How To Easily Build Your Own Greenhouse

Save $1,000's On Groceries All Year Round

Contents

Just What is a Greenhouse?

What do you think of when you think of a greenhouse? Maybe you envision something that is a privilege only for the rich and famous, a type of hobby shop or money drain that only the wealthy can afford.

But really, what do you know about greenhouses? Obviously these are stand-alone buildings that are used to grow flowers and plants that might not otherwise thrive in the soil outside. Greenhouses are known for their controlled environments which are imperative for the health of many different plants, especially the more exotic and rare ones. Tropical flowers especially need a warmer, more humid environment than might not be available in many areas of the country. This controlled environment is also needed for those who want to cross-pollinate and breed their own unique designs of plants, or who want to grow many different types of plants at once.

Greenhouses are also made just for the hobbyist. If you live in an area with a short growing season but really love to garden, a greenhouse can provide just the right atmosphere for growing plants year-round. Virtually all houseplants and vegetation can be grown in a greenhouse and they're not meant exclusively for the exotic or tropical ones.

To many, a greenhouse sounds like an expensive indulgence that can be enjoyed only by the wealthy and elite. Often in the movies a greenhouse is a building the size of most people's apartments or homes, and is seen on the grounds of a rich person's chateau or sprawling mansion. Perhaps

because of this type of portrayal, many believe that a greenhouse is just out of their reach budget-wise. And with budgets being very tight for people everywhere today, it's no wonder that cost is a concern for anyone considering such a structure.

Some also believe that when growing plants in a greenhouse you need nothing short of a degree in botany in order to be successful. Perhaps in your case you've noticed that you don't seem to have the best of luck when it comes to houseplants or a garden outside and assume for whatever reason that greenhouse flowers and plants will be even more difficult.

Whatever your doubts or assumptions about greenhouses, why not set those aside for just a few moments and consider the information in this book? We're going to cover in this first section just what a greenhouse actually is and later explain all the many details involved in maintaining one; after you've gone through this section and find that you know more about their function you may be pleasantly surprised at how easy they are to maintain and how enjoyable of a hobby they actually are!

Some greenhouses are very ornate, which may be why some people think they're out of their reach budget-wise.

The Definition of a Greenhouse

Note the very simple definition given by Wikipedia of a greenhouse: "A greenhouse is a structure with a glass or plastic roof and frequently glass or plastic walls; it heats up because incoming solar radiation from the sun warms plants, soil, and other things inside the building. Air warmed by the heat from hot interior surfaces is retained in the building by the roof and wall. These structures range in size from small sheds to very large buildings."

This seems simple enough, doesn't it? A greenhouse is just a building made almost entirely of glass or plastic. But the obvious question immediately arises - how does a building like this actually stay warm on the inside?

How a greenhouse works.

You don't need to be a physicist or scientist to understand the basics of how a greenhouse works. Remember that light is actually a type of energy and with energy comes heat. You may already understand how light and heat are connected - sit outside on a very bright, sunny day and of course you get too warm very quickly and easily. When your house gets hot in the summer you can get it cooler by closing the blinds, keeping out the sunlight.

Light radiates into all parts of a greenhouse because it is glass or plastic all around, unlike a house that has covering on the walls and roofs. This light that enters into a greenhouse radiates all the way to the ground where it gets caught, and because of its construction the heat cannot escape as easily as it does with a normal house. Heat rises through a process called convection, which is the movement of molecules within fluids. In a typical house heat escapes through the ceiling and walls, held in only by the type of insulation a home builder chooses. It also typically escapes through

cracks and crevices not sealed properly, such as around windows and doors and even through openings for light switches and electrical plugs.

Greenhouses on the other hand are virtually airtight and the thick type of plastic or glass used does not allow that heat created by the light to escape as easily. So, the light comes in to a greenhouse and brings with it heat. Typically heat would rise in a house and escape through the roof or walls, but in a greenhouse it gets trapped and stays inside.

Plastic greenhouses are usually constructed with a special plastic that contains PE film, a type of polyethylene. This is the same type of thin plastic that is used to make plastic shopping bags. There are other types of plastics used for greenhouses but again, their purpose is to let the light in without letting the resultant heat escape.

Understanding how a greenhouse works should emphasize how important it is to make sure they're constructed properly if you decide to make your own or to assemble one from a kit. Being neglectful of openings or using materials not designed for a greenhouse may render them ineffective.

Use of greenhouses.

