VEGETABLE CONTAINER GARDENING

2 BOOKS IN 1: THE COMPLETE GUIDE TO LEARN BOTH COMPANION PLANTING TECHNIQUES AND HOW TO BUILD COOL CONTAINERS TO ENJOY YOUR URBAN GARDEN IN EASY WAY.

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C O N T A I N E R
VEGETABLE GARDENING

THE COMPLETE GUIDE TO CREATE IN EASY WAY YOUR URBAN GARDEN. HOW TO GROW PLANTS, VEGETABLES, SALAD, FLOWERS AND HERBS USING POT, TUB AND OTHER CONTAINERS.

DAMIAN WYLIE

INTRODUCTION

Container gardening practice allows you to garden all year round irrespective of your outdoor climate. Plants grown in containers are more accessible, given little chance to weeds, and require the use of fewer gardening tools. You can rearrange them in a way that suits your taste and needs.

Growing plants in pots allow for mobility, especially when you need to get them exposed to the sun. You can quickly move them outside for exposure to sunlight, and they can be moved inside for adequate protection when it gets windy or cold outdoor.

When containers are being placed on the balcony or deck of your house, they add value and beauty to such area and also make fresh vegetables available to the family. A container gardening project is also an excellent way to start gardening because it can be done with little effort on a small scale.

What is container gardening?

Container gardening can be referred to as the growing of plants such as fruits, herbs, and vegetables in containers. It is an ideal practice for people living in high-rise apartments who do not have access to outside spaces. This system of gardening also works fine for people with a limited budget that can’t afford to maintain a regular garden.

Container gardening can be used in creating a stylish simple garden space using high or low maintenance, depending on what works for you. It is ideal for people who find it difficult to bend down due to old age or any other health challenges. Setting large containers of 2 or 3 feet high, on the ground makes it easier for you to reach and makes the plants less prone to weeds, unlike conventional gardens. With this system of gardening, you can create an attractive planting design quickly, which will, in turn, become a center attraction.

With so many people living in cities and towns we are increasingly pushed for space yet many people want to grow their own food, flowers or herbs. In many urban areas people don’t have a garden or access to space to grow traditionally.

Container gardening is the perfect solution to this problem, allowing you to grow vegetables, fruit, flowers and herbs no matter where you live. It is very easy to turn container gardening into a feature that can be eye catching and attractive plus you can plant on walls or fences rather than just putting containers on the floor.

But container gardening isn't just limited to urban dwellers, even for people with gardens, container gardening is a great way to maximize your usage of space, grow extra plants or even to grow plants that wouldn't normally thrive in your area. You can plant up the container and leave it in the sun outside during the summer months but as it gets colder you can move the container indoors to protect your delicate plant from the elements.

This book is designed to be a complete guide to growing in containers and will discuss the benefits of growing your own food before moving on to teach you about planning your container garden and selecting the right containers. Believe it or not the choice of container is important for more than just aesthetics!

You will learn about the general soil mixed required to successfully grow in containers, including an understanding of pH levels and how they pertain to soil and successfully growing plants.

Containers are actually very flexible and you can grow a wide variety of different plants in them and you will learn not only what you can plant but also what you should not plant in containers. Plus, you will get more in-depth information about some of the more popular plants you can grow in containers and specific advice about them.

Feeding and watering your containers is extremely important and it has to be done right so you will find out more about how to do this properly so that your pants thrive. You will also find out what to do with your containers over the winter months, another important and often forgotten subject.

For many years, I rented my home and I moved from house to house. It quite simply wasn't practical for me to grow in the soil because of the amount I moved so I grew in containers. I had fruit trees that moved with me whenever I moved, I grew tomatoes, potatoes and salad vegetables in containers and it was a convenient way to grow because I simply didn't have the time to maintain a vegetable garden, even though I did have a garden. I even lived in a house with no garden yet still kept my containers and grew vegetables.

When I had more time, I got an allotment and started growing in earnest there yet I still grow herbs in containers at home so I had easy access to them from the kitchen for cooking. There is nothing like fresh herbs when cooking.

Even at my allotment I still grow plants in containers. I have mint growing in a pot (purely because it is so invasive) and I grow my potatoes in containers as it is easier than in the soil. I have planted up some fruit bushes and dwarf fruit trees in containers too.

Container gardening is very versatile and allows for a lot of flexibility in what you can do and grow. My fruit trees in large containers had flowers planted around the base. So, you aren't just limited to growing in containers for food you can combine the two.

At the end of the day you can grow whatever you want in containers and it depends on your personal preferences and needs as to what you will plant. This book gives you an in-depth guide into container gardening and shows you how you can successfully grow pretty much anything in a container. Enjoy learning about container gardening and enjoy planting out your containers. This is a very rewarding gardening method and is ideal for anyone who is limited in time or space yet still wants to grow their own food. You will find this very easy to do and you may be surprised by how productive it can be!

CHAPTER 1
PLANNING YOUR GARDEN (LYING OUT YOUR GARDEN)

Some of the most fundamental questions to ask you include, but are not limited to the following

1. Where will I site my raised bed garden?
2. What type of raised gardens will I adopt?
3. What do I plant?
4. When do I plant?
5. What do I do about weeds?
6. Do I need to set up irrigation?

Where will I site my raised bed garden?

Plants and vegetables are never going to survive for long without sunlight. It is an essential part of their diet. The more the sunshine, the higher the tendency for your garden to flourish. On average, plants need about eight hours of sunlight daily. So, this means your choice of location is highly dependent on where in your yard receives the most amount of sunlight.

Another thing to consider in locating your raised bed gardens is the type of soil you have present within your yard. As much as you can import a whole lot of compost soil from outside, it is crucial to see if the ground within your space is usable for such an exercise. This test will help cut down cost and will ease incorporation. So, in an event where you find out that your yard indeed has a significant amount of soil that will adequately support plant life, it would be a shame if you don’t use them. Please ensure that before you use the soil from your yard for planting within the frames, and that it is entirely rid of weeds, grasses, and debris that won't impede plant growth.

If your number of besteads is much, then buying soil in large amounts will suffice. They come in a cubic foot, cubic yard or cubic meter. When making your purchase, you can demand about sixty percent topsoil, thirty percent compost and about ten percent potting soil, which contains essential plant nutrients contained in perlite, vermiculite and peat moss.

There are other options to explore in the case where finding quality soil is hard to come by. A mixture of compost and potting soil at equal proportions will serve wonderfully.

b. What type of raised gardens will I adopt?

You would have to go through the three types of raised beds gardening earlier and make your choice. They all have their unique characteristics which can be customized to meet your preferred demands for your yard.

c. What do I plant?

Your choice of what to plant will significantly influence other critical decisions about your chosen adventure.

First, make up your mind on whether you would be planting for aesthetics or consumption. Planting for aesthetics will require that you consider the type of materials to use, how high above the ground and the variety of shapes to employ. Planting for consumption, on the other hand, will require particular focus on soil type, depth, and sizes of bedsteads.

In both cases, you are encouraged to choose out of a pool of your favorite plants. Plant to what you love to eat- tomatoes, peppers, potatoes, cucumbers, etc. you can choose to have a mixture of consumption and beautiful plants. Just ensure that you don't plant them tightly together as this will increase competition for nutrients and air circulation.

It's vital that you research on the growing habits of the plants you choose. Some are crawlers, and others are climbers. Some are root plants, while others are tubers. Read up on your preferred choices. Also, it's essential that you read up on which plants would be right to grow together. While planting tomatoes with cabbages is fine, planting tomatoes with crawling cucumbers can prove to be challenging.

Finally, do your research on how to effectively grow your plant, taking into cognizance the prevailing climate within your region. Some plants may not need to be planted from seed level in your garden because the favorable weather which they may require might be gone long before they reach harvest. So, it would be best to purchase them from a nursery and transplant. In any case, the onus is on you to do thorough research before making your choices and proceeding to plant.

d. When do I plant?

This question is an important one. Your answer will be determined your choice of plants, the current climate within your region and at what level you choose to do your planting.

Some plants thrive in cold weathers; broccoli, for example, but tomatoes will die out in such cold temperatures. With each plant, there are best times to plant them. You must do your research and put down frost dates and take note of soil temperatures. Under no condition should you grow any plant that is averse to cold when the frost hasn't passed.

As some plants are opposed to low temperatures, so are others that can't survive in extreme temperatures. Be careful to figure out what your garden choices may require. On average, most plants do well in reasonable soil temperatures of between sixty to seventy degrees Fahrenheit.

In the event where you embark on transplanting, it is vital that you do so when temperatures are average, and the weather is just right. In the case where you transplant and the weather turns out to be harsh, then you'll have to cover them up for the meantime and shield them from intense sunlight and dry winds.

e. What do I do about weeds?

Weeds can be an inconvenience. They are unwanted plants that grow anywhere they can. They are not only undesirable, unappealing to the eyes, but they also compete with your planted crops for soil nutrients and space.

It's essential to get rid of weeds before you embark on constructing your couches. These weeds can be weeded out using simple garden took like hoes and hand trowels. Weeds can also be eliminated by using soil and environmentally friendly pesticides. These should be applied as instructed by the manufacturer and within specified periods as prescribed.

In the case where you import topsoil, compost and peat moss for mixture and eventual installing into the bedsteads, it is imperative that you ensure that seeds, plants, and roots of unwanted plants are entirely removed.

f. Do I need to set up irrigation?

In most cases, yes you would. Irrigation is vital for your plant to thrive.

Without water, plants will dehydrate and wither away. Unless you live in a region where it rains throughout the year, you will need to have a plan on how to water your plants. If your garden is small, then watering it with a watering can be done as often as required. But in the case where your garden is quite large and manually watering each bedstead every day without breaking down is nearly impossible, then you will need to put up irrigation mechanisms. Simple piping done by a qualified plumber will go a long way in handling the challenge. Ensure that the plumbing work is done before the bedsteads are laid. That way, it will be easier to co-opt into the entire arrangement. Also, consider collecting rainwater as it will significantly reduce your spending cost on water.

With the above questions answered, embarking on raised bed gardening should be a remarkable experience for you. As you journey through each step, you will have more questions. It's essential for you to concentrate on the project while seeking further clarifications as you go on. Listed below are some points for you to read and take note as they are essential.

OTHER TIPS

- Don’t step on the prepared soil, ever.
- Plant, then mulch.
- Install irrigation mechanisms before laying the beds
- Put in place barricades against the creeping in of weeds.
- Have a yearly compost dressing of the beds.
- Keep the topsoil as fleecy as possible.
- Have a plan to plant cover crops.
- Never neglect the soil, even if you are not gardening.
- Research on your choice plants, never presumes you know them.
- Maintenance is critical, don't sleep on it.

CHAPTER 2
PLANTING STRATEGIES (PLANTING, MAINTAINING, HARVESTING)

Now that we've gone through all the key aspects of starting a garden it's finally time to go out there and start your own. There's a lot of information in the preceding pages, so in an effort to make things a bit easier I've created the following steps to getting started.

Each planting strategies is an actionable item you can go out and do right now. Once you've completed all of them, you'll have your very own garden ready to go!

1. Find a space: Take a look around you house and determine where you want to grow. Look for places near windows with lots of natural light, but don't discount other areas that could cater to low light plants. Figure out exactly how much space you have to start with. If this is your first time start small. There's always time later to grow your garden. If you're particularly low on space consider a hanging or tiered garden. These gardens utilize vertical space, and can help you get more garden out of your square footage.
2. Determine a good plant: Once you have a good place chosen and a decent estimate of the lighting, figure out what type of plant you want to grow. Start by determining what type of plant (veggie, fruit, herb, flower) and use that to narrow your search. Then determine which types of plants in that category fit the lighting of your chosen area. Finally, make sure that space wise you can grow the chosen plant. While a sunny windowsill is a great location for chives, it's far too small for an eggplant! Don't forget outgrow lights either. If you have a good area that's a bit low on light using a grow light is a great option.
3. Read up: Once you've got the plant decided read up a bit more about it. You're primarily going to be looking at care instructions, container considerations, and soil choice. This will

give you solid information to go off on for the next couple of steps. Keep in mind all the tips you learned in this book, but supplement it with the specifics for your chosen plant.

4. Pick a container: If you've done your research you should have a pretty good idea of what type of container to get. The material is generally not too big of a concern, it's the size that matters. You'll want to make sure that you pick a container big enough to not only house the plant, but also accommodate further growth. In particular, pay attention to how wide or deep it should be to accommodate the root structure. Don't forget about proper drainage either.
5. Get some soil: All plants need soil to grow in! With you research done go out and pick up a quality potting soil that fits your plants type. Most types of commercial potting soil will work with most plants, but there are a few exceptions (for example succulents) that may need a bit different soil in order to thrive.
6. Plant it: Finally, it's time to plant! Either start from seeds, or buy a small pre-grown plant called a seedling. In many cases, starting with a seedling is a bit easier, although it's also a bit more expensive. Whichever you choose, get your container ready with your chosen soil and place your seeds/seedlings in at the appropriate distance. Depending on the size of your plant, you'll need to leave differing amounts of space between each one. Most plants like 8-12" but this could me more or less depending on the plant.
7. Set a maintenance schedule: Once you have your plants safely in their new home it's a good idea to get into a routine to help you on track for upkeep. This is as simple as just giving them a quick check in the morning, once a day, or something similar. While this may not seem like a much, even spending 30 seconds a day checking your plants has some serious benefits. It not only helps make sure you're watering them enough, but it also allows you to catch any sort of issues or pests early and fix it before it becomes a larger issue.
8. Harvest: If you're growing an edible/harvestable plant you'll want to experience the benefits of your labor! It will depend on the specifics of your plant, but within a few months you'll

generally start to be able to use the plant.

9. Even if you're not intending to eat it, it's still a good idea to occasionally cut back and prune the plant. This not only keeps it looking good, but also encourages healthy growth.
10. Repeat: Once you've successfully grown one plant there's nothing stopping you from repeating your success. Take all that you learned and go continue to experience the joy of gardening!

CHAPTER 3
BUILDING STRUCTURES

Location of your raised bed.
There are a few factors to take into account when building a raised bed

You should try to find a spot in the garden that gets the lightest but not exposed to high prevailing winds.

Try to stay as close as possible to a water source and your kitchen.

Stay away from shaded areas i.e. under trees or beside your house.

If you are building more than one side by side leave around 80cm between them for ease of access with a wheelbarrow.

You should try to find a flat area as this will make it easier to work later on.

Planning and building.

Although we have taken out the planning of actual construction of your bed there are a few things you can add that can be beneficial when growing vegetables.

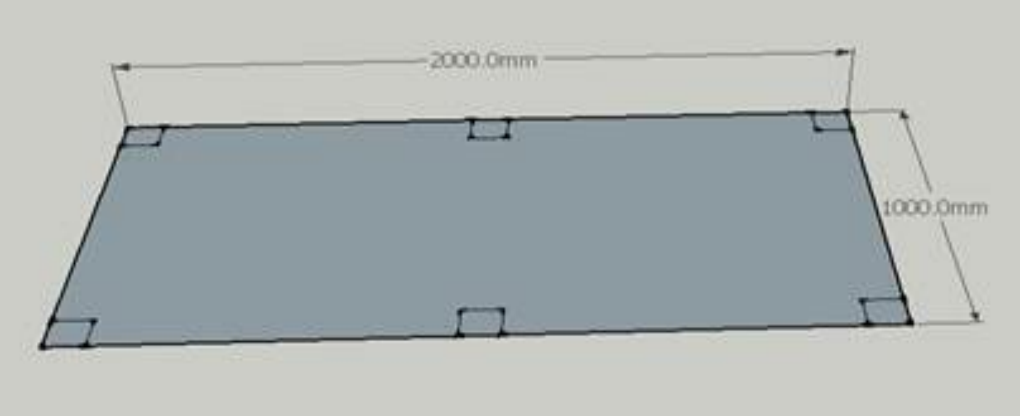
Would you like your bed to have a greenhouse effect?

Would you like your bed to have a built-in watering system?

Would you like a hard path around your bed, or would you prefer gravel or grass?

Starting out.

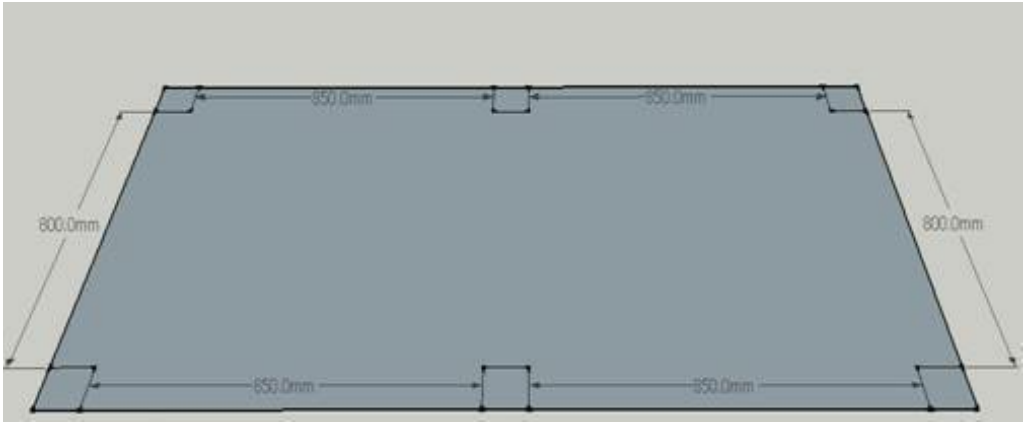
Once you have selected the area for your raised bed, we recommend that you clear a rectangle to a size of 2m by 1. This makes it easier for the construction stages.



This image shows the size of the area required.

Post holes.

Then, we have to dig out the 6 post holes to a depth of 60cm. Use a spade to dig square holes the width of your spade. Try to keep the holes as straight and square as you can as this will add to the strength of the final construction. Use the image below to plot out your holes



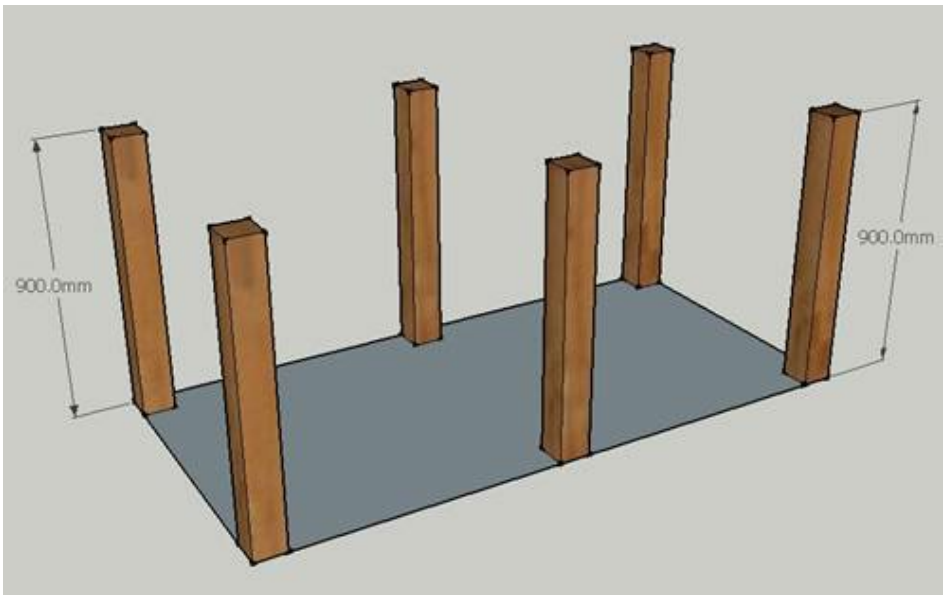
Placing the posts.

We will now put in our posts the posts are 100mm x 100mm and are 1.5m long.

It’s important that when placing the posts that not only are they the same height as each other that they are vertically straight.

Place 1 post per hole and then follow the instructions on the post Crete bag. Allow to set and then move on to the following part

Use the image below as a guide.

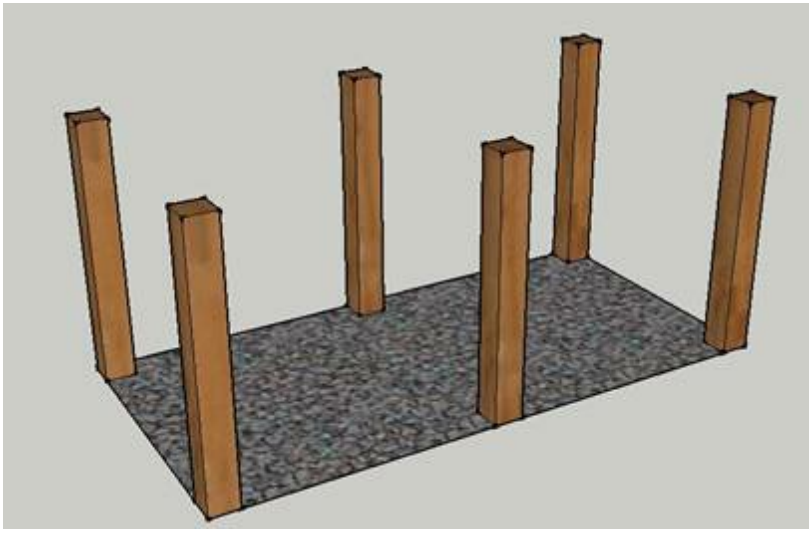


Ground cover.

In this we are going to suggest a way to stop any unwanted weed from growing under your bed.

We recommend that you use a good quality weed suppressant fabric then cover with stones of your choice.

We suggest that you lay them around 7-8cm thick.



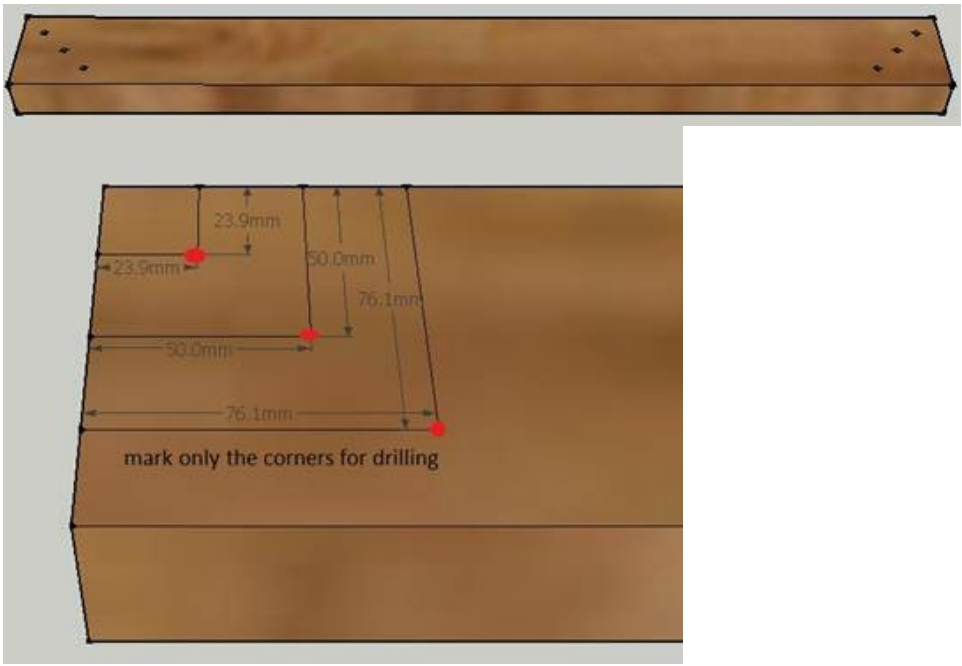
This is the stage your bed should be at now.

Cross beams.

We are now going to guide you through installing the cross beams. These are 100mm by 47mm and 1m long.

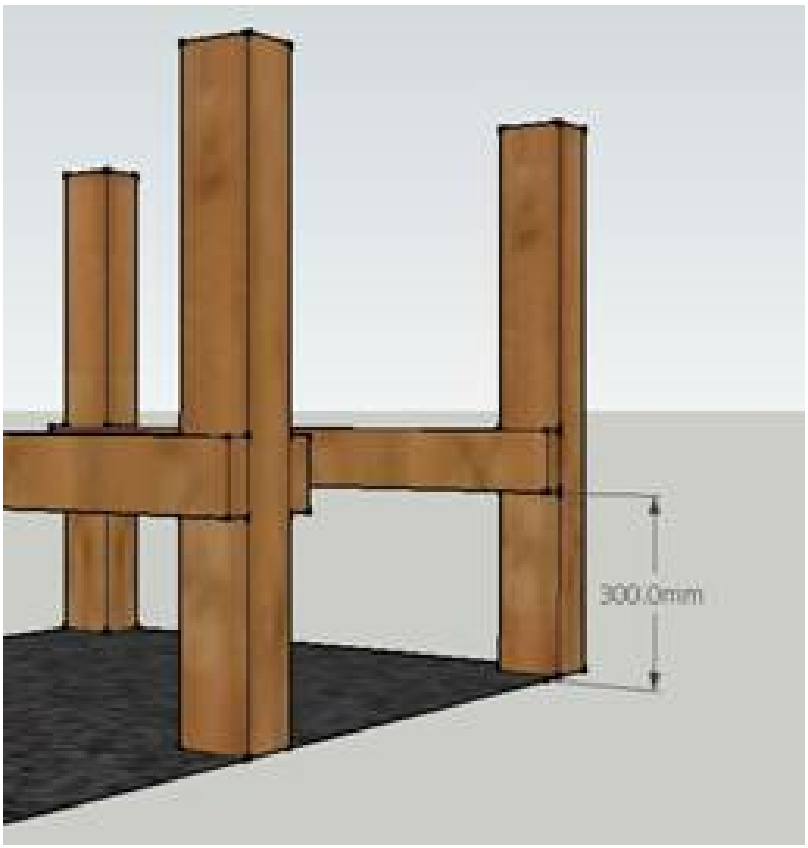
We suggest that the beams are predrilled to avoid splitting, so depending on the exact screws, you choose to use drill holes 1mm less than the width of the screws.

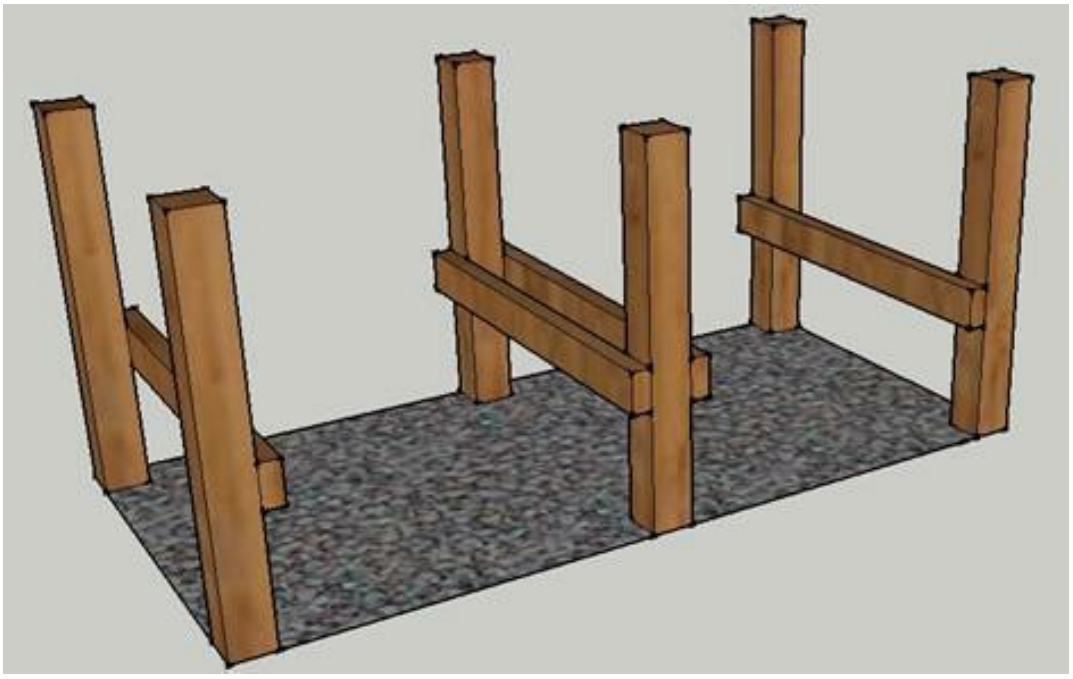
Use the images below as a guide.



Cross beams (cont.)

Then, screw these cross beams 300mm from the base and 500mm from the top of each post as shown in the pictures.

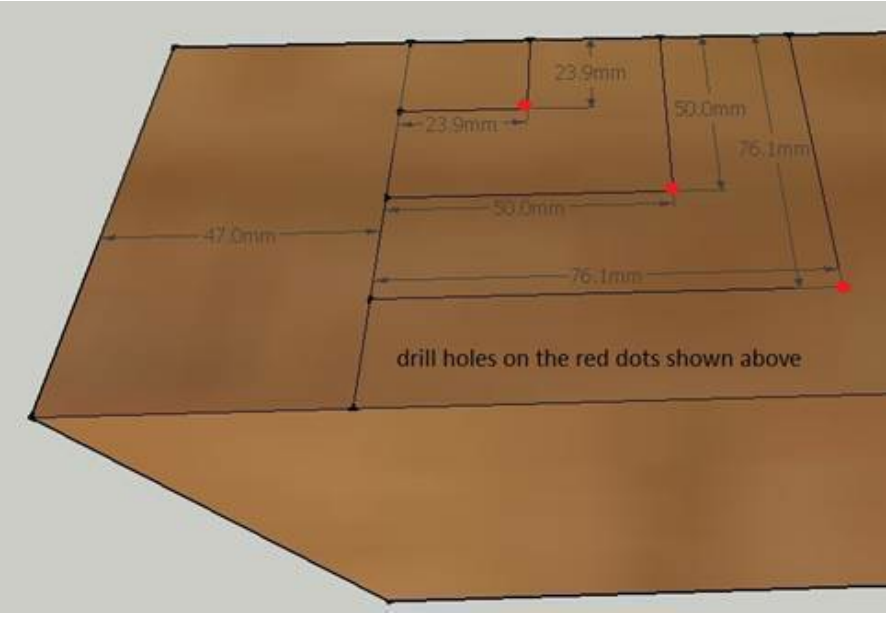




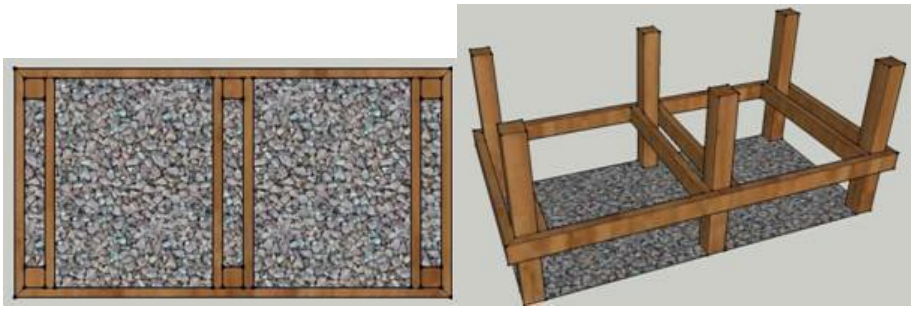
Installing the first rails.

Then, we will install the first set of wall rails.

As with the cross beams these will need predrilled use the image below as a guide.



Once you have all the ends predrilled screw them on as shown below.



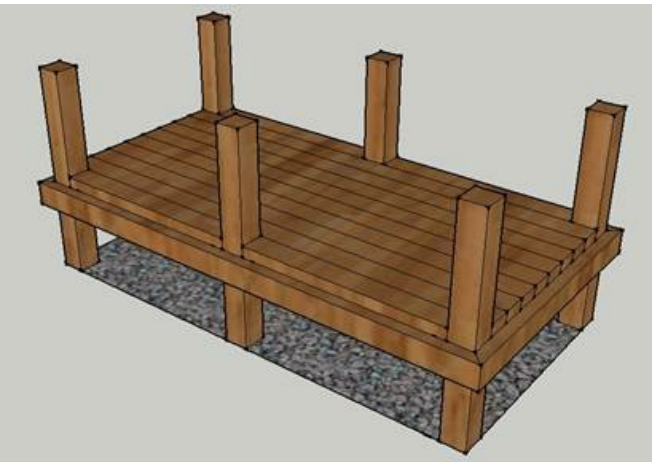
Installing the floor beams.

Now it’s time to screw each of the floor beams to each of the cross beams remembering to pre-drill before screwing them down.

Use the images below as guides for pre-drilling.

Short length for between the posts.

This is an image of the floor completed.



When you have completed this be sure to drill 20 diameter holes in the base around 3 on every other board.

The walls.

Repeat for the rest of the walls.

