or even three different levels of plants, including a ground cover crop at the base. If the soil has sufficient nutrients, then the plants can thrive.

Pest trapping

Another term for this type of companion planting is **trap cropping**. With this system, a specific plant will be placed in the garden for its ability to attract a pest, thus keeping the pest away from the rest of the crops. The trapped insects on the plants can be disposed of in another way, such as bending the branch or stalk of the plant in a bucket of soapy water to kill the insects. Or, if you prefer, you can leave the plant, now full of bugs, alone for the season because the bugs will remain there.

A prime example of a pest is the diamondback moth, which can destroy a cabbage crop. Plant collard greens close by to attract the moth, keeping it away from the cabbage. Rose plants are another example — to keep the Japanese beetle out of your roses, plant old-fashioned four o'clocks, a beautiful perennial aptly named because the flowers only open after the sun has gone down.

The mustard plant is a big contender in this category as well because it will attract cabbage worms and harlequin bugs. Cabbage worms refer to several species of caterpillars but the main one in North America is small, fuzzy, bright green, and feeds on cabbages, broccoli, and cauliflower. The harlequin bug, indigenous to the southern United States, looks like an orange and black stink bug and can destroy an entire crop of cabbage, Brussels sprouts, turnips, kohlrabi, or radish. In fact, if they cannot find any of these, they will move on to potatoes, okra, beans, beets, and even fruit

trees and field crops. However, if you plant the mustard plant in a separate area of the garden early in the spring, the bugs will gather on it. You cannot get rid of them by pulling up the plants because the bugs will scatter and will simply find another plant to latch onto. Instead, you can dunk the leaves or bend the stems into a bucket of soapy water to drown the insects, or spray it with insecticidal soap. Even better, consider planting the mustard plants with some of the plants that attract parasitic wasps or tachinidae flies, such as tansy, clover, and dill, as they are both predators of the harlequin bug.

Shelter planting

One of the most helpful benefits of combining plants is the ability to provide natural windbreaks, shade, and trellises. Some plants can grow to different heights while occupying the same space. The example of planting corn and beans together applies here again; the cornstalk serves as a trellis for the beans to climb, while the beans do not harm the corn stalk or the corn and they help by adding nutrients to the soil.

Heavy winds can damage gardens by removing mulch, topsoil, and eroding packed beds and hillsides. Rain and hail can also cause severe damage by beating down young seedlings and tightly packing a new soil covering that has just been laid. This is where a tight ground cover can help. By carefully selecting the right type of ground cover, the gardener can help prevent soil erosion without harming nearby plants. The best groundcover plants are usually those that prefer shade. For example, **cut-and-come-again salads**, meaning salad greens that do not need to reach maturity before harvesting and can be cut to grow again, are easy to grow, and all they need is a narrow band beneath other rows of plants. They create a beautiful groundcover while taking advantage of a space that is not very useable for other plants. Clover is another example of a ground cover that likes shade and will help keep the soil covered against wind, rain, and hail.

Crop rotation

History has shown the problems of not utilizing crop rotation – think of the Irish Potato Famine problem of the mid-1800s. In this case, blight, a fungus, destroyed three-fourths of all the potato crops for years, creating widespread famine and eventual death for much of the population. Potato was the main crop of the country and the most widely consumed food of the middle- to lower-class people. The people starved when the potato crop failed because they had no secondary crops to succeed as food or cash crops. When only one crop is planted, this is called **monoculture**. Planting potatoes, sunflower, or safflower in the same place year after year can lead to an extensive spread of Verticillium fungus and kill off the entire crop for the season and even affect future crops.

Crop rotation means relocating the crops to a different part of the garden every year. When companion planting, you need to ensure succeeding crops are always a completely different genus or species than the previous year's crop to minimize disease. The rotation sequence is usually at least two years, but it may be longer. For example, if you plant potatoes in one spot, do not plant them in that spot again for at least three or even four years. The reason you want to rotate your crops is to accomplish the following:

- Minimize disease
- Discourage insect infestations
- Deter weeds
- Improve soil fertility
- Reduce erosion
- Reduce the use of chemicals

Number of beds to rotate

The number of crops you want to grow will determine the number of beds that you rotate. If this is your first attempt at establishing a vegetable

garden, it is best to start small. A 10 foot by 15 foot plot will be large enough for someone just starting out. It does not have to be a square so consider a round, rectangular, or even an oval-shaped garden.

You will need to decide whether you will be companion gardening at ground level or in raised beds. Raised beds allow for more intensive planting and can provide just as many vegetables as their larger counterparts. When considering crop rotation with raised beds, you will take the crop from Bed 1 of this year and move it to Bed 2 next year, then to Bed 3 in the year after, and so on. If you are not sure how many beds to create, try for four. You can plant in three beds while allowing the fourth to rest as you build it up with compost and green manure.

Most people group beds by classification; others group them with “like” qualities. For example, you could divide crops by the nutritional requirements:

- ***Group 1:*** Leafy plants that thrive on oxygen — lettuces and salad greens, broccoli, cabbage, cauliflower, and kale
- ***Group 2:*** Fruits that need phosphorus — squash, melon, pumpkin, tomatoes, peppers, and cucumbers
- ***Group 3:*** Roots that love potassium — onions, shallots, garlic, leeks, carrots, turnips, and radishes
- ***Group 4:*** Soil replenishers — legumes, corn, potatoes, beans, and peas

Another way to divide crops is by these classifications:

- **Cultivated row crops** — corn and potatoes
- **Close-growing grains** — wheat and oats
- **Cover crops** — clover and grasses

There have been many studies showing that certain crops should (or should not) follow others for the best yield. Beets will yield best when they follow

barley or wheat; soybeans should follow beets; and potatoes should never follow tomatoes.

For more information on crop rotation, here are some online resources you can reference:

- Manitoba Agriculture, Food, and Rural Initiatives' Web site offers extensive information on crop rotation research and the inherent benefits of this type of program — **www.gov.mb.ca/agriculture/crops/forages/bjb00s43.html**.
- Ontario Ministry of Agriculture Food & Rural Affairs' Web site offers information on crop rotation for agricultural purposes — **www.omafra.gov.on.ca/english/crops/field/news/croptalk/2002/ct_1102a6.htm**.
- North Dakota State University's Web site offers information and charts on the crop rotation for various agriculture crops and the benefits each type of crop provides — **www.ag.ndsu.edu/pubs/plantsci/crops/eb48-1.htm**.

To decide how to rotate your own crops:

- Make a list of the crops you want to grow
- Fertilize and mulch the current bed for the crop it contains
- If you are growing legumes, always plant them after grains to replenish the nitrogen in the soil taken by the grain crops
- Incorporate as much compost or green manure into your garden as possible at all times
- Keep careful notes of your crop rotations so you know from year to year what was planted in what location

Another consideration after crop rotation is how to maximize your yield. Because each plant requires different nutrients and is also used as a food source for different destructive pests, planting a different crop in the space each season can both reduce the presence of pests and replenish the soil, giving the gardener the best chance of increasing yield.

Beans and corn once again offer an easy example. Corn requires a great deal of nitrogen in order to produce a good yield, and beans fix additional nitrogen into the soil. So by following beans with corn, you will have a greater production of corn.

Cover crops

Cover crops are a second crop planted to improve the production of the primary plant. This is an important concept of companion planting where one plant can help others. Examples of this type of crop include grasses that are grown in orchards or legumes grown during the winter season to improve the crops. Some plants like rye and clover can be planted immediately after a crop is harvested to protect and nourish the soil. In some instances, the secondary plant is grown immediately to absorb any nitrogen left in the soil after the fall harvest that would otherwise escape into the groundwater.

The home gardener needs to understand that some plants help build soil, and others leach the nutrients out of it. Most cover crops help build the soil and can:

- Provide protection from sun and weeds
- Give food for beneficial insects
- Provide nutrients for other plants by being worked into the soil at the end of the season

Cover crops are usually divided into legumes and non-legumes. Legumes, which include beans, peas, and lentils, are able to fix nitrogen, and can

provide at least some of the nitrogen requirement for the next crop in rotation. Legumes generally provide more nitrogen, but less total organic matter than non-legumes. The advantage lies in their nutritional value, so they are often used anyway. Non-legumes include wheat, rye, corn, buckwheat, oats, and barley. They are vigorous growers and will provide organic matter to be worked back into the soil.

Within both legume and non-legume groups, there are species specific to either a warm season or a cool season. By using both types of plants, it is possible to improve the overall productivity of the soil. During the growing season, cover crops prevent soil erosion and help control weeds. At the end of the growing season, the cover crop is dug under, without pulling the plants, to improve soil structure, aeration, water holding capacity, and nutrient content. Even with cover crops, it is important to have a plan for rotating different grains. Using the same cover crop year after year will increase plant-specific pathogenic organisms. By switching out to a different cover crop, the gardener will interrupt the life cycle of the organism and discourage it from multiplying.

If you are not using raised beds, you can actually mow cover crops to provide instant organic mulches for the growing plants. Think of a large orchard planted with special grasses; mowing them back helps keep the growth in check and produces good mulch for the orchard.

Planting cover crops is easy if you are using seeds, which is one of the easiest and cheapest ways to plant large areas; you can sow the seeds like you are spreading chicken feed to your fowl. Walk forward through the garden and toss out handfuls of the seed in a circular motion, attempting to cover the area evenly. If you are sowing several different kinds of seeds, you can either mix them into one general seed pile first and then throw them all out together, or you can sow first one and then the other. If you are

sowing raised bed gardens, you cannot walk forward so it is best to walk along the side and try to spread the seed evenly throughout the bed.

Now that you have an understanding of how to start companion planting, you will want to decide on what kind of plants to include in your companion garden.

Ways to Choose your Companion Plants

Every gardener has different tastes and different needs and every garden will present growing conditions that offer up a challenge. The growing conditions between your yard and your neighbor's yard can be different, and there can even be differences between your front yard and your backyard. And, as any gardener will tell you, the geographical area of the country in which you live will often dictate the way that your companion plants work together. A distance of only a few hundred miles can present an entirely new set of landscape, temperature, and humidity conditions. Soil may be rockier or sandier or the pH may be higher or lower, affecting conditions enough to change the transplanted gardener's approach to his or her garden.

Every garden contains sun, shade, sheltered spaces, open areas, dry spaces, and places that retain water. These mini-ecosystems must be understood and taken into consideration before designing a garden or choosing the plants to go in it. If space is unlimited for the garden, then crops, herbs, flowers, and shrubs may all be placed where it best suits them. Few gardeners have that freedom in most cases, so space is at a premium.

As with any garden, you need to understand what you have to work with before you create your companion garden. The type of soil, the amount of water available or that you will need, and the amount of sun or shade available should also be considered. Then you have to consider the types of plants that will fit into and flourish in your garden. If you are looking to

incorporate a more intensive companion gardening system into your plans, the soil will need to be rich and heavy in nourishment to accommodate the extra plants.

You must select the right plants to accommodate the planting area, rather than the other way around. Let us take a closer look at some of the ways you can select plants for your garden.

Choosing by climate and geographical location

When you purchase plants in a garden shop, they will be tagged with a hardiness zone number.

The hardiness zone is a system the U.S. Department of Agriculture (USDA) developed as a rough guide to the plant's hardiness. The term "rough" applies because hardiness depends on many factors, such as:

- Duration of cold or hot weather in any given year
- Force of wind
- Depth of roots
- How much water is in the soil at the time frost first hits

The USDA has divided the United States and southern Canada into 11 planting zones or USDA Plant Hardiness Zones. The USDA has defined these regions by a 10 degrees F difference in the average annual minimum temperature in the area. The higher the USDA hardiness number, the warmer the temperatures are for gardening in those planting zones. This means that areas within northern Minnesota are in USDA planting zones of 2 and 3, and southern Florida is in the USDA zones 9 through to 11. However, most of the United States falls into the USDA zones of 4 through 8, which cover areas where the average lowest temperatures range from -20 degrees F to 20 degrees F.

Plants and seeds will normally be labeled according to these USDA planting zones, meaning the zone on the label is the zone in which a gardener will be the most successful in the growing that particular plant. The zones can be closely linked, so it is possible that although you live in zone 7, your weather this year (or this season) will act like zone 8. This means that severe winter weather may kill off some plants or an especially hot summer may do the same.

There is an interactive USDA hardiness zone map available through the U.S. National Arboretum Web site at **www.usna.usda.gov/Hardzone/ushzmap.html**. Find your location on the map and understand the zone you are in and what this means for your garden. No matter how much you love a wisteria plant, if you are located in the far north it will not survive. Likewise, if you love ferns but live in Arizona, you probably will not have a lot of success — besides, wilting plants are not attractive in any garden.

Microclimates

A **microclimate** is defined as a mini-climate or a small, specific place found within a larger or macroclimate. This happens as a result of a different type of exposure to the elements. For instance, sunny hidden places in the garden that are sheltered from harsh winds and frosts can contain microclimates.

Consider a south-facing home surrounded by half an acre of land. The front yard receives hours of hot sun and the brick house and the brick wall separating the front from the back will reflect heat, so plants that are closer to these areas may bloom earlier and later into the seasons. They are also more likely to overheat in the summer. Moving to the back or the property, the small deck has a shady part closest to the house, while the outer edge gets more reflected light. The border of the brick wall receives no light at all and is perfect for a shade garden.

Such unique microclimates can be great for experimenting with plants that might otherwise be considered not hardy enough for you geographical location. If you have a plant reported to be for zone 4 and you live in zone 3, you can try growing the plant in a warm sheltered microclimate.

Vegetables are also classified according to frost survival, and these too may be manipulated somewhat if your garden has microclimates. In addition, they can be covered using old cotton sheets or heavy plastic if there is danger of imminent frost. This is a common practice with strawberries if night temperatures drop unseasonably low.

Choosing by light/shade

Another major consideration is the amount of sun the garden and plants will receive in a day. Most gardens will require at least six to eight hours of sunlight a day, even during the spring and fall. Many times when the gardener is unsuccessful with a plant, it is simply because it is not receiving the full amount of sun, even though the gardener feels that the plant was placed in a sunny area.

The number of hours of sun available for your plants is not the only factor to consider; you also have to consider the intensity of the sun. Gardens that are exposed to the east receive cool morning sun and are shaded in the afternoons. Gardens with a western exposure are shaded in the morning and receive very hot sun in the afternoon. If delicate plants are placed there, even if they are considered sun loving, you may notice bleaching and sunburn — browning, dying leaves — especially in warmer climates. The flowers will also fade quickly in the intense heat.

Here is a list of light conditions you might see on the plants at your local nursery:

- **Full-sun plants:** These must go in areas that get a minimum of six hours of direct sunlight every day.
- **Partial sun, also called semi-shade:** These plants thrive underneath a trellis, a tree branch, or a place where the sunlight is filtered. They need some direct sunlight, but it can alternate with periods of shade.
- **Full shade:** These plants require light, but not direct sun. They should be planted under dense trees or in the shadows like on the north side of a house or wall area.

Choosing by nutrient needs

All plants have specific requirements to make them grow and produce in the way they are meant to, but these requirements differ from plant to plant. Some vegetables deplete the soil of particular nutrients. For example, sweet corn is a heavy feeder that takes a lot of nitrogen (and plenty of other nutrients) from the soil. If you plant climbing beans at the base of each growing corn stalk, then the bean's roots can fix the nitrogen from the air into the soil where the corn can make the best use of it. Other legumes, like peas, grow well with other nitrogen-hungry vegetables like cabbages, broccoli, and cauliflower.

Another way of choosing companion plants is by how they grow and where they receive their nutrients. Two different types of vegetables can feed at two different soil levels, which is what happens when you grow carrots and onions together. Onion roots stay just under the surface of the ground whereas carrots push their roots very deep, which is where they feed. By growing the two together, you boost the productivity of your beds.

Choosing by water needs and availability

Water requirements vary from plant to plant and water availability varies from garden to garden. Some dirt is porous and the water will seep away

quickly while other garden beds are made with mulch and rich compost that will hold water for longer. If your garden is on a hillside, you need to watch that all the plants' water does not drain down the hillside and away from the plants' roots.

Another consideration is the type of watering system you have available. Are you close to a lake and is there ground water close to the surface? Or do you live in the desert and you need to water a minimum of twice a day? Are you prepared to face an increase in your water bill, or are you looking to have plants that do not need heavy watering? Do you already have enough hoses to cover the size of the garden you are planning? Have you considered using soaker hoses? They work well in many gardens as they can deliver a slow and steady water supply.

Choosing by soil conditions

The soil that is present in the garden must be rich with nutrients to help the plants grow to their full potential. Soils may consist of clay, loam, sand, shale, or rock. You can test what kind of soil is in your garden by taking a shovel, digging a hole in the ground, and pouring a bucket of water into the hole. A very hard soil, like one with a clay base, will never drain; the water may stay there for days. Clay soil will drain, but it may take three hours or even more. A clay/loam mixture will drain somewhere between 30 minutes and two hours. A loam or a sandy loam will drain between ten minutes and an hour. Pure sand will drain so quickly you are unable to keep the hole filled. And of course, if you find rock just below the surface, you will not be able to dig a hole at all. You will need to keep the soil condition in mind when you choose your plants or you will need to improve the soil first.

Soil pH

The acidity of the garden soil is also important and is referred to as its pH level. It is measured on a scale of 1 to 14 with 7 being neutral. A value

above 7 means the soil is alkaline, or basic, and if the soil is below 7, it indicates an acidic soil. The acidity reflects the amount of calcium, in the form of chalk or lime, in the soil. This level can change over time and can be affected by rain and the crops growing nearby. Clay soils tend to be alkaline and sandy soils tend toward acidic levels. There are three common terms used to describe the soil pH. Sweet soil has mid-range pH (between 6 and 8) and is ideal for most plants. Sour soil is acidic with a low (below 7) pH, and bitter is used to describe alkaline soil, meaning it has a pH higher than 7.

The pH level is so important because it can affect the release of nutrients and have an impact on worm and micro-organism activity. The pH of a garden soil will affect plant growth. Most vegetables do well in a slightly acidic soil (around 6.5 to 7) as they can more readily access the nutrients in this type of soil. Some plants do not have a preference and some are highly susceptible to pH conditions. You can check with your local nursery to discover what the soil needs are for any plants you wish to plant in your garden. If you are going to test the pH levels in your garden, it is recommended that you take soil samples from two to three different locations in the garden.

None of these garden conditions need to be permanent; it is possible to offset nearly all of the circumstances listed above. If a drought situation exists, irrigation can be put into place. Windbreaks can be built to keep off the worst of the wind. But it is always the easiest to work with the natural conditions that exist in your area. The goal of the garden, after all, is to be beautiful and productive, whether what is being produced is food or flowers.

Regardless of the soil’s existing condition, adding good topsoil will help your garden grow. Adding compost will enrich the soil with nutrients, as will adding well-rotted manure. Some gardeners use fertilizer throughout

the blooming season to increase the amount of flowers and increase the yield of the plants. If you prepare the soil well with topsoil, compost, peat moss, and manure, the garden will need minimal to no fertilizing throughout the season.

Where to purchase the ideal soil for your garden

Most major garden centers offer topsoil, either bagged or in bulk, fertilizer, compost, and manure from various sources. If you are uncertain about what you need, speak with a specialist to get advice on the right products. Many of these centers will also offer bulk sales where you can purchase large quantities of dirt. It is better to go to a garden center or a landscaping supply store for this type of material because if you purchase these materials online, you will usually have to order in large quantities, which will make shipping expensive. Your local center will also be able to advise you about problems with the soil in your area.

The compost and fertilizer will add nutrients and improve the texture and workability of the soil; the manure will add nitrogen; and the peat moss will increase the water-retaining capacity.

Choosing by color or appearance

Some gardens appear to have been designed by an artist with the beautiful use of colors, textures, and shapes and appear to meld into a beautiful harmony. Many times, this sort of garden has been carefully laid out with a particular color sequence in mind. Spring might be for the cooler colors — white, yellow, and purple — and in summer the hotter colors come into play — red roses, yellow dahlias, marigolds, and bright asters. Many gardeners love to mix violas and blue delphiniums with the yellow and reds. Other gardens may contain loads of white flowers, sweet alyssum, and climbing roses, mixed with the soft grays of artemisia, lavender, and lamb’s ear. The Hosta “Royal Standard” works well in these arrangements too.

If the garden area is very small, using a two- or three-color spectrum can be dramatic. When considering planting for color, consider what appeals to your eye. It may be the cooling whiteness, gray-green foliage, or the extreme hot of ruby red flowers. It may also be the combination of colors that appeals to you, such as lemony-yellow with blue and purple contrast.

Even a garden of all green can be beautiful. In this case, texture and pattern take the place of color. Green is restful, especially in the heat of summer. Consider planting glossy and waxy leaves, hairy or woolly leaves, or toothed and smooth leaves. Together these add interest to the green garden.

Many gardeners like to work with a color wheel to decide the best relationship between their garden's colors. The color wheel is made of six segments containing the three primary colors (red, blue, and yellow) alternated with the secondary colors (green, purple, and orange). Green is between yellow and blue because it is a mixture of these two colors, purple is between red and blue, and so on. The color wheel is helpful because by looking at it, you can determine what effect a certain combination of colors might have. Colors that are close on the wheel, like orange and yellow, are more harmonious; colors that are opposites, such as purple and yellow, will present more of a contrast. This can help you determine whether you would like an exciting, dazzling garden, or one that is more gentle and relaxing.

The strength of the colors used will have an effect on the overall grouping. For example, a soft yellow, such as moonlight coreopsis, will have a soothing effect; a stronger yellow will be much more dramatic. If the garden has been planted and you find the colors are too strong, it is easy to lighten the contrast by adding a lighter shade of the same flowers that already exist. Make sure the softer tones of flowers or their foliage have a definite shape, and that enough of them are used to create the contrast. Otherwise, the lighter-colored plant will be overwhelmed and lost within the stronger colors. If your goal is to develop a scheme that offers richness,

consider a garden of golds, reds, and shades of blue/purple. Foliage in this garden should vary from dark green to a purple shade.

White is often omitted from the garden because it tends to look chalky. White draws attention, especially in summer plantings, so it is usually not scattered throughout the garden. However, if used in small doses and mixed among red, yellow, and oranges, whites can accentuate the heat of these colors. If white has been rejected in the past because of its starkness, try a creamier shade instead (like the edges of hosta variety called “Francee”). Pastels and whites are especially enjoyable during twilight hours, particularly if backlit by the sun. Many gardeners select white jasmine, moonflower, and the climbing rose variety rosa x fortuniana just for these purposes.

If planting a first-time garden in a single color, consider using all green. Green is a very restful color and offers many shade varieties, including deep purple-green, true green, blue-green, gray-green, and yellow-green. Blue-green leaves will have a deepening effect, just as blue flowers will. Rustling pale or variegated ornamental grasses planted against deep green hollies or other glossy, strongly shaped leaves offer textural appeal.

A popular garden theme is to use a single color like an all-purple garden. To avoid the color coming across as monotone, use the many different shades like mauves, periwinkle, lavender, violet, and purplish-black. Some good plant choices for the purple garden include:

- Purple smoke bush
- Bronze fennel
- Purple basil
- Eggplant
- Burgundy bush beans
- Ruby perfection cabbage

- California lilac
- Cornflower
- Catmint
- Turquoise blue fruit

If you are gardening for color, consider these tips to have a long season filled with beautiful blooms:

- Determine your color scheme and then stick to it so the garden will not look chaotic.
- For extra interest, include a wide variety of plants: annuals, perennials, flowering shrubs, trees, roses, and bulbs. In the food garden, tuck some of these into the bare spots.
- Consider the seasons. The biggest challenge you will have when developing a new garden is to provide color from early spring through late fall. Do not forget to look for shrubs with bright fruit or trees with a great winter shape or fall foliage color.
- Use one or two bold plants to give focal points to your garden area. Foliage with a strong shape or texture can make everything else stand out. Consider adding cardoon to your garden.
- Plan to work through all the seasons because a garden evolves over time.
- Be willing to take out the plants that are not working and replace them with something else.

Choosing by genetically similar crops

Attempting to garden with natural conditions means much more than gardening by zone, climate, and soil type; it also means selecting plants according to their similarities or differences. When you select plants that are from the same botanical family, you are choosing those that are genetically

similar. Grouping the plants together is an easy way to garden because in general their light, moisture, and soil requirements will match. They also often have the same pest problems and similar diseases, so it is possible to end up with trouble if you are not careful. Just be sure to read up on the problems that might exist with different plants.

Choosing by the critters that plants attract or repel

Certain plants fall into the “pest control group” of plants and the goal of planting them may be to attract beneficial pests or it may be to repel those that are harmful. Many gardeners also purchase beneficial insects, such as ladybugs and praying mantis, and grow the plants required for the insects to flourish. It is also possible to grow specific plants that will attract these “good” insects to your garden.

Here is a list of some easily attainable plants that attract a wide range of beneficial insects:

- Golden aster
- Goldenrod
- Marguerite
- Bachelor’s buttons
- Black-eyed Susan
- African daisies
- Calendula
- Dwarf morning glory
- Cosmos
- Sunflower
- Zinnia
- Buttercups
- Dandelions

- Lamb’s quarters
- Wild mustard
- Queen Anne’s lace

Just as some plants attract certain insects, others deter them. By combining specific deterrents with the vegetables, herbs, or flowers that bugs normally damage, you can successfully harvest plants without adding harmful chemical pesticides. Note that some of the deterrents are trap crops, which means they act as a decoy, drawing the pest away from the plants they are most fond of. For example, nasturtiums will trap aphids and mustard plants attract harlequin bugs.

Now that you know a little bit more about companion planting in general, the next chapter introduces a variety of vegetables used in companion planting.

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CHAPTER 2: Companion Vegetables

This chapter offers you an in-depth look at how to plant various vegetables and the best and worst companion plants to go with them. Remember that most vegetables like a nutrient-rich soil full of well-rotted compost and mulches. Even if the individual plant instructions do not mention this fact, make sure your garden bed is richly prepared before beginning. There are a few vegetables that do well in sandy beds, like carrots, but most do better in well dug over dirt that has been enriched with nutrients in preparation for the long growing season. All beds will also benefit from additional nutrients throughout the growing season.

The following are guidelines you can follow, but take the time to make this fun. Mix up the planting and interplant carrots with beets and radishes or try planting kohlrabi with both to take advantage of the nutrients at the surface level versus deeper root levels. Vegetable gardening can be a fun and rewarding experience.

Asparagus

Asparagus prefers to grow in the same spot year after year, so pick a full-sun location for best results or partial shade in a spot where it will not need to be disturbed. You will need to purchase asparagus crowns from your local garden center or nursery catalog. The crown will have a strong root system but the top growth will be dormant. Plant the crowns in early spring for most locations; if you live in a warmer climate, you can plant in late winter. The asparagus will need to be planted deep so make a trench approximately 6 to 7 inches deep. Spread the bottom of the trench with wood ashes or bone meal and compost if you have it. There will be instructions on the asparagus when you purchase it, so make sure you read and follow them.

In general, soaking the roots first, preferably in a compost tea, is a good start. Then lay them on their side in the trench approximately 1 foot apart. Make sure the rows are 3 to 4 feet apart. You will the fill in the trench slowly as the sprouts appear but only cover the stalks and be sure to leave the foliage uncovered. With time, the trench will fill in and the asparagus foliage will now be above ground level. It is important to be diligent with the weeding and you should aim to lay down mulch once the trench is filled in.

Asparagus has many companion plants, including the family of aster flowers, dill, coriander, basil, comfrey, and marigolds, which will deter beetles. Parsley appears to increase the growth of both plants when they are grown together. Tomatoes and asparagus help each other; tomatoes protect against asparagus beetles and a chemical in the asparagus juice deters

nematodes from tomato plants. There are no known bad companions for asparagus; however these plants do better when they are not close to onion, garlic, or potatoes.

Beans

There are different types of beans available, like snap, dry, and bush. Some will have different companions, both good and bad. There are some basics that apply to all types of beans. Plant in a full-sun location or partial shade if you live in hot climates. Sow seeds only after danger of frost has past. For scarlet runner beans, which are climbers, supply support of some kind. Thin the seedlings to 5 or 6 inches apart, but leave slightly more space for pole beans.

All beans have the ability to enrich the soil with nitrogen. They all do well when planted with carrots, cauliflower, peas, radishes, potatoes, strawberries, the brassica family, chard, and corn, and they are of great benefit to cucumbers and cabbage. Summer savory is another good companion to beans as it improves the beans' growth and flavor and deters the bean beetles. Marigolds, rosemary, and nasturtiums also deter bean beetles.

Bad companions for beans include garlic, onion, and shallots as they appear to stunt the plants' growth. They are not happy planted close to gladiolas. Beans are prone to diseases, but crop rotation will prevent most of them. There are also companions specific to individual types of beans.

Bush beans

Bush beans, a shrub variety of the snap bean, do well with celery if planted at the ratio of one celery plant to six bush beans. Bush beans do well close to celery and leeks but only if there are only one or two bean plants there. If more than this are planted, then none of them do well. Bush beans will give

and receive benefits when planted with strawberries and cucumbers. Bush beans are a bad companion to fennel and onions.