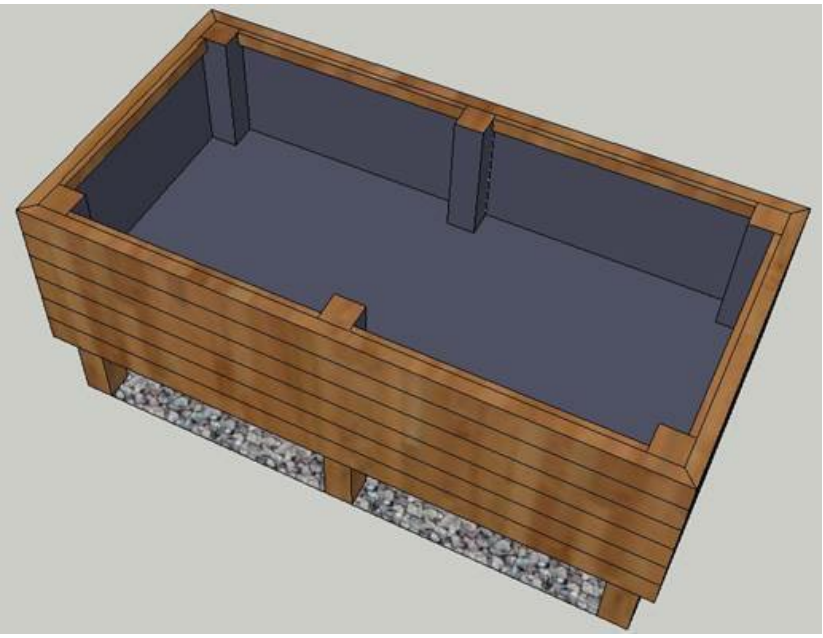
Fitting a liner.

Using a staple gun fit a liner to your bed we recommend 2 layers of good quality weed control matting however you may use plastic but make sure

there are sufficient drainage holes.

Fitting a liner continued.

Using 22mm by 50mm timber screw a piece in each of the gaps between the posts as shown below.



Filling your bed.

Vegetables grow in pretty much any type of soil but if you're growing root vegetables they grow better in light and airy soil.

For our vegetable bed at home we have a mix of multipurpose compost and good quality topsoil, but this is down to you and what you prefer.

Before filling the bed, it would be the ideal time to install any sunk in water system you may want to use.

You will need either 1 bulk bag of compost or topsoil approx. 1000kg to fill your raised bed.

Material check list.

Item	Description	Number of
(A)Legs	100mm x 100mm x 150cm	6
(B)Cross beams	100cm x 47mm x 100mm	4
(C)Walls (short)	109.4cm x 47mm x 100mm	12
(D)Walls (long)	209.4cm x 47mm x 100mm	12
(E)Screws	120mm long	324
(F)Screws	50mm long	24
(G)Liner of your choice	N/A	N/A
(H)Post Crete	Bags	6
(I)Liner timber	22mm x 50mm x 85cm	4
(J)Liner timber	22mm x 50mm x 80cm	2
(K)Compost or soil	1 bulk bag approx. 1000kg	1

Tools required.

· Pencil

· Tape measure

· A square

· Hammer

· Screwdriver

· Hand saw and miter box

· Miter saw (optional)

· Spade

· Sprit level

· Sharp work knife

· Staple gun

· Drill bits

· Hose or bucket for water

· Battery drill/with screwdriver attachment

· Shovel

· Wheelbarrow

CHAPTER 4
SIZE OF CONTAINERS WITH CONSTRUCTION

Choosing containers is an important part of your container gardening and can be literally anything that will hold soil whilst having drainage holes in the bottom. Your choice of containers can communicate a lot about yourself and your container garden can be practical and utilitarian, or it can be stylist, sophisticated and a feature of your garden. You can use containers to screen an area of your garden, block out an unwanted view, create privacy or just to brighten up an otherwise dull area.

There are a lot of different choices for material, shape, color, finish and size and you will need to consider what fits your budget and style.

Be aware that your choice of material will affect its longevity and its maintenance requirements. Some materials last longer than others and will look good for longer whilst others will require regular maintenance or replacement.

A major consideration is whether or not the container is porous, i.e. will it absorb water? Porous materials will lose water faster than non-porous materials, meaning you need to water them a lot more, particularly in hot conditions. You can line pots with plastic to help reduce moisture loss, though ensure there are drainage holes in the plastic to prevent waterlogging. Porous pots can be sunk into the ground, with the rim above ground level, to help reduce moisture loss too.

One issue with clay or terracotta pots is that they tend to split and break because they are porous. They absorb water and then when it freezes over winter the water expands as it turns to ice and it can break the pot.

The weight of a container is another consideration, particularly if you are going to move the pot in the future or fix it to a wall. I can tell you from moving my potted trees from house to house weight is a very important consideration if you are planning on moving the pots anywhere, even around your garden.

You can put large pots on a dolly with casters which will allow you to move it a bit easier. Larger pots can be filled with an inert packing material to a level, so you don't need as much soil. Larger, heavier pots cannot be fixed to a wall because it will cause damage, but plastic pots are going to be lighter than metal or terracotta, meaning you can put larger plastic pots on the wall because they are lighter.

If the pot is hanging in the air, then it will need watering more often because it will dry out quicker due to the wind and possible heat reflection off the wall. You also need to consider where water dripping out from the pot will go as you don't want it to cause a nuisance.

Remember that the temperature will fluctuate more with metal containers than non-metal containers and that dark colored containers will absorb more heat than lighter colored ones. Temperature fluctuations are more of an issue with smaller pots as it can damage the roots and dry out the soil much faster.

The Importance of Drainage

Drainage is absolutely vital to container gardening because the majority of plants do not like soil that is too moist. If a plant is sitting in water, then the roots and even the plant itself will rot and die. If your containers do not have drainage holes already then you will need to drill them as well as ensuring your soil mix is free draining.

Very little soil will fall through the drainage hole but if you are concerned then you can put some stones in the bottom of the pot, cover the whole with coffee filter paper or even a piece of broken terracotta pot. This prevents soil loss whilst ensuring water can still drain out.

Smaller pots with no drainage can be dunked in a bucket of water and then removed and carefully turned on its side for a couple of minutes to drain excess water.

Some people put saucers under the pots to catch excess water but be aware that the soil will still absorb water and make the pot waterlogged. If you are using a saucer then you need to empty the water regularly from it. If it is outside, then you will need to empty this saucer after every rain shower to prevent your plants becoming waterlogged and dying.

The same problems apply with double potting, where you put a plain plastic

container within a more decorative outer container. Water will drain through the soil into the outer container where it will still rot the roots. Again, it needs emptying regularly. Whilst double potting allows you to quickly change seasonal displays and stop invasive plants from spreading you need to be aware of the potential for root rot.

Putting gravel or stones in the bottom of a container doesn't actually help with drainage and will still cause your plants to get waterlogged.

Self-watering pots are a great idea as the water is drawn up into the soil through a capillary action, meaning they are great if you are not able to water your plants as often as you would like. Just be aware that if they are outside then they can still get waterlogged after heavy rain.

Shape and Size

You must consider the size and shape of the container because it has to be stable enough to hold your plant and not tip over. If you live in a windy area you may consider weighing down your pots, particularly if you are growing tall plants, to prevent them from falling over.

Square pots are by far the most stable whilst the traditional pots can tip over quite easily. Smaller pots easily become top heavy and fall over in the wind. If you are concerned about the pot tipping, then look for a base that is broader than the pot's height/

The type of plant you want to grow will influence your choice of pot because succulents need shallower pots so they can dry out properly, but other plants made need larger pots to prevent the root ball drying out. Larger pots with thicker walls can insulate roots against colder weather, ideal for overwintering plants.

Whatever you do, do not trim the roots of the plant so that it fits the pot. This is a sure-fire way for you to kill or damage your plants. Plants should fit the pot without looking like it has been squeezed in but if the plant is too small then the soil can stay wet for longer with root rot becoming much more likely. If you are growing vegetables, then container size is vital otherwise the plant will not have enough resources to grow a good crop.

The look of your containers should also fit with the area where you are building your container garden. Think about the style and color together with

how its “fits” with your plants and area.

If you are growing large plants, then you will need to provide them with support. An easy way to do this is to pour quick-set cement into a coffee can or something similar and put the support in this. When it has dried put the can in the bottom of your large container and cover with soil.

Pros and Cons of Popular Container Materials

There are many different potential materials for your pots, and I want to talk about them now with you, so you understand how they differ from each other. It isn’t necessarily that some are better than others, but they have different properties which can be important depending on the type of plant you are growing.

Upside Down Grow Bags

These are an innovative and trendy invention designed for growing tomatoes, though you can grow potatoes in some of them. These don’t need any floor space and are designed to be hung from a hook. They aren’t particularly cheap but if you look around the bargain stores you can usually find these at a fraction of their retail price.

These pots are good looking and will definitely become a talking point in your container garden.

The advantages of this planter are

- Soil warms quickly
- No weeds
- Easy to water
- Less chance of disease
- No support required for your tomatoes

The disadvantages of this type of planter are

- Heavy crops, e.g. beefsteak tomatoes can be too heavy for it
- Limited in what you can grow
- Works best for small tomato varieties such as tumbling or cherry tomatoes
- Needs more frequent watering in hot months

These are more a novelty, I feel, than a practicality and you can grow tumbling tomatoes in hanging baskets perfectly okay at a fraction of the cost of one of these planters.

Grow Bags

There are two types of grow bags that you need to be aware of. The first is a flat plastic bag that is full of soil. Typically, you cut two or three holes and grow tomatoes, peppers, cucumbers or other plants in them. The second type are more like shopping bags, being made out of strong plastic with handles. They are cheap, easy to move and are ideal for growing crops such as potatoes in though are good for a lot more.

These are great for growing vegetables because once you have used them you can discard the soil and fold the bags up. I use them on my allotment for potatoes so that I do not end up leaving potatoes in the soil during the harvest.

The advantages of these are

- Lightweight

- Easy to move
- Easy to store
- Good lifespan considering the cost (will last 3 to 5 years at least)
- Good drainage
- Suitable for a wide variety of plants

The disadvantages of these are

- Limited range of colors and styles
- Not particularly aesthetically pleasing
- Can learn if the soil is not level

These are considered a more temporary solution and are perfect when you find yourself with excess plants and nowhere to put them but if you want a container garden on a budget then these are ideal.

Metal Containers

Metal containers come in all different shapes and sizes and can be very nice to look at. There are a number of different finishes and styles, but you do need to be aware these will often come as a premium. Metal containers are not the cheapest, but they are durable and can look good for years. Often these will be used for double potting, i.e. a plain plastic pot is put inside the metal container to avoid damaging the metal and to allow plants to be swapped easily.

The advantages of metal containers are

- Very decorative and good to look at
- Durable – they do not chip, break or crack
- Will age well and often gains an interesting color as it corrodes

The disadvantages of these planters are

- Provide very little insulation (use double potting to get around this)
- Can heat up rapidly which can cause root damage
- Will dry out quickly so needs more watering

- Must have holes drilled in it for drainage
- Can be heavy, depending on the type of metal, so may not be suitable for vertical gardening

Wooden Containers

These are great to use, and you can get planters, window boxes and all sorts of other types of container. Often these are used for double planting though can be planted direct. You can paint or treat the wood to make it look good, though ensure that whatever you use is food safe. Older wooden containers can be treated with harmful chemicals, so you need to be careful when purchasing these.

The advantages of these containers are

- Can look very good and made to fit in to any garden / balcony scheme
- Insulates roots from the fun
- Durable and survives the cold well
- A great choice for larger or permanent container gardens
- Woods such as cedar and redwood are rot resistant and can last ten or more years without treatment

The disadvantages of these containers are

- Can split sometimes but this is easy to fix with rust proof rails
- As it is a natural resource you can find pests live in the wood as it ages
- Needs elevating off the ground to prevent the bottom from rotting
- Requires regular maintenance in order to extend the life and keep them looking good

Hanging and Wall Mounted Containers

These are great if your space is limited or you want to experiment with vertical gardening. You can easily turn a boring, featureless wall into a productive and beautiful display plus it is a great way to grow plants if you have very limited space.

You must consider the weight of the container with the soil, plant and its crop (if any) when fixing it to the wall as you can find the container becomes too heavy and will not be safe on the wall.

The advantages of these containers are

- Usually cheap as they are often made of plastic
- Makes great use of otherwise “dead” space
- Available in a wide variety of styles and finishes
- Can grow a wide variety of different plants

The disadvantages of these containers are

- Can heat up and dry out rapidly due to weather exposure
- Requires work to fix to the wall
- Need to be placed so they can be accessed for watering and maintenance
- You must consider where water drips out of the bottom, so it doesn’t cause a nuisance or do any damage
- Can get waterlogged in heavy rain

Self-Watering Pots

These are great for anyone who doesn’t like watering their plants regularly or who travels but still wants to enjoy greenery. These are not suitable for larger plants such as fruit trees as their roots will work down into the water reservoir which will cause problems. These pots are great for vertical gardens or hanging baskets as it prevents the plants from drying out too quickly.

These are pots that contain a hidden reservoir of water at the bottom that is drawn up to the plant through capillary action. Many of these will have a plug at the bottom of the pot which needs to be removed if sited outside to prevent the pot filling up when it rains.

The advantages of these containers are

- Great for anyone who is busy or away a lot and doesn’t have time for regular watering
- Perfect for plants that like moist conditions but would struggle in

your area because they would dry out
- Ideal for small plants, where space is limited or where the pots are hard to reach

The disadvantages of these containers are

- Not suitable for larger pots or plants
- Provides additional weight which must be considered when attaching the planter to the wall
- Costs more initially

Stone Containers

Containers made out of stone can have a lot of character and look fantastic, but they are going to be expensive and they are heavy! Often you can find cheaper containers that are made of resin which are lighter though they can be more susceptible to damage. However, for the difference in price and ease of moving they can be well worth while.

The advantage of resin containers is that they can be molded into a wide variety of shapes, textures and patterns. Production methods are extremely good which means it can be very difficult to tell resin from natural stone, often lifting the container is the only way to tell.

The advantages of stone containers are

- Very long lifespan
- Good heat retention and insulation
- Very good to look at, aging well over time

The disadvantages of this type of container are

- Breakable
- Very heavy to move, particularly when full
- Without pre-made drainage holes it can be difficult to add extra drainage

Terracotta Pots

These are one of the most common types of pots used in container gardening

and will usually come with just a single hole in the base. They are visually appealing though you are unlikely to find much of a variety of color, but you will of shape and size.

The advantages of this type of pot include

- Sufficient drainage for most types of plants
- Retains heat well
- Bottom heavy, making them ideal for larger plants and / or windy sites

The disadvantages of this type of put include

- Very difficult to drill more drainage holes without damaging the pot
- Chip easily and are breakable
- Can crack in frosty weather
- Soil can become too hot
- Porous, meaning they dry out quickly

Concrete Planters

These are similar to stone planters in many respects but are made out of poured concrete rather than stone. They are, therefore, available in a wider range of shapes and can often be cheaper than stone. There are faux concrete planters on the market which are more lightweight.

The advantages of these types of planters include

- Bottom heavy, so ideal for windy sites
- Come in large sizes so are suitable for larger plants
- Good insulator and helps protect plants from extremes in temperature

The disadvantages of these planters include

- Very heavy, particularly when filled with soil
- Environment issues with the production of concrete may be a concern for you

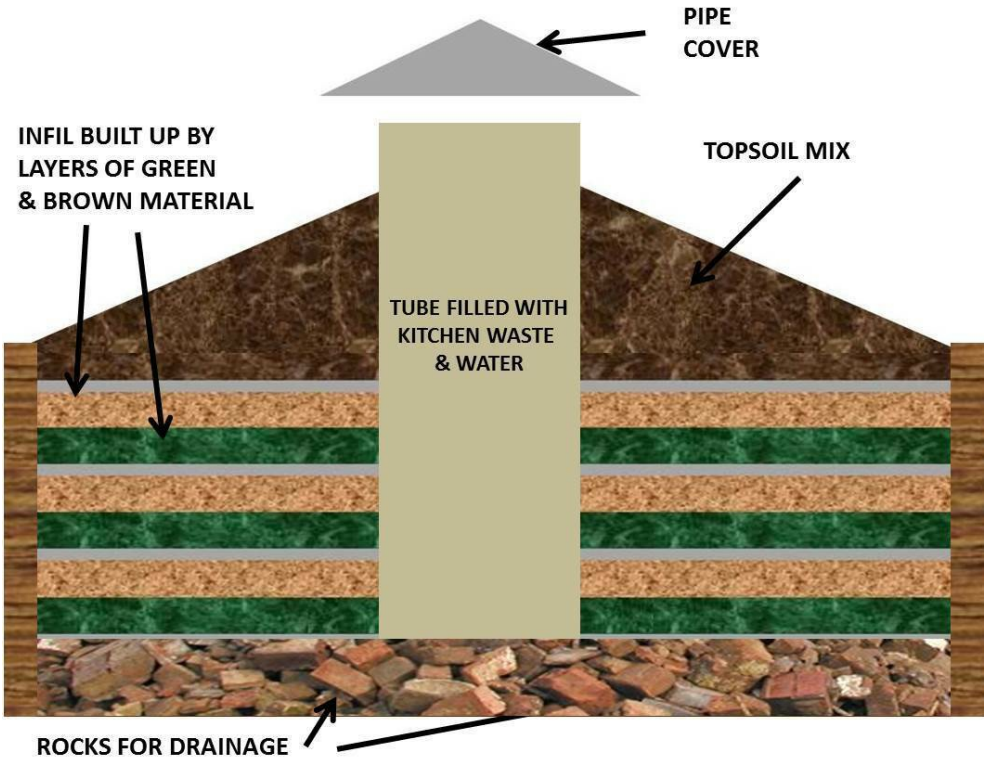
- Can dry out quickly
- High in lime which can be toxic to some plants, so you need to either cure the inside or rinse it thoroughly before use

CHAPTER 5
INFILL MIXES

If the Well is the ‘engine room’ that drives the operation, then the infill is certainly the machine itself! However, this vegetable-producing ‘machine’ will only operate to full capacity if the infill is correctly laid out.

Fortunately, this is not difficult to do!

The diagram below should give you a good idea of the system, which is laid out in steps 1 – 4.



Step 1 Lay out a bed of gravel or broken bricks about 4-6 inches deep. This will act as drainage and ensure your bed does not become water-logged and sour.

Step 2 lay out your first layer of ‘green’ material. This includes organic material in the form of grass cuttings, vegetable waste or clippings. In fact, just about any green vegetation (minus seeds) will do. Stinging nettles or

comfrey especially add a good deal of nitrogen and potassium to the mix.

Animal manure (herbivores only) can (and should) also be added to this mix.

Step 3 Then, cover over with ‘brown’ material. This includes dried grass, leaves, thin twigs and any other organic dry material.

Wood ash is also a good source of potash and should be added to this layer.

Step 4 Cover over with a thin layer of cardboard (remove any staples) or white paper (not colored). Then soak well with water.

Repeat this process of layering until you reach a few inches from the top of your structure. Top-off with a good 6 – 12 inches of topsoil, sloping to just beneath the top of your well – as in the picture.

Similarly, to other no-dig gardening methods, shares many advantages over conventional methods, including the following…

1. Overcoming Adversity: As mentioned, this method can be used whatever your ground conditions. Poor soil quality or stones and rocks simply do not matter when using this technique.

Even if you are in an area prone to flooding, or even the opposite – extreme drought, the Keyhole Garden will still ‘produce the goods.’

2. Abundant Crops: Owing to the nutrient-rich soil composition, and the on-going nature of the feeding program; you are assured of great healthy food crops.
3. Easy Maintenance: The design of this garden means that everything is within arm’s reach, with little bending and no heavy digging involved. This means that more time can be spent tending your plants, rather than laboriously digging out weeds with a heavy spade or garden fork.

This is particularly so if you use the special infill method described, rather than using wee-seed contaminated garden soil.

4. Longer Growing Season: Similar to Raised Bed gardening, a Keyhole Garden bed is raised from the ground, thereby somewhat insulated against the cold. This means that it warms up quicker in the Spring, and takes longer to succumb to the cold

later on in the season.

5. Best Use of Space: A huge variety of crops can be grown in a small area – 3-meter diameter (9 foot ten inches). This is owing to the fact that the nutrient-rich soil can stand crops being planted much closer together than you would in a traditional row garden.

Also, the fact that you are not wasting space on pathways between rows of vegetables, means that every square inch of your Keyhole Garden is available for planting.

6. A Critter Free Area! Put simply, the raised effect of the garden means that it is much easier to keep at bay destructive pests of the four-legged variety! Even flying pests such as birds, butterflies or even locusts and grasshoppers, can be kept out with some simple modifications to the arrangement.
7. Perfect for uneven surfaces: Maybe your garden area is a little too steep to consider growing vegetables? No problem. A keyhole Garden can be easily constructed so that the actual growing area is level and easy to operate.

This is similar to the terracing designs that have been used for centuries by many civilizations, hindered by a lack of level growing space.

These are just some of the many advantages over traditional ‘row’ gardening practices that the Keyhole method enjoys. Obviously, the number of layers will be determined by the height of your KG. This is ok. What you are creating here is simply a self-sustaining grow-bed that will be nutrient rich and require very little in the way of fertilizer.

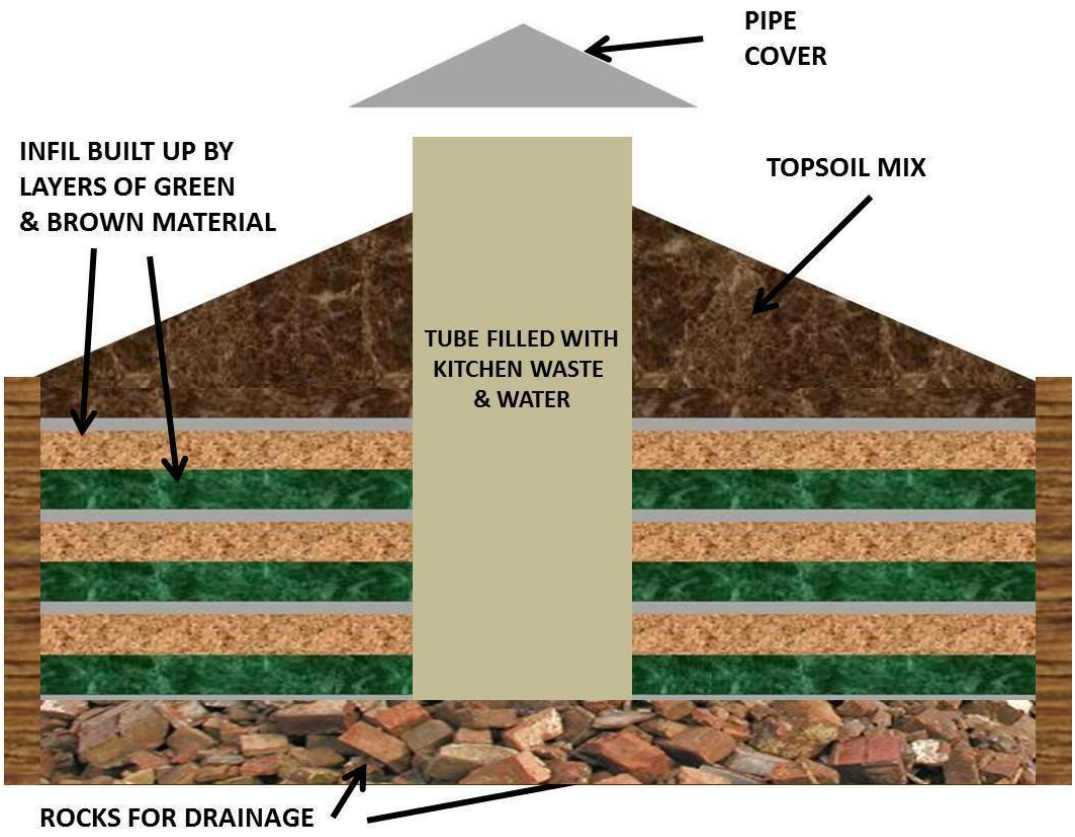
In the picture above you will see a typical African-Style Keyhole Garden setup. It has an outer edge of mud brick to keep in the soil. An access point at the front, and a center well arrangement made from woven branches to irrigate and feed the garden with nutrients.

This outer shell can be built from just about any material imaginable. The idea being that whatever material is freely (or cheaply) available, and suitable to build up sides strong enough to contain the soil, will suffice to build the structure.

This building material can be stone, timber, mud brick, corrugated sheeting (standing vertically so that the material is easily turned), even sand bags or gallon containers filled with sand!

The main thing that will determine the materials used are cost, and supply. Both of these aspects are affected by the height of the bed which can vary from 6 inches (150mm) to 3 foot (750mm) high.

To best explain what you are trying to achieve with regards to the build, check out the diagram below.



This simple diagram shows layers of green and brown material, built up in much the same way as you would for a lasagne garden or compost heap. Over time this decomposes to form a nutrient-rich bed in which vegetable crops will flourish.

This composting material is then topped off with topsoil sloped to the center, as shown above, which is about 12-18 inches at its deepest.

How Does It Work?

Basically, this system works by using ‘waste’ organic materials to build up the layers (more details on this later), and then covering it all with a layer of topsoil for planting.

The center tube is a perforated design (more later), to allow the contents to leak out into the bed, thereby constantly topping up the infill with nutrients to feed the plants.

This tube (accessible through the keyhole part of the structure) reaches down to the bottom where there is a rubble bed for drainage. This tube is constantly

‘charged’ with kitchen waste including washing-up water which composts down to feed the whole bed with nutrients throughout the growing season.

A cover or ‘hat’ above the tube is an optional component, but in very hot climates this will help retain moisture within the central well.

CHAPTER 6
MAKING A GOOD COMPOST

If you are looking for a uniform and easy to handle organic matter for your garden area, making your own compost might turn out be handy as it transforms the readily available organic materials such as grass clippings, household debris, and plant residue. Although finished compost is usually low in plant nutrients, but composting empowers you to enrich your soil in an efficient and inexpensive way.

A compost pile is usually constructed to decompose. It can either be free standing or enclosed in a container and can be prepared any time of the year. Generally, decomposition rate is faster in summer and fall so you will get a larger amount of organic matter. Wire fencing is regarded as the best container as it lets plenty of air to cross. You can buy easy to handle composters at garden centers.

Constructing a compost pile

Building a good quality compost does not involve the mere casting of organic matter in the corner of your yard so that it can spoil on its own. Of course, everything does eventually rot. But to make a compost acceptably, you need to have a right size for your pile, supplement the correct types and quantity of materials, and provide the optimum moisture.

Some traits of a good quality pile include that it heats up swiftly, and this indicates that the decaying organisms are doing their task properly, increased decomposition rate is also evident, and finally the pile doesn't give any unpleasant odor.

The pile is usually built in layers, and you can easily estimate the correct quantities of materials for a compost pile. Just follow these straightforward steps

- You should choose a well-drained area in your yard because constructing a compost pile on a wet area impedes the

decomposition process as the pile layers become too wet.

- You should create a 4 to 6-inch layer of brown materials; they are usually rich in carbon content. These brown materials include old grass clippings, roots, and stalks of old plants, dried hay, and leaves. The smaller (finely chopped) they are the larger is the surface area on which the decaying organisms can attack, and thus the materials can decompose at a quicker rate.
- You should also supplement a thin layer of green materials as they are rich in nitrogen. These include kitchen vegetable leftovers, green grass clippings, 2 to 4-inch layer of manure, or some organic fertilizer rich in nitrogen.
- Try to build the layers using browns and greens alternatively and the pile should not cross the 5 feet high mark. If the pile crosses the 5 feet high mark, too little oxygen will reach the center of the pile, and certain anaerobic microorganisms will take control of the decaying process, thus producing bad odors. The width should not exceed the 5 feet mark as well.

Here are a few additional parameters to better
your compost pile

- It is vital to moisten each layer of your compost pile slightly with a sprinkle of water, but don't let the pile get too wet.
- Try to cover each layer with a few inches of garden soil as it protects any material in the nitrogen layer (green materials) that may interest flies, such as household debris.
- Sprinkle wood ash or ground limestone on the carbon layer (brown material). It helps to keep the pH range stabilize between 6 to 7 mark which most of the vegetables prefer.

Materials that should not be added to a compost pile

A good quality pile generates ample heat to kill many insects and disease-causing organisms, but you can't completely rely on the heating as it isn't uniform and even. So, it becomes vital to avoid adding the following materials to your pile

- Infected or diseased plant material must not be added to your

compost pile as it may survive the extreme conditions of composting. So, when you apply the finished compost, these materials have the capacity to infect your plants.

- The heat might not be enough to eradicate the weed seeds, and they might grow in your garden later.
- Even a small piece of a root can give rise to a whole new plant, so the pieces of aggressive grasses and weeds such as Bermuda grass and quack grass must be avoided.
- Some herbicides can escape the composting process without breaking up, so grass clippings from lawns treated with herbicide should be avoided.
- Meat and fat leftovers can attract animals to the pile, and they also break down gradually.
- Cat and dog fecal material may contain the diseased entity that can be transmitted to human beings.

Moistening and turning your compost pile

The decay process begins soon after you have constructed your compost pile, triggering the center of the pile to heat up. The moisture content serves as a vital factor that helps decay organisms to work satisfactorily. Following are the techniques to keep your compost pile moist

- You should water the pile as needed. An easy way to determine the need for water in your compost is to dig a hole about 1 foot into the pile and check for its moisture content. You should have vigilant approach while watering the pile as the water seeps into the pile, presenting a false picture of dryness from outside the pile.
- In case you are living in a dry region, water the entire pile to keep it moist.
- Depression can also be made atop of the pile to gather rainfall.

Turning the pile periodically is necessary as it ensures the proper aeration, prevention from over-heating, and allowing the material to decompose evenly. The pile can be turned the outside of the pile to the center or by shifting the pile from one spot to another. The frequency and quantity of turning the pile are dependent on the speed of decay process. For example, green materials like fresh green clippings decay at a much faster rate when

compared to dried plant material. Whereas cool temperature or rain turn the pile soggy, thus slowing up things. If you want to estimate the exact time of turning pile, follow these simple guidelines

- In case you added finely chopped material, the pile may be all set to turn in a week.
- If your pile consists of bigger pieces of organic material, you have to wait several weeks before turning.
- You are just required to turn the pile two or three throughout the process.

You can use your compost when the interior of the pile is not hot anymore, and the pile has attained a dark, crumbly uniform texture. This process may take about 1 to 2 months. To check the hotness of the pile, fell the interior of the pile with your hand or you can also use a compost thermometer, which can be bought from a garden center.

CHAPTER 7
INSECTS THE GOOD AND THE BAD

Pests and diseases are every farmer's nightmare. It depends on your environment if you will have to deal with a lot of them, or luckily, with less possible. But let's admit that there are good and bad pests.

The first thing to do when you are a beginner is well observing their effect on your plants. Bad pests come in hordes, take control over your plants and feed on them, blowing away all your best projects.

The good pests are

-Spiders

-Earthworms

Honeybees

-Praying mantis

-Ladybugs

-Ground beetles.

They are a natural way of fighting off some of the bad pests. Along with these, we may also use the natural help of some plants that that can help us keep our garden healthy. These are:

-Marigolds

-Parsley

Broccoli

Capsicum

-Oregano.

The most common pests are

1. The mole

Let’s face it that the mole can be sometimes cute. When you think better of it, you will realize that they eat earthworms, that are useful for our soil, but they also eat a lot of parasites that mess up with our soil. Furthermore, they dig galleries that turn out to be quite helpful for the drainage of the water. The only bad effect they have on our garden is the unaesthetic heaps they make on the grass or in the middle of the alley. We must admit it’s not that bad a pest.

2. Field Mice

It is absolutely a bad pest since it devours all our plants. The best natural remedy is the cat.

3. Hares

It attacks mostly trees, but leafy vegetables or beet and carrots are also its favorites. You can use chili peppers to keep them away or animal manure and naphthalene.

4. Birds

They can eat some harmful insects, but they also eat our small leaves. Let’s just say that they are 50% useful and 50% harmful. It’s not nice at all to find all our plants destroyed, but it’s nice to get rid of weeds, small snails or small rats.

5. Aphids

They attack any kind of plant they find in their way and are quite hard to get rid of. Their natural remedies are ladybugs, some spiders and small birds. Another remedy is using a fern solution. It is easily made by using 1 kilo of fern leaves in 10 liters of water. Let it sit for a week then dilute at a 10% rate.

You can also try planting parsley around the plants that are most sensitive to aphids or soaked tobacco.

6. May bug

It affects the roots of our plants. The way to fight them off is by using potato baits to collect as many worms as possible.

7. Potato bug

It’s harmful to potatoes, tomatoes, and eggplants. The most natural remedy is placing horseradish near the affected plants. Collecting them is also easy to do. The following step is getting rid of them.

8. Earwigs

They are both bad and good pests. Bad because they feed themselves on our seeds, plants, and fruits. Good because they also eat small insects, snails, and organic waste. You may use peanut butter traps to collect them or simply place a bucket of water with soap in your garden. They will be attracted and eventually drown in it.

9. Ants

They can be quite a big problem, especially when they team up with the aphids. Their nasty habit of “raising” aphids for their secretions, rends them bad pests. The natural way to get rid of them is by using strips of sticky paper, place them at 40 inches above the ground level. You should repeat this method twice. Another efficient method is using plants with strong smells. Ants don’t like garlic, mint, oregano or walnuts. Lemon juice also comes handy for sending ants away.

10. Cabbage moth

It is a bad pest, making big holes in our cabbage, salads and other green leafy vegetables. Natural remedies are ashes, salt, and garlic. Spread them early in the morning on damp plants.

11. Tomato hornworms

It affects tomatoes, peppers, potatoes, and eggplants. They eat the leaves and the fruits. The way to get rid of them is by using light traps or simply planting parsley or carnations close to your vegetables.

CHAPTER 8
ORGANIC PEST CONTROL

Container plants naturally experience fewer pest attacks since they are grown in a cleaner and more regularly sanitized environment than field or garden plants. Nevertheless, it does not make them free from pests, diseases or other issues. An insect could sneak into any garden, and fungal spores are always present in the air. Plant diseases, “weeds and pests can be a danger to crops. The only solution is to spray pesticides regularly”, says “chemical companies” However, chemicals might create more issues than they resolve. Sustainable farmers align with nature to maintain soil, crops, weeds, diseases and pest life in balance. We call this integrated pest management (IMP) or natural pest management.

Integrated pest management prevents pest problems and plant diseases, and keeps hazardous chemicals away from us and our surroundings. It as well prevents problems of pesticides resistance and chemical reliance. Even though you are to make use of pesticides, it is significant to ascertain if pests are damaging your plants, the intensity of the damage being done, and whether creatures in the garden are already taken care of the pest. After that, you can make decision on if and when chemicals are to be used, and what type to use. The best method to control both diseases and pests is to ensure plants remain healthy.

Start with Prevention

- Select disease-resistant types. Numerous vegetables and ornamental plants have been confirmed to be resistant to diseases, like rust, mildew, and canker.
- Examine plants before buying them to ascertain they're healthy. After that, carefully clean them before planting.
- Do not over-crowd your plants. Ventilation prevents the condition of dampness that encourages the growth of fungi and other diseases.
- Take note of moisture levels if the soil is too dry or too wet to correct the situations. Ensure plants dryness all the time.

- Examine your plants. Attend to issues before getting out of hand. Take out and destroy any plants or fruit that you suspect to have contracted disease.
- Ensure you are always clean. Virus or bacterium could be spread by your clothes, hand, and footwear. Wash your hands before and after working on your plants and wash your clothes as you might have been in contact with unhealthy plants.
- Clean your tools. Soil sticking to tools may accommodate disease organisms. Also, wash pots before you reuse them.
- Make use of clean containers and clean potting mix.
- Remove any already infected plants and those that have more than half of their leaves gone.
- Check for pest every day when you water. Remember to check on the beneath of leaves, because that the hiding place for starving bugs and their eggs.
- Decide on how much you are ready to deal with it. The plan is not to eliminate the pest, but to control it.
- Understand what pest you're having an issue with. Consult your local extension service if you are not sure of the pest. Doing this will make you adopt the pest control systems specific to your issue, instead of pouring varieties of chemical on the plant in an attempt to know which work better.
- Problems with smaller pests like whiteflies or aphids, spider mites, could be harder to control and might spread plant infections. To eliminate these pests, use organic pest control
- Build healthy soil which presents a friendly abode to insects and helps prevent numerous plant diseases.
- Plant at the right time, diseases and pests mostly respond to the climate, like the first warm day or the first rains. Consulting other farmers about these methods and observing the growth of each crop will assist you in knowing the best time to plant. Planting before the usual time will ensure crops are matured enough to resist diseases or pest that show up at a particular period. While planting, later on, could lead to the death of most diseases and pests due to no available food.
- Look for pests, observe if insects are helping or damaging your crops. Plant-eating insects are a normal part of farming. They do

slight harm to crops as far as they strike a balance with other insects, particularly the ones that consume pests.

- If you still experience pest attack after all the precautions, try (IPM) Integrated Pest Management
- If you need to act, make use of simple pest control measures that are safe for your plants, you and the environment as a whole.
- Check up your crops frequently to help you know when to permit friendly insects to perform their duty, and the need to spray with natural pesticides or other pest control methods arise. When looking for diseases and pests, ask questions like:

1. Are the plants being eaten by an insect?
2. Are friendly insects keeping pest under control?
3. Is damage to the increase? Will it affect the crop yield?
4. Is it a harmless, friend or pest?

At times the insects you easily see are defensive to your plants by eating the pests. And the plants might be at a growth stage where they could survive pest damage and stay healthy.

Worms are essential for healthy soil. Spiders, bees and most insects that reside in water are friends and help in controlling pests. As well, small wasps or flies with a long, thin tube at their back are friends. The ideal thing is to leave a friendly insect to help your crops.

Pests damage crops by eating them or sucking the liquid in them

Sap-suckers includes mealybugs and scale insects, aphids, whiteflies, plants and leafhoppers, nematodes, mites and trip’s

Plant-eating insects are snails, slugs, plant and pod borers and caterpillars

HOW CAN YOU ELIMINATE PESTS?

Once you understand how pest destroys crops, you can make use of natural pesticides made for a particular pest.

Once you understand when pests show and how they relate to their surroundings, you can make use of physical techniques of pest control.

Spray with natural pesticides to prevent crops from being damaged and to

prevent people and the environment from being harmed by chemical sprays. They are cheaper than chemicals and easy to make.

Natural pesticides often require proper care when used. Always remember to wash your hands after usage. Do not use more than needed. Ensure you always wash food before selling or eating them if a type of natural pesticide doesn't work use another kind, as they may not all work well in same conditions.

Natural Pesticides for Plant-Eating Insects:

Chili pepper, Garlic and pepper, dry and grind them to a powder.

Soak the powder (a handful of powder to a liter of water) in water all night.

- Pour the mix through a cloth to take out solids
- Combine a small amount of mild soap to assist pesticide glue to plants
- Spray the mixture directly on plants. Firstly, examine your mix on one or two plants. If you observe that it's too strong, put more water and test it until it looks perfect.
- Do same again as when due, and after it rains.

Natural insect repellent for Sap-Sucker:

You can eliminate sap-sucker pests by covering them with oil that obstructs their breathing holes or mild soap. Mix mild soap and vegetable oil with water then spray the plants to kill the pests. Don’t make use of strong soaps or detergents as they damage insects, soil, and most important plants.

PHYSICAL METHODS OF CONTROLLING PEST

There are several physical methods of controlling pests or preventing parasites and predators, based on their life cycles and habits. Consult other farmers to learn more about the system they use.

- Animals and Insects

Snake, frogs, and birds, observe these animals in your garden to know if they control the pest or not. Most of them consume pests and pollinate plants. With the kind of beak, a bird has, you can notice what it eats by observing the way it acts in your garden. You can drive away crop-eating birds by hanging

shiny paper, a scrap of metal and old cassette tapes near crops.

Nearly all bats eat mosquitoes. Some of them eat fruits while a small number of them bite animals. With careful observation and by checking their leftover food, you will know whether they are eating insects or your fruits off the trees.

- Plant a Variety of Crops Together

Planting varieties of crops offer spaces for useful insects to reside and makes it difficult for pests to locate the plant they are fond of eating. Growing varieties of crops also increase food safety, and if a crop fails, other crops will be available. The following are the ways of planting varieties next to one another will guard against pests:

- Some flowers catch the attention of predators that eat pests
- Some sturdy smelling vegetables and herbs prevent pests
- You can combine crops with trees and animals to improve the advantage of each of them
- A few plants trap pests. Instead of eliminating pests, you can plant things that pests prefer to your crops. They will stick to the trap plants and stay away from your crops.

CHAPTER 9
INDEX OF VEGETABLES, SALAD, HERBS, FLOWERS AND PLANTS

Tomatoes

These are probably the most well-known vegetables to grow in a pot, they are also one of the most productive crops. It is not unusual to harvest up to 10 lbs. of fruit from a single plant.

Tomatoes can be started with either seeds or small plants from the garden center. This is entirely up to you, and the amount of time you have to spend nurturing seeds. Sometimes it is easier to buy the plant. Either way, you should be sure that the pot is large enough to handle the full-grown plants.

Also, remember that you will most likely have to stake them, so the pot should be deep enough for a stake to be secure. You can sometimes find a round cage which will fit inside the rim of the pot. Your plants are placed inside, and the cage serves as a climbing frame for the tomatoes. It also prevents them from making fruit become heavy and dropping over the sides of the pot.

Tomato plants are a great way for children to start learning about the garden, as they grow so fast, and are so delicious to eat, right off the vine!

There are bush varieties such as ‘Cherry Cascade’ that can be planted in hanging baskets if this takes your fancy. The advantage of growing a bush variety is that it does not need to be staked, so maintenance is minimal. Ideally, you should have one seedling per 5-gallon pot.

Radishes and Spring Onions

This pair is probably the easiest to grow, they are also very fast growing, and a great way to perk up any salad.

Sow them directly into your pots throughout the summer, and your fill, ensure that you have a constant supply of them. Thin the seedlings out so they do not get too crowded.

Sow directly into their pots, and thin out to 3 inches apart.

Lettuce

This is one crop that you will find works better if you sow frequently because if you sow them all together, they will all ripen at the same time. You will have more lettuce than you can deal with!

Lettuce prefers cooler temperatures, so if you have sweltering summers, delay them until the worst of the heat has passed.

Grown in pots, lettuce is likely to be attacked by slugs and snails. Lettuce likes to be kept moist all the time, and it prefers a shady spot.

They should be grown quickly, otherwise they will bolt, and the soil should be full of nutrients or the leaves become tough.

Lettuce is another plant that would prefer to be planted directly into the soil, although you can start them in seed trays and transplant the seedlings later.

A better way is to start the seeds in bio-degradable pots and simply plant the whole pot when they need to be transplanted.

After planting the seeds, you should notice germination after about two weeks. Birds enjoy lettuce as a snack, so it is a good idea to cover it with chicken wire or mesh to protect the seedlings.

Lettuce should be ready between 8 – 12 weeks depending on the variety. Some loose-leaf types will be ready in 7 weeks, making them an ideal crop to plant every week or so, through the season.

Beetroot

Another easy to grow vegetable which can be served either cold or hot! Beetroot is easy to grow and can be sown directly into your pots. Select pots that are at least 6 inches deep as crowding the roots will mean unhappy beets.

Although beetroot will tolerate poor soil conditions, they prefer a well-drained pot and good soil, with a pH of about 7.

To start the seeds, the temperature must be between 50 – 85ºF. Plant the seeds in rows (good idea to have a rectangle pot). You should notice germination in about 8 days, although if it is cooler this may take up to two weeks.

You will need to thin the seedlings out when they are about 4 inches tall. Be careful not to damage the roots of the healthy seedlings when you do this. Your beets like to be placed in full sun.

Potatoes

If you ever had the notion that growing potatoes was only for experienced gardeners, think again!

Probably, the only rule to consider when growing spuds is that the number of potatoes seeds you have in relation to the pot size must be reasonable. Keep the guideline in mind that each plant will need about 10-litre pot to grow. Do not be tempted to cram more in, because you won't get any more potatoes, you may even get less, or none at all.

You may find bags in your garden which are already designed in a way that is ideal for growing the plant, from these you'll find out that the recommended amount per bag is no more than three or four.

One good thing with potatoes is that they are not fussy about the pot you choose for them. As long as there is adequate drainage, they will be happy.

Old dustbins, potato bags, even stacks of tires will work for your spuds, as long as there are holes at the base to drain the water.

To start, select the type of potato you want to grow. There are many different varieties ranging from tiny salad spuds to big, creamy baking potatoes. Potatoes like to be kept well-watered. You should keep the potatoes moist, particularly as they grow, and the foliage is spreading. Liquid feed is also a good idea.

Buy your potatoes from the garden center, this way you can be sure you are getting a good stock, which is disease free. After you have covered the drainage holes with old broken pots, cover with compost, and lay two potatoes with their eyes pointing upwards. Cover with another 4 inches of compost and give good water.

As the little plants appear, add another layer of compost, so that you are in effect burying the seedlings again, and again until they reach the top of the pot. Remember to water and fertilize.

Your spuds are ready to harvest when the last of the foliage begins to die away. You can put your hand into the soil and have a feel for them (hopefully

there will be heaps!), then tip the pot over to its side and empty it all out.

Plant your potatoes late in February and March. They will be ready to harvest about 10 weeks later when the foliage turns yellow and dies back.

Carrots

You can plant carrots directly into the pot where you want them to grow. You may have to thin them to about three inches apart.

Any vegetable that needs to grow in a straight line is better off being sowed in a square or rectangular pot, instead of a round one.

Make sure that the pots are at least 10 inches deep, so the carrots are not stunted.

Cover the drainage holes with pot pieces and then add the growing compound, along with a fertilizer such as fish blood and bone.

With your finger, make small rows in the soil and thinly sow your seeds. Cover and then give them good water. It is a good idea to water with a watering can instead of a hose, as the water pours out in a sprinkle that will not wash the tiny seeds away.

Your seedlings should take between 7 to 10 days to germinate. When they reach an inch in height, you should thin them out. Select the healthiest looking ones and keep them, while gently removing others so as not to disturb the roots. Your remaining carrots should be about an inch apart.

Chilies and Peppers

Because these can grow rapidly and make large bushes, do not plant more than 2 plants. Chilies like sunshine, and they tolerate heat very well, so if you have a spot that is too hot for other plants, use it for them! They will thank you for this!

Chilies look great at all stages when they are growing, they have lush green leaves, and provide an array of colorful fruits. Depending on how hot you like them (small means hot, in this case), select your chili plants with the thought in mind that one plant can quite easily yield up to 70 chilies, so unless you are supplying a market stall, you may want to start with one or two plants only!

Chilies freeze beautifully, use a pair of scissors, and snip them into pieces, pop into a bag and then freeze. You can also dry them by hanging them in an airy hot place, where they will not get rained on or damp.

Peppers and chilies are easily grown from seed. There is a popular belief that you'll never get a good pepper or chili plant using seeds from the fruit you have bought from the supermarket. My belief – go ahead and dry the seeds and have a go at it!

Sow the seeds in early February to mid-March. It is a good idea to make the soil slightly damp before you sow, make small holes with a finger or dibber, plant two seeds, then cover lightly.

Should you be fortunate to find out that two seeds germinate, select the stronger one and remove the other once they are about an inch tall.

Peppers and chilies are not cropping that you can start outside in the cold months, they will not germinate. The temperature must be above 20 degrees for them to germinate and usually takes up to three weeks before any seedlings appear.

When the second set of leaves has appeared, you should separate the plants.

Larger pots will produce a slower-growing plant with a higher yield.

A smaller pot will give you smaller plants, but the advantage is that they will bear fruit early

They can handle some cold, but are much happier in hot spots, with a full or half sun.

Water well in the early growing stage as they like a good amount of water. If you keep the soil moist, you will find that you have a better crop than if the soil gets too dry. They like heat, moisture, and a well-drained pot. Make sure that their feet are not sitting in water.

Onions

Whether you grow your onions in the ground or in pots, you still need some space between them, so aim for large mouthed pots. The pot should be at least 10 inches deep, and you will need 3 inches between each plant.

Often, people grow onions in tubs, but plastic ones work well as long as you have drainage holes at the bottom. Plastic tubs are far cheaper than ceramic

pots, but care must be taken when making holes in them. You can score the plastic with a knife and then carefully drill holes through.

An attractive way to grow onions is in an old bathtub (with drainage of course), that is placed on bricks, in fact, any old pot that is long enough will work well.

Make sure that your onions get six to seven hours of light a day, so not totally in the shade. Onions grown in pots must be watered frequently because they do not have access to soil that has absorbed rain.

Pot grown onions need a good, deep watering 2-3 times a week. Check the soil every other day, and if the top is dry to the touch, then water them.

You should aim to plant your onions before the last frost of the season. This way you will be able to harvest them at the end of summer. Onions are slow growing when you start them from seed, and you can expect them to take a few months to be ready.

If you grow your onions from seed, then bear in mind that the seeds need cooler temperatures to germinate, and hotter temperatures for the bulbs to develop.

Your onions will need well-drained soil with a neutral PH. Dig in a good amount of compost before you plant them, and then leave them. Pot-grown onions will benefit from occasional feeding because they do not have as many nutrients as those grown in the garden, and if you do feed them, then make sure to avoid fertilizers with high nitrogen contents. This type of fertilizer makes the green tops better, but the bulbs do not develop well.

Garlic

The bulb of the garlic is where all the flavor comes from, but the green parts can also be eaten. When planting garlic, it is important to remember that you plant one clove at a time, and not the whole bulb. So, divide the whole bulb into separate cloves. Take a look at a clove and work out which way is up, and which way is down. The blunt end goes down, and the pointed end goes up.

The cloves must be planted 2 – 3 inches deep, and the pot should be deep enough for the roots to develop, without cramping them up.

Garlic which is planted in the fall will be ready to harvest by June. It’s a great

idea to keep the garlic near the kitchen door, so that it is readily available when you cook.

Make sure that the pot you use is at least six inches deep and has enough space so your garlic can develop. Garlic is not fussy about the pot you choose, as long as there is good drainage. Even a plastic bucket with holes in will work.

Use well-drained soil and any pot that will hold the amount of plants you plan to grow.

Garlic loves to be grown in full sun, but do not be too fussy as it does well with a little shade also.

An easy way to start your garlic is to but a whole head and carefully separate the cloves using a thumbnail. Try not to bruise the cloves. If space is at a premium select the biggest cloves and leave the smaller ones for cooking.

Make a small hole with a dibber, just about the depth of the clove. Place the clove in the hole, with the flat end down, and the pointed part up. Firm the soil around the clove. The top of the clove should be just below the surface of the soil.

A tip here is to not let too much of the garlic clove be visible, as they are favorite foods of birds that will just come and pull them out of the ground.

Plant your cloves 4 inches apart from each other, and water well. Very little is needed after that as they are almost maintenance free. They will benefit from a good watering particularly in very dry regions; however, do not water from mid-July as this will cause them to rot.

Spinach

The pot of your choice. You should choose a pot which is at least 8 inches deep. Depending on whether you like your spinach leaves big or small will indicate the spacing between the plants, but you will have to thin the seedlings when the 2nd set of true leaves has appeared.

You can expect the seeds to germinate between 5 – 14 days, although this depends on the variety. This timeframe also depends on the growing conditions.

You should thin the seedlings to about 3 inches apart. You can also grow the

seedlings in individual pot, or large crate. Even window boxed with spinach looks good, as the leaves come in pretty color.

If you enjoy the younger leaves of spinach in salad, then you can get away with only leaving 2 inches between the seedlings.

If you grow spinach in the cooler months, make sure they get sunshine, so find a sunny spot. Spinach likes sunshine. If you grow it in the hot months, then select a spot that gives sun with some shade.

The best soil or potting mix for spinach is anything that is rich in organic matter. Spinach prefers a crumbly potting mix while avoiding any type that clogs the drainage holes and leaves it waterlogged.

Spinach is one plant that must have good drainage, otherwise, it will turn yellow and die. So, keep the mix moist but not soggy or wet.

If you start with seeds, you can plant them in temperatures that are as low as 40 degrees Fahrenheit (4 degrees Celsius). They will also be okay if you start them in warmer temperatures. The best temperatures for the mix should be about 50-80 degrees F. Once the temperatures get higher, you may need to move the pots into the shade.

One thing to bear in mind is that spinach seeds can’t be kept for very long, so instead of buying a whole bag and keeping them for a year, just buy a small amount at a time.

Spinach, even in pots, will be susceptible to various pests and diseases. Slugs, aphids, and caterpillars love spinach so be sure to keep an eye out for them.

Mildew is a common problem, although this can be reduced by planting in the cooler time of the year, and also by keeping the leaves dry.

Most varieties of spinach will be ready to harvest in about 40 days, sooner if you want to harvest the very young leaves. When you harvest your spinach, you should cut the outside leaves first so that the plant keeps producing more leaves.

As soon as the plant shows signs of ‘bolting’ (when it grows a tall flower stalk), cut the main stem and harvest the whole plant.

Planting a few seeds every few days will give you a continuous supply of harvest. This will also prevent you from ending up with all your spinach being ready at the same time.

Peas and Runner Beans

Both peas and beans can be sown directly into pots. 5-gallon pots will work well for them.

Beans are one of the most prolific crops that you can expect several kilos from just one pot of plants. The plants are very attractive, especially when they flower. The beans will be tastier when they are harvested young and small.

Beans enjoy a constant supply of water, so it is a good idea to set up a reservoir which gives them a drip system.

Peas enjoy a cooler temperature, so do not be tempted to grow them in the heat of summer. Sew them directly into your pot from March to June and expect a crop about two months later.

Peas and beans need to be supported so a trellis of some sort is needed for them. A few stakes with chicken wire wrapped around them will be enough to give them a climbing frame. It will also make it easier for you to harvest them.

Peas and beans work on the premise that the more you pick, the more they produce, so do not be afraid to pick whenever you like. They will just keep on producing.

Runner beans can be sown in the same way as broad beans. They are hardy climbers so be sure to give them a trellis to wind their way up. Beans like to be well watered, and if you do this, they will reward you with a good crop.

If you don’t have space for runner or broad beans, you may try Dwarf beans, as they take up a lot less room, and grow just as well. In fact, why not grow both types!

One thing to be aware of is that beans attract bees to pollinate them, so keep children away from them if you notice the bees.

That being said, they will provide you with an endless supply from June onwards.

CHAPTER 10
VEGETABLE PLANTS, HERBS AND FLOWERS PLANT PROFILES WITH SPECIFIES SEASONAL INDICATION

You can grow practically any fruit and vegetable in a greenhouse with a little planning and common sense. Because a vegetable needs either warm or cool weather, crops sort themselves into two distinct categories: cool season and warm season. Planting in the proper season is an important with greenhouse gardening.

Planting Trees, Grapes, Kiwis and Goji Berries

Planting trees is a little trickier than most people think. Remember they are very slow growing plants, and it is usually 5 years before you will bear any fruit. You might ask yourself if it is worth it. If you are determined to grow them, it is possible. Make sure to plant dwarf trees and dig a hole at least a couple feet deep and wide. This will allow the tree more growing height. You will then want to create a retaining wall inside the hole by using an empty barrel, wood or medium size rocks. This will stop the dirt around from filling in the hole.

You will want to place the trees in middle or where the greenhouse is the tallest allowing for ample room to grow. Even dwarf trees can grow taller than what they are supposed to. Find trees that are extremely resilient to insects and pests which can be a problem with fruit trees in a confined area. I would recommend releasing ladybugs and praying mantis each year, which will help significantly with pests, not just for trees, but for the plants.

You can also train the branches of any tree to grow along a fence, which will create more room in your greenhouse. By planting shorter plants underneath the tree, you will be using your precious growing space wisely. You could easily grow a watermelon underneath the tree or smaller plants such as herbs.

Planting Grape Vines, Kiwi Plants & Goji Berries

Planting grape vines is rewarding, exciting and fun! Not only will you be getting delicious organic grapes, but you will have intense green, large,

beautiful grape leaves extending to the top of your greenhouse. We recommend growing both grapes and kiwi plants with ample growing height, as they get very tall. We have a long row of 4” hog panel fencing which we trellis our 3 grape vines and 2 kiwi plants on, with approximately 7 ½ feet of height (more would be better). We ordered our 3 different variety of grape vines and a male and a female kiwi from a nursery, and followed the planting instructions. Our favorite grape is the 'einset'. Grapes and kiwis love manure, water and lots of sunshine. Both need to go dormant and would only work in a seasonal greenhouse.

Don't let trellising and pruning the grape vines or kiwi plants stop you from planting them. Most people learn from mistakes anyway, but really there is no way to kill these plants from pruning them wrong. Even vines in the wild still grow without pruning. We use twine for keeping the vines close to the fence and simply trim off branches after we can see where the grapes or kiwis have established themselves for the season. It takes a little common sense.

For Goji Berries, simply plant your start in the tallest area of your greenhouse and help support it against a fence, using twine or rope to keep it from bushing out too much. It only takes 3 years for your goji plant to reach the 8' tall. If it gets too bushy, simply cut some branches out which also helps promote berry growth. They love lots of manure and water! They also need to go dormant and would only work in a seasonal greenhouse.

Watering Through Winter: If is extremely important to make sure you deep water your trees, grape vines, goji plants and any perennial plants such as herbs and strawberries over the winter so the roots do not dry out. If they were outside, they would naturally get rain water or snow melt over the winter. Deep water them once a month.

Tomatoes, Tomatillos, Onions, Peppers,
Cilantro & Garlic

Tomatoes: We love tomatoes, which is why we plant 23 of them - a full 48 feet lengthwise row. You can plant them every 2 feet, which is not what is recommended on most planting instructions. We make fresh and bottled salsa, tomato sauce, stewed tomatoes and even spaghetti sauce. (Julie gets all the credit for the canning and cooking) Tomatoes are extremely easy to grow. You can use a start from a nursery or grow them from seed into the exact spot

they will be growing. They need soil that is rich in calcium, so we save our egg shells and grind them into a fine powder and mix it into each individual planting space using a small shovel. You can also place one aspirin pill in the planting hole which is supposed to deter pests, but we are not sure if it really works. Tomato worms can often be a problem with tomatoes, but we find picking them off when they get a few inches long gets rid of them. If you notice small black droppings and chunks of your tomatoes eaten, then you probably have tomato worms.

Tomatoes need a cage for support, because they can get quite tall and heavy. The cage needs to have spaces big enough for you to reach your hands in for trimming and harvesting. We made our own tomato cages out of fencing with 4” squares. Our local builder supply was selling old fencing for a fabulous deal so we invested our money and made tall, durable tomato cages which we use year after year. They will probably last at least 25 years, so a good investment is worth it. Don’t buy the tomato cages stores sell, unless they are at least 4-5 feet tall and are extremely strong and durable. Most of the cage’s stores sell are so short and flimsy which makes it difficult to press in the ground and are not tall enough for greenhouse tomatoes. Tomatoes grow taller in a greenhouse than they would outside, which is why you need tall, strong tomato cages. Tomatoes can grow up to 10 feet tall in one growing season in a greenhouse, and taller if you allowed them to grow for a few years in a row.

Another method for growing tomatoes is using a skinny rope or twine hung from the top of the greenhouse ceiling. You need to make the rope long enough to reach the ground. When the tomato vine is a few feet tall, simply wind the rope around and continue to loop around it as the vine gets taller and taller. We don’t prefer this method as it requires a lot of trimming and training, equaling time. This method is often preferred with the advantage of saving money!

Tomatillos: Planting tomatillos is similar to planting tomatoes; except they don't get as tall as tomatoes. You can use a shorter cage and you only need to plant 2 or 3 of them to make a large batch of tomatillo salsa.

Onions

Green Onions: These are the green stem onions you buy at the store. They are

so simple to plant, and the seeds drop themselves creating new plants year after year. We have not planted any seeds except for the first year. We love them and they go great in fresh salsa.

Yellow, White or Red Onions: These are also easy to grow. Simply place in the soil, leaving the little top slightly exposed. Place 2-3 inches apart. These go great in fresh and bottled salsa.

Peppers: Plant the seeds or starts in an area that will receive lots of sunlight and heat, which they love. They need lots of water and rich soil. We place our pepper plants in a raised grow box, planting them closer than what is recommended at 14"-16" apart. They need a little support around them to keep them from drooping. We have two rows of pepper plants in our grow boxes and have a small wire fence around the entire grow box to help hold them up. We recommend planting plenty of bell peppers, Anaheim and/or big Jim peppers and a few hot peppers like jalapeno.

Cilantro: You can never have too much cilantro! Simply start from seed and make sure to plant at least 2-4 of them, because you will want them for all of your Mexican dishes. When they get tall, support them with a pole and a little twine. Make sure to save a few seeds for planting next year.

Garlic: Simply take a garlic from a nursery or the grocery store and pull the garlic segments apart. Place in rich soil 4" - 5" apart, leaving the top of the tip barely showing. If you don't get a successful harvest, leave them in the ground over winter and let them spread and grow. You'll be amazed! They spread a little like flower bulbs do.

Cucumbers, Cantaloupes & Herbs

Cucumbers and cantaloupes grow similar to tomatoes in that they need a fence or twine to help support them. They can grow on the ground, but this makes them more susceptible to pests and bugs. We start them from seeds and transplants, as both works great! They love rich soil and lots of water.

To grow cucumbers and cantaloupes using a fence or cage, simply plant 4-6 seeds or starts in a cluster, underneath the fence or cage. The first 2-3 weeks they seem to grow slow, but after that they grow extremely fast. If it seems they are growing slow, you can mix 1 tbsp of Epsom salts in the soil, in a cluster of plants, as this seems to give them a growth boost. Epsom salts makes the soil more alkaline which soil sometimes lacks. If you wanted to

test your soil and see if it is acid, test kits are available. Another option for increasing plant growth in cucumbers, cantaloupes and all your plants, is to spread organic mineral powder into the soil.

If you are wanting to use twine or rope for supporting your cucumbers and cantaloupes, simply attach a rope/twine from the ceiling of your greenhouse and attach it to your grow box or secure it using a large rock or cinder block. We tie it around screws which we drilled in to the outer sides of the wood on our grow boxes. We have many pictures throughout this book showing the rope/twine and fencing.

Herbs:

Basil is an annual herb and will need to be planted year after year. It doesn't require a lot of sun, like peppers so we place them to the front of our greenhouse which receives less light! This is our favorite herb for cooking, so we plant 4-6 of them. They do best if they have a slight support, but usually they can hold themselves up! Find a stick or a short cage if you want to support it a little.

Oregano and Thyme are both perennial plants and only need to be planted one season. Every year they will grow back, becoming fuller and larger. Both plants need to be thinned a little, and cut back to keep them from growing too large. We like to cut the leaves, dry them and use them for cooking! (make sure to water these over the winter, once a month)

CHAPTER 11
COMPANION GARDENING: GOOD COMPANION VS BAD COMPANION

COMPANION PLANTING

The idea of companion planting has been providing excellent results to the container farmers. It involves the planting combinations of specific plants for the mutual benefits of the plants involved. The concept here is that individual plants do help each other in taking up nutrients and helping with the management of pests, while also attracting pollinators. Nevertheless, research is still on the way to find out more planting combination that works fine. There are a few that are listed here that have been scientifically proven and will also work fine in your container garden.

Melons or squash with Flowering Herbs

All the vegetables here are known to need pollinators for production. Therefore, you can plant flowering herbs such as fennel, parsley, and dill close to the squash or melon to invite insect visitors into your garden. The only way to get enough yields of these vegetables is through pollination.

Calendula with Broccoli

Calendula flowers are known to produce a sticky substance from their stems which in turn attracts aphids and gets them trapped there. Planting them beside the brassica crops such as the broccoli will help to deter aphids from broccoli while also attracting beneficial ladybugs to dine on the aphids.

Radishes with Carrots

Both radishes and carrots take up nutrients from different locations in the soil, so they do not compete for nutrients or other resources. Their fast growth characterizes radishes, and they do not grow as deeply as carrots do. Carrots generally have long taproots, and it takes more time for them to mature when compared to Radishes.

Lettuce with Tomatoes or Eggplants

These plants are characterized by different growth habits which makes them beneficial to each other. Tomatoes and eggplants will generally grow taller; thereby, they are useful in shading cool-season crops like lettuce that doesn't like heat at all. Growing them with tomatoes or eggplants will also help in extending their harvest period.

Nasturtium with Cucumber

This combination involves introducing both pollinators and beneficial insects into your garden, which will, in turn, help in improving biodiversity. Nasturtiums are characterized by a unique scent that helps in repelling pests and also growing in a colorful tumble underneath.

Tomatoes with Basil or Cilantro

Apart from the belief that planting basil alongside tomatoes helps to improve the flavor of tomatoes, basil also has a strong scent that helps to prevent pests. As an added advantage, when basil or cilantro is allowed to spout flower, it will result in bringing in the pollinators.

Corn, Pole beans with Squash or Pumpkin

These combinations are popularly referred to as the three sisters. Corn gives pole beans a platform for climbing while beans will convert atmospheric oxygen into a form that can be used by both plants. Squash and pumpkin are leaves spreading plants, thereby creating living mulch that helps in reducing weeds as well as holding of moisture.

Lettuce with Chives or Garlic

Planting of chives or garlic, which is characterized by strong smell will help in repelling aphids, thus protecting your Lettuce. You can also add alyssum nearby to help invite beneficial insects.

Sweet Alyssum with Swiss chard

Alyssum is an annual crop that can be quickly grown from seed between the rows of vegetables, and it is known to attract hoverflies. The Hoverflies are

beneficial insects that help in the control of aphids.

Chamomile with Cabbage

Chamomile helps in inviting beneficial insects for a variety of brassicas such as cabbage. You can cut off the Chamomile and leave to get decomposed on the bed while allowing the roots to remain intact to decay and help add nutrients to the soil.

Roses with Geraniums or Chives

Generally, plants that exhibit strong smell or taste will help in deterring aphids and beetle. Though it has not been entirely proven that this works, it worth trying to prevent roses from being eaten by beetle or aphids that multiply rapidly.

Bad Companion

There are a few reasons why some plants should not be grown alongside others if you are considering the organic method of growing your vegetables.

I mention particularly organic, because the general idea behind companion planting is to avoid the use of chemical pesticides and fertilizers whenever possible.

Some plants should not be grown together simply because they both attract the same pests or other predators, others because they make the same demands on the soil, leading to them both producing a poor harvest. Some plants grown close together may produce a damp environment that leads to fungal or other infection.

Here are some plants to avoid if possible when considering a companion for your veggies.

Beans:

Should not be grown in the same vicinity of garlic, shallot or onions, as they tend to stunt the growth of the beans.

Beets:

Should not be grown along with pole beans, as they stunt each other’s

growth.

Cabbage

Is generally thought not to do well near tomatoes, mainly because the tomato plant can shade the cabbage. Avoid planting near radishes, as they do not grow well together.

Carrots:

Avoid planting near dill as this can stunt growth. Dill and carrots both belong in the Umbelliferon family, and if allowed to flower it will cross-pollinate with the carrots.