Pole beans

Pole beans, a climbing variety of bean like scarlet runner beans, do particularly well with corn, summer savory, and radish. They do not particularly like beets. They make bad companions with onion, beets, cabbage, eggplant, kohlrabi, and sunflowers.

Broad beans

Broad beans, also called fava beans or horse beans, produce large, flat pods with large beans inside. They are excellent companions for corn, potato, cucumbers, strawberry, celery, and summer savory. They are bad companions with onions.

Beets

Beets are an easy-to-grow crop that prefers a full-sun location and well-tilled soil with good drainage. They germinate well and will need to be thinned to 4 inches apart with rows at least 2 feet apart. Beets are great for the garden as they add in minerals to the soil.

Beets are good companions for lettuce, onions, kohlrabi, and the brassica family. Mint, garlic (which improves the beet’s flavor), and catnip help beets grow. If you do not want to plant mints around the beets, you can use mint foliage as mulch. Beets are bad companions to pole beans and gives mixed results next to bush beans.

Broccoli

Broccoli grows best in full sun or partial shade in a well-drained soil. In terms of minimizing disease, plant broccoli where no other brassicas (including cabbage, Brussels sprouts, kohlrabi, and cauliflower) have been planted in the previous two years as per crop rotation rules. Broccoli is a large plant and can reach 3 feet in height so the seeds or nursery seedlings should be planted 18 inches apart after danger of frost has passed. If they do not form heads (broccoli florets) properly, they are deficient in lime, phosphorus, or potash. You can purchase these nutrients at your garden center and add them to your broccoli plants.

Broccoli, like all the brassicas, does well with aromatic plants including dill, which improves the plant's growth and health. Broccoli is a good companion to beets, celery, chard, cucumber, lettuce, onion, potato, and spinach. Flea beetles like broccoli so plant Chinese Daikon and Snow Belle radishes to attract flea beetles away from the broccoli.

Do not plant close to tomatoes, strawberries, pole beans, peppers, or mustards as they are bad companions.

Cabbage

Cabbage needs to spend at least half the time in the shade. You can grow from seed or purchase the plant from a nursery to get a jump on the season. Insects like young cabbages so consider covering the plants with a light-weight cloth when they are first growing. They love compost, fertilizer, and water. If the cabbage's florets do not form properly, the plant is deficient in

lime, phosphorus, or potash and you should purchase some from your local garden supply store to add to your beds.

Cabbage, like all the brassica family, does well with aromatic plants including dill, while sage, peppermint, and rosemary help repel cabbage flies. Celery and dill improve cabbage's health and growth. Clover will reduce native cabbage aphids and cabbage worm. Other good companions include onions, potatoes, hyssop, thyme, and southernwood. Wormwood repels white cabbage butterfly. Tansy deters cabbage worm and cutworm, and thyme deters cabbage worm. Nasturtium deters bugs, beetles, and aphids from cabbage.

Bad companions for cabbage are strawberries, tomatoes, peppers, lettuce, eggplants, rue, grapes, and pole beans.

Carrots

Carrots prefer full sun and need a very loose, preferably sandy soil for the roots to grow easily downward. If your soil is high in lime, humus, and potash, you will have sweeter tasting carrots. Low nitrogen levels in soil will decrease the flavor of your carrots. Sow seeds directly into the garden several weeks ahead of the last frost (in warm climates you can sow in fall, winter, and spring). Sow seeds around ½ inch deep and thin to 3 to 4 inches apart. Thin early before the roots entwine and be careful to not damage the remaining plants.

Plant onions, leeks, rosemary, and sage to deter the carrot fly. Other good companions include lettuce, onions, chives, beans (which are a good source of nitrogen and can help increase your carrots' flavor), peas, peppers, radish, and tomatoes. Tomatoes can stunt the carrot's growth but they will have a great flavor. Bad companions for the carrot are dill and parsnip. If you want to use carrots to attract insects, they need to be able to flower, so

plant a few carrots with the intention of leaving them in the ground instead of harvesting them for eating.

Cauliflower

Cauliflower likes a full-sun location in a well-drained soil. Purchase nursery stock to get a jump on the season or sow outdoors after danger of frost has past. Sow in small clusters of several seeds but once they have sprouted, keep only the strongest cauliflower plants. Keep the plants moist when they are young.

For growing instructions and companions, see cabbage as most members of the brassica family have similar growing requirements.

Celery

Celery needs to have a lot of sunshine but can have partial sun for half of the day. Celery requires a rich, moist soil. It is easiest to work with plants from the nursery that you can transplant into the garden when there is no danger of a frost. Plant 8 to 10 inches apart and be generous with compost and water over the growing season.

Good companion plants for celery include beans, leeks, onions, spinach, tomato, and the brassica family. Garlic and chives help keep aphids away from celery. If bush beans and celery grow together, they will strengthen each other. Friends to celery include cosmos, daisies, and snapdragons. Bad companions for celery are corn, lettuce, and aster flowers.

Chard

Chard is an easy-to-grow vegetable. It prefers full sunlight unless you live in a hot climate where they prefer partial shade. Well-drained soil with compost helps chard produce well. For most climates, sow the seeds in the spring and thin to 8 inches apart when the seedlings are about 6 inches high. You can either eat these seedlings or transport them to another spot in the garden.

Good companions for chard include beans, brassica family members, and onions. There are no known bad companions.

Corn

Corn likes full sun and a rich, well-draining soil covered in mulch. Sow several seeds in a hill approximately 1 inch deep and 6 inches apart. When seedlings are close to 4 inches tall, thin them to 1 foot apart. Corn needs a steady supply of water and mulch.

Corn helps beans when grown together (as in the Three Sisters example) and sunflowers, legumes, peanuts, squash, cucumbers, melons, amaranth, white geranium, lamb’s quarters, morning glory, parsley, and potatoes all help corn. Marigolds help to deter the Japanese beetle away from corn. Planting radishes around corn and letting them go to seed deters an insect called a corn borer, which is known to be a pest for several agricultural crops. Bad companions for corn are tomato and celery. Pigweed is said to

raise nutrients from the deeper earth level to a place where the corn can reach them.

Cucumber

Cucumbers like full sun and can also do well with afternoon shade. Seeds are sown several inches deep a couple of weeks after danger of frost has passed and once the soil has warmed slightly. Plant the bush varieties approximately 1½ feet apart and the vine varieties 2 to 3 feet apart.

Cucumbers have many good companions including corn, beans, sunflowers, peas, beets, and carrots. Radishes can deter cucumber beetles. Keeping dill close to cucumbers attracts beneficial predators and cucumbers attract ground beetles. Nasturtiums improve the cucumbers' growth and flavor. Bad companions for cucumbers include tomatoes and sage.

Eggplant

Eggplant loves heat, so plant it where it can have full sun. It is easiest to purchase started plants then transplant them when there is no longer any danger of frost. It is preferable to wait a week or two after frost has passed to allow the soil to warm up. There are dwarf and standard varieties of eggplant. Plant the standard versions approximately 1½ to 2 feet apart and the dwarf varieties can be 1 to 1½ feet apart. Tie the taller varieties to stakes to keep the fruit from touching the ground.

Good companions for the eggplant include amaranth, peas, spinach, and marigolds, which deter nematodes. Eggplant helps beans and peppers. They are good to plant with corn as they deter raccoons from eating the corn and the corn protects the eggplant from a virus that causes wilt. Bad companions for eggplants are pole beans, fennel, and potatoes. There are mixed results when planted with aromatic herbs.

Horseradish

This is an easy plant to grow and will take over your garden in no time. Find a corner away from most of the plants and consider planting horseradish in containers. It is easiest to purchase a small plant from the nursery and it will grow in most conditions. Plant 1 foot apart and bury the top of the root 4 inches below the surface. Make sure you water this plant well.

If you grow this plant in a container, you can move the containers around. Keep 1 plant in the potato patch to deter the blister beetle and help deter Colorado potato beetle. Horseradish also improves the potatoes' resistance to disease. If you are going to plant it in the potato patch, be sure to dig it up and remove it in the fall to prevent the plant from spreading.

Kohlrabi

Kohlrabi is a cooler weather vegetable that can be planted for both spring and fall crops. Plant in full sun and in well-drained soil. Sow seeds outside four weeks before the last frost. Plant the seeds ½ inch deep and 3 inches

apart but thin them to 6 inches when the seedlings are several inches high, which will not take very long as these plants are very fast growing.

Kohlrabi is a good companion with cucumbers, beets, onions, and chives and appears to help protect members of the mustard family. It is a bad companion to strawberries, tomatoes, peppers, and pole beans.

Leeks

Leeks like a full-sun location that offers well-drained soil. It is easiest to buy leek plants to transplant into the garden around the time of the last frost. Place the seedlings approximately 6 inches apart. Set the plants closer together if you are planting long, thin-stemmed varieties or set them wider apart for thick-stemmed varieties. (Always check the package for specific planting instructions.) Make a hole and set the seedling down so that only an inch of the top of the plant is exposed. Fill it in loosely with soil.

Leeks will improve the growth for celery, onions, and apple trees. Carrots help leeks by repelling carrot flies. Bad companions for leeks are legumes including beans and peas.

Lettuce

Lettuce does best with a mixture of sun and shade. It does not like extreme heat and will need shade during the hottest months or else it will go to seed. Sow the seeds outdoors once the ground has thoroughly thawed and can be worked. If you purchased plants, set them approximately 1 foot apart (this

may vary based on the variety so read the label) and sow several times for a lettuce supply all summer.

Lettuce does well when close to radish, onions, kohlrabi, beans (both bush and pole), cucumbers, carrots, strawberries, beets, and sunflowers. Chives and garlic are great deterrents of aphids so plant them close to lettuce. Mints like hyssop and sage repel slugs so plant these plants close to your lettuce if slugs are a problem in your area. Lettuce is a bad companion to celery, cabbage, and parsley.

Onions

Onions are another plant where it helps to purchase plants at a nursery instead of starting the plant from seeds. You can transplant onions into your garden up to two months before the last frost is expected. Any earlier than this and it could be too cold for them. They like a partial to sunny spot and appreciate compost. Make sure the soil is dug over well to allow for good bulb development and weed constantly in the early growth stage as the weeds can crowd out the young onion plants. As the bulbs grow, make sure to keep them covered if they start to push out of the ground.

Good companions for the onion include all the brassicas, beets, lettuce, tomatoes, summer savory, leeks, kohlrabi, dill, lettuce, and tomatoes. Plant onions in the strawberry patch to help the strawberries stay healthy and fight off disease. Pigweed has the ability to raise the nutrients from subsoil and makes them available to the onions. Bad companions for onions are peas, beans, and parsley.

Peas

Several types of peas are available for today's gardener including garden peas, snow peas, and snap peas. They all like a sunny exposure and a rich soil. Sow the seeds in the garden a month before the last frost and make sure there is support, like a trellis, fence, or netting of some kind, ready for them. Plant the seeds 1 inch deep and approximately 3 inches apart in rows and keep 3 feet between rows. Peas germinate quickly and you will need to start the vines twining up the support very quickly. Plant peas several times to keep a fresh supply of peas all years long.

Peas are good companions to carrots, turnips, radishes, cucumbers, corn, beans, celery, chicory, eggplant, parsley, and potatoes. Bad companions for peas include garlic and onions as they stunt the growth of the peas.

Peppers, Bell

Peppers are sensitive to cold so it helps to get a jump on the season by purchasing started plants at the nursery then transplanting them outdoors several weeks after the danger of frost has passed. Set them 1 foot apart in the garden and add in stakes for the varieties that will grow more than 1 foot high. They like full sun and a well-drained soil. You can sprinkle Epsom salts around the plants to supply the magnesium they need for good development.

Good companions for bell peppers are basil, okra, marjoram, parsley, lovage, and carrots. They also do well if planted closely with other peppers and tomatoes as long as the crowded leaves offer the peppers shelter from

direct sunlight. The presence of geraniums and petunias also helps peppers. Bad companions include fennel and kohlrabi.

Peppers, Hot

There are many varieties of chili peppers to choose from and most transplant well and fruit heavily. You can sow seeds or purchase started plants from the nursery. Sow seeds in a full-sun location after danger of frost has passed. Peppers need a lot of water but do not let them sit in water. They are fast growing plants and the fruit only takes a week or so to ripen on the vine. The more you pick the plant, the more peppers will grow.

Hot peppers are good companions for chard, cucumbers, eggplant, escarole, tomato, okra, and squash. Companion plants that are good for hot peppers include basil, parsley, oregano, and rosemary. The root of the hot chili plant excretes a substance that prevents root rot and other Fusarium diseases that are responsible for wilt in cantaloupe and muskmelon.

Potato

Potatoes like full sun and a well-drained soil high in phosphorus but low in nitrogen. Nitrogen prevents the potatoes from fully growing their foliage. The ground needs to be well dug 1 foot deep for them to form properly. Plant potatoes a couple of weeks before the last frost has passed. You can plant the seed potatoes whole or cut larger ones into smaller pieces, making sure each piece has several eyes. The simplest way to plant potatoes is to plant them 7 to 8 inches deep and about 1 foot apart from each other (cut

side down). The stems will grow up to the surface. For easier harvesting, plant potatoes in a trench and cover with several inches of soil. When the stems are 6 to 8 inches tall, hill mulch around the plant, leaving just the foliage showing. As the plant grows, hill more mulch around it. The potatoes will form inside the mulch.

Horseradish is a plant that will help potatoes. Good companions for potatoes are bush beans, brassicas, carrots, celery, corn, marigold peas, onions, and peas. Flowers that complement potatoes are petunia and marigold, which deters beetles. Bad companions for potatoes include sunflowers, cucumbers, kohlrabi, pumpkin, eggplant, the squash family, turnip, and fennel. Both tomatoes and potatoes are prone to the same blight so keep them apart to avoid contaminating each other.

Pumpkins

Pumpkin requires a long growing season to allow the fruit to produce and ripen, so it helps to shorten this time by purchasing the plants from the nursery or start the seeds indoors. Plant outdoors three to four weeks before the last expected frost. Pumpkin likes full sun and a light, well-drained soil. Give the plants at least 5 feet of space in every direction as they like to sprawl out. As the vines spread out, you can place the vines in the direction you want them to spread throughout the garden. Once the fruits appear, pinch the vines back so the energy goes into the fruit. Do not harvest the pumpkins until after vines have died but make sure you harvest them before freezing temperatures hit.

Good companions for pumpkins include corn, melon, and squash. Buckwheat, catnip, tansy, and radishes all help pumpkins and they attract spiders and ground beetles, keeping these insects away from the pumpkin. Radishes will keep the flea beetles away; marigolds will deter beetles; and nasturtium will deter beetles and various bugs.