Corn:

Avoid planting corn and tomatoes together, as they both attract the same tomato fruit-worm.

Cucumber:

Sage should be avoided near cucumber, as it generally injurious to the cucumber plant.

Kohlrabi: Do not grow alongside pole beans, peppers, strawberry or tomatoes.

Lettuce: Does not prosper well beside cabbage, as the cabbage stunts growth and reduces the flavor of lettuce.

Leeks: Avoid planting leeks near legumes. (peas, beans, peanuts or alfalfa).

Parsnip:

Grows well alongside bush bean, onion, garlic, pepper, potato and squash.

Peas:

Onions and garlic stunt the growth of peas.

Potatoes:

Tomatoes and potatoes should not be planted together as they attract the same

blight.

Radish:

Avoid planting hyssop near radishes.

With that in mind, and notwithstanding the above list, here is a selection of popular vegetables and their particular needs, that can be grown in your KG.

This list includes instructions for growing these vegetables in a traditional ‘row’ garden, but this is easily adapted with the KG garden in mind.

CHAPTER 12
VERTICAL GARDENING

What is vertical gardening?

Vertical gardening is not a new concept in the world. Since the beginning of time, plants have been a considerable part of our lives. The Babylonian gardens are the best example, even if they are still considered to be purely legendary. Yet no one can contest their usefulness, since they were structured on different levels, which is where the “vertical” in this plant growing method comes from. We must also think of the Mediterranean way of vertically growing plants, for the only purpose of growing food or providing shade in smaller areas, or the classic English cottages covered in ivy or other climbing plants.

The Germans also certified the benefits of vertical gardening in our homes due to its ability to retain heat during the winter and cool buildings during the summer. The French gave the entire world the invention of the espaliers. They are mostly used for bearing fruit trees, but in modern days, we can

actually use them for all sorts of plants. In the 1980's, a French botanist, Patrick Blanc, inspired by his travels in Asia, introduced to us his trademark hydroponic system, which became known worldwide and was the most impressive natural way of design. In the 1990's, some researchers from Canada enhanced the power of this growing system and, since then, vertical gardening continued changing and evolving.

Vertical gardening has certainly become the best way to take advantage of small spaces, use fewer materials, and work efficiently. It is also a very popular DIY project. It's not only about design and beautiful things surrounding us; it's also about a practical way of growing food.

In the past few years, vertical gardening has become not only a hobby, but an important part of self-help development tools in what makes for a better living. If you live in the city, with the sheer space of the balcony at your disposal, or if you live in a house with little garden space available, but are very keen on having beautiful flowers, fruits and vegetables all around, then vertical gardening is the way to go for you.

It is the best method to combine work and pleasure in order to achieve your goals in living a natural life. It takes small efforts (much less work), less money and a lot of imagination and practical ideas. With this creative outlet, you can turn your life around.

As I said, it's not only a hobby, it's a very practical way of allowing your family to consume fresh food and spend time creating something really helpful, yet full of gratification for ourselves. It is also a way to spend quality time with your family and find ways to educate your children about a less expensive way of living and embrace the era of minimalism. We should take advantage of the smallest thing that we own. We should consider turning a hobby into a real helpful way of securing for ourselves the best quality life ever.

We should consider some important things. The space that we can use, the money that we can spend, the right sunny location of our garden, the soil, the compost to use, and the irrigation system. Also take care when choosing the right plants to grow or seeds or other materials needed, such as supports, containers, trellises, and finding the best ways to overcome pests and diseases.

The necessary space is not that big (on our small balcony, we can arrange the

most eye-catching plant wall).We can keep our costs down, as we can use all sorts of discarded materials (use your imagination and you may find zero cost ways to creating yourself a very original, yet productive garden). Or we may use the modern, beautifully designed, and practical supports). The best location is easy to find (it all depends on the sunlight since, it is the most important factor in our choice of plants to grow). The soil is not hard to choose (we must have the best one available). We can make the compost ourselves, in order to spend less and to have the most natural foods available to our plants. The irrigation system is not that hard to get (even in this case, we may find traditional, less expensive ways, or we may just trust the modern irrigation systems with all their benefits, among which the timer is the most important one).When it comes to defeating pests and diseases of our plants, we may use some traditional remedies, or in some cases, just go along with what our specialist recommends.

Some of you will discover the magic of microclimates. In our modern days, in the end it’s all about a safe, beautiful, carefree and magical special place to call your own. Not only for those who live in overcrowded cities, but even for those who live in the country. We live in a world that is overloaded, that is always in a hurry, and that doesn’t give us the right space and the things that we actually need. At the end of the day, we all need solace, and sometimes the only way to find it is going to our personal gratifying place, which sometimes happens to be a small vertical garden on our balcony, or a beautiful outdoor vertical garden in our backyard.

It is a place that gives us reasons to be proud of ourselves, especially when we started from zero, using only our imagination and good will in order to obtain something really useful, like growing natural fruits and vegetables, or simply something magical like a flower garden. It is a well-known fact that the plants (especially flowers) have a positive effect on our minds. Be sure that nature is the most healing device for our souls, bodies and minds. And adding the results of our work to create something useful, or beautiful may become even more enchanting.

Some of you may also discover the economic power of this plant growing system due to the fact that it gives us the chance to have foods growing all year long. For that, it may take a bit larger space or just the nerve to try it. But for now, we intend to focus on our personal vertical garden.

Vertical structures and containers

In this journey, the best thing is to use your imagination or simply let your kids help you. We all know that they are far more creative than us adults. The first thing to consider is utility, but let’s admit that beauty and color add a bit of spice to our lives.

If you go online, you may already find a lot of beautiful, attractive, and innovative ideas for creating a unique and relaxing corner into our home. From there on, we must do our best to create something original and mind blowing.

When we live in an apartment, we have to deal with limited spaces and other obstacles, but they’re truly not that hard to overcome. Some important things to consider are light, the appropriate containers, the watering system that we will use and, of course, design. Plants bring oxygen and a feeling of bliss to our lives. That’s why, in the past few years, naturally designed walls have become a “must have” product. So, why not do it with vegetables and fruits, which may add a more beneficial touch to our lives, since it will give us the nourishment that we need.

But let’s talk about the benefits of a vertical garden. Well, first of all, it helps you save your precious space. The vegetables and fruits are easier to harvest,

seeing the thorough organization of your space. A vertical garden benefits the best airing, which is an important contributor to healthier plants and crops. These plants don’t have direct contact with the soil of the garden, which will better protect them from soil diseases and pests.

Regarding the light, there’s not much to do. You should find the most sunlit spot, like on your balcony (depends on the orientation of your flat), the most sunlit wall inside your home, or simply hang your plants on the kitchen ceiling.

For containers, we have limitless options, starting from those special ones that we can buy in stores to our things discarded into our attics. Don’t forget to choose only objects that allow water draining. If not, you may easily drill the ones you find, such as buckets, terra cotta pots, mason jars, old ladders, shoe organizers, PVC pipes, plastic bottle tops to old drawers, paint cans, clay pots, wood pallets, and conduit piping. Anything that comes to mind is good to use, as long as it has enough space for the plants that we want to grow. Pallets, shelves, old ladders, and drawers are maybe the ideal supports to use. Think that the towering system allows each and every scaled plant to obtain the right amount of water and the needed quantity of light. Hanging terra cotta or clay pots may also be the best solution for lack of space.

In my opinion, the best three ways of organizing your urban garden are:

1. Feet on the ground

You may use a double staircase, or self-made cedar shelf support, an old narrow wardrobe with drawers, or anything else that may come to mind, or simply buy something already done that you find in furniture stores. The important thing is to make sure that your support is stable enough. For more safety, please anchor it to your wall or ceiling, especially if it's a high one. Using trellises is also a good way to support your tall plants.

Tiered gardens are an efficient method of urban gardening. It doesn't need much space, so it's a good vertical garden idea for your balcony. By layering your garden, you will obtain more space for your plants with less effort possible. Raising plants on top of each other gives you the possibility to obtain more crops in minimal spaces. The containers to use should have different sizing, giving each plant its own space. It's very easy to do; you may simply use wooden cases. Set them one above the other, starting from large too small. If you don't find the materials to make it, don't worry; there are special tiered garden containers in stores.

Gutter gardens are also an economical method for vertically growing plants.

They are a very efficient method for those who live in apartments. It's almost cost-free, since we can use all recycling materials and they do not require much effort in preparing them or maintaining them, since they will never break or crack. For more safety, we should secure them, tying them with stainless steel cables and stainless-steel screws. We may use our imagination in obtaining different sizes, depending on the plants that we want to grow and our available space, and also obtaining a most colorful, original support for our urban vertical garden. They must be well fixed to the ground, due to the fact that we may grow a variety of plants in it.

Pallet gardens are a very original and non-traditional idea for vertical gardening. It's a very economical method and a very easy DIY method. The first thing we need is a wooden pallet. You may find it in stores, or you may actually try to ask some local businesses if they are willing to give you one for free. Once you get one, make sure that is safe enough for you to use. Place it on the ground, take off some slats in order to create enough space for your plants, and add landscape fabric (it's better to use two or three layers of it) on the backside of your pallet. Secure it to the wood using a staple gun and proceed to create pockets on the inside. Use thick layers of landscape fabric in order to obtain as many as possible and secure it with the staple gun, making sure that the soil will not drop.

Trellis gardens will help you get traditional. It's all about using wooden structures to support your plants. There are plenty of these structures available in specialized stores, but you may easily get creative by reinventing this method. It's a method used worldwide to grow vegetables, fruits and flowers and a classic one, considering the fact that native Americans, for example, were using corn to support the beans. In some countries, this is still a natural, cost-free, and productive method to obtain more crops while using less ground.

PVC pipe gardens are also a very efficient method of urban vertical gardening, considering the economic factors, the eccentricity, and the spicy effect on our cluttered apartment. It does not require much effort to build such a support for our vegetables, fruits or flowers. It's for the best to create a steady support, taking in account that our safety and that of our children comes first. There are plenty of useful ideas regarding securing these structures. One certain beneficial aspect is the fact that we may use dripping irrigation system on it. And, above all, it offers a lot of extra space. It is the

perfect method for growing berries and bushy plants while utilizing the smallest areas available.

Tower shaped supports also give an original touch to our homes. It’s a not that difficult of a DIY method to build up an interesting and eye-catching support for growing our favorite plants. They are suitable for any garden or small balcony.

Once you have your vertical support well anchored in the most sunlit location of your apartment or balcony, you should start thinking about the plants you want to grow. If you have shady areas, then you must consider growing lettuce, cabbage, and greens. If you are blessed with plenty of sun, your selection of plants is wider. You may grow tomatoes, peppers, beans, potatoes, radishes, cucumbers, squash, pumpkins, and even carrots.

2. Stuck to the wall

When it comes to decorating walls with plants, there is no limit to the imagination. There are special metal plates that can be fixed on your walls or your doors if you like, allowing you to place any kind container or pot there, in whatever size or color you see fit. You can design your wall with any shape that you want. You can create a huge green painting, or a heart-shaped panel, or a colorful bookcase or connected box system, or simply using your kitchen containers. Let your creativity go wild!

Pocket-shaped pots are becoming a creative, non-traditional method of designing our homes. You may buy them in stores, or you may simply use your imagination in choosing recycling materials with different sizes and colors, adding beauty to your space and serving as an efficient technique to grow vegetables or fruits.

You can give your house a modern touch by using metal supports that you can easily find in any store, or a traditional touch, by using clay pots or recycled cans painted in different colors. You may certainly be original by using wooden pallet supports, recycled PVC pipes, painted plastic bottles, and so on.

Gutter, pallet, trellis, and PVC pipe gardens that were mentioned above (for ground supports) are surely some of the best methods in designing our walls while actually obtaining crops and a lot of gratification in harvesting the best variety of fruits and vegetables. The things to consider are the best supporting methods (safety comes first) and the best location, and the light factor.

Once your location and support are chosen, you should choose the right plants to grow, always taking into account the lighting and the available space between one shelf or another, and between the containers that you chose.

The inconvenience of this method is the impossibility of using the dripping irrigation system. This results in a bit of extra work when you have to water your plants.

3. Hanging from the ceiling

This is certainly a newcomer in the plant-growing world! The best choice is to use the most original and stylish Bosker Sky Planters. They are available in small and large sizes. It’s made of stoneware ceramic or recycled plastic and this unique irrigation system offers the ultimate solution for us to make the most of our limited space. It provides water to your plants for up to two weeks. And the special locking disc won’t allow the soil or water to drop on our floor. So, make space for upside down gardening!

Another advantage is hanging them on the ceiling, hence not adding to the clutter and giving more free space to breathe. The sun factor is not that hard to overcome, since you can place your supports as near as possible to the windows. In addition, the ceiling area is the warmest of the entire house and is also the area with most natural light available. That will offer benefits to your plants.

The most suitable plants to grow in these supports are small ones, such as herbs, salads or spinach in the kitchen (one of my favorites are also strawberries), flowers in the living room, and on the balcony, a small variety of taller plants, like cherry tomatoes, beans, peppers and radishes.

The hanging method may also be efficient with other small containers, such as, clay pots, baskets, buckets, bottle tops, or anything else that may come to mind. In these cases, we have to grow our plants in the traditional way, but nothing should discourage our inventive mind. With proper fixing to the ceiling, there should be no problem at all, except for the irrigation system. It may add a bit of extra work.

CHAPTER 13
RAISED BED GARDENING FUNDAMENTALS AND CREATION

Traditional gardeners have been making use of raised beds to grow their vegetables for many years. They would double dig the beds, creating circular or rectangular mounds a foot or so high with the sloping edges on the sides of the beds. This is especially effective in areas that receive lots of rain since it guarantees good drainage. Additionally, it allows a bit more space to grow your veggies.

Companion planting works perfectly on raised beds. Those vegetables which need more space for their roots like carrots would be planted on top while others like leeks and onions would fill up the space on the sides of your beds. The latter repel pests and would act as a shield for the carrot plants on the top of the bed.

These are but a few of the numerous benefits of gardening in raised beds. Therefore, it is not surprising to find that our modern-day gardeners are turning their attention with more frequency to this method. They have added a twist though, now solid frames replace these sloping sides to give the raised beds a distinct and well-defined structure. What this means is that you can make the beds as high or tall as you want them to be without the danger of soil runoff when it rains.

It might sound like a huge job, but these modern raised gardening beds are easy to assemble or build by yourself. Frames can be built with concrete blocks, timber or bricks and then filled with many organic materials mixed with soil. You will find kits ready for assembling as well as prefabricated plastic containers at almost any gardening center. Now anyone and everyone can easily and successfully grow their vegetables in raised beds.

I will now point out some of the many benefits of this Raised bed Gardening method.

1. Excellent Aeration

The older, traditional way to create raised beds is simply to dig up the soil, piling it into rows. You can follow this method and then support the two sides by using solid frames. Otherwise, place your frames in place and then fill them up with compost, farmyard manure mixed with quality soil. Whichever way you choose to do it, your plants will flourish in this enriched soil and its loose structure will allow excellent air circulation around all the roots.

We know that the different parts of plants all need to breathe, and so do the roots. For example, during photosynthesis, the leaves take in carbon dioxide and expel oxygen. If your plant sits in compact soil, the roots will suffocate and will not succeed in developing fully. This is because they need good aeration for their roots to be able to absorb the essential nutrients in the soil. To explain further; the soil bacteria convert the nitrogen in the little air pockets into nitrate salts and nitrate, thus providing the macronutrients for the plant. Without sufficient air, there is a lack of nitrogen and therefore less nutrients will be available to the plant.

It is clear that the population of microbes in your vegetable soil must be kept healthy and this is made possible with good aerated soil. The balance of anaerobic and aerobic bacteria should be maintained as they all play their different roles to enhance the fertility of the soil.

2. Good Drainage

Even during a downpour of rain, your raised beds will render good drainage. No wonder this method is so popular in the tropics with its heavy rainfall. Because the soil has such a loose texture, water will seep slowly into the bed instead of a making a quick runoff with the accompanying washing away of all fertile topsoil. Furthermore, all the excess water can easily drain away.

Although most plants do not mind moisture at all, they hate to get their feet wet. Firstly, all that water around their roots will make breathing almost impossible. Secondly, too much moisture will promote fungal and bacterial diseases. Lastly, excess water drenching the soil can change its pH level and raise the acidity. Plants which prefer more neutral or slightly alkaline soil will suffer as a result.

Some plants, for example those that live in bogs are adapted to grow in drenched soil but most plants prefer soil with a twenty five percent-moisture level. Raised beds will not allow water stagnation while at the same time

keep your soil quite evenly moist because the water is soaked into the lowest levels of your beds quickly.

3. The Spreading of Roots

Although plant roots can be quite persistent in their effort to grow, they will find it difficult to do so in tightly compacted soil. In loose soil they can grow and spread out to their hearts contend. Furthermore, a framed bed will retain the moisture after watering a lot longer than the more traditionally raised beds because the frames prevent water loss on the sides of the beds more effectively. Drying out of the beds can therefore be prevented and good root spreading will follow.

Plants growing in non-raised garden beds generally have a very shallow system of roots since they find it impossible to penetrate through the more compact soil deeper down, unless of course you go to the trouble of tilling the soil deeply before you plant your vegetables. This means that the plant roots are unable to get to the moisture kept in the deeper layers, which in turn may lead to dehydration of the plant when the moisture on the surface evaporates. Well-developed root systems anchor your plants. It also enlarges the potential food source area from which the plant can gather its nutrients and water. Vegetable plants in particular, need enough of both to encourage vigorous growth and maximum yield during their relatively short growing season.

4. Minimum Risk of Compact Soil

A raised bed will not completely deter your smaller pets like dogs and cats from digging and rolling around in your gardening soil, but it definitely will keep humans and larger pets or animals at bay. This will prevent the tamping down of the soil. The ideal width for your raised beds is three to four feet, making it easy for you to do your gardening chores such as weeding, harvesting and fertilizing without having to step onto the beds.

The floods which sometimes occur after a heavy downpour can also compact the soil of cultivated fields. Wet soil is heavy and will sink down and fill all the little air pockets. Once the water has evaporated, you will be left with a dense, hard layer that is not very accommodating for the plants. Raised beds allow the water to drain away much quicker, preventing floods to cause soil compaction.

5. Improved Weed Control

Sick and tired of weeding? A raised bed garden is the answer. In a normal vegetable plot, you will find it hard to get rid of all the frustrating weeds no matter how dedicated you are. They just seem to take over all the time.

When you cultivate the soil for normal vegetable beds, you expose lot of the weed seeds that have been lying dormant underground shielded from the sun. The exposure to sunlight and extra moisture they receive during irrigation will provide them with the opportunity to start sprouting, just what they have been waiting for. Very quickly, they will feed on the nutrient-rich soil prepared for your vegetable plants and begin to flourish.

You can make use of the option to fill your raised beds with relatively weed-free soil and compost. If a few stray weeds appear, your raised beds with its loose soil will make weeding a breeze. A good tip is to fill up your raised beds with as many plants as will grow in it so that they will suffocate and outgrow any stubborn weeds that may try their luck.

6. Easier than Amending Existing Soil

Garden soil greatly varies from area to area; sometimes it is more alkaline and chalkier, often it is too acidic and plants will not thrive without your intervention. Vegetables in general like slightly acidic to neutral soil, anything with a pH level of between 5.5 and 7.5. Having said that, there are exceptions. Blueberries and tomatoes, for instance, like more acidic soil while asparagus and broccoli prefer to have their roots in sweeter soil.

The remedy for alkaline soil is to add Sulphur, for acidic soil lime can be added. Sometimes applications have to be repeated a number of times to get the desired effect but a downpour can undo all your hard work in a flash. It is not a simple, straightforward process to change the intrinsic nature of any type of soil.

If you plan to cultivate different kinds of vegetables, raised beds will give you the option of which soil you choose. On top of that, you can now fill up different raised beds with the type of soil each variety of vegetable prefers. The addition of lots of compost, something most gardeners usually do, makes it easier to sustain the soil’s neutrality.

7. Garden on Top of Existing Turf

You have made the decision to start your own vegetable garden, but the task of having to dig up and clean the existing turf presently growing on the area you have targeted is just too daunting. Do not despair; raised vegetable beds can be built straight on top of your grass without having to dig up any sods.

Mark your area, and then place multiple layers of cardboard and newspaper on the area. Erect your frames and then simply continue to fill them with grass clippings, soil, sand, decomposed farmyard manure and compost. Plant your seeds or seedlings in this rich mixture and you have started your garden without too much backbreaking labor.

8. Avoid Root Run from Larger Plants and Trees

Sometimes you will find that the only available space left in your garden for your vegetables is near a number of well-established trees. These trees have massively huge roots to anchor them to the ground and will devour all the nutrients in the soil, leaving very little for your vegetable plants. You may be able to get rid of some of these invasive roots, but it is an impossible task to get completely rid of them all. Using chemicals to try to kill the roots is not an option because these very same chemicals can harm or even kill your vegetable plants. However, your raised beds will be safe from this problem since tree roots generally grow downwards and will not reach into the raised beds.

9. More Effective Pest Control

Creepy crawlies are true to their description, they usually enter vegetable patches this way, crawling away until they find food. Encountering an obstacle like a solid frame will definitely deter some of them from crawling up. They may just pick the easier option of continuing along the ground. To protect your plants from soil parasites like nematodes, line your raised beds along the sides and the bottom with plastic. If you fear annoying rodents burrowing their way into your beds, use a netting of wire, placing it at the bases of your beds.

Overall, it will be easier to rid your beds of the various offenders just because they are more accessible. Applying chemical or natural pesticides or picking out invaders by hand is a lot less cumbersome if you do not have to bend down to ground level all the time. Everything, including nasty pests will be

more visible to the eye too. Walking along your raised beds, inspecting your plants regularly you can quickly detect infestations and deal with them immediately. Remember; the sooner you tackle any pests the easier it will be to rid your vegetable garden of them.

10. Extra Available Space

Raised beds in the traditional fashion provide more space for plants growing along the sides of the beds. Although this advantage is not applicable to framed beds, they can provide additional space in another manner. Many of the plants growing along the side edges of the frames will extend over these side edges, leaving more room for other plants on the top surface of the bed. More light will be able to reach the plants as well.

Those varieties of tomatoes that normally will need staking can simply be allowed to grow downwards instead of upwards. Make sure the beds you plant them in are high enough. Strawberries and the vines of sweet potatoes tumbling down the sides of your raised beds will make a very pretty picture in your garden and create a luxurious aspect.

Raised Beds: Site Creation

One of the questions most frequently asked about raised beds for growing vegetables is just how tall they should be. There is no definite answer to this question, I am afraid. There is no ‘ideal height’; it is completely up the individual. However, there are certain considerations that you must keep in mind. These include the soil conditions under the beds, the costs involved, the depth of the soil required for your specific crop and of course, which height would allow you to work comfortably in your raised beds. This last aspect should take priority if you are a matured gardener.

Double Dig

Although the plants in your raised beds will be provided with their own rich soil, some of them may grow roots that extend into the soil underneath the beds to search for additional nutrients and moisture. Therefore, it is important to prepare the soil below by double digging it. This must be done before you start on your raised beds and once done, need not be repeated.

Double digging simply means the depth to which you have to dig up the soil; it is approximately twenty-four inches deep, or in other words, two lengths of the blade of your shovel. Remove all the hard rocks and debris that could obstruct roots from growing down into the ground. Keep your eyes open for other large roots entering into this space. For instance, trees that grow nearby can send their roots to more than fifty feet diagonally underneath the surface searching for nutrients and water. Double digging will provide an extended reservoir of water and nutrients, which your plants' sturdier, deeper roots can have accessed to.

Digging up the ground also allows you to have a closer look at the status of the underlying soil, and to decide which amendments should be made. If it resembles clay, for instance, peat should be used to lighten it in order to aerate it and improve the drainage.

Improving the Subsoil

You have cleared the ground area of debris and rock and finished your double digging. If needed, you can now add some peat moss that will lighten your soil. Because peat has an acidic nature, you have to balance the pH level of the soil by adding lime. Sprinkle some rock phosphate over the plot and mix in with the soil. Your ground area is now ready for the raised plant bed, so assemble the frames and fill up with rich soil. When you almost reach the top of the raised bed, add compost and fertilizer. Do not add the compost and fertilizer too long before the season to avoid early, unexpected spring rainfalls to flush them too far down into your soil.

CHAPTER 14
ADVICE AND TIPS

#Tip 1 Adequate sunlight

Every seedling needs adequate sunlight for it to properly germinate to a fully functioning plant that will produce the benefits you are looking for. The average sunlight requirement for a growing plant is a maximum of 6 to 12 hours a day of uninterrupted sunshine.

But this depends on the kind of vegetables you are growing in your container garden. Through estimation, plants like Tomatoes, Broccolis and generally vegetables require as much as 8 hours to half a day for them to thrive well. For root crops like radishes, carrots or beetroots, such plants need a maximum of 6 hours of sunlight exposure to grow. If the target plants for the vegetable garden are lettuce, spinach and any other crop of the spinach family, at least 4 hours of sunshine exposure is required for the plants to grow.

Sunlight is an important factor that determines where you locate your container vegetable garden. If your target area doesn't receive that much sunlight it is advisable to pick another spot. Sometimes the sunlight may be adequate, but it does hit the ground completely; this may be witness if the garden is located among tall buildings. Here you will need to have your pots or containers raised to access as much sunlight as possible.

The aspect of sunlight will also determine what kind of plants you choose for your container vegetable gardening. If your area doesn't receive that much sunshine, it is advisable to plant that require about 4 hours of sunshine. An area with sunshine all day is perfect for plants like tomatoes or vegetables.

One last thing to know about sunlight; midday and evening sunshine works best for your plants in the place of morning sunlight. Midday/evening sunshine has more intense rays that will nourish your growing seedlings better. So, it's best to always make use of the midday hours towards the evening for your container vegetable gardening.

#Tip 2 Water for your plants

Water is an essential part in your container vegetable gardening. The roots require water most and need to stay moist throughout the growing period. This is the tricky part; you have to be careful not to use too much water and drown the poor seedlings. On the other hand, using little water may dry out the plants to a wilt.

So, you need a balance between the two and the only way to be sure is by having an idea of the kind of root structure your plant has. Vegetables like tomatoes, egg plants and beans have a deep root structure thus the water concentration should be more in order to reach the plants. Cabbages and cilantros and lettuce don't form a deep root thus won't need that much water on them.

Another thing to know when caring for your container vegetable garden is the soil type you used to plant your seeds to determine how much water is required for growth. Soil types entail clay, loam and sandy soil; each has a different water retention capacity which can be tested using a glass jar. Sand drains water quickly while clay soil hold water at the top and it takes time to reach the bottom. Loam soil is voted the best for planting as it distributes water evenly and reaches the roots easily.

The planting season will also determine how much water you use; the summers will call for more watering compared to the cooler periods.

#Tip 3 The right temperature for the vegetable garden

The average temperature for plants in a garden is an approximate of 60°F; this is applicable for your container vegetable gardening. If you live in a hot area where the temp goes beyond 60°F you may want to consider some shade for your young plants. You really don't want to scorch them up especially in the hot summer heat.

On the other hand, seedlings don't function well when left in cold temperatures, unless the planted seeds require such. This is why it is important never to use extremely cold water to water your container vegetable garden; the icy shock in a hot summer may not be a good thing for the young plants.

You also have to be careful what kind of material you use on the containers; it is advisable to use non conducting containers for the job. Avoid metallic containers or those with dark colors which can absorb a lot of heat into the

soil. You can always use a thermometer to keep the temperature in check; and make the necessary adjustments to keep the temperatures optimum. More on containers is in tip #5.

#Tip 4 The right soil type for your container garden

The first tip on soil for your container vegetable garden; never use garden soil! This comes from the fact that container vegetable gardening has the advantage of dealing with fewer weeds and only the required plants. Using soil fresh from the garden is a nice way of importing an army of weeds into your containers.

So, go for that soil which hasn't been used for gardening and has enough nutrients to sustain your growing plants. Generally, there are about four types of container gardening soils which can be used to grow your vegetables in: silt, sand, loam and clay.

Sandy soil is perfect if you are growing plants that don't require a lot of water to grow. Furthermore, sand contains large particles in it which are perfect for draining water easily, trapping a lot of moisture and air for the plants. Silt is voted as the ideal soil type for your container vegetable gardening. Silt is a better water retainer providing the damp environment the roots need. Comparing it to sand it is having more nutrients in it though not as much as loam and clay soil.

Clay works best if you are planting vegetables that constantly need a wet environment. Clay drains water slowly, and captured moisture stays longer in the soil. However, you need to be careful working with clay because it tends to be too acidic if not handled by a professional.

Loam soil is a mixture of sand and clay and combines the characteristics of the two for a better planting environment. The sand part of it helps in the free flow of water and air into the soil while the clay helps in holding moisture and air for the roots.

There are other gardening soils in the market; these are just the four basics which are perfect to work with especially if you are a beginner in container vegetable gardening.

#Tip 5 Containers for vegetable gardening

The use of containers for vegetable gardening is a huge relief from the hassles of looking for a suitable gardening place. Moreover, you can easily move and arrange the plants however you want in your home nursery to give them a better access to sunlight or for breathability.

Container vegetable gardening ensures your plants don't fight for nutrients, but the tricky part is providing the same growing environment for all your seedlings. For this reason, it is vital to go for containers of the same size and make sure they reflect heat away instead of absorbing it. It is also advisable to work with large containers; about 18 inches is good as it holds more soil meaning it retains more moisture and air.

Providing the same environment for all your seedling means you have to use containers of the same shape, size and material. This ensures they receive the same amount of water and fertilizer, so they have the same chances of producing great yields.

The containers you use depend on how much you are willing to spend; bear in mind that the best containers in the market for your gardening will go for high prices. So perhaps you might want to save now in order to provide your plants with the best growing environment in the future. Some gardeners may be concerned with the aesthetics of their home container vegetable gardening; here you can use pots, plastic containers or terracotta with appealing colors to them. Wooden containers are also perfect if you are looking for aesthetics; they tend to give a natural posh look to your home garden.

#Tip 6 Adequate drainage for the plants

This also applies to the kind of containers you use; make sure the containers are well holed at the bottom to drain off excess water. Drainage is important to prevent soaking up the seedling and destroying them with excess water.

Unless you are growing rice in containers (which is unheard of) best make one or a few holes at the bottom of the containers to drain off unwanted water. Earthen pots come in handy here because they contain pours that drain water spontaneously. If you cannot get these then stick to normal containers but make sure they can drain water at the bottom.

#Tip 7 Seeds for your container vegetable gardening

Getting seeds for your container vegetable gardening is very easy; you can

borrow a few seeds from a friend, get them from an old garden or buy them from stores or online.

Buying new seeds is by far the best option, this way you can choose the variety for yourself and you can even have them packed separately or assorted. Getting seeds from a fellow grower is not bad as well since it cuts down on costs. The bottom line is to determine what kind of plants or herbs you want in your container vegetable gardening to determine the kind of seeds you are going to get.

Another factor to consider is whether you want to grow the ordinary GMO seeds or want to go completely organic. Organic seeds ensure you have a container vegetable garden in its most natural form. Organic seeds are also perfect if you are looking forward to container vegetable gardening that is free of chemical additives and uses natural fertilizer. GMO seeds on the other hand are perfect if you are looking for quickly growing plants that will yield within the shortest time possible.

As you choose your seeds, it is good to start with plants that are easy to grow and maintain; especially if you are a rookie at the job. The best seeds to buy or get from a friend are tomato, radishes, potato, cucumber, eggplant, carrots or peas. These vegetables are easy to work with and are perfect for a first-time experience at vegetable gardening.

While buying your seeds from stores or online retail points, it is good to always read the labels to see if the seeds are what you are looking for. An organic farmer should look at the label and make sure it reads organic seeds. Reading the labels also help you determine the kind of environment the seeds need to germinate in and how to properly take care of the seedlings to maturity point.

#Tip 8 Location for the gardening containers

The idea behind location is to get as much sunlight as possible to the growing seedlings; sunlight is necessary for germination and photosynthesis. This can only happen when the seedlings are strategically placed where sunlight constantly hits.

Your backyard is a perfect place to start your own container vegetable gardening especially if it receives a lot of sun during the day. However, if you live in a store apartment, this doesn’t shatter your container vegetable

gardening dreams. Try placing a few pots adjacent to the windowsill where the sun always hits. Alternatively, you can try you can try your home balcony if it receives adequate sunlight as well.

As crazy as it may sound, you can grow your own tomatoes or potatoes right from your balcony and enjoy fresh veggies every day. If you aren't comfortable with that idea you can always start with herbs; herbs don't grow that big and will sit perfectly at your windowsill or balcony. Use pots for your container gardening; they are aesthetically appealing and will blend in with your balcony décor or the windowsill.

#Tip 9 Elevate your Plants for maximum sunlight

This is an alternative to your balcony or windowsill. Elevating your plants or seedling for maximum access to sunlight is a good thought in areas receiving little sunshine. This is made possible by constructing stands from the ground up where you will place your gardening pots in neat rows with enough spacing for breathability.

Alternatively, you can hang some pots on the wall of your backyard where they can access sunlight. The best thing about container vegetable gardening is the ability to move your growing pots around; in a day you can hang your pots at strategic points where they will need the sunlight, they require to produce food. If you are working with an elevated stand, make sure the structure is placed at a point that always receives the most sun. On the hand you can build a light and mobile stand which you can move around as you want.

#Tip 10 Fertilizers for your container vegetable gardening

When it comes to use of fertilizer, it depends on nature of your vegetable garden; this falls in two categories, organic gardening and the contemporary use of artificial fertilizers.

Organic container vegetable gardening takes everything on a natural course; you will need compost or manure for fertilizer which is mixed initially with the soil when preparing the containers for planting. Plants use up all the nutrients in the soil so you will have to add more manure/ compost to the containers to keep the seedlings fed with nutrients. Living on the countryside is an advantage as you have ready access to farmyard manure. You can also

prepare your own compost heap at your backyard for the container vegetable garden.

Option two, you can buy organic manure from shops but make sure there are no other additives in them. Artificial fertilizer is also bought from shops and it comes with different nutrient blends in it for the plants. Buying artificial fertilizers is not a bad idea as you have a chance of selecting the key nutrient ingredients you require for your container gardening. However, you have to be careful about artificial fertilizers that raise soil PH to acidic levels your plants cannot contain.

This is why organic fertilizer always rules over artificial fertilizer since it’s natural and safe. It’s also a cheaper option if you can prepare the manure yourself. There are numerous internet tutorials on compost making you will find useful.

CHAPTER 15
GARDEN TOOLS AND ACCESSORIES

Gardening can be done in several ways, but if you have chosen a container garden, you should have specific gardening tools for you to succeed. If you intend to acquire the most substantial part of your crops, you need to begin the planning before time. Purchase your seeds and garden equipment so that there will be time to sprout and germinate seeds.

Numerous gardening tools could be purchased, but the following are the essential tools for container gardening

- Small shovel

A small shovel is perfect for pots. It makes it simple to dig in fertilizers and also to plant your crops or seeds in the pot.

- Hand Weedier

A hand weedier is a small fork class of tool with a long neck. It's useful for planting seeds and small plants and removing the little weeds that grow in containers. It can be used to dig a tiny hole to put the plant or seed.

- Plant containers

A plant container is a container for the crops, and it has to be the right size. You can make use of any container for growing plants and vegetable crops. Wooded boxes or crates, gallon-sized coffee cans, old washtubs, as well as five-gallon buckets can be used for growing vegetables in as much as there is sufficient drainage.

- Small cups or egg Cartons to start seeds

You can use this for sprouting seeds. Ascertain your container is sufficiently broad to give room for the seeds to germinate. If you do not have enough space, the plants have to be transplanted as they grow. Also, you may need to buy a seed heating device as most times you a required to sprout them within, for it to be adequately warm so that they can germinate and grow.

- Soil

Quality potting soil is a determinant for your plants to grow well. That is the secret to a successful container garden. If you use poor soil, your plants or seeds will not grow. The soil means a lot. Make sure you get top quality soil that your plants require to thrive with or without fertilizer.

- Plant seeds

A plant seed can be flower or vegetable seeds. The ideal thing is to look for high-quality seeds if you are to plant vegetables to be able to harvest seeds and keep for another season. Determinate tomatoes and shrub type plants grow brilliantly well in containers. If you're looking forward to the best crops in your pots, go for these types of plants.

- Garden Gloves

Though garden glove may not be very essential if you are the type that easily got disgusted by dirt and didn't want stain beneath your nails, or sensitive to some particular plants, you need garden gloves. Also, if you do not want to lay your hand on a caterpillar, tomato hornworm, snail and gardens insects when removing them from your favorite crops, garden gloves do the job better. It will also guard your hands against thorns or all other sharp components of the plants.

- Watering can

Watering can do the job better by making the task of watering plants simple and trouble-free because water is running out of it in the form of trickling rain. You can, however, make use of a milk jug to convey water outside. But if you are to use it, ensure you gently pour the water in your hand and spread with your fingers to enable the water to scatter and drop softly into the soil. If not, water coming from jug may land heavily on the soil and splash back on the crop's foliage, raising its danger of having fungus issues and other infections.

- Trowel

A trowel is also an essential tool for container gardening. It is being used to loosen up compressed dirt as well as digging through trash in plant

containers. Rather than using your hands, the trowel will get the task done better and faster and leave your hand dirt free.

- Pruners

A pruner is useful for cutting off dead foliage and pruning plants. Though you might think of using scissors, it is not advisable to use it. There are wet saps on plants which may leave remains stick and rust on your scissors. Cutting plants with scissors instead of pruner also increase the risk of the plants being infected. Pruner is more active in cutting thicker crop stems, also enable clean cut while leaving your plants healthier in the containers.

- Plant Organic Pesticide

If you are a non-fastidious type who could squish insects and not have a bad feeling, a pesticide may not be necessary for you. However, if the reverse is the case, it is ideal you have a plant-safe pesticide as part of your tools. Ensure you adhere to all instructions on its usage because it may not be right on food plants. Possibly, you can remove the pest from the plants and spray on the floor with the pesticide.

- Stick or String

These are essential for supporting container plants that needed to be upheld. An example is tomato plants (string and stick or tomato cage can be used to support tomatoes). They can also be used for young trees that needed to be upheld to grow in a straight line up and plants growing up the fence. Stick can be bought at your local garden store. String or yarn could be an organic color, like brown or dark green for it not to stand out in the garden environment.

- Quality Fertilizer

Fertilizer is also essential for the growth of your plant. Having secured good soil, ensure you obtain a high-quality organic fertilizer to get the best result from crops. Compost can be in pellet or liquid form. You can buy specific fertilizer for each type of your plants like rose or citrus fertilizer. However, an all-purpose plant fertilizer does the job for most gardeners. Compost can as well be used to supplement your crop’s feeding

- Potting Bench

A potting bench is also an essential tool for gardeners. Firstly, it serves as a platform to assemble and store your small appliances, plant marker, fertilizer, and the likes. You can also use it to conveniently move your planting tools from one place to another (for example, from your kitchen to your garden)

Each of the gardening tools is very important for your container garden to be successful. Make sure have them at your disposal to ease work as well as getting the best results out of your products.

CHAPTER 16
HYDROPONIC GARDEN

An approach to gardening that in increasing in popularity is hydroponic gardening. Using hydroponics for your indoor garden will offer you a quick and easy way to grow your vegetables. You can get hydroponic appliances that provide the light and water necessary for the plants. Plants, including vegetables, tend to grow much faster when grown using hydroponics than the standard of growing them in soil. The major drawback to hydroponic gardening is the cost of having to replace your grow lights from time to time.

If you don't want to purchase a ready-made hydroponic gardening set up, then you can create your very own set-up. However, keep in mind that making your own hydroponic gardening set-up is much more complicated and requires a lot more effort to get going.

You may be wondering, "what is hydroponic gardening?" Well, hydroponic gardening is growing plants without them being in soil. Your plants will get all the nutrients they require in the hydroponic system. Plants need nutrients, water, and oxygen supplied to their roots in order to properly grow and develop. The different hydroponic growing systems provide these elements in various ways.

Growing your indoor garden with hydroponics is one of the best ways to have fresh fruits and vegetables year-round. Also, it is a great alternative for growing several different plants in smaller spaces. Hydroponics provides the plants with the necessary requirements for growth directly, instead of the plants having to seek them out. Root systems on hydroponically grown plants are much smaller and plant growth is larger.

Elements

There are many different elements to gardening using hydroponics. For example, you can very easily control and maintain all the required elements that help your plants grow healthy. These factors are

1) Light
2) Temperature

3) Humidity
4) pH Levels
5) Water
6) Nutrients

Since you can easily control and maintain these elements, using hydroponics for your garden is much less time-consuming than gardening traditionally with soil.

Light

When you use hydroponics indoors, you can provide light through a bright window- typically one of your Southern-facing ones, or under grow lights. The type of light used usually falls on the gardener and the types of plants that are being grown. The light source must be bright enough that it triggers fruit and flower production.

Temperature, Humidity, and pH Levels

In order to successfully grow plants using hydroponics, you must be sure that you have proper temperatures with the proper levels of humidity. In addition, pH levels are important. You can get a kit to help you get started- these tend to make it much easier. For the most part, room temperature is enough for most plants when using hydroponics indoors. The humidity levels need to be around 50 to 70 percent for proper plant growth- which is about the same for houseplants.

When it comes to gardening with hydroponics, pH levels are also quite important, and you need to check them often. The pH levels for most plants need to stay between 5.8 and 6.3. You should also be sure that your plants have plenty of ventilation, which can be taken care of using oscillating or ceiling fans.

Water and Nutrients

Nutrients for the plants are provided using fertilizer and water that has been specifically designed for hydroponic gardening. You should always drain, clean, and refill the nutrient solution- which is fertilizer and water- once to twice a month. Since your hydroponically grown plants do not use soil, there will be much less maintenance. There will be no weeding, and no diseases or

pests that can occur in soil. Things such as sand or gravel can be used to grow the plants, but this is just an anchor- it does nothing to help keep them healthy and alive.

There are several different methods for offering the nutrient solution to the plants.

Passive this is the simplest form of gardening using hydroponics. This allows you to determine how much and when the nutrient solution should be given. You can use a wick system, which uses trays that are filled with growing mediums (gravel or sand) and the plants. The trays will float on the nutrient solution, which allows the roots to absorb the water and nutrients as they need to.

Flood and Drain this are another easy method, and just as effective as the passive. You flood your hydroponic trays or pots with the nutrient solution, which then drains back into a tank. This requires a pump and you must be sure that there is always nutrient solution in it to keep it from going dry and burning up.

Drip Systems these require a pump and are typically controlled using a timer. When the pump is turned on, the nutrient solution drips onto the plants. There are two basic kids of drip systems non-recovery and recovery. The recovery ones collect the excess and the non-recovery do not.

You can grow almost anything with hydroponic gardening techniques, from vegetables to flowers. It’s a really easy and effective method to grow plants, especially if you have a small area- such as an indoor garden. You can use hydroponics in most indoor gardening set-ups, and this will yield you healthier plants and higher quality fruits, vegetables, and herbs.

CONCLUSION

Now that you have completed this book, you should now be feeling a lot more confident about making your very own garden. After all, as you have read, you can easily create your garden once you know what you need to do. Some early planning, attention to detail and care will go a long way to giving you a garden you can enjoy all year-round.

There are a lot of people who want to start their own vegetable garden, but they don't often find it difficult to get started.

You will have learned about the different kinds of gardens that you can build and how the weather will affect them. You can even determine the suitability of your spaces for a garden. You have learned about the soils that plants thrive on and how you can modify any kind of soil to suit your needs. Even if you don't have the room for a giant, outdoor sprawling garden, you still have options as an apartment-dweller to create an indoor garden and you will still be able to enjoy the exact same benefits of having an outdoor garden.

More importantly, you know how to plan your garden and prepare it so that it flourishes. Of course, planting the seeds and seedlings should no longer be a problem as well. You can even take care of the mulching and the compost parts of the garden.

In short, you are ready to go out and start getting your very own garden to flourish like a dream. If this book helps a single person in planning, preparing or growing their garden, my purpose of writing this book will be fulfilled. I wish you all the best for your endeavor and for your future.

COMPANION PLANTING

THE COMPLETE GUIDE TO COMPANION GARDENING. HOW TO GROW AND PAIR VEGETABLES, HERBS AND FLOWERS TO MAKE YOUR GARDEN SUCCESSFULL.

DAMIAN WYLIE

INTRODUCTION

Companion planting has been used by traditional farmers and home gardeners for centuries. In today's modern, scientific world, much of companion planting is ignored in favor of high yields and neat rows of plants smothered in chemicals for maximum yield with minimum effort. However, companion planting is very effective, helping to prevent pests and diseases while increasing yield and improving taste and all without a chemical in sight.

What is companion planting?

Firstly, it is not about giving your plants company to stop them from being lonely as they grow.

It is the technique of planting a different species of plant near to another in the knowledge that this benefits one or both plants. Effectively, it is about putting two plants near each other, so they help each other out in several different ways.

Although the history of companion planting is long, the scientific mechanisms behind it were not originally understood. In most cases, companion planting has been developed through testing, by 'secrets' passed down through a family and oral traditions. Despite the lack of scientific development, companion planting works, and many of the traditional companion plants are surprisingly effective when subjected to scientific investigation. Companion planting does help to reduce the incidence of pests and diseases as well as keeping the soil healthy.

As a gardener, you may have heard of the three sister's method of planting corn, beans, and pumpkins. This is an example of companion planting. The three plants grown together help each other. The sweet corn provides a pole for the beans to grow up; the beans trap nitrogen in the soil which benefits the pumpkins. The pumpkins cover the ground with their leaves which suppress weeds and helps to retain moisture.

You may also have heard about planting marigolds near to your tomatoes, or basil. Both of which provide benefit to the tomato plants in the form of

protection improving the flavor.

There are lots of different types of companion planting. As you read this, you will learn lots of different plants that work well together, many of which you probably already grow in your garden, just not together. Although they are not a miracle cure, they do provide some benefits and help to reduce the amount of chemicals needed for your plants.

Many of us garden away, completely unaware of companion planting. Sometimes, purely by accident, we will plant two crops together that help each other, get a bumper crop and wonder what we did. Conversely, and I know I have done this, you plant two crops together and wonder why they do so badly, putting it down to poor weather, bad seeds or just plant bad luck.

Being aware of companion planting means you can deliberately put plants that help each other together while separating out plants that do not play together nicely. It is highly beneficial for you and means you get better quality plants every single year. Companion planting removes a lot of the guess work from growing a good crop of vegetables.

If you live in an area which is afflicted with certain pests or diseases, then use companion planting to help reduce the impact of these problems. They may not solve the problem completely, but they will go a long way to reducing the negative effect on your plants.

Companion planting is completely organic, and so appeals to a lot of people who want to look after the environment and minimize their use of chemicals. When done properly you can significantly reduce your reliance on artificial chemicals while improving your yield.

For many gardeners, companion planting is a hotly debated subject. You have one camp that is firm in their stance that companion planting is nothing, but a placebo developed by hippies. The other group attest that companion works and is the best thing ever.

In my opinion, companion planting works, but like everything else, should not be blindly followed or believed. It does work when done correctly and certainly does not cause any problems. Most companion planting is a combination of science and common sense.

The planting of marigolds with tomatoes is perhaps a good example of this. This pairing is done because it keeps nematodes away. However, what you

may not be aware of is that marigolds only work on certain types of nematodes and only certain types of marigolds work. Also, the effect is cumulative, so you may not get much protection in the first year as it can take several years for the chemicals produced by the marigolds to build up in the soil to a level where they are effective against nematodes.

There are numerous benefits to companion planting, including:

- Attracting Insects – many companion plants attract beneficial insects such as bees for pollination or ladybugs (ladybirds) to eat aphids and so on
- Shelter – larger plants as companions can provide shelter from rain, the wind or even too much sun
- Soil Improvement – some plants, such as beans, fix nitrogen into the soil which can then be used by other plants
- Support – as per the three sister's method, some plants provide support for climbing plants
- Decoy Plants – some plants act as a decoy, either the insects attack them instead of your crop (such as planting roses with grape vines), or they mask the presence of your crop with its smell, such as planting leeks or onions with your carrots to deter carrot fly.

One thing to also consider is that there are also antagonist plants as well as companion plants, i.e. Plants which stunt the growth of each other when planted together. A good example is black walnut trees, which release a chemical into the soil which prevents other plants from growing near it.

When you start companion planting you will realize how growing a monoculture, which most of us do, where plants are grown in rows of or blocks of a single species, actively encourages pests and diseases. With companion planting you plant other plants in the same row, they can still be productive vegetables, but they also reduce the incidence of pests and diseases.

Filling your garden full of herbs will also help repel pests, attract bees and they are fantastic in your cooking! You will learn about the various herbs you can grow as companions and which plants the different herbs work best with.

Intercropping is another great way to maximize your use of space. In the same row in between your slow growing vegetables, such as cabbage and cauliflower, you sow fast-growing vegetables such as lettuce or radishes. This maximizes your use of space as well as helping to keep down weeds. In some cases, this can provide companion planting benefits.

There are lots and lots of different types of companion planting, and even the dreaded weed can be your friend, in certain circumstances. This technique is good fun, helps you get the most from your vegetable garden, and most importantly, keeps pests and diseases to a minimum. You can even plant green manures, which are turned into the soil to build it up and prepare it for the next season’s crop.

Once you start companion planting, you will love it. It brings a boring, straight-rowed vegetable plot to life and makes it more interesting and productive. It reduces your reliance on chemicals and helps you to work in harmony with nature.

CHAPTER 1
BENEFITS OF COMPANION PLANTING

Host Finding Disruption

This type of companion planting seeks to confuse or ‘disrupt’ the insects from locating the host or your vegetable plants. Scientists studied the pattern that insects use to find the host on which they wish to feed.

They are attracted to the scent of the host plant. If you have ever stepped into a greenhouse with thriving tomato plants, you have experienced the sensation that these insects do. The insect avoids landing on bare soil, there are predators there that can kill them. So, they land on the first ‘green’ thing they can locate.

From there, the insect begins hopping from leaf to leaf searching for the perfect perch on which to feast. According to studies done, if the insect cannot find a suitable location on something ‘green’ they will give up and fly away. What the scientists did was add clover to the equation, giving multiple ‘green’ targets for the insect to land on.

Clover as ground cover around cabbage gives the cabbage root fly ‘greener’ to plant eggs near. The emerging larvae crawl around to find only clover. The study showed that thirty six percent of the insects laid eggs next to the cabbage when bare soil was used, versus seven percent when clover was planted next to the cabbages.

The scientists also made decoys of green cardboard that also disrupted the insect’s patterns of landing and discouraged them from staying and feasting.

Pest Suppression

Some plants give off a natural pesticide that repels insects, some repel weeds, while others repel nematodes and fungi. These natural solutions to pest suppression can help keep the manmade chemicals from touching your garden while keeping them healthy. You just must know which plants to place where.

Pollinator Recruitment

Without bees, it is said that the Earth would begin to slowly die out. Bees pollinate the fruit and vegetables we eat, without fruit and vegetables, large animal populations would die off. Without large animal populations, herds of cattle and pigs would starve. Eventually that would work into the food chain leading to humans.

Since bees, as well as other beneficial pollinators are so essential to the survival of the Earth itself, think of the impact they will have in your garden.

The chemical means to keep the tomato beetle and aphids from your harvest will kill those insects that are helping your garden thrive! Chemical pesticides do not discriminate. There are plants, though sometimes these plants are not vegetables or fruits that will attract these busy garden workers to your garden. Planting a few of this nearby will allow them to do their work.

Predator Recruitment

While some insects help your garden through pollination, others will help by preying on the pests that wreck your garden. Some of these ‘predatory insects’ eat pests, others lay eggs on the bodies of pests, while still others lay eggs near the plant where their larvae will hatch and feast on the nasty bugs.

Aphids are the bane of the rose garden. But they can also do substantial damage to vegetable plants and fruits as well. Planting marigolds near the plants that may attract aphids will help keep them away for two reasons.

- First, the scent of marigolds is said to deter aphids from landing nearby.
- Second, marigolds attract hover flies which produce larvae that feed on aphids that are on the same plants they are on. Marigolds are inexpensive annual flowers that can be purchased from many garden or farm stores.

Companion planting can also help with obtaining at least a part of a crop despite catastrophic damage to a crop nearby. If the borer worms destroy your lettuce, corn or cabbage plants, the other veggies in the same location may escape destruction and still provide some fruit for you. The more plants in the same space there are, the greater the odds of harvesting at least one of those crops.

While some insects prefer one type of vegetation over another, some are voracious enough to devour whatever they find. So, while the hedged investment gives you maximum use per square foot of garden space, other methods are needed to keep these pests at bay.

Ladybug beetle hunting aphids.

Increased Level Interaction

Also called protective shelter, this is an example of the seven-layer forest garden with large trees providing shade and wind buffering for the smaller more susceptible plants. Or the larger plants or trees act as a trellis for vine plants to grow on keeping the fruit or vegetable high off the ground where it remains vulnerable to many pests.

Nitrogen Fixation

Just as some plants thrive by using the nitrogen in the soil around them, others thrive by giving off nitrogen in the soil around them. When you know which veggie is which, you can pair them together and anticipate a rich harvest of both. The effects of plants on other plants and the effects of plants on weeds is a study called Allelopathy.

Some walnut trees, like the Black Walnut produces an allelochemical known as juglone. There are many crops that are affected detrimentally by this naturally occurring chemical. This observation was made thousands of years ago and farmers were urged to avoid planting in fields where large walnut trees grew.

Positive Hosting

Positive hosting involves planting specific plants that attract the beneficial insects so that they can spread to your garden plants and eliminate the problem pests. These plants serve as a “host” that will eventually be consumed by the beneficial insects. If you have a colony of beneficial insects growing near your garden, you will not have a need for the chemicals. We will look at a few of these positive hosting plants.

Trap Cropping

Trap cropping involves planting a decoy plant near susceptible vegetables to draw away the destructive insects. These ‘decoy plants’ are then netted and removed when they become infested and are discarded. More decoy plants will be used to replace the ones discarded. One example of this is the use of Nasturtium. These are smaller flowering plants sometimes referred to as

‘watercress’.

Nasturtiums attract caterpillars that will also attack lettuce and cabbage plants. The nasturtium plants are located near the patches of lettuces and cabbages thereby reducing the pest damage to the desired plants.

Pattern Disruption

Once one tomato plant has been infested, the monoculture planting method leaves an entire row of plants vulnerable to the infestation of the same bugs. Pattern disruption spaces out the similar plants from each other making a total loss of vegetables or fruits less likely. The key is in what plants to use to disrupt the predator insects' typical pattern of infestation.

CHAPTER 2
COMPANION PLANTING STRATEGIES

Companion planting can be used in several ways in the garden. Every time you turn around, it seems someone is coming up with a new way to use companion plants to their benefit.

Here are just some of the many companion planting strategies that can be employed to help gardeners get the most from their crops:

- Complimentary planting. The act of planting two plants close to one another that will bestow benefits upon each other.
- Cover crops. These are crops planted to act as ground cover or living mulch. Planting cover crops at the end of gardening season will prevent soil erosion, decrease the impact of water runoff during the rainy season and add organic material to the soil when the cover crop is turned under. Choosing the right type of cover crop is key to ensuring a plot of land continues producing well into the future.
- Nutrition planting. Some plants fix certain nutrients into the soil as they grow. Others release nutrients into the soil after they die. Nutrition planting places plants nearby that are ready to take full advantage of the nutrients being released into the soil.
- Succession planting. This is a spin on nutrition planting in which plants that benefit one another are planted one after another. For example, bush beans fix nitrogen into the soil. Corn needs nitrogen to grow. Grow bush beans early in the season and turn them into the soil after harvest. Plant corn in the same area to take full advantage of the nitrogen released into the soil.
- Pattern disruption. Plant row after row of similar crops and a single plant infested with pests or disease can spell doom for the rest of your crop as the next plant is only a short hop away. Break plants up by adding other plants between them that are not susceptible to the same pests and diseases and you have just made it a lot harder for them to spread.

- Square-foot gardening. Divide a small garden into 4' X 4' planting areas and divide those areas into plots of 1 square foot apiece and you have got a square-foot garden. Companion plants are important in square-foot gardens because you are trying to grow a lot of plants in a limited amount of space.

A plant that benefits a nearby plant is good. A plant that benefits multiple nearby plants while benefitting from them is even better. The best companions bestow multiple benefits upon one another and are mutually beneficial. Finding a group of plants that all benefit each other in multiple ways is one of the best ways to ensure you have a bumper crop.

Full Sun vs. Partial Shade

One of the biggest decisions you are going to have to make is whether you are going to grow a full sun or a partial shade garden. If you are limited on space, this decision may have already been made for you and you are going to have to work with what you have got. The amount of sun and shade an area gets is one of the major determining factors of the types of plants that can be grown there.

Most fruits and vegetables prefer full sun, so if you are looking grow a produce garden, that is the way to go.

That is not to say they all prefer sitting in the middle of a desert baking in hot sunlight. Full sun is defined as at least 6 hours of sunlight per day, while some plants need as many as 8 to 10 hours per day to thrive. Trying to grow plants that require full sun in an area that gets less exposure to the sun than this will be an exercise in frustration. The plants may grow, but yields will be reduced, and they will be more susceptible to attack from pests and disease.

Partial shade or partial sun implies a plant needs less sunlight and can get by on 3 to 6 hours of sunlight per day. These plants do best when they are shaded from the sun in the afternoon when It is at its peak. Placing a plant that prefers partial shade or partial sun in an area that gets full sunlight can scorch the plant when temperatures start to climb, causing it to wilt or even die.

Full shade means relatively little sunlight. There may be a small handful of plants you can grow in full shade, but without much light, you are going to be

very limited. If you want to plant fruit and vegetables, you are going to have to find another spot.

Most vegetables, fruits and herbs prefer full sunlight. If you have a garden that only gets partial sunlight, you are going to have to select plants that can be grown with only partial sunlight. There is not a whole lot you can do to increase the amount of sunlight an area gets short of chopping down trees, moving mountains or tearing down buildings. Reflective mulches can be used to reflect sunlight back up to plants, but the effect is minimal.

Lettuce, spinach, radishes and some varieties of strawberries are well-suited to partially shaded garden areas. Other crops like peas and potatoes will grow in partial shade, but yields will be reduced. To be clear, these plants will still need sunlight to grow—they just do not need as much as some of the needier plants.

Those looking to grow plants that require partial shade in a full sun location have a handful of options at their disposal. For one, you can build a structure that provides shade during certain times of day. It is best to build a shade that provides relief from the afternoon sun, as opposed to one that provides shade in the morning. Afternoon sunlight is hotter and more likely to damage plants than morning sunlight. Another option is to set up latticework through which the sun can shine. Your plants will get sunlight throughout the day but will not be exposed to the constant heat of the sun. Some plants will do better than others with this technique, so experiment to find out what works best.

You may be wondering what all this has to do with companion planting. There are some plants that grow tall or have large leaves that spread out that can be used to provide shade to smaller plants. The larger plants can be planted as companion plants to smaller plants that need partial shade. Corn, sunflowers, tomatoes and artichokes can all be planted to provide shade for smaller plants. Trellises plants like pole beans and grapes are also a good way to provide dappled sunlight, which is light that is filtered through the leaves of the trellised plant.

These larger sun-loving plants can be planted to provide shade for plants like cabbage, broccoli and cauliflower that do not do well when temperatures start to climb as summer approaches. Smaller plants like carrots, cucumbers and lettuce can also benefit from being planted in the shade of a taller plant if the taller plants do not surround them and completely block out the sun.

Trees can be used to provide shade, but you must be careful not to use a variety of tree that is going to grow to great heights and completely block sunlight from reaching your garden. If trees are already present and are providing too much shade, you may be able to top them or prune them back to ensure your garden gets ample sunlight.

CHAPTER 3
COMPANION GARDENING: GOOD COMPANIOS VS BAD COMPANIONS

Plants That Grow Well Together:

Here is a list of plants that grow well together, with a brief explanation of just why this is the case. Although this list is not by any means an exhaustive list in itself; it only takes a little imagination to bring different species together, when you have the most basic gardening skills; and the knowledge that is contained in these notes to guide you.

Asparagus:

Best companions include: Tomato, parsley and Basil; and French marigold planted alongside will deter beetles. If on its own or just with Tomato plants, then Comfrey can be planted around as a good source of nitrogen for both plants.

Beans:

Companions include Beetroot, cabbage, celery, carrot, cucumber, corn, squash, pea's, potatoes, radish, strawberry.

Beans produce (draw from the air) nitrogen that is beneficial to the other plants

Nasturtium and rosemary can deter bean Beatles, while Marigolds can deter Mexican bean Beatles.

Cabbage Family:

Companions include cucumber, lettuce, potato, onion, spinach, celery.

Chamomile and garlic can be grown to improve growth and flavor.

Marigolds and Nasturtium can be grown alongside to act as decoy for butterfly's and aphid pests. While mint, rosemary and sage will also deter cabbage moth and ants – as well as improve flavor.

Marigolds planted next to carrots attract hover flies, who's larvae in turn eat aphids. The smell of the marigold flowers also confuses the carrot fly

Carrots:

Good companions include beans, peas, onions, lettuce, tomato, and radish.

Including chives in the area will improve flavor and growth, while onions or leeks will distract the carrot fly by masking the scent of the carrots; as will sage or rosemary.

Celery:

Bean, tomato and cabbage family make good companions for celery.

Nasturtium, chives and garlic deters aphids and other bugs.

Corn:

Good companions are Potato, pumpkin, squash, tomato and cucumber.

French marigold deters beetles and attracts aphids from tomatoes.

Cucumber:

Good companions include, cabbage, beans, cucumber, radish, tomato.

Marigold and Nasturtium are good for attracting to themselves, aphids and beetles. Oregano is a good all-round pest deterrent.

Lettuce:

Cabbage, carrot, beet, onion, and strawberry are all good companions for Lettuce.

Chives and garlic discourage aphids.

Melon:

Companions include pumpkin, radish, corn, and squash.

Marigold and Nasturtium deters bugs and beetles, as does oregano.

Onions:

Good Companions include the cabbage family, beet, tomato, pepper, strawberry, peas, and chard.

Chamomile and summer savory help improve growth and flavor. Pigweed brings up nutrients from the subsoil and improves conditions for the onions.

Parsley:

Good companions include asparagus, tomato and corn.

Peas:

Good companions include beans, carrot, corn and radish.

Chives and onions help deter aphids, as does nasturtium.

Planting mint is known to improve the health and flavor of peas.

Peppers:

Tomato, eggplant, carrot and onion are known to be good companions for peppers.

Potatoes:

Good companions include bean, cabbage, squash and peas.

Marigold makes a good general deterrent for beetles, while horseradish planted around the potato patch gives a good overall insect protection.

Pumpkin:

Melon eggplant and corn make good companions for pumpkin.

Oregano and Marigold give a good all-round insect protection.

Radish:

Companions are carrot, cucumber, bean, pea, melon.

Nasturtium planted around is generally accepted to improve growth and flavor.

Squash:

Companions include melon, pumpkin, squash and tomato; while nasturtium and marigold; along with oregano, helps protect against bugs and beetles.

Strawberry:

Good companions include bean, lettuce, onion and spinach.

Planting thyme around the border deters worms, while borage strengthens general resistance to disease.

Tomatoes:

Good companion plants for tomatoes include celery, cucumber, asparagus, parsley, pepper and carrot.

Basil and dwarf marigold deter flies and aphids; mint can improve health and all-round flavor.

These are some examples from popular vegetable types and offer a guide as to what to consider for your companion garden.

Plants That Do Not Grow Well Together

There are a few reasons why some plants should not be grown alongside others if you are considering the organic method of growing your vegetables.

I mention particularly organic, because the general idea behind companion planting is to avoid the use of chemical pesticides and fertilizers whenever possible.

Some plants should not be grown together simply because they both attract the same pests or other predators, others because they make the same demands on the soil, leading to them both producing a poor harvest. Some plants grown close together may produce a damp environment that leads to fungal or other infection.

Here are some plants to avoid if possible when considering a companion for

your veggies.

Beans:

Should not be grown in the same vicinity of garlic, shallot or onions, as they tend to stunt the growth of the beans.

Beets:

Should not be grown along with pole beans, as they stunt each other's growth.

Cabbage:

Is generally thought not to do well near tomatoes, mainly because the tomato plant can shade the cabbage. Avoid planting near radishes, as they do not grow well together.

Carrots:

Avoid planting near dill as this can stunt growth. Dill and carrots both belong in the Umbelliferae family, and if allowed to flower it will cross-pollinate with the carrots.

Corn:

Avoid planting corn and tomatoes together, as they both attract the same tomato fruit-worm.

Cucumber:

Sage should be avoided near cucumber, as it generally injurious to the cucumber plant.

Peas:

Onions and garlic stunt the growth of peas.

Potatoes:

Tomatoes and potatoes should not be planted together as they attract the same blight.

Radish:

Avoid planting hyssop near radishes.

Quick Reference Companion Planting Table

VEGGIES	GOOD COMPANION	BAD COMPANION
Asparagus	tomato, parsley, basil	onions, garlic, potatoes
Beans	beetroot, cabbage, celery, carrot, cucumber, corn, squash, pea's, potatoes, radish, strawberry.	garlic, shallot or onions
Beets	broccoli, brussels sprouts, bush beans, cabbage, cauliflower	charlock, field mustard, pole beans
Cabbage	cucumber, potato, onion, spinach, celery.	strawberries
Carrots	beans, peas, onions, leeks, lettuce, tomato, and radish	dill
Celery	bean, tomato and cabbage family	corn, Irish potato and aster flowers
Corn	potato, pumpkin, squash, tomato, cucumber	tomatoes
Cucumber	cabbage, beans, radish, tomato	late potatoes
Eggplant	beans, peas, spinach, tarragon, thyme	
Garlic	cabbage, cane fruits, fruit trees, tomatoes	peas, beans
Leeks	Carrots, celery, onions	legumes
Lettuce	carrot, beet, onion, and strawberry	cabbage family
Melon	pumpkin, radish, corn, and squash	
Onions	cabbage family, beet, tomato, pepper, strawberry, and chard	beans, peas
Parsley	asparagus, carrot, tomato and corn	mint
Peas	beans, carrot, corn and radish	garlic leeks, onions, shallots
Peppers	tomato, eggplant, carrot and onion	fennel, kohlrabi
Potatoes	bean, cabbage, squash and peas	apples, cherries, cucumbers, pumpkins, sunflowers, tomatoes

Pumpkin	melon eggplant and corn	potato, raspberry
Radish	carrot, cucumber, bean, pea, melon	hyssop
Squash	melon, pumpkin, beans, cucumber, onion	potato, tomato
Strawberry	bean, lettuce, onion and spinach	cabbage, broccoli, Brussels sprouts
Tomatoes	celery, cucumber, asparagus, parsley, pepper and carrot	fennel, kohlrabi, potatoes

CHAPTER 4
ORGANIC GARDENING TECHNIQUES

You have been attempting to eat progressively organic nourishments, both to diminish the measure of pesticides you and your family expend and to help ensure nature. In any case, take one gander at your supermarket receipt and you realize that purchasing organic can get over the top expensive, extremely quick. Fortunately, there is a method to become your own delightful, new produce while having a fabulous time and learning simultaneously: organic gardening!