Radish

There are literally hundreds of radish varieties you can plant in your garden. They are all quite simple, easy to cultivate, and can be sown a month before the last frost. Plant seeds in spring or winter (check seed packet for instructions) but plant the seeds ½ inch deep and try to thin to 6 inches apart. You can try spreading the seed thinly then covering it with a mulch. You can plant new sowings every week up until the hot summer months. They prefer cooler weather and intense heat will turn them bitter.

Radishes are a good companion to have in the garden as they deter against cucumber beetles and rust flies. Good companions for radishes include beets, bush beans, pole beans, carrots, chervil, cucumber, lettuce, melons, peas, and spinach. Radish will attract an insect called leaf miners away from spinach yet the leaf miners, although they will eat the radish leaves, do not harm the root from growing. Radishes will deter spider mites when planted close to tomatoes. Radish is thought to protect all members of the squash family from the squash borers. If you plant leaf lettuce close by in summer, it will help the radishes become more tender.

Chervil and nasturtium are known to improve the growth and flavor of radishes with the added value of letting them go to seed to repel squash borers. Bad companions for radishes include cabbage, cauliflower, kohlrabi, broccoli, turnips, and Brussels sprouts as well as the hyssop plant.

Rhubarb

Rhubarb is available in most nursery centers as a crown. It can be planted in early spring as soon as the ground can be worked. Find a location off to one side in full sun so it can grow undisturbed year after year. Plant at least 1 foot deep with at least 3 feet between the plants. Set deep enough in the ground that the new buds are covered by 1 to 2 inches of dirt. When the shoots emerge, place mulch around them. Rhubarb appreciates mulch and compost when available throughout the season. Snap off the seed heads to have the plant continue producing stalks.

Rhubarb is a good companion for the brassica family. You can add any of the family to your rhubarb patch and watch them do well. Rhubarb is a good companion to columbines as it helps deter red spider mites. Rhubarb also helps protect beans against black fly. There are no known bad companions for rhubarb.

Shallots

Shallots belong in the same family as garlic and onions and like garlic. The shallot bulb will grow other bulbs around it. Like onions, you want the soil well dug over and loose for the bulb to form properly. Plant the bulbs roots down with the tops even to the surface and around 8 inches apart from each other.

Good companions for the shallot are the same as for garlic and onions as they grow well with most garden vegetables. Bad companions for the shallot are peas and beans.

Spinach

Spinach is a great cool weather crop so sow for spring and summer harvest or sow in late summer for fall harvest. It will go to seed quickly in intense summer heat. Plant in full sun for cool weather and shadier areas for late summer planting. Sow into the ground as soon as it can be easily dug over and two months ahead of the last expected frost. Sow seeds ½ inch deep and 2 inches apart in rows. This plant can be sown several weeks in a row. Thin seedlings to 6 inches apart with the leaves about 4 inches tall. You do not want spinach to be crowded as that can cause them to run to seed early.

Peas and beans are good companions to spinach as they can take advantage of the shade of the vines' height. Spinach is compatible with cabbage, cauliflower, celery, eggplant, onion, and strawberries. There are no known bad companions for spinach.

Soybeans

Plant soybeans after the last frost for your area in a full-sun location. Plant seeds 2 inches apart in rows that are 2 feet apart. Soybeans tolerate drought well but they will produce more if they are kept moist throughout the growing season.

Soybeans attract rabbits so only plant them if you are willing to share or if you have a secure, rabbit-proof garden. They are good companions to corn as they add nitrogen to the soil. There is some question as to whether they attract or dispel beetles.

Squash

Squash is one of the easiest vegetables to grow, and with so many colors and varieties available, they offer a lot of interest to any garden. You can start seeds indoors or purchase started plants from the nursery. Read the labels on the seed package for insect-resistant strains that are now available. (You can look on the package to tell whether your squash variety is insect resistant.) Plant in a full-sun location with a well-drained soil several weeks after the last expected frost. Plant two plants together in a hill to the same depth as the pot they are leaving. Plant the hills 3 to 4 feet apart.

You can include a good companion for squash by sowing radish seeds in the hill with the young plants and letting the radishes go to seed instead of harvesting them. Like with cucumbers, radishes will prevent insects on the squash plants. Other companion plants include cucumbers, corn, melon, and pumpkin. Borage will help to deter worms and improve the squash's growth and flavor. Marigolds help deter beetles and nasturtium helps deter squash bugs and beetles. Oregano provides general pest protection. Squash, like pumpkin, is helped by buckwheat, catnip, and tansy, all of which attract spiders and ground beetles, keeping them away from the squash plants.

Tomatoes

Tomatoes are technically a fruit but as everyone considers them a vegetable, they will be included here. Buy tomato plants from the nursery (or start

indoors or in a greenhouse) and plant outdoors after all danger of frost has passed. Tomatoes like heat so give them a full-sun location out of the wind. Like most garden vegetables, they prefer mulch and compost. Dig a large hole (1 foot across) and place compost inside. Set the plants 1 to 1½ feet apart (read the label for more specific instructions). Plant them deep, leaving the top four branches exposed to encourage root development. You can cover young plants with floating covers, which are plastic sheets or tunnels made of special polyester with pores big enough to let in water and air but small enough to keep out insects. These covers help protect plants from wind and cooler temperatures. You can also cut a 6 inch-wide collar or disk with the plant in the center to deter cutworms. Tomatoes require a lot of water so water often and they appreciate compost tea every week for optimum fruiting. Do not water tomatoes from the top – they do better if watered at ground level.

Tomato plants are good companions to roses (protecting them from black spot), peppers, and asparagus (protecting the asparagus from the asparagus beetle). There are many good companions for tomatoes including beans, celery, cucumbers, head lettuce, onion, parsley, and peppers. Garlic between the tomatoes will deter spider mites. Flowers to companion plant with tomatoes include nasturtium, marigolds (as they deter nematodes), and pot marigold (as it deters tomato worm and many general garden pests). Basil will repel flies and mosquitoes along with improving the growth and flavor of the tomatoes.

If stinging nettles are planted close, they will improve the tomatoes' ability to keep longer after being picked. Borage will deter tomato worms and improve the tomato's flavor and growth. Dill is only a companion plant to tomatoes until it matures. While dill is young, it improves growth and health of tomatoes, but after it matures, it will retard the tomato plant's growth. Bad companions include kohlrabi, which stunts the tomato's

growth, and all members of the brassica family. Keep tomato and potatoes apart as they can suffer from similar strains of a fungal disease and can contaminate each other. Tomatoes do well with carrots but the carrot's growth may be stunted. However, the carrots will have a sweet flavor when planted with tomatoes. You can plant a few close to the tomatoes then plant rows of carrots elsewhere for harvesting. Other bad companions for the tomato include eggplant and peppers (as they share similar blight issues) and fennel, which can inhibit the tomato plant's growth. Also do not plant tomatoes close to corn as the tomato fruitworm is very similar to the corn earworm and you may end up with both pest problems.

Turnips

Turnips are easy to grow and are easy to store over winter, like potatoes. There are several varieties to choose from, most with similar growing conditions. Turnips like a full sun and well dug, loose soil for the bulbs to develop. Plant the seeds approximately ½ inch deep and 6 inches apart. Plant rows 1 foot apart. Keep the turnips free of weeds, especially when they are young.

Good companions for turnips are peas and vetch, which deter the aphids that tend to plague turnip tops. Bad companions include hedge mustard and knotweed. To minimize pest and disease problems, do not rotate the turnip bed location with the cabbage family.

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CHAPTER 3: Nourishment for Every Garden

There is a good chance that the garden that you are planting will need soil enhancement at some point in time. If you are going to follow some of the companion planting concepts, you will need to nourish your garden throughout the year. There are only so many nutrients naturally in the soil and it will not take long before you will need more to feed your plants.

Ways to Feed Your Garden

There are many options available to feed your garden. Some require commercial fertilizers, but the best are ones that you can use without adding chemicals to the soil. These include:

- Monoculture
- Rotation
- Mulches
- Compost
- Garden teas
- Fertilizers

Monoculture

Monoculturing is the process of planting just one type of plant. In companion planting, this practice is used to enrich the soil through the benefits one plant can give. This monoculture plant is then turned back into the soil to increase the nutrient level of the soil. One example of this is to grow alfalfa or another grass crop and turn it back under before it goes to seed to let it decompose further before planting that area of your garden. By doing this, the soil has a chance to rest and replenish itself.

Rotation

Crop rotation is a great way to control insects, weeds, and diseases, and it also enhances soil fertility. Vegetables in the same botanical family will require similar nutrients in similar amounts. Some will be considered heavy feeders like broccoli, sweet corn, and tomatoes, and will utilize more of the soil's nutrients, whereas others are considered light feeders, like carrots, onions, peppers, and potatoes, and will use fewer nutrients. To go along with these plant types, there are plants that add nutrients and improve the soil, like peas and beans. If you practice crop rotation by alternating these three types of crops in one bed, the soil can be enhanced.

Mulches

Mulch is a protective layer placed over the soil. There are many benefits to using mulch including:

- **Minimizes weeds** — the mulch will suffocate weeds and stop light from reaching the seeds, which stops new weeds from germinating.
- **Improves the garden plants** — the mulch covers the plant's roots that are on the surface, saving them from damage caused by cultivation and drying out.
- **Retains moisture** — mulch reduces the amount of evaporation, which keeps the soil moist, and allows for a more even growth.

- **Minimizes temperature differences** — the mulch minimizes the temperature extremes at the soil level so it stays warmer at night and cooler in the day.
- **Improves the soil** — if you are using organic mulch, it will add nutrients to the soil as it decomposes, encouraging microbial growth. It also encourages earthworms to burrow in the soil, which aerates and drains the soil. The mulch also prevents the soil from packing down.
- **Creates a more even-looking garden** — mulch stops the dirt from splashing up onto the plants during rain or watering and from washing the soil away from the plants during too heavy rain or watering.
- **Gives the garden a finished look** — the garden looks professional with a nice mulch covering it. A uniform layer of good looking mulch throughout the garden gives the area a uniform, “finished” look.

The following are some forms of mulch you may want to consider.

Organic mulch

There are many types of organic mulch to choose from. There are some you may have readily available and others you may need to buy. Most will be available through your local garden center.

The best organic mulches include:

- **Bark or small wood chips** — these come as small or large chips (or chip your own if you have a wood chipper) and work well under trees and shrubs. You can purchase finely shredded cedar mulch in various colors that can add an interesting designer component.
- **Leaves** — fall leaves are great for mulching large open areas, particularly around squash, pumpkin patches, or other sprawling areas. If you are short on another type of mulch, like compost or newspaper,

leaves make a great second layer. Not only does it cover up something unsightly, but it also helps with decomposition.

- **Eucalyptus** — this mulch has to be purchased from your local garden center and comes shredded or as fiber mulch. The advantage of this type of mulch is that the oil in the eucalyptus repels termites, fleas, ticks, and insects. The disadvantage is that it can be hard to obtain and it can be twice as expensive as other types of mulch.

- **Grass clippings** — when they are fresh, they are smelly and will stain your hands but are high in moisture and nitrogen, making them good for the garden. Avoid using clippings that are full of grass seeds because these seeds are likely to sprout in your garden. This mulch is easy to work with and can be placed throughout the garden where the seedlings are more delicate or closely planted, such as around lettuce, spinach, and carrots.

- **Straw** — if you have access to straw, it offers excellent winter protection for your garden. The only problem with using straw is the potential for some of the seeds to germinate. Straw should be seed free but because it is often confused with hay, which still has seeds, it is possible to end up with seeds in your bales. Another disadvantage is that it is not very attractive and looks worse as time goes on.

- **Pine needles** — this is a long-lasting mulch that can slightly acidify the soil under it. This makes it good for potatoes and strawberries, which benefit from the more acidic soil. It is also an easy mulch to put into small or hard-to-reach places. Pine cones can also be used and make an attractive addition to any woodland garden.

- **Pine bark** — this is a mulch that decomposes slower than other varieties and will last a year or more. It comes in different sizes, ranging from fine to 2-inch chunks. The disadvantage of this mulch is that it can

lower the pH slightly. You can still use it around the same plants that prefer a more acidic environment like strawberries.

Non-organic mulch

There are several non-organic mulches available on the market. These types of mulches keep the weeds down and do not need replacing like organic mulches. Some of these mulches include:

- **Plastic sheeting** — these are large sheets of dark plastic. They are great to use in the spring to warm up beds and are also great for suppressing weeds. If you use a heavy grade plastic, which will last many years, you can lay it down between rows of plants where you want more heat, like between tomatoes, or on paths where you want to suppress weeds. You can use the sheeting to help improve the soil by stuffing the underside of the black plastic with organic matter to compost underneath the sheet. Some gardeners even lay the plastic down and cut holes into it to transplant seedlings. The plastic can stay on throughout the whole season as a weed suppressor. The problem with doing this is that it will not let water through it.

- **Landscape fabric** — this is a loosely woven fabric that helps retain moisture and slows or even prevents weed growth. The disadvantage of this type of mulch is it is usually one of two layers with a top layer covering the fabric to make the garden bed look better. Also consider that some landscape cloths are nonporous and will not let moisture through. If you purchase the nonporous type, the plant roots can suffocate and rot.

- **Rubber** — this product is made from recycled tires and will not decompose, making it permanent mulch. It can be purchased as mats, tiles, and nuggets and is available in various colors. It will not blow away or wash away under a heavy watering. It also comes in many

attractive colors, giving it a strong design element. In practical terms, insects avoid the rubber and it does not sink into the ground like gravel and rocks. However, the product can give off a strong odor and can be both expensive and hard to find.

- **Stone (pebbles and gravel)** — stones can be as small as pea gravel or as large as small boulders. The small gravel will stop the weeds better, but when topped with an assortment of boulders, together they create a nice contrast for the garden. Stones are another permanent cover as they do not break down over time but offer great color and texture to a garden. The disadvantage is that some of the smaller rocks will disappear into the soil over time and working with this type of mulch is physically demanding.

When to mulch

Lay the mulch down in the garden after the soil has warmed up in the late spring or the early summer. Placing an even, shallow layer of mulch approximately 2 to 4 inches deep will be effective against wind, sun, weeds, and pests. Be careful of the plants and avoid putting the mulch close to the crown of the perennials and the stems or trunks of shrubs and trees as you do not want to damage new growth and you need to leave plants space to obtain water.

If you live in a winter climate, one of the best times to mulch is in winter. Depending on where you live, the freezing and thawing process causes the soil to expand and contract. This can break new roots and even force your plants out of the ground in a process called frost heaves. If you cover the garden with something loose and full of air, like straw, when the ground first freezes, you can help keep the ground frozen until winter ends. Once spring arrives, you can remove the mulch.