Do not have a clue where to begin? It is conceivable to employ somebody to introduce and keep up a beautiful organic nursery for you, however most of us can focus in with a shockingly low measure of exertion. Keep in mind, you can begin little, even with only a solitary plant or two. Try not to stress if things are not immaculate immediately.

Organic gardening implies you will not utilize engineered manures or pesticides, however that does not mean your plants battle for themselves.

Setting up the Soil

To get the best outcomes with your new organic nursery, you will need to ensure the dirt is appropriately adapted. You need to eat, thus do plants, so ensure your veggies get loads of new supplements. Sound soil assists work with increasing solid, gainful plants. Concoction soil medicines can saturate your nourishment, yet they can likewise hurt the valuable microorganisms, worms, and different organisms in the dirt.

The most ideal approach to measure the nature of your dirt is to get it tried. You can get a home testing unit, or better, send an example to your nearby agrarian expansion office. For an unassuming charge you will get a total breakdown of pH and supplement levels, just as treatment suggestions; make certain to disclose to them you are going organic. Regularly, it is ideal to test in the fall, and apply any organic supplements before winter.

Regardless of whether you do not possess energy for testing, you will need to ensure your dirt has a lot of humus — the organic issue, not the

correspondingly named Mediterranean spread.

Making Good Compost

All nurseries profit by fertilizer and you can make your own nearby. Hello, it is free! Manure takes care of plants, enables save to water, eliminates weeds, and keeps nourishment and yard squander out of landfills by transforming trash into "dark gold." Spread fertilizer around plants or blend in with gardening soil — It is difficult to utilize excessively!

The best fertilizer structures from the correct proportion of nitrogen-and carbon-rich organic waste, blended in with soil, water, and air. It may seem as though muddled science, however, do not stress excessively if you do not have the opportunity to make impeccable manure. Indeed, even an insignificantly tended heap will in any case yield better than average outcomes.

1. To begin, measure out a space at any rate three feet square. Your fertilizer stack can be a straightforward heap or contained inside a custom pen or container (some can be pivoted, to improve results).
2. Include substituting layers of carbon (or earthy colored) material — leaves and nursery trimmings — and nitrogen (or green) material —, for example, kitchen scraps and fertilizer, with a dainty layer of soil in the middle.
3. Top off the heap with four to six creeps of soil. Turn the heap as new layers are added and water to keep (scarcely) clammy, to cultivate organism activity. You ought to get great fertilizer in as meager as two months or more if It is virus.
4. An appropriately kept up fertilizer heap should not smell. If it does, include increasingly dry carbon material (departs, straw, or sawdust) and turn it more every now and again.

Picking the Right Plants

It truly pays to choose plants that will flourish in your specific miniaturized scale conditions. As a general guide, check the USDA's Hardiness Zones. Pick plants that will modify well to each spot regarding light, dampness, seepage, and soil quality. Most gardens have degrees in these factors. The

more joyful your plants are, the safer they will be to assailants.

If you are purchasing seedlings, search for plants raised without synthetic composts and pesticides. An extraordinary spot to look is at your neighborhood ranchers' market, which may likewise have local plants and assortments appropriate to your region. It is smarter to purchase stocky seedlings with scarcely any blossoms yet, and root frameworks that do not look packed.

Numerous things are best developed from seed, including sunflowers, yearly poppies, coriander, dill, yearly phlox, larkspur, yearly lupine, morning wonders, sweet peas, squash, and cucumbers.

Planting Crops

Plants that you will reap, for example, vegetables or cutting blossoms, ought to be assembled firmly in beds that you do not stroll on. Raised beds work extraordinary. Gathering decreases weeding and water waste and causes you target fertilizer and supplements. Adequate space between columns advances air flow, which repulses parasitic assaults.

Recall that seedlings will not generally remain small, and you would like to confine dominating. It is a smart thought to thin yields dependent on nursery proposals.

As per Leslie Land, if you need the most significant yields of organic produce with restricted existence, these plants are ordinarily champs:

1. Vague tomatoes: so, named because the vines continue getting greater and creating new natural product until ice.
2. Non-crossover (antiquated) shaft beans: They continue developing and delivering until ice — expecting you keep them picked.
3. Zucchini: Everything they state about torrential slides of zucchini is valid, particularly of cross breed assortments.
4. Swiss chard: You can continue severing external leaves for a considerable length of time, and each picking will be delicate insofar as plants get enough water.
5. Tall snow peas and sugar snaps: They develop promptly and produce delightful prizes.

Watering

The best time to water plants is for the most part toward the beginning of the day. Why? Mornings will in general be cool with less breezes, so the measure of water lost to vanishing is decreased. If you water at night, plants remain moist short-term, making them bound to be harmed by contagious and bacterial sicknesses.

Preferably, you need to water the roots, not the greenery, which is effortlessly harmed. A dribble or drench framework can work incredible, or just cautiously water the bases of plants by hand.

Most specialists prescribe significant, rare watering for built up plants, commonly a sum of around one inch of water for each week (counting precipitation). A couple of uses seven days supports further establishing, which advances more grounded plants. To abstain from stunning delicate greenery, attempt to utilize water at or close to air temperature; gathered water is ideal.

Weeding

Regardless of where you live, you will despite everything get weeds. Pulling them by hand may seem like difficult work — and it tends to be — however it additionally can be acceptable exercise and gets you outside in the natural air.

Decrease the quantity of weeds you need to fight with by applying mulch, which additionally ensures the dirt. Organic mulch and burlap can work after all other options have been exhausted. Straw is modest yet does not keep going long. Wood chips are decent yet can get expensive. Numerous individuals pick to utilize grass clippings, in spite of the fact that it ought to be noticed that because they are high in nitrogen, clippings should just be utilized on plants that need a great deal of the supplement, for example, squash and lettuce.

Securing Plants without Pesticides

If your nursery is being attacked by bugs, it might be an indication of different issues, so the principal thing you ought to do is ensure plants are getting enough light, supplements, and dampness. Likewise recollect that an

assorted nursery forestalls bugs by constraining the measure of one sort of plant presented to adversaries.

It is ideal to encourage normal predators in your nursery, for example, frogs, amphibians, reptiles, winged animals, and even bats. Gainful creepy crawlies can be your closest companions, particularly ladybugs. Numerous nurseries even sell jars of them; however, it is actual there is a high likelihood they will not stay. Leave a little wellspring of water out to draw in cordial predators. It is likewise a smart thought to develop plants with little blooms, for example, sweet alyssum and dill, which draw in savage bugs. Nets and column spreads can likewise work.

Organic weapons incorporate Bacillus thuringiensis, a normally happening microbes that upsets the processing of caterpillars and other leaf-eaters. You can likewise utilize green oils, insecticidal cleansers, garlic, or hot pepper splashes.

Gathering

Remember to reap your rewards for so much hard work! By and large, the more you reap, the more your plants will create for you.

During top gather season, you will likely find that It is ideal to check your nursery consistently. Got herbs? If you use them new, pick them directly before you need them. However, if you will be drying and putting away them, it is ideal to hold up until not long before they blossom, since they will have the most flavor. Accumulate all herbs aside from basil in early in the day, not long after dew has dried. Reap basil in the late evening since it will last longer after some time in the sun.

When gathering verdant greens, pick irregularly from the whole harvest, a little from each plant. For broccoli, hold up until the focal head is as extensive as it will get, before sending off buds for blooming. Cut it off right over the leaf hub, and you will likely show signs of improvement creation from the remainder of the plant. When all is said in done, it is ideal to cut produce off with a sharp knife or scissors as opposed to tearing with your fingers, which can make more harm plant tissue.

If you get an excessive amount of abundance, recollect you can likewise freeze, store a few kinds of produce in a root basement, or take up canning. Appreciate!

Tidying Up

If you notice wiped out plants either during the season or toward the year's end, ensure you pull up the whole creature. Remember to rake up underneath, since ailing leaves can harbor issues for quite a while. Put all contaminated material somewhere down in the forested areas, in the ground at any rate a foot down, or on the blaze.

Generally sound or lapsed plants can really be left set up over winter. You will give some nourishment and living space to feathered creatures and other wildlife, and plant spread can help shield your dirt from dissolving. It is smarter to slash off annuals as opposed to yanking them out. That way you will leave soil flawless and help keep weeds from increasing a dependable balance.

Companion planting can advance the wellbeing and profitability of your nursery from multiple points of view. You can utilize companion plants as:

Companion Plants are Natural Pesticides

Numerous individuals have worries about utilizing pesticides to avoid undesirable vermin in their nursery; particularly if they have pets or little youngsters. Notwithstanding the wellbeing concerns, utilizing synthetic compounds to free your nursery of "bugs" will likewise free your nursery of supportive creepy crawlies, for example, honeybees that are required for fertilization.

There are heaps of plants that you can use as normal nuisance repellants. Plant some African Marigolds that discharge a characteristic compound from their underlying foundations that deflects bothers.

Companion Plants as Natural Fertilizers

Companion planting can be useful to your nursery's dirt. Certain plants feed nitrogen into the dirt, an essential part that all plants should be solid. Vegetables are a plant that produces significant levels of nitrogen. Take a stab at planting a column of this bean for a solid high-delivering crop.

A Trap Crop

Companion planting can likewise be utilized in another manner: as sacrificial

plants to keep the ideal nursery solid. Utilizing companion plants to make a "trap crop" draws bugs, slugs and different vermin away from the more looked for after nursery.

CHAPTER 5
CREATING GOOD COMPOST

When it comes to making a good organic compost, there is the quick way and the longer way. If you are about to build your raised bed garden, or indeed fill in your pots already – then no doubt you will be looking for the quick way!

Quick organic compost mix:

First, you need some well-rotted manure, preferably horse or chicken, then mix that with a good quality topsoil, mixed with general garden compost from the local garden center. I generally find that a mix of around 60% compost, 20% well-rotted manure and 20% soil makes for a good all-round growing medium.

This mixture may of course be changed, for instance if you wish to grow champion leeks, then heavier manure content should be considered.

Compost Mixes:

There are many different mixes of compost that will suit certain plants more than others, and this is great if you are specializing in a specific area like growing giant pumpkins! However if you have a source of well-rotted manure, then this is ideal for crops such as tomatoes, beans, peas, leeks - in fact just about anything, as rotted manure is a great source of nitrogen which every plant needs in different quantities.

There are certain plants that also make valuable additions to the compost heap such as nettles, which speed up decomposition and add valuable nitrogen, or comfrey, which is a terrific source of potash (potassium) and has a high carbon to nitrogen ratio – which is ideal for most plants and perfect for tomatoes, fruit and berries.

If you are working a homestead or hobby farm, then you almost certainly have access to chicken manure! This is very rich in nitrogen and a fantastic addition to your compost. Be sure though to let it rot for at least 1 year to kill off any parasites or eggs that may be in it; also it needs this time to ‘mellow’ otherwise it is too strong in nitrogen for most plants to tolerate.

When using manure of any kind you have the option to add it to your composting heap while they are both still in the process of decomposing; or you may add the fully decomposed manure directly to your SFG as part of the mix.

When has manure decomposed enough to use?

You will know when the manure has finished decomposing when it has a deep ‘earthy’ smell – not smelling of dung; and the material itself should be relatively dry and crumbly when handled.

If it still smells of dung, then it has not finished decomposing and should be left for a further few weeks or even months.

Here is a chart to show just what the different animal dungs ‘bring to the table’ about percentage values of nutrients.

	NITROGEN	PHOSPHORUS	POTASH
Average farmyard manure	0.64	0.23	0.32
Pure pig dung	0.48	0.58	0.36
Pure cow dung	0.44	0.29	0.49
Horse Manure	0.49	0.29	0.58
Deep litter on straw	0.80	0.55	0.48
Fresh Poultry Dung	1.66	0.91	0.45
Pigeon Dung	5.84	2.10	1.77

A good composting mix for raised beds and containers particularly, must be light and airy; this will promote excellent growth and be easy to maintain about weed-pulling and other general gardening tasks.

Apart from the mixes already mentioned, here are some mixes for my SFG and Raised Beds that I have had great success with.

Mix 1: 60% compost, 20% washed sand, 20% peat moss.

Mix 2: 40% compost, 20% fish meal, 30% coconut coir and 10% good topsoil.

Mix 3: 50% compost, 20% vermiculite (or perlite), 30% peat moss.

Mix 4: 50% compost, 30% peat moss, 20% quality topsoil.

Mix 5: 40% compost, 40% peat moss, 20% vermiculite.

More on Composting

As mentioned, Compost takes time to mature, that is the hard facts of decomposition I am afraid. However, any serious gardener is always looking ahead at least one or two seasons and preparing their growing plans accordingly.

To create your own compost; you should ideally have a composting bin, or a box arrangement that has a lid; this will keep away vermin and prevent the rain from cooling down the compost.

A simple wooden structure made from recycled pallets will often make a very effective composting bin. Be sure that the opening is wide enough to allow for turning the contents with a garden fork occasionally to improve the composting process.

The materials for good compost should be layered in order to get the best effect, as in the picture below. This neat layering will of course be upset after the first turning over; however, it gives the whole composting process a good start and ensures a proper mix of materials.

Compost Ingredients:

Carbon (Dried Matter): Dried leaves, straw, wood chips, grass, small twigs.

Nitrogen (fresh matter): Vegetable scraps, lawn clippings, weeds, manure.

Soil: The addition of good soil adds minerals and micro-organisms to the compost, thereby stimulating aerobic composition.

This layering process – including watering well between layers - generates significant heat which also kills disease organisms and weed seeds etc., in effect making it suitable for use in the garden. If there is a shortage of nitrogen, then the whole process is lengthened. The job of the good compost maker is to see that this is not the case and provide suitable quantities of air, moisture and nitrogen to the mix.

With all this in mind a good composter should be constructed in such a way as to ensure good ventilation to the mix; as well as allow for turning the compost (for aeration).

Traditionally Nitrogen can be added to the mix by adding fresh dung as the nitrogen is in the urine; or by adding suitable plants such as nettles (without the roots) and grass clippings which are rich in nitrogen.

As different materials decay at different times, it is also advisable to have not just one composter, but three at least if you have the space for them. This way you can really take control over your composting efforts.

Material to consider for composting; can in theory be anything organic in nature, and includes such things as vegetable cuttings, tea bags, shredded paper, garden waste, grass cuttings, seaweed, comfrey leaves, kitchen waste, shrub cuttings, wood ash and fallen leaves.

If you have a good source of leaves available, then one of the simplest composters to make is perhaps the weld-mesh composter. Simply get some 2” weld-mesh cut from the roll so that it forms a tube about 18 - 24” across.

Cut so that there are wire ends that you can fold over, then bend the wire ends into itself where the end of the wire tube meets; so that it forms a permanent tube shape, then stand upright.

You should be left with a simple wire-mesh tube. This can then be filled with leaves to form a rich compost material.

If you make several of these tubes, they can even be arranged to form a kind of ‘compost fence’- a great source of compost and a good talking point amongst the visitors!

Not everything organic is good for creating compost however, and material to leave out of the composter, include meat by-products, eggs or dairy products – unless you are considering Bakashi Composting which does in fact utilize these products very effectively.

Dog and cat dirt or litter, should never be put in the composter. Meat, bones or fish scraps should be kept out. Never put ashes from a coal fire into the composter, as this introduces Sulphur to the mix.

Small amounts of wood ash are acceptable however as it introduces lime and potash, as well as magnesium and phosphoric acid, all of which are good for enriching the soil.

When adding or building up your compost, then it is a good idea to layer occasionally with some straw, garden soil, or fine twigs this all helps with the general aeration of the mix and the composting process.

Composting Materials Time-line:

Here is a short list of composting materials and the time taken to compost in ideal conditions.

Materials taking 6 months +

Kitchen vegetable trimmings (beware - stems and stalks take 2-3 years or more), annual weeds, fruit peel, lawn trimmings (no more than 15cm thick).

Material taking 1 – 2 years

Hedge clippings and pruning (except conifers and evergreens which will take more than 3 years to break down completely), paper and cardboard, autumn leaves.

Material taking 3 years +

Thick stalks and stems of plants, evergreens including holly or conifers, eggshells, sawdust & wood shavings, or thick layers of grass clippings.

Any other organic material that is large and bulky will naturally take longer to compost.

Another Option?

Finally, if you have no space to compost, or no time or whatever – consider your local authority! Many municipal authorities are composting as part of their environmental efforts, this is highly regulated and usually excellent quality – and it is often given away free or for very little cost!

If that option is not available or you would like to get started growing your vegetables immediately; then you can certainly go for store-bought, while your own composting efforts are a ‘work in progress.’

Patience:

Something that can be in short supply for most people! It does however take patience to produce good compost, and usually a two-year period will be required to get the best out of your composting efforts. The results however will show in the quality of your vegetables, and the general health of your garden.

Leaves and grass cuttings can take a particularly long time to fully rot down. How do you know if the material is well rotted? In general terms, well-rotted material should have a healthy earthy smell, and not smell like it is still rotting!

It will be crumbly in your hand, and not be over wet and cloggy.

After all that effort, then you will also have the feel-good factor in knowing that you have done your bit for the environment – never to be underestimated!

CHAPTER 6
THE INFLUENCE OF ALLELOPATHY

Firstly, you may be forgiven for saying to yourself “What the heck is Allelopathy?” It is not after all the kind of word that comes up in everyday conversation!

However, there is a simple explanation. Allelopathy is in fact a process of bio chemical’s that are beneficial to other organisms, for their growth or development.

These bio chemicals are called allelochemicals and can be either beneficial or detrimental to the target organisms – i.e. your vegetables.

In fact, even the detrimental effects of plants can play an important part in any natural defense program against herbivores for instance, as they discourage grazing animals from eating your crops.

Allelopathy is characteristic of certain plants, bacteria, algae, coral, and fungi; and Allelopathic interaction between the species plays an important part in the success of many plant species.

Resource competition also plays a part in Allelopathy, as the various plants compete for the elements (water, light, or nutrition) that is required for their survival. Although not strictly speaking negative Allelopathy, this plays a part when deciding which plants to choose as companions between the species.

Allelopathy is playing an important part in researching different environmentally friendly ways of controlling weeds, or making crops more productive, without so much dependence on chemical fertilizers or insecticides.

Again, this is nothing new, and in fact as early as 300B.C. Theophrastus noted the inhibitory effects of pigweed on alfalfa crops; while in 1st century China 267 plants were recognized as having pesticidal properties that could be beneficial to other plants.

Allelopathy refers to the chemical interaction between shrubs, trees and their components with the ecosystem of your garden. This is a key determinant of

the choice of crops that should be used especially trees in companion gardening. Picture this, one way your garden may be failing is when the trees near it are consuming some minerals in your garden thus making it poorer mineral wise.

With this understanding, we will seek to get to the root of trees that must not feature in the farm due to Allelopathical reasons. The black walnut for instance is a menace in the gardens. It is a natural secretor of hydro juglone. Hydrojuglone is not a toxic chemical until it is oxidized. When oxidized, it becomes juglone which is a toxic substance that kills off any plants in the vicinity. Note that the secretions can go for up to a five-meter radius circle and poison a huge part of your garden.

The leaves and the bark of the black walnut are also secretors of this substance. Similarly, dangerous trees include red oak, black cherry, cottonwood, waxmyrtle, and sugar maple tree. The American sycamore tree is also an active releaser of the toxins. That said, it is therefore vital to keep your garden as far as possible from these trees to protect your crops from this poisoning.

If you have an existing garden with these toxins, there are steps that you may take to reduce the impact of these substances to your crops. The first thing here at play is to remove any leaves that fall from the said trees and keep the garden a clean as possible. As you locate your garden to the perfect spot, be sure to plant a buffer zone of neutral crops and trees in between the crops and the dangerous trees. One of the best buffer crops to plant here is the Kentucky bluegrass. Once planted, it will be an efficient absorber of these toxins and very few will make it to your garden.

The trees that may be planted in the buffer zone to help in reducing the effect of the poison are crabapple trees, pine, dogwood, and buckeye. Birch, beech and the white ash tree. Though frowned upon, there are many fruit plants such as apples, berries and grapes that can thrive in the buffer zone.

Allelopathy is not always on the negative though. Luciana tree for instance has great additive features to the soils. This miracle tree increases the yield of corn and other related crops in the farm. It is really one of the best alternative Allelopathy is best described as chemical warfare between plants. It is the ability of one plant to suppress another and to take advantage of that situation. The word is derived from two Ancient Greek words, ‘allelon’

meaning each other and ‘pathos’ which means to suffer.

Therefore, allelopathic plants deliberately create adverse growing conditions which stunts and kills off neighboring plants. This can be by reducing germination rates or seedling growth or just plain killing off competing plants. Used wisely, allelopathic plants can be a great alternative to chemicals!

Plants compete for resources such as space, water, nutrition, and sunlight. Some compete by growing rapidly, others spread out wide or send down deep roots. Other plants have developed chemical tools for getting the resources they require to flourish.

Allelopathic plants release compounds from the roots into the soil which then suppress or kill their neighbors as they are sucked up through their root systems. These harmful chemicals are, unsurprisingly, known as allelochemicals. Some of these chemicals can go as far as changing the level of chlorophyll production which can then slow down or even stop photosynthesis, which obviously leads to the death of the plant.

A lot of allelopathic plants release chemicals in gas form from small pores in their leaves. As their neighbors absorb these gasses, they are either suppressed or killed.

Some allelopathic plants deal with the competition when their leaves fall to the ground. The leaves decompose and release chemicals which then inhibit nearby plants.

There are a lot of different plants that have allelopathic tendencies, but it is not particularly common. Sometimes, however, you can very easily plant an allelopathic plant near one of its victims without realizing it and wonder why some of your plants struggle to grow.

The black walnut tree is probably the Master of Chemical warfare in the plant kingdom. Its leaves, roots, nut hulls and buds have allelopathic properties, and it also secretes juglone into the soil, which inhibits respiration in many plants. In fact, the black walnut guards its resources so jealously, that virtually nothing will grow near to one. Many a gardener has rejoiced at the black walnut tree in their garden until their realized that nothing will grow near it.

Allelopathic characteristics can be found in any part of a plant, whether it is

the root, bark, flowers, seeds, fruits, leaves, or pollen. It varies from plant to plant, though most plants store their allelopathic chemicals in their leaves.

Some common plants that are known to have allelopathic properties include:

- English laurel (Prunus laurocerasus)
- Elderberry (Sambucus)
- Bearberry (Arctostaphylos uva-Uris)
- Rhododendron
- Junipers, which hamper the growth of grasses
- Perennial rye hampers the growth of apple trees
- Sugar maple hampers the growth of yellow birch and white spruce

If you think about where you see these plants growing, you will see very little growing underneath or near them.

There is a lot of research underway into allelopathic plants, and the list of plants is regularly being updated. These plants are very interesting to farmers for their properties, which could well find their way into genetically modified seeds.

The advantage of allelochemicals is that they can produce natural herbicides and pesticides. Planting the right plants together as companions will keep down certain weeds, which can reduce reliance on chemical herbicides. When pairings are chosen well, the allelopathic plant will even have a positive effect on your chosen vegetable crop.

Allelopathic research is still very much in its infancy as researchers try to understand this interaction between plants. There are some research papers published, and you can use this effect to your benefit in your garden. If you have established plants already present in your garden and are struggling to grow anything else, it may be that one of these plants has allelopathic properties.

Be aware that allelochemicals can build up in the soil and it can take several years for the levels of these chemicals to drop so that other plants will grow. Years ago, I removed an English laurel tree from my garden as it was too large. Underneath was bare soil, nothing had grown there but when I dug over the soil and added manure, everything I planted died. It was several

years and a lot of fertilizer and compost before anything would grow in that area again. If you must remove allelopathic plants, then you may want to consider removing 12-18 inches of soil and replacing it if you struggle to get anything to grow in that space.

Trees for companion gardening and it generally enriches the plants around it.

CHAPTER 7
LOCAL CLIMATE CONDITIONS AND WHAT TO GROW

Climate conditions can be astonishingly variable from one latitude to the next, and because of that it is vital that you find out what hardiness zone you live in. Hardiness zones are geographically defined climate regions that have similar growing conditions throughout. They are generally arrayed along well-defined latitudes but can be subject to the effects of geographical features such as mountains, large bodies of water, and local climate conditions.

All regions of the world have hardiness zone maps available that will tell you what is best to grow there as well as when local frost dates generally occur. Familiarize yourself with these frost dates as well as what plants are best suited to grow in your region's hardiness zone.

Different Methods

There are a few different companion planting methods that have been shown to work particularly well. You may have already heard of some of them. The three sisters' technique, square foot gardening, container gardening, and the seven-layer system known as the forest garden are some of the most popular.

The Three Sisters

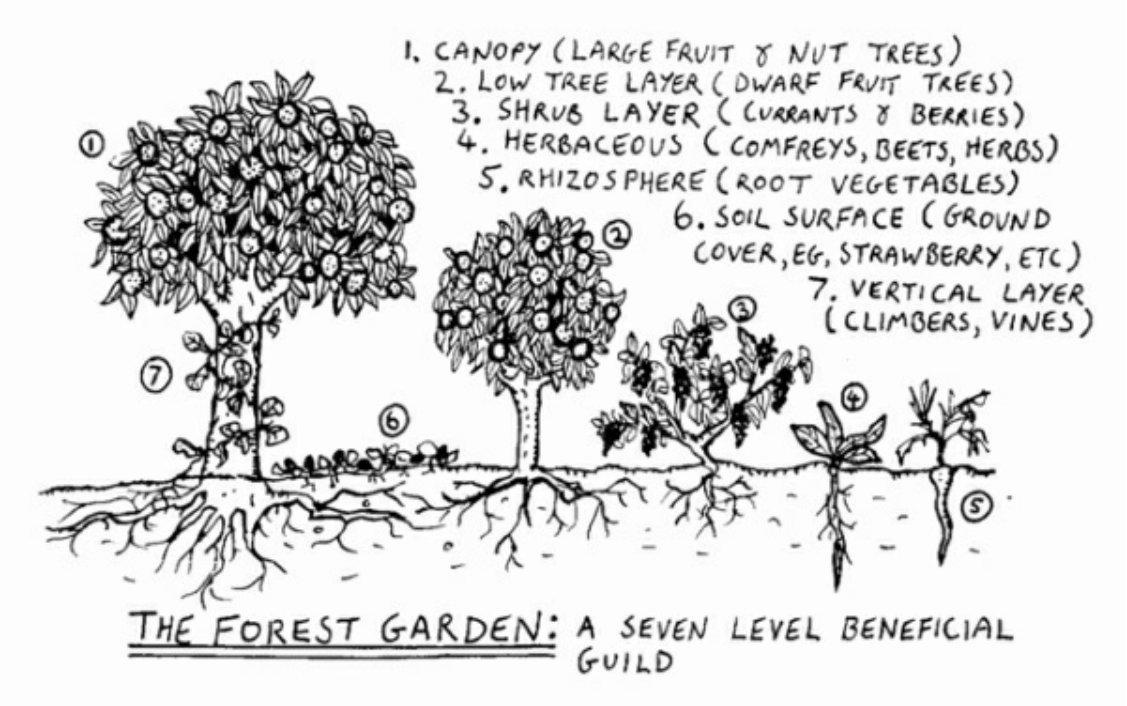
This is a companion planting technique that was developed by Native Americans to enhance the growth conditions of some of their staple crops: corn, beans, and squash. This technique uses the companion methods of structural support and nutrient cycling. Three or four bean plants are planted around the base of each corn plant in rows, with squash planted between the rows. The beans fix nitrogen in the soil for the corn plants, which in turn provide structural support for the bean vines. The squash also benefits from the nutrient cycling of the beans, and its broad leaves provide natural mulch to shade out weed plants.

Square Foot Gardening

Square Food Gardening is a companion technique designed to increase the amount of yield from a small garden space. In this method, long rows are abandoned in favor of a grid system. The grid is composed of 1’ x 1’ squares, and each square is dedicated to a different crop. This method allows the gardener to intercrop numerous cultivars in the same location more easily. This is useful because, with a square foot garden, you can incorporate companion plants, pest repelling flowers, attractive plants to lure pollinators and predatory insects, and cycle nutrients. This allows you to get the most effective companion planting system in the smallest space.

Container Gardening

This is a useful method for making the most of small spaces, as well as gardening when you only have a balcony, rooftop or patio available to work with. You can apply any of the principles of companion planting to your container garden for pest control, nutrient cycling, and structural support just as you would if you were planting in the ground. An additional aspect of companion planting in containers is the fact that you have more spatial variability to work with. You can trail creeping vines from the edges of containers, especially if they are hanging baskets. And you can build successively taller layers in the container, working from the outside edge inwards.



The Seven Layer System

This is an intensive companion planting method in which the garden is structurally modeled after the composition of a forest. Forests have complex understories with multiple ecological levels. In a seven-layer garden, tall fruit trees make up the upper canopy layer. The next layer is composed of smaller nut trees or dwarf fruit trees. Below this is a shrub layer with berry bushes, followed by a layer of medium sized vegetables. The lower layers include root and tuber vegetables and a ground cover of edible plants that propagate horizontally. The final layer is made up of climbing vines that grow up through the other layers.

Companion Planting Guide: Plant by Plant

In nature, plants live together in balance with one another and the environment around them. In a garden, however, you cannot always allow plants to grow wild together, and one of the challenges of companion planting is finding the right combinations that will work best for you. When you are planning out your companion garden, make a list of what you want to grow, and then refer to the following table to learn about which plants will make good companions, and which should not be grown together.

“Allies” are specific plants that will enhance the growth, flavor, and yield, as well as help deter pests. “Companions” includes suggestions based on optimal climate and habitat and aesthetic attributes. “Enemies” are plants that may negatively affect growth or interfere with one another.

NAME	ALLIES	COMPANIONS	ENEMIES
Anise	Coriander	Creeping thyme	Carrots
Apples	Dill, Queen Anne’s Lace	White clover, buckwheat	Potato plants
Asparagus	Parsley, tomatoes	Cold season crops: lettuce, beets, or spinach	None
Basil, sweet	Tomatoes	Flower beds	Rue
Beans	Tomatoes, corn, squash	Celery, corn, cucumbers	Garlic
Beets	Mints and catnip	Tall crops	Mustard
Broccoli	Beans, celery, potatoes, onions	Beets, nasturtium, marigolds, sage	Tomatoes
Brussels sprouts	Hyssop, peppermint, sage	Chamomile, dill	Tomatoes
Cabbage	Marigolds, nasturtiums, peppermint, sage, thyme	Kale, broccoli, Brussels sprouts	Fruits
Carrots	Radishes, peas, sage	Most vegetables	Dill, anise
Catnip	Eggplants, turnips	Mulch catnip anywhere	None
Cauliflower	Peppermint, sage, thyme	Cabbage, broccoli	Grapes
Celeriac	Beans, cauliflower, leeks, tomatoes	Scarlet runner beans, winter vetch	None
Celery	Leeks, tomatoes, cauliflower, cabbage	Leeks	None
Chamomile	Cabbages, onions, herbs	Use as a border for gardens	None
Chives	Carrots, grapes, roses, tomatoes	Use as a border or garden accent	Beans, peas
Chrysanthemum	Tomatoes	Use as a natural insecticide	Lettuce seedlings

Collards	Tomatoes, marigolds	Other greens	Grapes
Coreopsis	None	Use as a pollinator attractor	None
Coriander	Anise	Interplant anywhere	None
Corn	Beans, squash	Sunflowers	Wheatgrass
Cosmos	None	Use as a pollinator attractor	None
Cucumber	Radishes, marigolds, broccoli	Cabbage, cauliflower	Potatoes
Dill	Cabbage, tomatoes	Lettuce, onions, cucumbers	Carrots
Eggplant	Green beans	Lettuce	None
Fennel	None	Use as ornamental border to attract beneficial	Coriander
Garlic	Use as a deterrent	Tomatoes, eggplant, cabbage	Peas, beans
Geranium	Use as a deterrent	Cabbage and roses	None
Horseradish	Use as a deterrent	Plant in pots to control its spread	None
Kale	Dill, mint, sage	Cabbage, potatoes	Strawberries
Kohlrabi	Onions, beets, aromatic plants	Cabbage, broccoli	Strawberries, pole beans
Leek	Celery, onions, carrots	Anywhere in the garden	Peas, beans
Lemon balm	Broccoli, cauliflower, cabbage	Anywhere in the garden	None
Lettuce	Strawberries, cucumbers, carrots	Around taller vegetables	None
Marigolds	Cabbage, potatoes tomatoes, roses	Use as border or cover crop after harvest	Beans
Mint	Use as a deterrent	Plant in pots to control its spread	None
Mustard	Use as a deterrent; Brussels sprouts	Grow as a border in gardens	Turnips
Okra	Marigolds (to deter nematodes)	Eggplants, bell peppers	None

Onion	Potatoes	Interplant or use as border	Peas, beans, sage
Oregano	Use as attractant	Anywhere	None
Parsley	Asparagus; use as deterrent	Anywhere in the garden	None
Peas	Corn, beans, potatoes, tomatoes, carrots, cucumbers	Grow nitrogen-loving vegetables around pea trellises	Onions, garlic
Pepper	Marigolds, coriander, catnip	Okra or other tall plants	Kohlrabi, fennel
Potato	Marigolds, eggplants, nasturtium	Lettuce, radishes, green onions	Raspberries, tomatoes, squash
Radish	Peas, lettuce, beans, carrots	Intercrop with other vegetables in spring	Grapevines
Rosemary	Use as deterrent	Anywhere in herb gardens	None
Sage	Use as deterrent and to attract pollinators	Use as a border panting or in pots	Cucumbers
Spinach	Celery, eggplants, cabbage, peas, onions	Underplant taller vegetables and fill empty spaces with spinach	None
Strawberry	Borage, peach trees	Underplant taller vegetables	Cabbage
Sunflower	None specifically	Corn, beans, squash, or as a windbreak	None
Thyme	Eggplants, cabbage, potatoes, tomatoes	Anywhere in the garden	None
Tomato	Dill, borage, amaranth, marigolds	Surround with aromatic herbs like basil; grow with peppers, spinach, or lettuce	Black walnut
Turnip	Peas	Interplant with cabbage family vegetables	Potatoes
Zinnia	Use as attractant	Plant as borders	None

Lasagna Gardening

Lasagna gardening is the easiest form of no toil gardening. It gets its name

from the process of layering sheets of pasta when making lasagna. In this case you are making layers of healthy soil for your plants to thrive in. Instead of going downwards to sow plants, you are going upwards!

Its effectiveness and simplicity are since no digging, no tilling or no weeding is involved.

Advantages of Lasagna Gardening

1. No digging.
2. No tilling.
3. Minimal weeding.
4. Minimal watering.
5. No heavy-duty equipment needed.
6. No additives needed.
7. Fewer garden pests.
8. Greater choice of sites since you are building up soil rather than digging down.
9. Huge time savings.
10. Easily started, one person can comfortably do all that is required.

Starting Your Lasagna Garden

There are two main issues you need to consider before you commence.

a. What would you like to grow?
b. How much space do you have?

What Would You Like to Grow?

Make a list of plants that you want to have in your garden. Then make a list of other plants that you would like to have but can do without if necessary.

When you have your lists ready you will need to know the requirements of those plants regarding growing season, eventual size, amount of light required, amount of shelter required etc.

How Much Space Do You Have?

When you know the necessary growing conditions for your plant you will need to see which part of your garden fulfills that criteria or can be adjusted

to meet the criteria.

Most plants will grow reasonably well in poorer conditions than they prefer. However, you will not get the very best from these plants. If your site falls a long way short of meeting the plants requirements you will need to change your plan. It is far easier to grow plants that suit your soil, provide shelter, light etc. After all this is No Toil Gardening. Opt for the plants that will grow well in the general environment of your garden. If your site gets less than 6 hours of sunshine per day, you will need to choose plants that prefer a little less sunshine.

If your site is exposed to heavy rain, frost or wind you will need to choose your plants accordingly. Do not be over ambitious for your first year; you can always adjust in years to come. For your first year you want to get off to a great start, with as little effort as possible. The right plant for the right location is the key to a great first year. Lasagna gardening rules out the normal issues of digging down and adjusting your soil. You will be building soil upwards so why make it difficult when it does not need to be.

CHAPTER 8
AN OVERVIEW OF THE VARIOUS INSECTS SPECIES AND THEIR EFFECTS ON COMPANION TECHNIQUES

The good news is that insect pests are far outnumbered by insect allies in our gardens and yards. Without bees no flower will be pollinated and in this regard many kinds of moths and flies make their own contribution. Many beneficial insects' prey on pest insects and parasitic insects will lay their eggs right inside the pest insects. When the larvae hatch, they usually kill or at least weaken their hosts. Other ally insects like flies and dung beetles assist in the breaking down of decaying matter in the garden and so help to build good rich soil.

Wasps and Bees

Bees

There is a good reason why people in agricultural circles refer to honeybees as their 'spark plugs'. They are essential for pollinating crops. However, they are not the only pollinators around; wild bees make their contribution as well and act as agents of pest control on top of it all. Pollen and nectar are used by all bees to feed on; they also gather it for their nests. This is the main distinction between them and hornets and wasps. They fly from one flower to the next in their quest for food and in the process distribute pollen grains amongst the different flowers they visit, pollinating blooms as they go along. You will be surprised to learn that twenty thousand bee species can be found in the world, of which almost five thousand are in the USA. Cultivated crops are pollinated by several hundred species and many are vital for the pollination of wild plants.

Unfortunately, many factors have contributed to the decline in bee populations (both domestic and wild) worldwide. These are problem pests like mites, the loss of their natural habitat, and the use of pesticides. In recent years, a new phenomenon named Colony Collapse Disorder have decimated a vast number of honeybee populations in America. It has not yet been determined what the cause of this disorder is, but what we know is that the

worker bees just suddenly start to die, leaving their queen bee, nursing bees and as yet unborn brood without the necessary support. Eventually the whole hive collapses. Speculation is rife; maybe it is caused by parasites or diseases, maybe the damage done by chemical pesticides to their nervous and immune systems.

Luckily our tiny little ‘sweet bees’, bumble bees and other natives are still active and doing their bit to pollinate garden plants and agricultural crops. So, how can you encourage these native bees? Plant enough flowers to last the bees if possible. Allow some bare, open ground for them where they can tunnel and build their nests. Also make sure they have access to water in a shallow container.

Parasitic Wasps

The three major families are ichneumonids, braconids and chalcids. The Trichogramma wasp is the size of a pencil point while the black ichneumonid is huge and black. Because they are parasites, they lay their eggs into host insects. While their larvae grow, they absorb the necessary nourishment; it comes through their skin.

Yellow Jackets

Hornets and yellow jackets are feared by most people, but they have an important role to play as pest predators. Diving into foliage, they target caterpillars, flies and larvae which they feed to their own offspring. So, unless someone in your family is allergic to their stings or they are living in an area frequented by pets and people, do not destroy their nests.

Beetles

Ground Beetles

Ground beetles are blue black in color, swift footed, and hide away under boards and stone during the daylight hours. Come the darkness of night, they emerge to feed on slug and snail eggs, cutworms and root maggots. They even climb trees in search of tent caterpillars and armyworms. Large populations can live in gardens underneath the stone pathways, semi-permanent mulched vegetable or flower beds or in the undisturbed groundcovers of orchards.

Lady Beetles

Everyone knows lady beetles with their hard, shiny bodies. There are around three thousand species in total and they prey on soft, small pests like spider mites, mealy bugs and aphids. I must mention that not all the species are good for your garden, for example the Mexican bean beetle. The larvae as well as the adult beetles will feed on pests. The larvae resemble tiny miniature alligators with their tapered bodies and branching spines. You can buy convergent lady bugs at some garden centers. They overwinter in mass where they are collected. But it is not easy to keep them in your garden unless you have a greenhouse.

Rove Beetles

Rove beetles have elongated bodies with stubby, short wings, resembling earwigs' pinchers. They are tireless decomposers and will work away at plant material and manure. Others prey on root maggots.

Other Beetles

There are many other beetles that prey on snails, slugs and insect larvae, both as adult and larvae. Amongst them are fireflies (yes, they are really beetles), tiger beetles, and hister beetles.

Flies

The Tachinid Fly

These flies are dark gray in color, bristly and large and lay their larvae or eggs on stinkbugs, corn borers, caterpillars and cutworms amongst other pests. They are quite effectives against the outbreaks of armyworm and tent caterpillar.

The Syrphid Fly

These flies are also called hover or flower flies. They are easily recognizable by their black and white or yellow stripes but are also often mistakenly identified as yellow jackets of even bees. After laying their eggs inside aphids, their larvae devour the aphids. The larvae are translucent, unattractive gray maggots and resemble small slugs, so do not be misled by their

appearance.

Aphid Midges

The larva of this fly is a tiny orange maggot and will feed voraciously on aphids. They can be purchased at commercial insectaries. Release them into your greenhouse and you will see the positive effects very soon.

Other Beneficial Insects

Dragonflies

Dragonflies also go by the name of ‘darning needles. Together with their more diminutive cousins, the damselflies, they are often seen around ponds and marshes where they fly in their zigzag patterns, scooping up midges, gnats and mosquitoes in their mouths.

Lacewings

The larvae of the lacewings are green or brown and look like tiny alligators. They prey on several different small insects for example thrips, small caterpillars, scale insects, and aphids. The delicate adult lacewing is the same color as its larva, with huge transparent wings with its remarkable network of tiny veins. Their pale green eggs are oval and are laid at the tips of long fine midrib stalks of garden plants leaves like lettuces.

True Bugs

A whole group of different insects are covered by this scientific correct common umbrella term. Amongst the group are also pest species. However, many beneficial predatory bugs in this group hit on insects with soft bodies for example pear thrips and psylla, small caterpillars, beetle larvae, and aphids. In agricultural systems the following are valuable predators: Spined soldier and tiny pirate bugs, damsel bugs, ambush and assassin bugs.

Mites and Spiders

It is true that spiders and mites are arachnids; however, they are commonly grouped together with insects as they are all members of the larger arthropod classification. You will not easily notice predatory mites; they are extremely tiny but are wonderful predators. They live in surface litter, shrubs and trees. Mites which feed on plants such as cyclamen, rust and spider mites are kept

in check by Phytoseiid mites. Some of them also attack other tiny pests like thrips. Mites that dwell in soil devour insect eggs, nematodes, organic matter in the process of decaying and fungus gnat larvae.

Although you may have a fear of spiders, like many other people, do not kill them on sight; they form a valuable contribution to the elimination of pests in your garden. Most familiar are those spiders which spin such beautiful webs, but many live-in burrows from where they snatch insects wandering too close. Others swing on silky threads to leap upon their prey.

How Do I Lure Beneficial Insects?

First, you should make sure you do not drive away those bugs that already inhabit your garden. So, avoid dust and toxic sprays and that include organic sprays like neem and insecticidal soap which will also kill insects. If you absolutely must use them to preserve your crop be careful to spray them only on the affected areas of the plants under attack. Secondly, take care when you remove insect pests by hand unless you kill some of the beneficial bugs by mistake. I know some are just too tiny to see easily but make a point to learn how to identify those larger species like tachinid flies, lady beetles, and lacewings. Thirdly you can turn their habitat into the ideal haven by providing enough shelter, water and food.

Food

Plant borders and flower beds filled with companion plants which are rich in nectar and pollen like yarrow, dill and catnip. This will keep many beneficial insects satisfied, amongst them parasitic wasps, lacewings and native bees.

Water

Because of their size, many insects find it difficult to drink water from regular bird baths, water gardens or streams safely. Here is what you can do to assist those delicate bugs: Fill a bowl or shallow birdbath with some stones. Now add water but leave lots of exposed landing areas between the shallow water stretches so that they can safely land and take off without the danger of drowning. Check the bug bath regularly, especially in summer when water evaporates more quickly.

Shelter

You should leave a few weeds to grow amongst your vegetables. They will provide shelter and alternative food sources for some beneficial insects and bugs. Reduce the amount of dust in your garden, especially if you live in a windy area. Construct windbreak fences or plant hedges around your garden. Dusty conditions easily lead to dehydration in insects. Lay out mulched areas and permanent pathways around your garden and yard; they will offer safe areas for insects to hide away during the day, times of bad weather and during cultivation activity.

How Do I Purchase Beneficial Insects?

Gardeners, nurseries and farmers can buy beneficial insects from specialty companies or garden suppliers. Everything is available, from predatory mites and lady bugs to lacewings and aphid midges. This method of pest control can be very effective if you release them in a greenhouse or on commercial farms, on a very large scale. However, for the home gardener it might not be worth your trouble and expense. It is very likely that the insects will simply fly away to settle somewhere else. This will maybe benefit the neighborhood you live in, but you will still be left with the specific problem you wanted to address. It would be a much wiser decision to invest in plants which will eventually attract these kinds of insects to your yard naturally.

Maybe you feel you still want to try experimenting with this idea. Start by identifying your target pest. This is important since most parasites or predators target a specific species. Now do your research; read up on the internet and consult suppliers. When you receive your purchase, look at them closely so that you will be able to correctly identify them later. You certainly do not want to kill them by mistake later. Use your magnifying glass for the tiny predatory mites and parasitic wasps. Now release only some of them very near to your infected plants or directly onto them if possible. Then continue to distribute the rest of them evenly throughout the immediate surrounding area.

CHAPTER 9
COMMON PESTS AND HOW TO DETER THEM

Iam not going to tell you this works 100% of the time. Companion planting creates balance. So rather than completely eradicating pests, it encourages beneficial insects to eat the pests. Stopping complete infestation. However, you can combine companion planting with other methods to reduce pests even further. So, let us have a look:

Slugs & Snails

Slugs can be an annoying pest in the garden. I find them everywhere. I have lost a few plants to slugs. I find the best way to deal with them is pellets (organic and non-harmful to wildlife). However, I did try planting marigolds which is said to deter slugs. Well I can tell you that did not work. The slugs ate the marigolds and left the other plants alone. Which I was happy with.

- Only water the plant roots
- Keep the plants healthy
- Remove dying leaves
- Do not over feed your plant
- Plant sacrificial lettuce plants for the slugs to eat
- Pick off slugs and place them in your compost bin (where they do a great job)
- Chop some comfrey leaves and place them at the base of your plant. (slugs should eat these first).
- Plant alliums, lavender, rosemary, roses, sage, scented geraniums to deter slugs by smell.
- Use beneficial predators and encourage birds, hedgehogs and frogs into your garden.
- Nematodes (which is microscopic) to kill the slugs (see more below on how to make your own.
- Organic iron slug pellets or wool pellets

How to make your own nematodes

Collect about 20 slugs (gross I know). Place the slugs in the bucket with an inch of water at the bottom and gives them some leaves/weeds for them to eat. Seal the top with a lid or slab. Stir occasionally. After 2 weeks the slugs should have died from the nematodes and you can now dilute the water in the bucket by filling it to the top with water. Give it a stir and use a garden sieve or chicken wire to pour into a watering can. Water your susceptible plants of seedlings for about 6 week's protection.

Leaf Miners

To deter of confuse the moths, sawflies, flies or beetles that lay their eggs on the plant leaf and the larva mine the leaves.

Plant the following to confuse them:

- Radish
- Onions
- Garlic
- Marigolds

Or plant lambs' quarters or granny's bonnet to draw them to these plants rather than your crops.

Cabbage White Butterfly/Caterpillar & Root Fly

Oh, the damage these things can do. A beautiful looking white butterfly that lays its eggs on your brassicas. When the caterpillars emerge hungry, they will decimate your whole crop. They are a nightmare. So, what can you do?

- Plant nasturtiums to attract the butterfly, they love laying eggs on these
- Pick off the caterpillars
- Cover your brassicas before the butterfly emerges (with netting)
- Use bacillus thuringiensis sprayed on your plant
- Interplant with basil, dill, mint, cosmos, marigolds and or alliums

For cabbage root fly cover with netting and use collars, these can be

homemade, or store bought. See companions for leaf miner above as these are the same.

Greenfly/Blackfly Aphids

These always seem to be on fast growing plants. Aphids or blackfly love my runner beans and broad beans. So, what can we do to reduce the aphids on our crops to ensure there is a good balance? Firstly, we must understand how quickly these things reproduce. They do not lay eggs until autumn and have live young all through the growing season. They can decimate plants very quickly. So, we need a balance.

- Grow Summer savory to deter
- Nasturtiums as a sacrificial crop for them to attack instead (aphids' favorite food)
- Borage attract aphid eating insects
- Grow garlic or garlic chives near green/blackfly attractive plants
- Marigolds smell awful to aphids and attract ladybirds which eat aphids
- Sunflowers to attract aphids (tall versions will take a huge hit from aphids)
- Leeks to repel
- Catnip to repel
- Fennel to repel
- Feverfew, calendula, chives, cosmos, dill to attract ladybirds that eat aphids
- Wash off aphids with a jet of water
- Use your fingers to rub them off the leaves
- Ant control. They farm aphids for the honeydew they produce and will even milk them a bit like a cow, by stroking the aphid. They will also protect them from other insects.

Ladybirds really do help with preventing an aphid infestation. As I have said you need a balance. To ensure you have ladybirds to keep the aphid population down and your plants healthy. Why not get a bug hotel where they can hibernate or put down shallow saucers of water with stones in it? You want them to drink not drown.

Flea Beetle

These cause little holes in the plants leaves and the larva feed on the roots. So, to deter these pesky things we can:

- Cover brassicas and radish
- Plant nasturtiums as a trap crop for flea and squash
- Plant sage, basil, thyme, catnip or mint in pots around the susceptible plant.

Carrot Fly

These can have devastating effects on carrots. To deter the carrot root fly, try the following:

- Cover with mesh or fleece
- Sow your carrots thinly to avoid thinning out later. This causes the smell which attracts the fly.
- Grow alliums close to your carrots, leeks and onions work well
- Create a barrier around 75cm tall or grow your carrots in a box or pot 75cm tall. The flies are poor fliers.

Spider Mite

- Plant coriander to repel the spider mites
- Dill repels
- Garlic repels
- Pyrethrum Chrysanthemums (also effective against beetles, thrips, aphids, grubs etc. however It is toxic to humans and animals).

Whitefly

To deter whitefly from your crops, plant the following:

- Basil
- Nasturtiums
- Marigolds

Weeds

- To control ground elder, bindweed and couch grass plant Tagetes Minuta (Mexican marigold), not a pretty flower but its roots secret a substance which kills these perennial weeds.
- In autumn plant cover crops like field beans to replace lost nitrogen in the soil. Cut down in early spring and dig the plant into the soil. This will reduce weeds, replace nitrogen and keep the nutrients from being leached out of bare soil by rain.
- Herbs can be interplanted as companions amongst your vegetables or flowers as ground cover to reduce weeds.

CHAPTER 10
THE LASAGNA RECIPE

Mulch and compost are the two main ingredients in lasagna gardening. Mulch is basically any organic material that can be used on top of the soil to protect the soil from extremes of weather e.g. frost, extreme heat, heavy rain and wind.

Providing a layer of mulch also provides nutrients for your soil the nutrients are provided by worms and other beneficial organisms that set up their homes underneath the mulch layer.

Suitable Mulch Materials

Mature manure

Grass Clippings

Non-colored/glossy newspapers

Sawdust

Seaweed

Straw

Wood Ash

Plant Stalks

Small Twigs

Preparing Your Layers

At this stage you will have chosen your site and marked it out. You will have enough ingredients i.e. mulching materials and compost to create a couple of layers.

Layer 1

Gather newspaper and/or old cardboard boxes. Soak them in water prior to use. Now spread these over your site and leave the edges overlapping. Because they are wet, they are also heavier, this will keep them in place and

help them to decompose. You will prevent weeds from coming through by overlapping the newspapers/boxes.

Layer 2

Cover the newspapers/boxes with a 2-3-inch layer of compost. Totally cover the newspapers.

Layer 3

Cover the compost with a layer of mulch. Use any or all the materials listed earlier as being suitable e.g. grass clippings. Provide a layer of mulch between 4 – 8 inches deep.

Layer 4

Add another 2-3-inch layer of compost.

Layer 5

Add another layer of mulch material. Keep repeating steps 1-5 until your bed has reached a height of 24-36 inches.

When Can I Start?

You can start in either spring of fall depending on what materials you have available and what plants you want to sow.

Is It Really No Dig?

Yes, it certainly is! If you are sowing seeds you will need to spread a light layer of compost over your bed, set your seeds in place, cover seeds with another layer of compost and gently firm down.

It is better to wet the compost before putting it in place as this removes the need for immediate watering which would only scatter the seeds and compost.

When your seedlings have developed their first pair of true leaves you should gently pull in some of the mulch around the seedlings to form a small mound. ‘True leaves’ are the leaves that appear after the very first two leaves.

Sowing young plants is even easier. Just pull apart a layer and form a hole to the required depth. Put the plant in the hole; push back the layers in around the base of the plant. Give the plant a nice drink of water and then firmly press down the layers at the base of the plant. That is, it, all done!

How is A Compost Pile Layered?

A properly structured and well managed compost pile can be ready for use within 4 months in warm temperatures. The structure of the pile is very important, you already know the correct ingredients to use, and it is now time to layer them correctly.

The basic structure of a compost pile from bottom to top is a series of layers that begin on a hard surface. You can start your pile on top of pallets etc. but starting it on a hard surface such as concrete or compacted soil means easier turning. However, using concrete makes it more difficult for beneficial organism and worms to reach the soil.

My personal preference is to use a suitably sized area and clear it of all grass etc. I then lightly aerate the soil with my fork. This is the best of both worlds. It provides a solid surface which allows you to turn the compost, but it allows for quick establishment of contact between worms etc. and the compost pile. Once you have your base ready it is then time to start building your pile.

Step 1. Place a base layer of materials that will provide carbon. Shredded newspapers, dead leaves, wood chips, small twigs and branches. Make them no bigger than 2 to 3 inches in size. Smaller sized materials and greater surface area exposure will speed up the decomposition process. If you have enough materials, you should aim to make this first layer 4 to 6 inches deep. When this layer is in place you should lightly moisten it.

Step 2. Start your second layer. This layer consists of nitrogen rich materials such as grass clippings, fruit and vegetable waste, eggshell, coffee grounds, leftover bread and rice and leafy garden trimmings. If you have access to seaweed, you should use it. Seaweed is an excellent addition to a compost pile. This layer of nitrogen materials should be 2 to 3 inches deep.

Step 3. You will notice that the first layer of carbon rich materials was 4 to 6 inches deep and that the second layer of nitrogen rich materials was 2 to 3 inches deep. This is your ratio guide of approximately 2 parts carbon to 1-part nitrogen. Try to maintain that approximate ratio by using the thickness of

the layers as a guide i.e. 4 to 6 inches for carbon 2 to 3 inches for nitrogen. Now repeat the process as described in steps 1 and 2.

Step 4. After repeated these layers your compost pile should now be reaching 4 to 5 feet in height. If you are using a bin it is time to close it if you are using an open compost pile you should now cover it with plastic.

Step 5. Start a new compost pile using steps 1 to 4.

Step 6. You will need to monitor the moisture content of the pile. Use this sponge test, soak a sponge in water and then squeeze the water out, the moisture content of a wrung-out sponge is approximately the moisture content you are looking for with your compost. You need it moist, not soaking wet. Squeeze a few handfuls of the compost, ideally it should yield a few drops of liquid.

If the compost is too wet, grab your fork and turn the compost over. This will allow air in around the compost as well as improve drainage.

If the compost is very dry, you simply need to water it, turn it and water it again. Use the test described earlier to ensure that you do not over water.

Step 7. Temperature plays a large role in the decomposition process. You will need to occasionally check the internal temperature of your compost pile. You can use your hands or purchase a compost thermometer.

If using your hands, the compost should be hot to touch.

If using a thermometer, it should be within the range of 120 to 160.

Check every 2 to 3 weeks. When the temperature starts to decrease it is time to turn the compost.

Step 8. To turn the compost, you simply need to move the materials from the outside and the top of the compost into the middle and move the middle materials to the outside and top.

This is an easy process if you have a second composting area nearby and ready to go. If not, all you need to do is to grab your fork and dig towards the center of the pile. As you dig, place what you have just removed in a small pile to the side. When you have a significant hole dug into the pile you just need to start filling the hole with material from the outside of the pile.

When the center is now filled up again, spread the compost you previously

set aside along the top and outer parts of the pile. Inside out, outside in!

Step 9. Wait a few weeks and check the inner temperature again. You are looking for ‘hot to touch’ or 120 to 160. When your pile reaches this temperature, it will need to be turned one final time.

Step 10. At this stage you have turned your pile twice and it is unlikely to heat to those temperatures again. It should start to cool down, so now it is a waiting game. Wait for it to cool down and then give it another 3 to 4 weeks. Timings may vary but that is the general time span involved.

Step 11. Your compost should now be ready to use. It will be a lot smaller than it was originally and will be crumbly in texture. There should not be any significant odor.

CHAPTER 11
ADVICES AND TIPS

Tips for Growing More Vegetables

For people with limited space, a garden that uses companion planting is the perfect solution to growing vegetable plants and increase their harvest.

In order to make this practice work however, it is necessary to do some planning ahead of time on your part to optimize the yield when harvest time rolls around.

But there are some tips that will increase the output of your crops during this season. They have been found to work very well with the companion planting method and are mutually beneficial to both plant types.

There are many different benefits to this practice and some of the more popular ones include increasing the size and number of produce that is made, repelling garden pests that may otherwise wreak havoc on your plants and attract beneficial predators that can eat the invaders and keep your plot safe.

Just because you have limited space does not mean that you cannot enjoy a bumper crop of vegetables. By putting some of the following methods to use, you will see some marvelous results in the fall.

One such way is through interplanting. This is slightly different from companion planting in that it makes the most use of a small plot and the plants typically have more than one purpose. A perfect example of this method is using squash and corn in the same area along with bean plants. The corn stalks tend to grow tall and act as a support for the bean vines, while the squash produces large leaves that not only shield the ground to deter weed growth but also act as a natural barrier to corn pests.

Vegetables and flowers can also be interplanted for good results. This is one of the best ways to attract pollinators and natural predators to garden pests.

Succession planting is another popular method of putting in a garden plot and this has been used to extend the growing season.

There are 4 ways that succession planting can be implemented. The first

involves planting the same species but putting plants in at different time intervals. The second entails planting different vegetables in successive periods. You can also plant 2 vegetables in the same area in the third method, while the fourth way is planting the same vegetable but using ones that mature at different rates.

A final option is putting in plants that are annuals (i.e. they only need to be put in once) in order to enjoy multiple yields from one planting. These include such things as asparagus; rhubarb and sweet potatoes just to name a few of the more popular varieties. With the proper soil preparation, you can plant any number of varieties and enjoy a bountiful harvest for many years.

Grow Your Own Companion Herb Garden

The best thing about growing an herb garden is the ease of maintenance. Most of them do not need daily watering or fertilization. But you still need to weed!

Most veteran gardeners use a technique called deep watering which means irrigating the area until there are small puddles evident.

Pest issues are another story altogether. Since you will want to eat these plants at some point, an organic method is preferred to treat them. It is not hard so do not fret about making your own solution. In a one quart hand held sprayer, add a squirt of ivory soap or baby shampoo, then fill with warm water.

NEVER use detergent in this manner. This is just the basic formulas as it can be added to as necessary when combating a specific pest. You should always test the mixture in a small area before proceeding to make sure that the plants are resistant.

If you want to make sure it sticks well to the plants, add 1 teaspoon of vegetable oil. You can also take 1/2 cup of mineral oil and add crushed garlic cloves to it. Strain this mixture after letting it stand for 48 hours. Add about 1 teaspoon to the water/soap mixture.

Another alternative uses one bulb of garlic and an onion. Puree this in a blender/food processor. Put into one cup of olive oil and let sit for 48 hours. Strain the mixture and throw out the pulp. Now add 1/2 teaspoon of cayenne pepper and store in a glass jar. You can add 1 teaspoon to the soap spray as

needed.

If you would rather not use any type of spray in your plot, there is always companion gardening. This means planting herbs next to plant to keep bugs away. Just find a plant that has a natural predatory insect such as aphids and plant an herb next to it in order to keep them at bay. This is just one good example of using herbs in order to combat these types of insects naturally, so you may want to do further research on specific companion types.

However, using herb plants as a natural means of keeping out invaders is a great way to still enjoy your garden time and avoid the use of unnecessary chemicals that not only enter the water supply, but become a part of the food chain as well.

Laying Out a Vegetable Garden - Companion Plants

When putting in a vegetable garden, you should seriously consider employing some companion planting advice.

This method has several benefits including higher crop yield for starters. Most of the time, vegetable plants grow at a more rapid pace and yield more produce when paired with the proper companion. There are people who also think that the taste of the vegetable is also influenced in this manner.

The second major benefit is pest control. Certain hormones are released by plants that can repel garden insects. This organic method has been used for centuries by Native Americans to keep out unwanted intruders.

This type of planting can also help to attract insects that are beneficial too. These natural fragrances that are released can help to draw in pollinators for example. While some insects pollinate, others will help to keep down the destroyers of vegetation by consuming them.

You can also greatly improve the landscape of your garden by using this style of planting. Most plants are scattered at random in nature and not grown in perfect rows. You can achieve the same effect in your garden. Plants of all shapes, sizes and textures will give your plot the beauty and balance that may make your neighbors envious.

This is also a great way to maximize the amount of space that you have available. For most gardeners, this is a problem since they have more plants than space on average. However, you can put small and large plants together

as companions.

This is also a grand method to protect delicate vegetable plants. As you know some plants are inherently weaker and thus prone to damage more easily. A larger plant can provide a shield for a smaller companion and help to protect it from the elements.

You do have to know which plants go together in order to promote the proper growth and development of each species. Some combinations will not work well together, so It is important to know the right combinations. You can get a better idea of which plants will work together from some of the matches listed below:

Tomatoes will grow well with beans, carrots, garlic, onions and asparagus and are a poor match with fennel, dill and pole beans.

Squash will work with corn, onions and radish. Spinach grows best with celery, corn and eggplant. Potatoes are a good match with carrots, corn, peas and pumpkins, but not with lettuce, melons or peas.

Peas grow well with carrots, celery and corn and not so well with radishes, spinach and strawberries. Onions are a good fit for beets, celery, and tomatoes and a bad fit for asparagus, beans and peas. Lettuce has great companions in carrots, garlic and onions. Eggplants grow their best when paired with peas, peppers and spinach and terrible when grouped with fennel.

These are just a few of the combinations that have been scientifically proven to work well together. If there is something that you wish to plant that is not on this list, chances are that you can find it at the local library or on the Internet.

Companion Planting - Facts about Vegetables
That You Should Know

More people are growing their own vegetables as a means of feeding their family. These vegetables are not only fresher, but free from dangerous chemicals that are used in commercial operations. This is also a good way to relieve some stress from your life as well.

A method that is beginning to regain some of its lost popularity is called companion planting. This is based upon the proper arrangement of two or more vegetable species in proximity. It can be a great arrangement for both

plants if they are compatible.

Just like humans, plants need companions in order to prosper. If you learn the right combinations to put together, you will enjoy a more bountiful harvest.

This method has also been proven to reduce the number of bugs that typically invade this space. It is done mostly through the secretion or hormones or natural odors. On the other hand, some bugs are attracted by this scent and these are beneficial to your garden.

While there is no actual scientific proof as to which plants work well together, there is a mountain of evidence that supports this theory. Veteran gardeners have compiled their own suggestions based on years of date and amazing yields. In some cases, the companion method is found to favor one plant in the pair.

Many of the more popular vegetables and their best (and worst) pairings are shown below.

For example, carrots and beans can be paired together, but only the beans really benefit. Beans can be planted close to corn, but far away from onions. And nothing should be put by fennel since it has a deleterious effect on most other plants.

Some other great combinations are strawberries, beets, cabbage and eggplants.

You are probably most interested in the most cultivated vegetable plants: tomatoes. This wonderful vegetable (fruit) can thrive when paired with mint, onions and cabbage. But it does not work well with either fennel or corn.

Lettuce is another popular selection, and it will do wonderful with a radish, carrot or onion companion. However, you should avoid putting parsley, beans or beetroot anywhere near it.

Potatoes are another staple that can grow best with peas, beans and cabbage, but should not be paired with pumpkins or cucumbers. Spinach is great when paired with eggplants, cauliflower and celery. Peas will do their best with corn, beans, carrots and cucumbers, just to name a few of their favorite companions.

For a more general plant, marigolds are great as a companion flower, and mint is the perfect companion plant. Both attract beneficial insects while

helping to drive predators away.

Beets can be planted next to lettuce, cabbage and kohlrabi, but away from mustard or pole beans. Radishes are another easy vegetable to grow and they should be put close to beans, parsnips and spinach, but away from turnips, broccoli and cauliflower.

According to veterans of the gardening scene, there are thousands of possible combinations to choose from when putting in your plot. Ultimately you must make the decisions regarding the plant arrangement.

A good idea is to start with your favorites and then figure out the proper companion that will work well with them. This can not only save you time and effort (think weeding) but promote a healthier lifestyle for your family.

With the proper care, you can make that garden into something special this year.

CHAPTER 12
PLANTING COMBINATIONS TO USE/AVOID – FRUIT AND VEGETABLES

- Asparagus – Asparagus takes a long time to propagate and grow to edible size from seeds. You want to make sure you give its development all the advantages it can use.

Planting asparagus with carrots, tomatoes, and parsley can help improve the flavor and increase production.

Avoid planting near onions, garlic and potatoes.

- Beans – Beans grow fast and will continue to produce if you harvest them prior to their maturity.

Beans grow well with many veggies and fruit including carrots, celery, corn, eggplant and peas. Like asparagus, beans with onions, garlic and potatoes is not a good idea.

Any allium planted near beans will suffer and will affect both the growth rate and productivity of the bean plant.

- Beets – The beet is one of the few vegetables that benefit from a direct planting with garlic. In addition to garlic, beets also thrive when in the general vicinity of lettuces, onions and kohlrabi.
- Broccoli – Broccoli plants require a lot of calcium. Vegetable companion plants that are good for broccoli include beans, cucumbers, garlic, lettuces, onions and potatoes.