Another benefit of winter mulching is protecting all types of plants, including perennials and ground covers, from **winter burn**, which can happen when the winter temperatures damage the plants. When the ground freezes and there is a strong wind, the moisture is pulled from the plant.

Compost

Compost can be the best natural fertilizer for your garden, regardless of the type of plants you are growing. It is a mixture of decomposed plant and animal material (manure) and many other organic materials that then go through decomposition in the presence of oxygen, called **aerobic decomposition**, to create a rich black soil. This soil is excellent for your garden as a soil conditioner and fertilizer.

The best compost materials include fruit and vegetable material, garden trimmings (not weeds gone to seed), and animal manure from horses, goats, sheep, and chicken. Other materials to consider adding if you have them available include leaves, coffee grounds, paper, cardboard, seafood shells, tree bark, eggshells, and even “humanure” (human waste).

How to make compost

Choose a spot close enough to be easily accessible but out of sight. You can choose to purchase a compost bin or alternatively build a system to work in the space you have available. You can make a heap in one corner of the garden and use the area to make your compost pile; you can use a single bin and place all the organic material into it; or you can create a three-bin system (made from wood). If you leave the bins open on one side, you can easily add to the pile, and to turn it over occasionally. Only cover the tops of the compost bins if your area receives a lot of rain. The three-bin system allows you to turn the compost from one bin to the other so that the compost in the final bin is ready to use while the pile in the second bin is in

the middle stage and the first bin is just starting to decompose. However, you will need to manually move the compost from one bin to the other.

When starting a new compost pile, making a pile with two parts of brown materials to one part green will help the materials break down faster. The **green garden materials** are grass clipping or old annual plants pulled from the garden, and the **brown garden materials** are dry leaves and twigs. The green material is high in nitrogen and the brown material is high in carbon and both are required to make your compost work successfully. If you add in too much green, the compost will have a foul odor.

Pile or layer the green and browns into a heap until you have a compost heap that is about 3 feet by 3 feet by 3 feet. You want the pile close to this size because it will heat up quickly and will therefore break down faster. Once a week, check the moisture content of the pile. To decompose properly, your pile will need water, but if there is too much moisture, the pile will not be able to maintain the required heat level. Your compost should feel damp like a wrung out sponge; any more water content than this and the pile will start to smell worse than normal. If your pile is too wet, you can add more leaves; if it is too dry, you can water it gently with a garden hose.

Once a week, the pile needs to be turned over, meaning you turn the outside material into the center – where there is internal compost heat. Oxygen is required for the decomposition process, which is why you turn the pile. Turning the pile also stops it from becoming hard and compacted. Some people keep a perforated PVC pipe standing upright in the center of the compost pile to let oxygen reach the center of the pile.

If you turn your pile over once a week, you could have finished compost in eight to ten weeks. The compost pile that is not turned over will not be as active and will take longer to decompose with the good compost sitting at

the bottom of the pile. During the decomposition process, the temperature of the pile will reach between 110 and 160 degrees F. You can monitor the temperature with a long probe thermometer pushed into the center of the pile. Turn the pile when the temperature drops below the 110 degrees F mark to speed up the compost process. If you decide not to monitor the temperature, you can turn the pile every month.

The compost from the bin system is ready when the temperature lowers until it is barely warm and the original materials in the pile are no longer recognizable. It is possible you will have a few pieces that are not quite ”finished,” which is fine; throw them into the first bin to start the next pile of compost. The compost should also be a rich black-brown color, moist, and have an earthy smell.

How to use compost

Now that you have this great rich soil, it is time to add it to your garden. If you do not want any bits left in your compost, you can run it through a compost sifter, which is wire mesh in a frame, that will leave you with only soil. The bits and pieces that do not go through the sifter can go back into the compost pile. You can do several things with this nutrient rich-soil but treat it as you would any rich fertilizer or potting soil. There are several ways you can use your compost:

- **As a mulch to hold water** — you can spread it about 3 inches thick on the base of plants, trees, shrubs, or perennials in the garden. If there are some unfinished pieces in your compost, they are fine to use here as they will continue to break down over time.
- **To fertilize the garden** — you would want to dig the compost into the existing garden, going down several inches or more to work the compost in.

- **To make a compost tea** — some compost tea is natural byproduct of compost. If there is no liquid in your compost, you can steep a shovel full of compost in a bucket of water for a few days. After a few days have passed, remove the compost material, put it back in the compost pile, and simply water the plants with the compost tea. If you want, you can put the compost into something like an old towel, cheesecloth, or burlap bag before putting it into the bucket of water.
- **As a topping for your lawn** — often called a **lawn dressing**, you can add a 1- to 3-inch layer of compost on top of the existing grass. The compost works its way into the ground as the grass grows through it. Because it is a great way to fertilize the grass, adding compost in the spring or fall may eliminate the need to fertilize throughout the rest of the season.

Many people add the compost into their gardens in fall or spring, whenever it is ready, digging it in as they turn their beds over. Whichever way you choose, your plants will benefit from adding compost.

Garden teas

Garden teas are similar to compost tea except there are several variations to consider making, depending on the type of materials you have available. Making teas for your garden will give them an extra boost of nutrients to help them fight off disease and grow strong. The teas are good for any garden, especially companion planting gardens. Here are some suggestions to consider, depending on what materials you have available:

- Alfalfa tea
- Comfrey tea
- Manure tea
- Scrap tea
- Seaweed tea

- Swiss chard tea
- Weed tea

Alfalfa tea

To make this kind of tea, you will need a 5-gallon bucket and a sack of some kind like an old pillow case or rice bag. You want something that will allow water to soak through the material. Fill one quarter of the sack with alfalfa meal/hay. Fill the bucket with water, place the sack in the bucket, and let sit. The tea will need at least a week to ten days to steep. When the tea base is ready, remove the pillow case and dump its watery contents in the garden. Take 1 cup of the tea and put it in another bucket or gallon-size jug and fill it with water, diluting it down. This is the finished tea. Water the crops once a week with this high-phosphorus content tea.

Comfrey tea

You can make an instant comfrey leaf tea that is high in calcium, potassium, phosphorus, and other various minerals. For this tea, take several cups of comfrey leaves, place them in the blender, add enough water to make it blend, and liquefy the leaves. Take the pulpy liquid and put it into a 5-gallon container. Fill the container almost to the top with water with a strong pressure so that your mixture gets a frothy appearance. After your tea has mixed, it is ready to go onto the garden. Tomatoes and potatoes love comfrey tea as do most vegetables.

Manure tea

To make manure tea, take an old pillowcase or cloth sack and fill it about one quarter full of manure (cow, horse, chicken, or a mix) and place the sack in a 5-gallon bucket. Fill the bucket almost to the top with water and let the mixture sit for a couple of days. Stir it a couple of times while it is steeping. When it is done, remove the manure sack and dump the contents in the corner of the garden where it can finish decomposing. Then take the

brown liquid and dilute it down to a pale amber and water the garden once a week. Manure is high in nitrogen, making this a great additive to the garden. When you are working with manure, it is better to use gloves and wash your hands to avoid transmitting bacteria.

Scrap tea

Fill a cloth sack with kitchen food scraps like potato peelings, apple cores, and broccoli stems. Make sure the scraps are not animal-based but do remember to include tea bags and coffee grinds. Place the sack in a 5-gallon bucket and fill with water. Let the mixture sit for three to six days. When enough time has passed, remove the sack and dump its contents into the garden. Dilute the remaining liquid down to an amber-colored liquid and water the garden with this tea once a week. The tea can be left in the bucket outside until the next watering session.

Seaweed tea

For those who live in coastal areas, seaweed products and concentrate are available at many garden centers. If you live near the beach and are able to find your own seaweed, take a large bucket and fill it three quarters full of rinsed seaweed collected from the beach. Fill the bucket with water and let it sit for several weeks or months. (The liquid gets stronger the longer you leave it.) Once the liquid is done steeping, pull out the seaweed, add the plant to your compost, and use the liquid to fertilize your garden.

Swiss chard tea

This tea is made the same way as the comfrey leaf tea. It is just as rich a mixture as the comfrey tea and is rich in calcium, phosphorus, potassium, and trace minerals.

Weed tea

This tea is made of the nuisance weeds you are trying to get rid of from the garden. Fill a cloth bag with harvested weeds and put that sack into a large bucket of water, making sure the bag is completely submerged to kill off the weeds. Some weeds may not be dead even after two weeks submerged in the water, particularly running weeds like sorrel that will regrow from just a small piece left in the garden. After a month to six weeks, check to ensure there is brown sludge in the bucket and the weeds are completely dead. Take out the bag and let all the liquid drain. Put the contents from the bag into the compost pile, not the garden. The remaining liquid is weed tea and it can be poured straight onto the compost heap to accelerate the compost process or it can be added to the garden as a liquid fertilizer. To add to the garden, dilute the weed tea at a rate of one part weed tea to ten parts of water.

Fertilizers

Fertilizers are additives that help your garden grow. There are natural fertilizers and of course commercial fertilizers. There are many different commercial fertilizers that contain mixes of chicken manure, blood, bone, seaweed, sheep manure, and cow manure. For information on what commercial fertilizers are available for purchase in your area, check your local garden center.

There are other additives that you can mix into your garden that will fertilize the area. Consider adding the following items, which are all readily available at your local garden center, to your garden to increase its health and well-being:

- Blood and bone meal
- Mushroom compost
- Lime and dolomite
- Seaweed

- Wood ash

Blood and bone meal

Blood and bone meal fertilizer is a mixture of ground-up animal bones and dried up blood that is rich in phosphorus and nitrogen and have been used for centuries as a fertilizer. All plants will benefit from this fertilizer. It is usually mixed with potash, a potassium compound, for a total plant fertilizer. Check with your local nursery center to see what they have available.

Lime and dolomite

Lime is calcium carbonate and dolomite is calcium carbonate with magnesium carbonate added. They are made from pulverized limestone or chalk. These elements will raise the pH, reducing the acidity level in your soil, and will provide calcium and trace minerals for the garden. It is best to add this to the garden in the fall and let it work into the ground over the winter.

Mushroom compost

Mushroom compost is more than 75 percent straw, wood shavings, and manure, and the rest is a mixture of gypsum and limestone. Mushroom compost is a byproduct of the mushroom growing industry and is rich in organic matter and nutrients. You can buy it in bulk if you have a producer close by or you can buy it in bags. Check your local garden center to see if it is available.

Wood ash

Wood ash in small amounts is great for any garden as it is a good source of potash, potassium, and also contains phosphorus and micronutrients. If your soil is very acidic and has a pH lower than 5.5, the wood ash will raise the soil’s pH. However, if your soil is neutral or alkaline, it might interfere with

the plant’s ability to absorb the available nutrients. Do not put it around acid-loving plants like rhododendrons and blueberries for that reason.

Now that you have an idea of the herbs to put in your garden, and the ways to nourish your garden, the next chapter takes a look at maintaining your garden.

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CHAPTER 4: Garden Maintenance

Some people are in their gardens on a daily basis, taking joy in simple garden maintenance tasks. Others want to spend minimal time working in the garden so they can sit and enjoy the garden. Regardless of the type of gardener you are or the type of companion planting you are looking to practice, there are some simple tasks that will need to be done.

Maintenance Tasks

In the spring, it is time to pull weeds, remove mulch that was put on in the fall, and turn the beds over. Spring happens at different times around the world so understand the growing season for your area so you know when to get started. There are a couple of Web sites that will show you the last expected frost dates in your location if you are in the United States. The first one is through the Farmer's Almanac at **www.almanac.com/content/frost-chart-united-states**. Another Web site called Dave's Garden lets you put in your ZIP code and it will tell you the expected frost dates for both spring and fall for your area **http://davesgarden.com/guides/freeze-frost-dates**.

Early spring – pre-planting season

When it is too early to plant because the ground is still too wet or the danger of frost is still present, you can start weeding if you already have a

garden bed to work on. This is a good time, provided the frost is out of the ground, to pull weeds that will cause problems later on as the ground is soft and the softer the ground, the easier the weeds will be to pull. When you can, trim the perennials that survived the winter. Some take longer to show growth than others so do not immediately throw away a plant that has not started to sprout new growth. Pull up the old leaves and plant debris, and if you left the seeds in place for the birds, cut the branches back now.

As the garden dries up, add in compost if you have it and start to dig your beds over. If you do not have a garden already, this is the stage you should be laying out your design, building raised beds if that is your choice, and starting to work the area into a garden. You can start seedlings indoors if you can offer them enough light, and you can plant early crops outdoors if you have the ability to keep them safe from frost. Otherwise, hold off a few more weeks until the weather warms.

Another thing to do is to sort out your watering system and lay down hoses that you are going to use. You may want to have timers regulate your hoses to cover all your garden areas. You can have them go off each evening after the sun has gone down so the plants have the benefit of the water overnight during the cooler hours. If you water during the day, most of the water evaporates, robbing the plants of the necessary moisture.

You should be sorting through the plants you are interested in having in your garden and considering which plants should go where. Consider if you are going to have separate gardens for vegetables, herbs, and flowers or if you will interplant for maximum space usage. Will you need to put up trellises for plants to climb, or use another plant like corn stalks for beans and nasturtiums to climb up instead? If you know your garden will have insect problems based on your experiences from past years, consider which companion plants will help to solve these problems this year.

Once the ground has warmed up enough, it is time to plant.

Late spring – planting season

This is the busiest season next to harvest time for your garden. This is the time to make sure your garden has been dug over, enriched, raked, and is ready to put down seeds and plants. At this point, you can plant most plants with the exception of the tender ones like peppers, basil, and eggplant. Certain plants may need a cover to keep them warm for a few more weeks, like tomatoes.

You can put down the seeds, buy seedlings, or plant the seeds you started in the house. You can also buy annuals for window boxes and containers. If you are doing garden bed rotation and planting a cover crop in one bed, now is the time to get those seeds in the ground. This is also the time to keep weeding so the weeds do not have a chance to get established. If you notice certain bugs creeping into the garden area, such as slugs, it is time to remove them and start attracting the predators you want to have in your garden. Set up toad houses, create rock piles as hiding places, and have bird baths and bird houses as well as tall perches for the birds to sit on.

Digging the garden over

To dig the garden over effectively, the ground should be dry and crumbly. If you can squeeze it and form it into a flat cake of mud, chances are it is too wet. You can still dig it; however, it will take extra effort and it will not be as effective. The purpose of this stage is to break the crust that has formed over winter, kill the growing weeds, and open up the grubs and seeds to the birds.

To dig the garden over, put your shovel into the ground, lift up a hunk of soil, turn it over, and put it back down on the same place, breaking it up slightly before moving over to the next piece. You can use a piece of equipment called a rototiller to do this same job if your garden is too big to

dig by hand. Work the garden over about one to two weeks ahead of planting. Any longer than this and the ground can harden again; any shorter than this and the birds will not have had a chance to pick up the grubs that you have moved to the surface. When you are ready to plant, you may need to break the dirt up slightly again. This is particularly helpful when growing plants with long roots like carrots. The ground needs to be well dug and preferably sandy to grow the long carrots. If the ground is dense and full of clay, the carrots will be stumpy and short. This is also a good time to work any organic matter like peat moss or compost into the garden to improve the soil. It is also a good time to add fertilizer as you work the ground. As companion planting often means making the most out of the space available, the soil needs to be rich in nutrients to sustain the plants throughout the long growing season.

Seeding

Seeding is the process of sowing the seeds of the plants you want to see in the summer and fall. Generally, this refers to vegetable seeds but this is also the way many wildflower and annuals are started. Water the ground well before putting out the seeds.

If you are sowing in a row, gently create a trench using your fingers or a hoe and lay the seeds evenly spaced in the dirt as per the directions on the package of the seeds you are planting. Cover with a light layer of dirt. If you are scattering the seed in a general area, try to sow them evenly throughout the area. Once the seed is covered, label the garden row or bed and note the date planted. When planting is done for the day, water the area with a gentle mist so as to not disturb the seeds. Water daily until the seed is sprouted.

Transplanting

Transplanting the seedlings that you have bought or grown in the house is simple but requires a gentle hand because these young plants are easily damaged. Start by letting your seedlings acclimatize by setting them outside during the day and then bringing them in again at nighttime. This is a process called **hardening off** and will help the plants adapt to the outdoor cooler weather. It is best to transplant on a cooler, preferably cloudy day, as the transplants will transplant easier when they are not in the hot sunshine.

If you are planning to use newspaper or black plastic/landscape cloth to keep the weeds down, then cut holes in the center and dig big enough holes for the seedlings to settle into easily. You do not want to force them into the ground as the young roots may break off. Water the seedling well, remove it gently from its current home, open up any matted roots slightly, and place it in the new home. Form a slight hill of dirt around the base of the plant and press the dirt down firmly.

Thinning seedlings

When you sow seeds, it is easy to sow too many in one spot. In fact, it is almost impossible to not sow them too thick. That is where thinning comes in. Once the seeds have sprouted and have tops that are several inches high, then the process of **thinning** starts. This is the process of pulling out the plants that are too growing too closely together. The seed packet will tell you how far apart the plants need to be for optimum growth and you will have to pull any plants that are closer than this recommended distance. The idea is to have a couple of inches minimum between two healthy seedlings. You should look for the healthier of the seedlings and pull all plants out of that healthy plant’s space. By doing this, you avoid overcrowding. If you do not thin the seedlings, the plants become so overcrowded that they will not grow properly and will eventually die. This is particularly important if you are going to add other plants to maximize your space in your garden.

Divide mature plants

After several growing seasons, some plants need to be divided. You will know they need to be divided because they have reached the point where they begin to die off in the center and leave a brown ring. It is better if you catch the plant before it gets to this point. You can start when the plant has grown several times its size over a couple of years. Division is done by dividing the plants into several smaller versions of the original to keep the plants vigorous and happy for a long time.

Any time these plant have outgrown their location, they can be divided and moved. The best times to divide plants are in the spring and fall. The reason for dividing the plants in the spring is because the roots have not started actively growing yet and will be able to recuperate from the disturbance faster. In the fall, the growing season is over and the plants can be moved to a new location where they will have the winter to put down roots.

Before dividing the plant, soak it well because disturbing the roots will affect the plant's ability to take in water and nutrients for a short time. If the plant you are dividing has a lot of foliage on top, you may need to cut the leaves back by a third because this makes it easier for the plant to recover. Make sure you have the new location picked out, dug out, and well watered to receive the new plant because the plant will respond better if it is not left out of the ground for any length of time. Make sure to give the new plant sufficient space. Treat the new plant piece like a seedling and give it extra care until it is established.

The actual division process can take several different forms. The right way to do this usually involves digging out the entire plant and slicing around and through the roots to separate off a healthy chunk. Some plants like daylilies have twisted roots that can be gently pried apart with two pitchforks. Some people will take a sharp spade and make a clean cut through plants (especially grasses) while they are still in place. Regardless

of the method, after cutting the plant, lift it out of the ground, keeping as much roots and dirt attached as possible, and place it into the new location so the roots of the main plant have only a minimal disturbance. When you are done, hill the dirt around the new plant and the main plant's exposed roots and water them thoroughly.

Keep in mind that large plants can be divided several times and spread throughout the garden to create more plants. Also realize that some plants are so overgrown and root bound, like large ornamental grasses, that they will require an axe to help split the plant into two.

Taking cuttings

Another way to divide or create new plants is to take cuttings from a healthy plant and planting them in a pot full of potting soil. There are different types of cuttings that can be done. The most common methods include:

- **Stem cutting** — a piece of stem that needs to include one leaf node is planted in the soil and will produce new roots
- **Root cutting** — this is a section of root that when separated and planted elsewhere will produce new shoots
- **Leaf cutting** — a leaf is placed on moist soil and will need to produce both new roots and new stems

Some species, such as blackberries and geraniums, will produce new plants easily, while others will require more care. For more information on how to work with cuttings, see the Hortus USA Web site (**www.rooting-hormones.com**).

Summer – heavy growing season

In the summer, your garden will be an explosion of color and produce. The more you harvest, the more your plants will produce. They will need ample

sun and nutrients, but if you have prepared your beds properly, they will grow beautifully.

Watering

During the summer months, it is important to keep up a regular watering routine. Keep an eye on your garden and try to avoid overwatering. Also remember that with companion planting, the nutrient and water requirements are heavier when you plant a lot of plants in a smaller space as they have to share the resources among themselves. It is also easier to revive a dried-out plant than to dry out and save a waterlogged plant.

You should water your plants when the soil is dry several inches below the surface. To see if you have watered your vegetable and flowers sufficiently, use your fingers to check that the ground is damp at least 4 to 5 inches below the surface. In some regions of the country where fungus is a problem, morning watering will minimize the fungal growth. The normal rule of avoiding watering during the daytime should be ignored if your plants are wilting and stressed due to the heat. If your schedule does not allow you to water early in the morning or in the evening after the sun has gone down (which is the preferred time to water your plants), watering the plants during the day is still better than not watering them at all. Some plants will need more water than others and tomatoes are definitely one of them. These fruit are full of juice and you cannot have big, plump tomatoes without regular, preferably drip-type, watering. The problem is when you forget to water then attempt to make up for it with an extra heavy watering the next time, particularly if the plants are not mulched, they will take up a lot of water faster, causing the inside of the fruit to grow faster than the skin and the tomatoes will split. You can tell if your plants are not getting enough water because the foliage will wilt and the stems will hang limp.

Staying ahead of the pests

Always keep an eye out to monitor your garden's pest population. If you are companion gardening and have done so for a while, there should not be any major problems. If you have just started companion planting, it will take a bit of time for the balance of prey and predator to establish itself. It is important to keep an eye on the situation. Walk up and down the rows and inspect the plants by checking the undersides of the leaves, the tops of the leaves, the growing tips, and at the base of the stem for insects.

You may also find signs of disease, but this does not have to be a major problem. If you find a plant that is heavily diseased, pull it out of the garden and throw it away. Do not put it into the compost pile as the disease could spread. If there is just a leaf that shows signs of disease, pluck it off and throw it away.

Pinching off/deadheading

The process of snapping of dead blooms and in some cases growing tips is called **pinching off** or deadheading. The reason for pinching off the dead blooms is to encourage more flowering. Some plants, like coleus, are grown for their foliage and not their flowers so when the plant shows signs of flowering, you pinch off the starting blooms to encourage the plants to become bushier and thicker. The decision of whether to promote more flowering needs to be determined by whether you have enough flowers in the garden now to attract in the pollinators like birds and bees. If you are cutting flowers for vases, make sure you leave enough for the pollinators as well.

Some plants bloom and leave only beautiful dry pods full of seed that are often left in place. An example of this is the astilbe, which only blooms once a season. Pinching off the finished bloom will not bring on more flowers. Deadheading is normal with annuals like petunias, pansies, and even roses will benefit from having the dead blooms removed to promote new growth.

Cutting back

Some early-blooming plants start to get tired and scrawny looking in the summer and the older leaves start drooping and looking worn and damaged. The hardy geranium is a prime example. In the spring, it is a thick, beautiful clump but by the time the heat of the summer sets in, it is no longer as attractive. This is a great time to cut the plant back and have it regrow.

Some of these early bloomers will have new growth coming out of the center of the plant, which is a sign that the plant is ready to start again. You can cut the old foliage back to where the branches look livelier or you can cut it all the way back to the new growth, which is basal growth. Many plants will bloom a second time after you cut them back and coreopsis is another example. Wait until the plant has finished blooming then shear the plant down and wait for it to bloom again. All plants are different and require a little care to make them look gorgeous all summer long.

Another reason to cut back is because sometimes plants become tall and spindly and when they are ready to bloom, their stalks are not strong enough to support the flowers. To encourage the plants to grow stockier and stronger, you cut the plant back to about a third of its height once it has reached 8 to 10 inches tall. Let it grow again and then cut it once more. When the plant grows for the third time, it should be strong enough to support big, healthy flowers. The flowers may bloom a bit later than if you had not cut the stalks but there will be more flowers than ever. By doing this, you also allow the plants around to spread out and maximize their growth.

Fertilizing throughout the growing season

If you are growing a garden heavy with vegetables, you may want to fertilize mid-way through the growing season. When you fertilize mid-season it is called side dressing. The garden will need this second boost of

nutrients to keep some long-producing plants like tomatoes growing and producing strong throughout the season. To apply a commercial product, you can make a trench along the row of vegetables that you want to fertilize. You should never put fertilizer directly on the plants because it can burn the plants. Apply the fertilizer and then cover the trench. Because companion gardening makes heavy use of the available nutrients in the soil, it is important to replenish these nutrients on a regular basis.

If you are fertilizing with garden teas, they can be poured around the plants every week throughout the growing season and your plants will appreciate it. You can also add compost that is ready for the garden any time. This soil can be place around plants or up and down the rows.

Late summer – harvesting

Harvesting is the fun part of gardening and every plant has a different time to harvest. Here are some basic tips to keep in mind when you harvest:

- Pick only the items that are ripe – like tomatoes. Leave the others on the plant to ripen a little later.
- Pick the produce every few days. Plants like beans, peas, okra, and cucumbers will produce more if you pick often.
- Avoid picking vegetables in the rain or when the plants are wet to avoid spreading disease.
- Avoid damaging the plants when harvesting.
- If the plants are wilted, water and wait until they recuperate before harvesting.
- Once harvested, put the fruit and vegetables into a cool place. Enjoy the harvested fruits and vegetables as soon as possible.

- Disturb the plants as little as possible. If you are reaching under the potato plant to steal the new potatoes, make sure to avoid disturbing the roots. You can pull the whole plant if you want, but if you leave the potatoes you missed in place, the smaller ones will continue to grow. If you want potatoes for storage, you need to leave them in the ground until they have a firm skin. The potatoes will often continue to grow under the ground even after the plant above the ground has died.
- Some plants need to stay in place until after a frost before you harvest because a light frost will convert the starch in some vegetables like parsnips to sugar, improving their taste. Brussels sprouts will keep better after a frost as will the flavor of kale and collards. Pumpkins are not generally picked until a light frost kills the plant so the pumpkins can reach their maximum growth.
- Harvest for your taste. Some people like zucchinis only a few inches long and others prefer them when they have grown bigger than a foot.
- It is also okay to let some of the plants go to seed; the insects and birds will thank you for it.

Fall – cleaning up/preparing for next year

The fall is the best time for garden cleanup. This is also the time to cover the soil for winter and set up havens for the insects and wildlife.

Some plants will have an extended season – at least until a hard frost occurs. Many flowers will still be blooming throughout September like the asters, mums, stonecrop, pansies, and some of the clematis varieties. Plants like carrots, spinach, and Swiss chard can survive several frosts so do not be in a hurry to pull those plants. In fact, if you cover these plants with a thick layer of straw, cover the straw with a waterproof tarp to stop the straw from

getting wet, and place heavy rocks on the tarp to stop the tarp from blowing away, you will be able to harvest these vegetables throughout the winter.

Sheltering insects

Many of the insects that have helped you throughout the summer are going to stay in your garden over winter. If you plan on using cover crops and mulch, they will burrow into these during the winter. Leave water dishes out in the garden until the water has frozen. If you have boards around the garden, leave them in place. You can clean them up in spring and the insects will move into the garden then as well.

Planting fall plants

If you have new perennials, trees, or shrubs, this is a good time to plant them. It is also a good time to transplant and divide plants to set them out in new locations if you did not do it in the spring or if you find you have to do it again. Remember to deadhead the flowers of the perennials and keep in mind this is the right time to plant spring-flowering bulbs like tulips.

Taking care of perennials

In the fall, trim or prune back your perennials. You can either cut off any seed heads left on the stalks or you can leave them on for the birds.

Cleaning up the garden

This is the time of year that the plants look old and worn out; some are crumpled to the ground and the others sag because of the effort of producing all summer long. Clean out all the old and dead plants in the garden and put them into the compost pile.

When you are going through the garden beds, check for plants that have suffered from insects or diseases. If you find one, pull the entire plant including the roots to make sure the problem is not there next year. Remove all the plant material of the cabbage and squash family plants as well, as

they are prone to disease and can cause problems in the garden next year. If you have potatoes or tomatoes in the garden, be sure to harvest the plants completely and if you are planning on composting the plants, make sure you have an active compost going. Some diseases can survive winter in the compost heap as well so you want to make sure the compost is actively breaking down the plant materials.

Putting the garden to bed

Once the garden has been stripped and the perennials have been taken care of, it is time to lay down compost and fertilizer and either till the soil or dig it under. This will add nutrients to the garden that will decompose in time for spring planting.

If you are still in the mood for gardening at this point, you can prepare the beds for spring, plant a simple cover crop to add nutrients to dig over in the spring, or just let it all sit for the winter as it. This is time to relax and enjoy the silence of the winter. Spring will be here soon enough and the process will start all over again.

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CONCLUSION

Now that you are armed with the knowledge presented in this book, it is time to put the book down and get your hands dirty. Gardening — especially when using companion planting techniques— is a cathartic process full of learning and joy. Approach your garden as dynamic project, one that is always changing and growing as the plants develop. Be sure to leave yourself a place that allows for new plants as there will always be a new one you just have to have. Most importantly, remember to enjoy your garden — make it real and make it yours!