Grapes, berries, and mustards of all types introduce chemicals into the soil that broccoli plants just cannot handle.

- Cabbage – Cabbage is almost like the “O Positive” of companion plants as it improves the growth and flavors of many plants.

The only vegetables that cannot tolerate the presence of cabbage include

tomatoes, peppers, eggplants, lettuce and pole beans.

Strawberries and grapes also have a negative effect on cabbage growth.

The herb, dill, planted together with cabbage can attract the wasps that prey on cabbage worms.

- Carrots – Carrots and lettuces, onions and tomatoes go perfect together in the garden. Although some species of tomato plants can stunt the growth of the carrots, the flavor will still be good.
- Celery – Celery can be most successful when planted with beans, cabbages, onions, spinach and tomatoes. Unfortunately, the high nitrogen levels required by corn and some potatoes make them a bad companion for celery.
- Chard – Chards are those leafy lettuce-like plants that end up in many a southern cooking dish.

The chard can be planted near beans, cabbages, tomatoes, and onions.

The effect that Chards have on melons and corn though can affect both plants negatively.

- Collard Greens – These vegetables seem to favor others that grow underground. Garlic, Onions, potatoes and radishes will do well with collard greens as neighbors.

Beans, cucumbers, and lettuces also do well.

The collard green plant cannot do too well planted near grapevines.

- Corn – The second in the pairing of the Three Sisters method.

Corn does well with just about any other vegetable except for celery and tomato plants. The nitrogen levels tomato plants demand will starve the corn.

Corn can act as a trellis for more than just beans, so keep that in mind when planning your garden.

- Cucumbers – The spiny vines of most cucumber plants do well with both corn and bean plants.

Potatoes however do not do well with cucumber plants nearby.

- Eggplant – An eggplant and pepper combination are a win-win

for both plants. Beans, peas and spinach also help eggplant growth and taste.

- Garlic – Garlic is nature's antibiotic and a valuable addition to your garden. Many gardeners use garlic as a border plant to repel aphids and other insects including moths, Japanese beetles, snails and more.
- Grapes – To produce healthy and delicious grapes, the vines need a trellis of some sort to keep the fruit off the ground. Beans and blackberries all do well near grapes. Mustard plant is also beneficial to grow with grapes to help control nematodes.

Radish and cabbage however should be planted well away from the grapevines.

- Leeks – Leeks are a little like onions and while they help improve the growth of carrots, celery and onions, they do not like potatoes of any kind.
- Lettuce – Lettuce grows well in almost any combination of vegetables and fruits except for cabbage. Planting tall flowers like sunflowers or nicotiana can help shade the lettuce from the harsh rays of the sun.

Cabbage will affect both the growth and flavor of lettuces.

- Melons – Melons get along with everyone in the garden. Ideal companions are corn, radish and the different types of squash.
- Okra – Okra serves a multi-function purpose in gardens. It can be used as a shield from high winds for peppers and eggplants.

It grows well with cucumbers, melons and peas.

Okra also repels aphids.

- Onions – Other than peas and asparagus, onions can help the other veggies in the garden in growth and flavor.

They are also planted with strawberries to help fight diseases.

- Peas – Like beans, peas contribute nitrogen to the soil which is a real benefit to corn and tomatoes.

Beans, carrots, celery, cucumbers, peppers, tomatoes and turnips all enjoy the company of pea plants. Onions and potatoes do not grow well with peas.

For fruit, keep grapes away from peas.

- Peppers – Most species of peppers do well in locations with tomatoes, onions and carrots. One curious combination of peppers and apricot trees can lead to a common fungus that afflicts many pepper plants killing the entire apricot tree.
- Potato – Potatoes appear to be the pickiest of all vegetables when it comes to companion planting.

Asparagus, cucumbers, pumpkins, rutabaga, squashes, tomatoes and turnips all have a devastating effect on potato plants.

Corn, peas, onions, celery and carrots are just fine.

Use a border plant to keep the potato bugs away, like garlic or horseradish.

- Pumpkins – Pumpkins are hardy squashes. They do best companion wise with corn, melons, and other members of the squash family.
- Radishes – Another multi-function veggie! Radishes planted around leafy vegetables draw away insects from those veggies. The insects infest the leaves of the radish plant leaving a healthy bulb safely tucked underground. They keep bugs away from broccoli, spinach and more. Cauliflower and Cabbage plants do not like radishes. Even if you eat them, they make a great addition to the compost pile as a good supply of calcium for your gardens of the future!
- Rhubarb – Rhubarb acts as a deterrent to mites and aphids.

Cabbage, beans and broccoli all benefit from rhubarb in their area.

- Spinach – Spinach plants benefit from the shade that pea and bean plants give. Spinach also grows well with cabbage, cauliflower, celery, eggplant, onions and Hannibal Lecter’s favorite, the fava bean.

Radishes planted amongst spinach plants can help draw away the leaf miner insect that can devastate a spinach crop.

- Soybeans – The crop that is planted in the fallow years in corn fields is soybeans. They replace the nitrogen levels that the corn has depleted.

They can also be planted with the corn if you are harvesting manually.

- Squash – There are just as many bugs that love squash as there are people. Other than the potato, most other vegetable plants do just fine with squash.

It is after all the third member of the three sisters grouping.

Cucumbers, melons, onions and pumpkin all provide excellent companion skills for the lowly squash.

- Tomatoes – Other than potatoes, kohlrabi, cabbage and cauliflower, the tomato plant is every vegetable's best friend.
- Turnip – Turnips do not like other root growing vegetables near them. That includes potatoes, radishes and more. Peas replace some of the nitrogen turnips use and make a good companion plant for turnips.

CHAPTER 13
GARDEN MAINTENANCE

Some people are in their gardens daily, 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 understands 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.

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 weed-ing 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 can 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 except for 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 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 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 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 plants 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 enough space. Treat the new plant piece like a seedling and give it extra care until it is established.

CHAPTER 14
THE KEY IN SWITCHING TO COMPANION PLANTING

In the most basic sense, companion planting is the technique of combining two or more plants for a particular purpose. The most common reason is for pest control, although there are other very useful benefits to companion planting as well. While some methods of companion planting can benefit your garden in several different ways, and depending on what you want to grow, you can choose to concentrate on one or all these areas:

Insects

Companion planting helps keep your plants free of harmful insects in three ways. First, insects are often attracted to their preferred crops by their sense of smell. For example, cabbage worms are attracted to their favored host plants by the mustard oils in them. And onion maggots find onions by following the sulfur compounds released by the plant.

One way you can use companion planting to protect your plants is to mask their odors with other fragrant smells. Plants like garlic, for example, release aromas into the air that can deter bean beetles and potato bugs. Onions can keep pests from attacking strawberries or tomatoes. Mint can “hide” cabbage from cabbage loppers, while basil can do the same thing to keep hornworms away from your tomatoes.

By edging your garden with pungent plants, as well as mixing them into your garden, you can have a natural insect repellent growing among your vegetables. Some plants are almost irresistible to certain pests, and you can use these to lure them away from your crops. Nasturtiums, for example, are a wonderful attractant because aphids simply love them.

Color potato beetles will prefer black nightshade to even your potato plants. Attractant plants can help to keep your crops free of pests in two ways, not only do they lure pests away from your desirable crops, they also help to concentrate them in a location that will help make it easier to control them. Once these pests have been trapped on your decoy attractants, you can

remove these plants and destroy them along with the pests.

The third way companion plants can help keep your garden free of pests is by making your garden attractive to beneficial insects. Growing dill, for example, will attract pest-eating insects such as lacewings and parasitic wasps, all of which will help control aphids, beetles, and caterpillars.

Nutrients

The soil in your garden is the source of all the nutrients your plants need to grow, and you must make sure it is healthy and rich in order to ensure a good harvest. There are various ways you can build good soil.

And while you can establish healthy soil by adding organic materials to it, building compost, and laying down mulch, you can also actively use companion planting to help maintain your soil's nutrient content through the growing season and from one year to the next. One of the most important nutrients plants need in order to grow well is nitrogen.

Many plants require more nitrogen while they are growing than any other nutrient. Nitrogen is vital to the production of chlorophyll and the process of photosynthesis. Because of this, you will find that most fertilizers contain a large amount of nitrogen. Certain plants – in particular, legumes – are nitrogen fixers. This means that they contain bacteria in their roots that help to convert unusable forms of nitrogen to forms plants can uptake and use.

By growing these plants among those that use a lot of nitrogen, you can help keep nitrogen levels in your garden more stable. Most plants that are nitrogen fixers are in the legume's family, such as soybeans, alfalfa, peanuts, and clover.

Structural Support

There are several types of plants that need structural support in order to grow, and while many gardeners' erect trellises or frames for them to grow on, you can also grow structural supports for these plants. Beans and other plants that grow on vines can be grown with sunflowers or corn as companions. By planting a few beans around the base of each corn or sunflower plant, you can grow a natural trellis that the bean plants can climb.

This has the additional benefit that beans, being nitrogen fixers, will help

benefit the corn and sunflower plants as they grow. Structural support is not limited to climbers, however. It extends below the ground and can be considered in terms of shade and shelter as well. You can intercrop or plant your garden in a way that maximizes the efficiency of the garden space by increasing the yield in a smaller amount of space and making the most of water.

You can do this by mixing many different types of vegetables together, but the goals should be to grow crops that will not be in direct competition with one another, especially if you are growing them in a smaller space. One way you can do this is by growing taller vegetables alongside shorter, shade tolerant ones. Or, vegetables that have deep roots can be planted along with those with shallower roots. This minimizes competition for water and nutrients and has the added benefit of keeping the soil aerated at all levels.

Extended Harvest

This is one of the more difficult benefits to realize in terms of companion planting, because it requires a bit more planning and forethought than some of the others. By planning out your garden with an eye to the life cycles and growth periods of the plants in it, you can dramatically extend its life from the early spring all the way to the late fall and even into the winter. This is a sort of temporal (or time-centered) companion planting, in which new plants are cycling into the garden as others are dying or being harvested.

Everyone is familiar with the fact that tulips, daffodils, and other spring perennials are some of the first flowers you see after the snow melts. But they appear only briefly and are soon replaced by annuals and other plants that grow from seed through the late spring and summer. Because of this, many gardeners will plant bulbs in the same part of their garden that they intend to later fill with annual flowers like marigolds and black-eyed Susans. The same concept can be applied to your vegetable garden, as well.

You can plant cold season vegetables such as cabbage and beets early in the spring (particularly if you grow them under a cold frame) before you have even started your warm season vegetables indoors. Then, as the soil warms, you can plant a different set of crops where you are harvesting your cold season crops.

As fall approaches, you can replant another crop of cold season vegetable in

the same spot. In doing this, you extend the harvest of your vegetable garden considerably, and allow it to produce a much greater yield than it would if you were only planting a single kind of vegetable for a short period of growing time.

You can concentrate more on one of these areas than the others if It is your first-time trying companion planting, or you can try to balance your garden to incorporate all of them. Once you have more experience with companion planting, you will be able to plan a garden that seamlessly balances insect control, nutrient cycling, structural support and extended harvests, giving you better yields with less work.

Transitioning to a Companion Garden

Adding Companion Plants to an Existing Garden

If you have already got a well-established garden and you do not want to mess with it too much, you can still benefit from companion planting practices. You can begin the transition towards a companion-planted garden by adding a few beneficial species to your existing garden.

Rather than changing your garden plan in one fell swoop, you can start by working with what you already have. Perennials such as asparagus can benefit from the addition of some companion vegetables and herbs. You can plant flowers and herbs around the borders and between the rows of your garden. Maybe as a first project you can dismantle your onion patch and plant onions amongst your other vegetables. Every year you will get a little more comfortable with companion planting, and you will become an expert on what works best in your own garden.

It also helps to think outside the box, or the garden plot. You may not think of your raspberry bushes or your crab-apple tree, much less your flower beds, as part of your vegetable garden. But these areas also benefit from companion planting.

Alliums: This is the family that includes onions, garlic and chives. Plant these throughout your garden rather than keeping them all together. They will deter a wide variety of insect pests while at the same time attracting beneficial insects. Just keep them away from beans, peas and sage. Chives produce attractive (and edible) flowers and can be used in flower gardens too. They

are often used to protect roses from black spot, but the chives must be established for a few years before you will get results.

Aromatic Herbs: Basil, oregano, mint, dill, rosemary and sage will keep a variety of flying insects at bay, so you can plant them throughout and around your garden. Mint can take over very quickly, so It is best to keep it in a container. Dill should be kept away from carrots.

Marigolds: Plant some of these throughout your garden. You can even scatter the seeds to the wind in early spring and let them pop up where they will. French marigolds produce a natural pesticide in their roots that can keep soil pests such as nematodes at bay. The scent of the marigold plant also deters flying insect pests.

Nasturtiums: These can repel squash bugs, and act as a trap crop for aphids. You can plant them amongst your squash, or adjacent to the crops that you are trying to protect from aphids. Nasturtiums are beautiful to look at and are also edible. The peppery leaves and bright flowers add flavor and color to salads.

Radishes: These have a couple of advantages. You can interplant them in your garden because they mature while many of your other plants are still growing. They also act as a trap crop for a variety of insect pests. Little-known fact: radish seed pods are delicious raw or cooked if you pick them green!

Zinnias: Plant some of these colorful annuals around the edges of your garden or between the rows to attract beneficial insects to your garden. Pollinators such as wasps, hover flies and a wide variety of butterflies are attracted to zinnias.

More Tips for Transitioning to Companion Planting

If you have raspberries, try planting turnips and garlic near them. Garlic deters fungus and Japanese beetles, while turnips will repel Harlequin beetles.

If you have asparagus, you know how long it took you to establish it. It is not going anywhere, but you can plant some tomatoes, parsley and basil around it. Just keep the onions, garlic and potatoes further away.

Do you have apple or other fruit trees? Instead of leaving the ground

underneath them bare, you can plant herbs such as chives or bee balm. Chives can have the same protecting effect on apples as they do on roses. Bee balm is great for attracting pollinators and other beneficial insects. You can plant flowers such as Echinacea and lupins under fruit trees as well. Echinacea helps make deep soil nutrients more available to the trees, and lupins are nitrogen fixers that also attract butterflies.

Start adding vegetables to your flower beds. Flowering herbs such as chives and oregano are an obvious place to start, but even peppers, eggplants and cherry tomatoes can look attractive in a flower bed. If your flower garden incorporates a fence, use it as a trellis for scarlet runner beans. These edible beans have also long been used as decorative plants because of their brilliant red flowers.

CONCLUSION

So, you have finally learned a lot about companion planting and its surrounding concepts. There is still so much to be learned.

But remember, planning is key to any successful gardening activity. To finally help you get started with your newfound endeavor, here is a checklist that will prove helpful:

- Be sure to know what kind of plants you are planning to mainly grow. And yes, you must be very specific. Do not just vaguely say you want “vegetables”—there are many kinds. Do you want cabbages, lettuces, etc.?

Tip: To help narrow down your choices, come up with a list of 10 vegetables first. Then cancel out the ones you think are not so essential. A variety of 5 vegetables is a good number to start with.

- Figure out how every single one of these plants affects each other. A lot of the vegetables, flowers, and trees mentioned above will give you a good idea, but if you want to be thorough, you are going to have to do your homework. Remember, just because one type of plant benefits another, does not mean it will work with other combinations.
- Anticipate the height of each plant when fully grown. This is important for sunlight exposure. Taller plants will provide shade to shorter ones, but this is not always a good thing. In some cases, plants will need their dose of sunlight, while others, especially young saplings, need to have some shade.
- Finally, make a list of the companion plants that you think can benefit your main crops. Look back at the flowers and plants that can act as natural pesticides or recruit pollinators and predators to help keep your plants healthy.

If you have got those items in the list covered, then you are good to go!

Gardening can indeed be a very rewarding experience. Not only does it provide your home and family with a supply of natural produce, you also get

to benefit from seeing a beautiful garden right at home.

With companion planting, you can greatly increase the benefits of your gardening simply because you make the process easier by working with nature. Best of all, your conscience is clean because you steer clear of chemicals and stick to what is organic.

Always make it a point to know what you are planting and how each plant works with one another. If you do your homework, your garden will practically thrive on its own, and you are left to enjoy the fruits of your labor.

Finally, remember that companion planting, as well as gardening in general, should always be treated as a work in progress. Explore and be familiar with the plants within your locality, only then move on to fewer common types of plants. In the future, people might learn of new companion planting techniques, so you need to stay updated as well. The more you know about plants, vegetables, and companion planting in general, the better.

Companion planting can only help a strong plant. If your plant is weak or sickly or suffering from a disease, then no amount of companion planting is going to save it and it will be destroyed by everything. So, what can you do to ensure your plants stay healthy?

- Ensure you have prepared the soil for the type of plant you are growing.
- Ensure you feed the soil around the plant with the right type of nutrients the plant needs.
- Ensure you water your plants enough, but do not over water.
- Ensure you plant is correctly spaced away from other plants (for air flow and light).
- Ensure plants in a greenhouse have airflow.
- Ensure plants have enough light.
- Ensure plants in a greenhouse have shading (if needed).
- Keep greenhouses from overheating by watering the floor of the greenhouse.
- Ensure pollinating insects can access plants or you will need to hand pollinate.
- Research the plant you are growing and ensure you prepare everything you will need to grow it.

Sometimes you can do everything right, but crops fail because of circumstances out of your control. Just put this down to experience. Sometimes the weather will catch out even the most prepared gardener. There is little you can do if a late frost kills off your blossoming fruit trees. Blight may come along and get all your tomatoes before they have ripened. Yes, you can get blight resistant varieties but that does not mean they are immune. With all the things that could go wrong you wonder how anything grows at all. There really is no point in worrying about it, while it may be a bad year for apples or tomatoes, it may be the perfect conditions for another vegetable. So, do not be discouraged, enjoy it and just see what happens.

Gardening is fun and a time where you can experiment to a point. See what works for you. For example, what works in my garden or allotment, may not work in yours.

With this as a guide, you can enjoy the benefits of companion planting to make your garden healthier and more productive, and without having to work as hard to repel pests or keep your crops robust. Starting with a solid foundation of healthy soil that is rich in organic matter, carefully plan out how to arrange your companion garden to get the most out of your space.

Remember that increasing yield is not just about spatial efficiency, but also about extending the growing season to be if possible. By applying the principles of companion planting, you can have a beautiful, productive garden that takes care of itself. Companion planting is an important way to shift to using more sustainable, organic methods of keeping your garden healthy.

By weaning your garden off chemical fertilizers and insecticides and using natural methods to keep your plants healthy and free of pests, you will be improving not only your plants' health but your own as well. You will also be improving the environmental and carbon footprints. And your garden will be more robust as a result and better equipped to handle variable weather conditions, droughts, and disease. Thank you and I hope that you could apply everything you have learned about Companion Planting. Good luck!

INDEX OF FLOWER, HERBS AND VEGETABLES FOR COMPANIONS

Plant Name
Name: Scientific name Family: plant family Germination: time it takes to germinate Height: how tall plant gets Root Depth: how deep roots grow in optimal conditions pH: optimal levels Spacing: first numbers are between plants, second numbers are between rows Needs: whatever special needs a plant may have Companions: plants that are beneficial in some way or another. There are many benefits that come with companion planting. The five I focus on are: • Pest deterrent (P) • Disease deterrent (D) • Trap crops (T) are plants that attracts unwanted insects instead of one's chosen crop. • Enhancing flavor, growth, and/or yield (E) • Inviting beneficial (I) to pollinate and eat unwanted guests Detrimental: plants that are not so good to be around Problems: diseases, pests, and other issues that might arise.

Asparagus
Name: Asparagus officinalis Family: Asparagus Germination: 14-20 days Height: 3-8’ Root Depth: 3-4’ pH: 6.5-7.5 Spacing: 18-20” x 3-4’ Needs: Mulch, side dress with compost or manure, water regularly, full sun, deep soil. Companions: Asters (I), basil (P), coriander (I, P), cosmos (I), dill (I, P), horseradish (D, P), marigolds (I, P), parsley (I, P), strawberries, tomatoes. Detrimental: Alliums Problems: Aphids, asparagus beetle, asparagus miners, asparagus rust, fusarium wilt, crown rot, cucumber beetle, cutworms, rust, thrips.

Beans
Name: Phaseolus vulgaris Family: Pea Germination: 1-4 days Height: 2-6’ depending on beans Root Depth: 16-24” and 24-36” spreading. pH: 6.0-6.8 Spacing: Different for each variety Needs: Full sun, side dress with compost later in the season. Companions: Anise (P, I, E), basil (P), beets, borage (P, I, E), cabbage, carrots (I), catnip (I, P), cauliflower, celery, chamomile (I, E), chard, collards, corn (support), dill (I, P), kale, marigold (I, P), nasturtium (P, T), peas (E), potatoes, radish (I, T), rosemary (I, P), sage (P), savory (E), squash, strawberries, French tarragon (I, E). Detrimental: Alliums, beets (pole beans), gladiolus, and sunflowers depending on bean variety. Problems: Bean rust, skeletonized leaves from Mexican bean beetles, seed corn maggots, root rot nematodes, wireworms, potato leafhoppers, tarnished plant bugs, bean aphids, bean mosaic, curly top virus, downy mildew, mites, bean leaf beetles, flea beetles, green stink bugs, bean weevils, seed corn maggots, wireworms, leaf miners, mites, bean leaf beetle.

Broccoli
Name: Brassica oleracea Family: Cabbage Germination: 4-6 days Height: 18-36” Root Depth: 18-36” pH: 6.0-7.0 Spacing: 1.5’ Needs: Full sun, cool season, very fertile soil, mulching, calcium. Companions: Anise (P, I), asters (I), beets, bush beans, cabbage family, calendula (I), carrots, celery, chamomile (I, E), chervil (I, P), cucumbers, dill (I, P), hyssop (I, T), lettuce, marigolds (I, P), mint (I, P), nasturtium (P, T), onions (P), parsley (I, P), potatoes, rosemary (I, P), sage (P), thyme (I), zinnia (I). Detrimental: Pole beans, mustards, peppers, strawberries, tomatoes. Problems: Cabbageworms, cabbage loopers, diamondback moths, aphids, rabbits, deer, fungal rot.

Carrots
Name: Daucus carota Family: Parsley or Carrot Germination: 7-21 days Height: 12-18” Root Depth: 2-4’ pH: 5.5-7.0 Spacing: 2-3” x 16-30” Needs: Loose, rock free soil, compost, full sun. Companions: Beets, broccoli, calendula (P, I), caraway (P, I, E), chamomile (P, I), chives (D, I, P), leeks (P), lettuce, onions (P), peas (E), peppers, radishes, rosemary (P), sage (P), tomatoes (P). Detrimental: Anise (poor growth), dill (poor growth). Problems: Aster yellows, aphids, tarnished plant bugs, carrot rust fly, carrot beetle, carrot weevils, leafhoppers, cutworms, aphids, root knot nematodes, wireworms, fungal and bacterial diseases.

Cauliflower
Name: Brassica oleracea Family: Cabbage Germination: 8-10 days Height: 18-24” Root Depth: 12-18” pH: 5.5-7.5 Spacing: 12-15” x 24-46” Needs: Heavy feeder needing compost and or well-rotted manure, full sun, well-drained soil, mulch. Companions: Celery (E), chervil (I, P), dill (I, P), potted mint (P), nasturtium (P, T), onions (P, E), pennyroyal (P), potatoes (E), sage (P), thyme (I), zinnias (I). Detrimental: Grapes. Problems: Aphids, cabbage root maggots, cabbage loopers, clubroot, downy mildew.

Celery
Name: Apium graveolens Family: Carrot Germination: 7-10 days Height: 15-18” Root Depth: 6-12” pH: 6.0-7.0 Spacing: 6-8”-18-36” Needs: Lots of water, full sun to partial shade, potassium, fish emulsion. Companions: Beans, cabbage, calendula (I), cauliflower, chives (D, I, P), collards, cosmos (I), daisy (I), garlic (P), kale, leeks (P), potatoes (E), zinnias (I). Detrimental: Asters (invites insects that can cause celery leaf damage) corn, lettuce. Problems: Slugs, parsley/celery worms, aphids, carrot rust fly, celery mosaic, fungal diseases, fasarium yellows, blight.

Eggplant
Name: Solanum melongena Family: Nightshade Germination: 7-14 days Height: 24-30” Root Depth: 4-7’ pH: 6.0-7.0 Spacing: 18-30” x 24-38” Needs: Heavy feeder, full sun, heat. Companions: Amaranth (T, I, E), basil (P), bush beans, green beans (E), dill (I, P), lettuce, marigolds (P), peppers, redroot pigweed (E, P), tarragon (P, I, E), thyme (I), tomatoes, peas (E). Detrimental: Pole beans, fennel, potatoes. Problems: Flea beetle, cutworm, spider mites, fusarium wilt, lace bugs, blister beetle, Colorado potato beetle, blight.

Garlic
Name: Allium sativum Family: Amaryllis Germination: cloves sprout in 2-8 weeks Height: 1-3’ Root Depth: 2-24” pH: 5.5-7.5 Spacing: 4-6” x 1.5-2’ Needs: Planted in fall, loose well-drained soil, full sun. Companions: Cabbage family members, eggplant, lettuce and other salad greens, tomatoes. Detrimental: Hurtful to legumes. Problems: Onion thrips, white rot, onion maggots, cutworms, aphids, pink root, fusarium bulb rot, lesser bulb flies, wireworms, leaf blight, rust, onion smudge, neck rot.

Kale
Name: Brassica oleracea Family: Cabbage or Mustard Germination: 7-10 days Height: 12-24” Root Depth: 6-12” pH: 6.0-7.5 Spacing: 15-18” x 24-46” Needs: Rich, well-draining soil, full sun. Companions: Beans (E), beets, Brussel sprouts, cabbage family members, calendula (I), celery, chamomile (I, E), chervil (I, P), cucumbers, dandelion (I), dill (I, P), leeks (P), lettuce, marigolds (I, P), mint (P), nasturtium (P, T), onions (P), peas (E), potatoes, rosemary (I, P), sage (P). Detrimental: Grapes, tomatoes. Problems: Slugs, aphids, cabbage loopers, cabbage worms, harlequin bug, flea beetle, clubroot.

Leeks
Name: Allium porrum Family: Amaryllis Germination: 5-7 days Height: 15-36” Root Depth: 8-18” pH: 6.0-7.5 Spacing: 5-7” x 11” Needs: Sun to partial shade, hill up to blanch stems. Companions: Cabbage family members, carrots (I), celery, lettuce, onions (P), tomatoes. Detrimental: Legumes Problems: Onion fly, smut, pink root.

Lettuce and other Greens

Name: Lactuca sativa

Family: Sunflower or Aster

Germination: 3-7 days

Height: 6-12”

Root Depth: 18-36”

pH:6.0-7.5

Spacing: 6-12” x 12-14”

Needs: Sun when it is cold and shade when It is hot, loose well-draining soil.

Companions: Beets, carrots (I), chervil (I, P), chives (D, I, P), cucumbers, garlic (P), hyssop (I, T), leeks (P), onions (P), radishes (P), sage (P), strawberries, sunflower (I).

Detrimental: Celery, parsley.

Problems: Slugs, slugs, slugs: urrrrrr. I have found radishes help because the slugs seem to be attracted to them more than the lettuce at first. Hand collecting at night and in the morning seems to be the best option in addition to spreading used coffee grounds around plants. Rabbits, aphids, snails, cutworms, mildew, viral disease, wireworms, tarnished plant bugs, leafhoppers, thrips, aster yellows, mosaic virus, bottom rot, flea beetle, powdery and downy mildews, leaf miners.

Melons
Name: Cucumis melo (muskmelons) Citrullus lanatus (watermelon) Family: Gourd Germination: 4-10 days Height: 24” Root Depth: 2-4’ pH: 6.0-7.0 Spacing: 2-4’ x 5-7’ Needs: Lots of compost or aged manure. Companions: Beets, corn (E), peas (E), marigolds (I, P), nasturtium (P, T), radishes (P), sunflower (I). Detrimental: Potatoes. Problems: Squash borers, squash bugs, powdery mildew, bacteria wilt, cucumber beetle, mites, mildews and fungal diseases, mosaic, aphids, leaf blight, fusarium and bacterial wilts, scab.

Onions
Name: Allium cepa Family: Amaryllis Germination: 6-12 days Height: 15-36” Root Depth: 18-36” pH: 6.0-7.5 Spacing: 3-5” x 12-18” Needs: Weeded, full sun. Companions: Beets, cabbage family members, carrots (I), celery, chamomile (I, E), lettuce, potatoes, pumpkins, radish (I, T), savory (E), squash, strawberries, tomatoes. Detrimental: Legumes, parsley. Problems: Thrips, onion maggots, basal rot, pink root, cutworms, aphids, fusarium bulb rot, rust, smut, mildew, white rot, lesser bulb flies, wireworms, leaf blight, onion smudge, neck rot.

Peas
Name: Pisum sativum Family: Pea Germination: 8-10 days Height: 2-6’ Root Depth: 1-3’ pH: 6.0-7.0 Spacing: 2-4” x 18-48” Needs: Full sun. Companions: Anise (P, I), beans (E), carrots (I), corn, cucumbers, potatoes, radishes, turnips. Detrimental: Alliums. Problems: Deer, powdery mildew, aphids, pea weevils, root rot, seed corn maggots, cutworms, potato leafhoppers, tarnish plant bugs, pea aphids, wilts, mosaic, mites, downy and powdery mildews, blight, leaf miners, cucumber bee.

Peppers
Name: Capsicum frutescens Family: Nightshade Germination: 14-21 days Height: 2-3’ Root Depth: 8-48” pH: 6.0-7.0 Spacing: 12-24” x 18-36” Needs: Heavy feeders, full sun. Companions: Alliums (P), amaranth (T, I, E), asparagus, basil (P), beans (E), borage (P, I, E), carrots (I), celery, dill (I, P), garlic (P), lettuce, marigolds (I, P), nasturtium (P, T), parsley (I, P), redroot pigweed (E, P), roses, sage (P), Sweet Annie (I). Detrimental: Kohlrabi, fennel, potatoes. Problems: Aphids, cutworms, nematodes, fusarium and verticillium wilts, bacterial wilt, leaf miners, flea beetles, hornworms, pepper maggots, European corn borers, earworms, pepper weevils, tobacco mosaic virus, mites.

Radish
Name: Raphnus sativus Family: Cabbage Germination: 4-7 days Height: 2-12” Root Depth: 3-6” pH: 5.8-7.0 Spacing: 1”-2” x 8-12” Needs: Full sun to partial shade. Companions: Cabbage family members, lettuce, carrots (I), chervil (I, P), cucumbers, garlic (P), legumes (E), marigolds (I, P), nasturtium (P, T), onions (P), peas (E). Detrimental: Hyssop, grapes. Problems: Cabbage maggots, flea beetles, slugs on leaves, rodents, clubroot, scab, downy mildew.

Squash
Name: Cucurbita pepo Family: Gourd Germination: 6-12 days Height: 12-40” Root Depth: 1-6’ pH: 5.5-7.5 Spacing: 24-28” x 36-60” Needs: Full sun, heavy feeder. Companions: Basil (P), beans (E), buckwheat (I, E), catnip (I, P), celery, clovers (E), corn, fennel (I), marigold (I, P), mint (P), nasturtium (P, T), onions (P), oregano (I, P), radish (I, T), spinach, sunflower (I), thyme (I), tansy (I, P), yarrow (I, P), zucchini. Detrimental: Potatoes. Problems: Squash bugs and borers, downy and powdery mildew, cucumber beetle, mosaic virus, bacterial wilt, spider mites, pickleworms, aphids.

Sweet Potatoes
Name: Ipomoea batatas Family: Morning glory Germination: 2-5 days for slip root growth Height: 12-15” Root Depth: 1-6’ pH: 5.5-6.5 Spacing: 12-16” x 36-40” Needs: Full sun. Companions: Beets, dill (I), white hellebore (I), nasturtium (P, T), parsnips, thyme (I). Detrimental: Squashes because of similar growing habits. Problems: Sweet potato weevil, stem rot, scurf, black rot, nematodes, squash stinkbugs, rabbits, fusarium wilt, flea beetle, tortoise beetle, bacterial and fungal diseases, white grubs, cutworms.

Tomato
Name: Lycopersicon esculentum Family: Nightshade Germination: 5-10 days Height: 3-15’ Root Depth: 8-60” pH: 6.0-7.0 Spacing: 2’-3’ Needs: Fertile, well-drained soil in full sun. Companions: Amaranth (T, I, E), asparagus, alliums (P), basil (P), beans (E), borage (P, I, E), carrots (I), celery, dill (I, P), lettuce, marigolds (I, P), parsley (I, P), nasturtium (P, T), redroot pigweed (E, P), roses, garlic (P), pot marigolds (I, P), sage (P), Sweet Annie (I). Detrimental: Apricots, cabbage family members, eggplant, fennel, kohlrabi, peppers, potatoes. Problems: Red spider mites, blossom end rot, tomato hornworms, Colorado potato beetles, flea beetles, fungal diseases, nematodes, cutworms, root knot nematodes, bacteria wilt and spot, stink bug, tomato pinworms, tomato fruit worms, mites, blights, slugs and snails, various animals, aphids, tobacco mosaic virus, fusarium and verticillium wilts.