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CASE STUDIES: Real Stories from Real People

This chapter contains a collection of case studies from actual companion planters that use anything from herbs to vegetables to perennials to fruits. Enjoy!

Case Study: David Beaulieu

Landscaping guide for the Web site www.about.com
landscaping.guide@about.com
www.landscaping.about.com

Plants have always been an integral part of David Beaulieu's life in one form or another. He has eight years of experience writing about landscaping, which has encompassed most aspects of gardening in one way or another. David believes one of the biggest problems people have with establishing a garden is getting started. Here is the most simple and effective way to create a garden where only weeds or lawn exists without all the hard work.

"Starting a garden from scratch does not need to be the dry, labor-intensive job most people would assume. There are a few tricks and hints to help the process move forward faster and smoother. The first problem with establishing a new garden is getting rid of the old lawn. The easiest way to do this is to mark off your planned space and cover the entire area with newspapers. Make sure the newspaper layer is at least ten sheets thick and have each page overlapping the adjacent one by several inches. You do not want any of the grass below to show. You can mow the grass but this is not required. The newspaper sheets do not need to be laid down one by one; as long as a section is ten pages, lay it down as one.

The next stage is to lay mulch, 5 to 6 inches deep, down on the newspaper. This helps stop the papers from flying away plus it adds in nutrients to the eventual garden. Organic mulches of choice include compost, shredded leaves, and straw. Now water your 'garden'

and wait. It takes several months for the newspapers and mulch to kill the grass. The sod will eventually break down along with the newspapers and the mulch, giving you a nutrient-rich beginning for your garden.

If your potential garden is not lawn but weeds, the problem is much bigger, but transforming the land can still be done. It involves a process called soil solarization, and is best done in June or July. Cut all weeds as low as possible with a lawn mower or even a sickle. Next, rent a powerful tiller to dig through the hard soil to loosen the weed roots. Then, use a large steel rake and rake out the bulk of the weeks. Rake it again to level off. You might think you are done at this point, but in fact, the weed killing has just begun. Next, water down the area and cover it with a clear polyethylene sheet. Use rocks, blocks, or logs to hold the plastic down, but be sure to not puncture any holes in the plastic. Keep the plastic stretched out over the area for four to six weeks during which time the sun is 'cooking' the weeds before they can sprout. Any pathogens in the soil will be killed as well. When the time is up, remove the plastic and you have a 'clean slate' to plant your garden."

Case Study: Josh Kirschenbaum

Territorial Seed Company
Product Development Director
PO Box 158, Cottage Grove, OR 87424
www.territorialseed.com

Josh Kirschenbaum, a plant biology graduate from Ohio University, has worked at Territorial Seed Company for over a decade where one of his major responsibilities is to coordinate and evaluate the yearly trials.

"Territorial has a 44-acre, certified organic trial ground where we test vegetable, flower, and herb varieties. Not all 44 acres are used each year for trials but rather we rotate the fields. So, if one area was planted last year for trials, we will not use it for trials this coming year. Instead, we plant a cover crop in the fall and leave it in over the winter. Depending on the type of cover crop that we use, we may till it under in the spring or summer and plant another type of cover crop that is suitable for growing in the summer. By doing this, we replenish some of the nutrients that were used previously and incorporate as much organic material into the soil as possible.

Compost is an integral part of our gardening/farming system. The company grows its own trials and seed crop production (we grow plants, harvest the seed, clean it, and then package it), and consequently have a large amount of vegetative material that can be composted at the end of the season. The main way that we compost this is by vermicomposting — using worms to break down the plant material and turn it into rich compost. The compost is then used in our fields and in our soil mixes that we use for our mail order plants.

We mainly sell seeds and one of the most common problems that I see is with starting seeds indoors. If someone lives in an area with quite a good amount of sunlight in the early spring, then seedlings can be put in a south-facing, sunny window. Most of us, however, need to use some sort of supplemental light to get our seedlings off to a good start and avoid them becoming leggy and weak. This doesn't mean that you have to go and spend lots of money on an expensive grow light system — a simple fluorescent shop light can work just fine. The important thing to remember if using a standard fluorescent light to grow your seedlings is that the bulbs are typically not very powerful so you want to have the plants as close to the light as possible without actually having them touch the bulb. As the plants continue to grow, move the light fixture accordingly.

Another common problem is putting plants or seeds in the ground too early. Several vegetables are frost sensitive and plants will die if temperatures dip below freezing. Even if a frost does not occur, if a particular plant thrives in warm temperatures, it might become stressed by cold temps or just not grow. If planting from seed directly into the garden, it is very important to plant when the soil temperature is ideal for the particular type of seed. If the soil is too cold or wet, the seed could potentially rot before having a chance to germinate. Remember that soil temperature is quite different than air temperature and I highly recommend purchasing a soil thermometer to know for certain.

In regards to common problems people have with their insects, I recommend to:

- Make sure that you let us know when you would like to receive them. Most of the insects can be purchased year-round for those folks who have greenhouses. If a customer plans on putting the insects outside, they should wait to order them when it is warm enough.
- Try to introduce the beneficial insects when the pest population is present but low. If a ladybug doesn't have any aphids to eat, it won't just wait around for them!"

Case Study: Mary (Moosey) Ruston

Moosey's Country Garden
www.mooseyscountrygarden.com

Mary Ruston is a New Zealand gardener whose country garden is crammed full of foliage plants, roses, phormiums, and cordylines. She hosts a gardening forum for gardeners from all over the world at http://forums.mooseyscountrygarden.com

"No real gardener can be a perfectionist, can they? Imagine a garden in which no shrub grows too big too quickly; no expensive little treasure gets monstered by its neighbor; and no unwelcome bug dines out on gourmet foliage plants. But real gardeners will happily spend a lifetime trying to get everything in their garden just right. Here are six tricky little tips to make your garden appear closer to perfection than it actually is. This isn't really cheating — think of it as gently nudging the truth.

1. If your garden looks too messy, there is a simple solution: Sweep and/or rake all the paths, and make sure the path edges are well defined. Mow any lawns and cut the grass edges sharply. Introduce edging material into your garden — stones, bricks, logs — whatever suits your style.

2. If some piece is annoying you — an ugly trellis, an abandoned bathtub, a concrete slab — don't be a gardening wimp and camouflage it, celebrate it! Make the eyesore a quirky feature. Put plants or pots around it, decorate it, or place a seat nearby. Have it say 'Look at me. I'm meant to be here.'

3. Let the weeds lurk in the interior of your garden borders, but keep visible areas close to paths well weeded. Install colorful buckets where you can pop offenders as you wander past. And don't feel guilty that you're a cosmetic weeder. Enjoy your garden; don't become a slave to it.

4. Let differences be your guide when 'designing' a planting scheme. Contrasts make life interesting, and it's the same for gardens. Think fat and thin for leaves, blobby and spiky for shapes. Put a refined cane garden chair next to a wizened tree trunk. Grow a feathery perennial next to a rough and tough evergreen.

5. No garden should be totally predictable and controlled. Allow yourself as many random gardening events as you cope with. Encourage flowers that self-seed. Buy that interesting new plant; if it embarrasses your planting design, you can always stuff it into a flashy pot. By all means, make serious garden plans, but embrace the unexpected.

6. Gardeners often get terribly serious about their timing. When should they shift a rhododendron? Or put compost underneath the roses? The answer is simple: If it's free, then the time is right. A free load of rotted manure? Take it and spread it. A free rhododendron? Take it and water it. However, if 'it' costs you money, then do your 'When is the right time?' research and follow the instructions."

Case Study: Colleen Vanderlinden

Garden writer and blogger
www.inthegardenonline.com

Colleen Vanderlinden is the organic gardening expert for the Web site About.com and the author of Edible Gardening for the Midwest. She also blogs about gardening at her personal garden blog, In the Garden Online.

"I can't imagine not growing vegetables. The fact that $2 spent on seeds results in hundreds of pounds of food for my family still amazes me. I find myself devoting more of my yard to edibles, sticking containers anywhere I can find a bright spot of sun. As far as addictions go, vegetable gardening is a pretty harmless one!

I primarily use interplanting in my garden, mainly because I garden on a small urban lot and space is at a premium. Being able to use one area of the garden for two (and sometimes more) crops just makes sense for my situation. I also do some companion planting to help with pest control, particularly for thwarting tomato hornworm, which can be a big problem for those of us who are always trying to 'push' the season and get our tomatoes planted extra-early.

Tomatoes with borage is probably my favorite companion planting combination. If you plant borage near your tomatoes, you won't have a hornworm problem. And borage is a beautiful, useful plant in its own right. If you plant nasturtiums near your potatoes, they help deter Colorado potato beetles. I made the mistake of planting nasturtiums, for the edible flowers, near my Brussels sprouts one year. The only problem is that nasturtiums attract aphids like crazy, and soon I was dealing with aphids on my Brussels sprouts as well.

I also like to sow lettuce seed near newly-transplanted tomato, pepper, and eggplant seedlings. You can harvest baby lettuce leaves for several weeks before the tomatoes get large enough to completely take over the area. Finally, you can't go wrong with a traditional Three Sisters garden of corn, squash, and beans. They just work so well together, and it really does cut down on work for you as the gardener. I have tried interplanting (or intercropping) as well as pairing vegetables with herbs or flowers that will improve the growth and flavor of the vegetable, or, in some cases, confuse insect pests, keeping them away from the vegetables.

My advice to gardeners is to start small. It's so easy to keep buying seeds and trying new varieties, but things can become very overwhelming. Plant those foods you know your family will eat. Spend time daily with your plants. That will help you recognize little problems, such as pest or disease issues, before they become big problems. Be willing to try new things and experiment. Just because a book or magazine article says something will work (or won't work) doesn't always mean it is true. You just don't know what will work in your garden until you try."

Case Study: Diane Linsley

Diane's Flower Seeds
www.dianeseeds.com

Diane Linsley is the owner of Diane's Flower Seeds, an Internet business based in Ogden, Utah. She grows heirloom flowers and vegetables, especially rare perennials and unusual tomatoes.

"You can save seeds from most flowers, except for hybrids, which do not come from saved seed. When going out to harvest seeds, I stuff my pockets with small plastic bags that are perfect for small amounts of seed, or take stainless-steel mixing bowls for larger quantities. I use pruning shears and thorn-proof gloves to harvest the seeds off thorny plants.

The best time to collect seeds is when they are fully ripe. Seeds are produced in either pods or seedheads. Pods have seeds enclosed in a shell and are ready to harvest when they become dry and brittle, just before they split open and spill their contents. Other plants produce seedheads, which are open, instead of being inside a pod, with the seeds exposed. After the seeds are ripe, the seedhead shatters. The trick is to harvest the seeds before this happens. You can feel to see if the seedhead is loose as it will be brown, crunchy, and dry. Some seedheads turn from green to brown before they shatter.

Seeds should be dried in a well-ventilated room (70 to 95 degrees if possible), or they can be dried in a garage out of direct sunlight. Small quantities can be dried in plastic cups, on small plates, or in plastic bags propped open with toothpicks to provide air circulation. A thin layer of seeds will dry more evenly. Turn or stir them every few days. Most seeds require two to six weeks to dry completely, depending on the seed size, temperature, and humidity of the room.

Seeds can be cleaned after they have started drying. The chaff or coating is easier to remove when it is dry, but the seeds will need further drying after cleaning. Cleaning equipment includes different sizes of stainless-steel mixing bowls, a fan, and a kitchen strainer with a metal screen. Small seeds are shaken through the strainer to remove the chaff, which is the dried protective coating on the seeds. They are then passed from one mixing bowl to another in front of a gently blowing fan to remove the dust. Be careful not to blow away the seeds. Larger seeds from seedheads are rubbed between gloved hands to loosen them before being passed in front of a stronger breeze to remove the chaff.

Dry seeds should be stored in a cool, dry, dark place. Well-prepared seeds will remain viable in storage for several years."

Case Study: Beth Trissel

www.bethtrissel.com

Beth Trissel is a successful romance author and gardening specialist with an enthusiasm for all heirloom plants and old-fashioned cottage garden plants. She's been successfully practicing companion planting for decades and focuses on creating wildlife sanctuary gardens that bring in the butterflies, hummingbirds, songbirds, and honeybees.

"We rotate our garden vegetables as well as practice companion planting. There are time-honored combinations we've tried as well as making some of our own discoveries. Some that have worked well include:

- Nasturtiums and radishes planted closely around the cucurbit family (also commonly referred to as the cucumber, gourd, melon, or pumpkin family) help to deter the squash vine borer and cucumber beetles, which are deadly to the plants. This family is

our most trouble prone, so it gets the greatest attention when it comes to companion planting.

- Radishes are also a good companion for lettuce, spinach, and carrots.
- Interplanting garlic with roses has beneficial effects in warding off some of the pests and diseases that attack them.
- We've observed that old-fashioned sunflowers with multiple heads (planted by birds from the birdseed variety) grow the best. Sunflowers attract masses of goldfinches, a favorite songbird, and when planted in and around corn, reduce armyworms in the ears.
- Marigolds are an excellent companion plant for vegetables and flowers to help ward off Japanese beetles.
- Borage enriches the soil, attracts honeybees, and is another good friend for squash.
- Onions planted near carrots help repel the carrot fly.
- Tomatoes love basil and grow more robustly when planted near that herb. Sweet peppers also like basil.
- Sweet marjoram is beneficial to interplant with vegetables and flowers.
- Mint helps deter cabbageworms.
- Pumpkins and squash survive better when rotated from their usual spots. This year we tucked a pumpkin in among the massive, native clematis vine growing along the backyard fence that we refer to as 'the beast.' The borers didn't find it, plus 'the beast' cradled the orange globes.

My main recommendation for a healthy garden is to use a lot of compost and natural mulch, like well rotted hay or straw or even leaves as healthy plants better resist insects and disease. Some other tips include:

- Earthworms are a gardener's best friend and thrive in natural mulch, humus-enriched soil. Avoid chemical fertilizers and pesticides or you'll kill the worms and other beneficial insects.
- We clear the vegetable plot in the fall and if possible, till it. If not then, we wait and till in the spring. We've tried the heavy mulch/no till method, but accumulated an unbelievable number of slugs. Some of them were the size of small bananas and even had nests of babies. Now, we add a lot of compost to the soil in the spring and mulch with organic matter but let it break down over the summer and don't leave it in place for the winter."

Case Study: Amy Padgett

Writer and rose specialist

amy@amypadgett.com or amy@amycorwin.com
www.amypadgett.com

Amy Padgett, who writes fiction under the name Amy Corwin, is an heirloom or Old Garden Roses specialist. A member of the Wilmington Cape Fear Rose Society for years, she also been active in the New Bern Rose Show where she won top awards including Dowager Queen and Victorian Rose awards and several 1st place awards for English (David Austin) roses. Her garden is enrolled in the National Wildlife Federation's Backyard Wildlife Habitat Program, ensuring that her gardens provide water, shelter, and food for all creatures without the use of pesticides or other sprays.

"I love nontraditional companion planting as I do not spray my roses. Practice has shown me that the following combinations work:

- Heirloom roses are often pale pink to rich mauve, examples include 'Sydonie' or 'Baronne Prevost,' and they are stunning mixed with 'Filius Blue' or 'Tri-Color Variegata' peppers. Herbs we have paired with these pale roses include borage, chives, chervil, thyme, parsley, sage, and basil. We also have some lovely sprawling rosemary that serves wonderfully in corner positions next to rocks or bricks.
- Newer rose varieties that have more intense colors can be beautifully mixed with hot colored peppers such as the ornamental 'Medusa' variety. These modern roses also can benefit from pairing with marigolds and pyrethrum as those plants purportedly have mild insect-repelling characteristics.
- Of course, many bulbs look gorgeous with roses, including daffodils and lilies. The lilies are nice as they often bloom just when the roses are taking a rest between bloom cycles.
- Some of our most beautiful pairings have included the fragrant, pale pink rose 'Souvenir de la Malmaison' paired with 'Tri-color Variegata' peppers that have gorgeous leaves streaked with white and purple. The leaves perfectly complement the pale roses. The lush, salmon-colored David Austin rose, 'Lilian Austin,' paired with the pepper 'Medusa' and interspersed with 'Snowball' marigolds work well.
- Because we start a lot of seeds, sometimes it comes down to finding an empty spot in the garden, and sometimes those acci-dental pairings turn out the best. An example of this was when we planted borage and a horehound herb near our rich pink 'Sydonie' rose. The blue of the borage, silvery-green horehound leaves, and pink rose books just seemed to work. Some years we've

  planted masses of marigolds and pyrethrum edging the more modern roses, particularly yellow or salmon-tinged roses. Those are excellent in the fall and really brighten up the garden.

- For easy care, many of our beds are interspersed with daylilies and other bulbs as they require less maintenance. Not to mention that daylily flowers are excellent stuffed with cream cheese mixed with chives!
- Make sure your companions have similar soil and water requirements or make sure you can accommodate targeted watering. For example, roses like a lot of water while many herbs prefer dry environments. You can still grow them together, but one way to manage it is to place the rose to the back of the garden and gradually raise the garden level toward the front and edge it with rocks or bricks. You can then place dry-loving plants near the edge where the ground level is slightly (maybe only an inch) higher. Water will drain toward the back where the rose will appreciate it, and the herbs will flourish in a drier, hotter location toward the front.
- We have not seen any difference between beds with pest-controlling plants and those that don't have them. We've tried pyrethrum and marigolds among others. The plants themselves don't suffer from a lot of pests, but they do not seem to significantly discourage pests on companion plants. We did reduce Japanese beetles by using milky spore but we have not found any plants that will naturally keep them off the roses in July. Nothing stops the thrips except sprays, which we don't use.

There is almost always a way to make combinations work, so don't give up if you have your heart fixed on a specific pairing of plants. Be creative and express your own interests. Don't be afraid to try something different because the great thing about gardens is that they are easy to change. If you don't like the effect you've created with a pairing, you can always separate the plants and try a different pairing. It's very difficult to ruin a garden so don't be afraid to experiment."

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Additional The Art of Companion Planting “Little Books”

If you are intersted in companion planting with herbs, flowers or more, be sure sure to check out the rest of the books in this series:

- The Art of Companion Planting with **Herbs**: A Little Book Full of All the Information You Need
- The Art of Companion Planting with **Annuals**: A Little Book Full of All the Information You Need
- The Art of Companion Planting with **Perennials**: A Little Book Full of All the Information You Need
- The Art of Companion Planting with **Wildflowers and Weeds**: A Little Book Full of All the Information You Need
- The Art of Companion Planting with **Bulbs, Tubers, and Rhizomes**: A Little Book Full of All the Information You Need
- The Art of Companion Planting with **Shrubs, Bushes, and Vines**: A Little Book Full of All the Information You Need
- The Art of Companion Planting with **Fruits**: A Little Book Full of All the Information You Need

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APPENDIX

Online Information Resources

- USDA Natural Resources Conservation Service – this Web site allows you to search the database by either scientific name or the common name of various plants as well as by location. **http://plants.usda.gov/checklist.html**

- The Virginia Tech Department of Forest Resources and Environmental Conservation offers a database that allows you to search for information on various trees. You can search by the location or by hardiness zone. **www.cnr.vt.edu/dendro/dendrology/factsheets.cfm**

- The online version of the Audubon Field Guide series is available at **http://enature.com**. This is an excellent resource for looking up various information on most plants.

- Texas A & M University and Bioinformatics Working Group have complied a vascular plant image library that offers photos of most North American plants **http://botany.csdl.tamu.edu/FLORA/gallery.htm**

- The University of Wisconsin also offers an excellent resource with their Wisconsin State Herbarium specimen database at **www.botany.wisc.edu/wisflora/**

- This Web site lets you to search the University of Connecticut Plant Database for various trees, shrubs, and vines that you might be researching **www.hort.uconn.edu/fmi/xsl/search.xsl**
- North Carolina State University provides information on various plants as well as information about what plants will attract butterflies. **www.ces.ncsu.edu/depts/hort/consumer/factsheets/**
- An easy-to-understand garden insectary from Eartheasy.com is available at **www.eartheasy.com/grow_garden_insectary.htm**

Resources for Frost Dates and Hardiness Zones

- The U.S. National Arboretum has a hyperlinked map showing the hardiness zones across North America at **www.usna.usda.gov/Hardzone/ushzmap.html**
- For plant hardiness zones in Canada specifically, Agriculture and Agri-Food Canada offer a series of maps at **http://sis.agr.gc.ca/cansis/nsdb/climate/hardiness/intro.html**
- The Old Farmer's Almanac offers charts showing the last and first frost dates by area In the United States at **www.almanac.com/content/frost-chart-united-states** and for Canadian locations at **www.almanac.com/content/frost-chart-canada**

Online Resources for Nursery Stocks and Seeds

There are many good sources available on the Internet to purchase gardening supplies. Some that are the easiest to use include:

- Gardeners Network – this site offers bulbs, flowers, nursery stock as well as being a go-to place for information on growing various plants **www.gardenersnet.com/flower.htm**

- Territorial Seeds – this is another great online supplier of seeds, plants, and insects. **www.territorialseed.com/**

- Diane's Flower Seeds – Diane Linsley runs two Web sites; one for her seeds and the other for her daylilies. She prides herself on the quality of her product, the rare perennials, heirloom flower and tomato seeds **www.dianeseeds.com/Index.html**

- GardeningPlaces.com — this site offers a directory of online seed catalogues. On the home page, you can choose the type of online catalogues you want to look at **www.gardeningplaces.com/index.htm**

- Heirloom Vegetable Gardener's Assistant — this site offers an excellent listing of heirloom seed companies at **www.halcyon.com/tmend/links.htm**

- Some other favorites for buying seeds include:
  – Burpee seeds and plants at **www.burpee.com**
  – Stokes Seeds at **www.stokeseeds.com**
  – Henry Field's Seed & Nursery Co. at **www.henryfields.ca**
  – Vesey's Seeds offers both a U.S. Web site at **www.veseys.com** and Canadian Web site at **www.veseys.com/ca/en**
  – Richters for seeds and plants at **www.richters.com**

Recommended Reading

Here are few other book titles on companion gardening to consider:

- Carr, Anna, *Good Neighbors: Companion Planting for Gardeners*, Emmaus, PA: Rodale Press 1995.

• Cunningham, Sally Jean, *Great Garden Companions, A Companion-Planting System for a Beautiful, Chemical-free Vegetable Garden,* Emmaus, Pennsylvania: Rodale Press 1998.

• Little, Brenda, *Secrets of Companion Planting: Plants that Help, Plants that Hurt,* Sandy, Utah: Silverleaf Press 2008.

• Lord, Tony, *Encyclopedia of Planting Combinations,* Buffalo, New York: Firefly Books (USA) Inc. 2008.

• Phillips, Ellen, *Rodale's Illustrated Encyclopedia of Perennials,* Emmaus, Pennsylvania: Rodale Press 1993.

• Riotte, Louise, *Carrots Love Tomatoes: Secrets of Companion Planting for Successful Gardening,* North Adams, MA: Storey Publishing Ltd. 1998.

• Riotte, Louse, *Roses Love Garlic,* North Adams, MA: Storey Publications 1998.

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GLOSSARY

Aerobic decomposition: the process of decomposing in the presence of oxygen

Annuals: a plant that completes its life cycle in one year or less

Bolt: go to seed quickly

Brown garden materials: compost materials that are high in carbon and typically brown in color, including dry leaves and twigs

Companion planting: the practice of planting two or more plants together to enhance the growth and quality of nearby plants; to provide maximum ground cover; and, when possible, to improve the soil

Compost tea: a mixture that results from steeping compost in a large bucket of water, essentially providing a diluted, liquid form of compost you can spray over gardens and plant beds

Container gardening: the process of growing plants in pots or containers instead of in the ground; the advantage to this system is gardeners can easily move plants if they are not growing well or plants can be grown indoors

Corm: a swollen, underground plant stem

Cottage garden: an informal, lighthearted garden that contains perennials, herbs, and rosebushes; there are often fences, trellises, arbors, or seating areas that will give a vertical aspect to the garden without detracting from it

Country garden: a form of garden that is a mix between the mixed border garden and the cottage garden style; it may incorporate trellises, arches, perennials, hedges, trees, and elements that are both formal and informal

Cover crop: a crop planted to improve the function of a primary plant

Crop plants: plants that are grown primarily for human and animal feed

Crop rotation: relocating crops to a different part of the garden every year

Cut-and-come-again salads: salad greens that do not need to reach maturity before harvesting and can be cut to grow again

Dampening off: when young seedlings suddenly die, most likely from rot

Deadheading: the process of plucking dead blooms off flowers; also called pinching off

Digging a plant under: the practice of leaving a plant in the ground and turning the dirt and soil over, chopping the plant and roots as you do so

Division: the process of separating a plant into several smaller versions of the original to keep the plant healthy

Dolly: a small platform with wheels used to move heavy objects

Dwarf trees: versions of trees that have been kept artificially small through horticultural practice

Floret: a tiny grouping of flowers centered together on a series petal-like bracts

Flowering shrubs: shrubs grown primarily for their flowery show

Formal garden: a garden that features defined shape and structure, often featuring clearly outlined beds and strong, geometric shapes

Frost heaves: when the freezing and thawing process plants go through causes the soil to expand and contract, which can break roots and force plants out of the ground

Fruit bushes/trees: trees and/or shrubs that bear edible fruit

Full-shade garden: a garden when no direct sunlight reaches the ground at any time of the day

Full-sun garden: a garden that can grow in the hottest and driest conditions; fruit trees, vines, and shrubs grow well in this type of environment

Garden insectory: a type of garden designed to attract or harbor beneficial insects

Grafting: attaching a plant from a differing type of fruit or tree onto another tree

Grasses: plants that have jointed stems, leaves, and produce seed-like grain

Green garden materials: compost materials that are high in nitrogen, including grass clippings and annuals pulled from the garden

Green manure: a form of organic compost that benefits a garden

Hardening off: the process used to acclimate seedlings to an outdoor environment; it usually entails setting seedlings outdoors during the day and bringing them in at night until they are used to the temperature

Hardiness: the temperature range in which a plant will survive

Hardiness zones: the different zones, as determined by the USDA, where various trees, shrubs, and flowers will most likely survive

Hardscape: aspects of a garden that do not grow; for example, driveways, walkways, and fountains

Herbaceous border gardens: a form of garden that is backed by a high stone wall or a picket fence and features summer perennials of various heights and foliage varieties

Herbaceous plants: plants that their tops die down while the roots or bulbs remain alive

Herbs: small, seed-bearing plants that are most noted for their aromatic, medicinal, healthful, and cooking qualities

Intercropping: another term for companion planting

Lawn dressing: a 1- to 3-inch layer of compost that is added on top of existing grass

Level interactions: planting tall plants with short plants to provide shade and structure

Light shade: a garden's lighting condition where filtered sunlight comes through the leaves of trees, still allowing some light to hit the plants beneath the tree

Loamy: a form of soil that is a mixture of sand, clay, and organic matter; this is an ideal form of soil

Microclimate: a mini-climate or a small, specific place found within a larger climate area; this results from different types of exposures to the elements

Minimalist garden: a garden that features a clean, crisp look and incorporates clean lines, simple spaces, and are often used in conjunction with contemporary architecture

Mixed border garden: a simple form of garden that include perennials, annuals, and bulbs

Monoculture: when only one plant is used in a garden

Naturalized garden: a garden that strives to recreate a balance that is often seen in nature; this garden welcomes wildlife and seeds and bulbs are scattered throughout the bed, allowing nature to scatter the plants instead of planting them in rows

Nitrogen fixation: when plants such as peas, beans, and clover excrete excess nitrogen into the soil, allowing other plants to absorb the nitrogen

Nut bushes: bushes grown for the nuts they produce

Ornamental shrubs: these shrubs are grown purely for looks

Overwinter: surviving the winter season

Perennials: plants that live longer than one year

Polyculture: a method of planting species of plants together for mutual benefit, usually in agricultural situations

Prairie garden: a mix of perennials and grasses that are grown together

Rhizome: a horizontal plant stem with shoots above ground and roots below ground

Run to seed: when a plant matures too quickly and produces seeds more quickly than they can be eaten

Scorching: when leaves burn and dry up because of too little water

Seeding: sowing seeds of plants you want to appear in spring and summer

Side dressing: fertilizing mid-way through a growing season

Soaker hose: a hose with small holes throughout the tubing that allows the hose to equally distribute water among plants

Taproot: one long, single root

Thinning: pulling out plants that are growing too close together and moving them to different areas of the garden

Trap cropping: using a specific plant in a garden to trap or attract a pest, keeping it away from another plant in the garden

Tuber: a thickened portion of an underground stem

Vegetable: plants that are edible or part of the plant is edible

Vertical gardening: using plants that will climb taller than standard plants so gathering vegetables, fruit, or herbs is done at a higher level

Wildflower packets: a wide variety of plant seeds mixed together and used to throw into fields to achieve a natural look

Winter burn: damage that winter temperatures cause

Woodlands garden: a garden style that typically incorporates a canopy of trees, a layer of shrubs, and the woodland floor

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