It may seem obvious as to the use of greenhouses; as we've said, they work to nurture plants that might not survive outside. This might be because they need special elements to survive and thrive; different plants need different "diets" that they get from the soil and from the environment around them. It might also because of the growing season; tropical plants need a warm and humid environment all year and some areas have very short summer seasons. Having a greenhouse means that plants can be kept warm and nurtured all year, just like how humans live in houses to be safe from the elements!

Greenhouses have many more benefits than that. They allow a true gardener or even the hobbyist to work with plants in a controlled environment so there's no worry about getting sunburn during those hot summer months or about early frost ruining delicate seedlings.

Since most greenhouses have shelves on which plants are kept, this means less stooping and bending as you would in a soil garden. They're a great way for those that are elderly or who have limited mobility to still enjoy their gardening and flowers.

There is also typically less work needed to actually maintain the plants - in a soil garden there is constant worry about weeds and pests. But with a greenhouse the plants are kept safe and away from pesky squirrels, rabbits, and household pets.

There are those that are very interested in organic gardening or just gardening at home for whatever reason. Some appreciate organic gardening because they're very worried about the pesticides and chemicals used to grow food and the additives used during the manufacturing processes. They may also be concerned about the environment and their "carbon footprint" and want to do what they can to live naturally, at least as much as possible.

Some want to garden at home because of course the cost of food is getting obscenely high in most areas, especially the price of produce items. If you can grow even just a few items in your own garden this might make a tremendous impact on your family's food budget.

A greenhouse allows a person to garden easily and during most of the year as well. Whether it's because of an interest in organic gardening or just gardening plain and simple, a greenhouse can be a great indulgence for the hobbyist or serious gardener.

Greenhouses Around the World

Greenhouses can be as small or as large as you want them to be. They are so successful in growing plants and vegetation all year round that they can be found in many areas as tourist attractions.

The Royal Greenhouses of Laeken in Brussels, Belgium.

The Royal Greenhouses of Laeken

In Brussels, you can visit this complex of several greenhouses in the park of the Royal Castle of Laeken. This complex was actually built between 1874 and 1895 when engineers where just beginning to experiment with buildings made of glass and steel, and features what is called the "Iron Church," or a domed greenhouse that originally served as the royal chapel for King Leopold II and his family.

The complex itself is over 270,000 square feet or 2.5 hectares. Unbelievably, some of the plants included in the original greenhouse are still in existence in the complex itself, making them well over 100 years old. While the complex itself is still part of the private residences of the royal family, it is open to the public for two or three weeks every year, during the peak growing season when the majority of flowers are in full bloom.

Royal Botanic Gardens

In London you can find the Royal Botanic Gardens which is actually an organization that runs the Kew Gardens and Wakehurst Place gardens in Sussex. This botanical research and education institution is an extensive collection of glass greenhouses, cottages, and other beautiful attractions. Tourists from all over the world flock to these gardens to tour not just the arboretum but their carnivorous plant collection, their cacti collection, as well as their bonsai, grass, Rhodedendrons, bamboo, roses garden, lilacs, herbs, ferns, orchids, and so many other beautiful plants and flowers in their extensive collections and gardens. Most years, the gardens received over 1.5 million visitors annually!

But more than a tourist attraction, the gardens are one of the most important botanical research facilities in the world. Kew is important as a world seed bank and the Kew herbarium is one of the largest in the world with approximately 7 million specimens used primarily for study.

These gardens began to be collected and structured in the early 1700's and have been extended and added to ever since. In 1987 they opened what would be their third major conservatory, the Princes of Wales Conservatory, opened by then Princess Diana.

The Botanical Garden of the Technical University of Braunschweig

The water lily house in Kew Gardens.

In Germany, the botanical garden of the Technical University of Braunschweig houses some 1200 different species of plants and flowers in greenhouses. This complex began construction in the early 1800's and still today serves as an important research facility for botany and many other plant sciences. Many of the original trees planted in the outside areas of the garden are still in existence today. Much of the destruction that the garden suffered during bombing raids of World War II was undone and rebuilt over the years.

While the garden and greenhouses exist mainly for research purposes, the plants they house are still considered some of the most beautiful and exotic in the world.

There are of course many other beautiful greenhouses in existence in the world; some of the most exotic are housed in Spain where greenhouses or a big business and very common with private residences. Chances are your local zoo or city park has a greenhouse somewhere on the grounds, whether you're allowed to tour it or not. They're commonly used to house and nurture not only plants and flowers but butterflies and many varieties of insects and other creatures.

There are some 1200 varieties of tropical and exotic plants and flowers housed in greenhouses at the botanical garden of the Technical University of Braunschweig.

Personal Greenhouses

Large and expensive greenhouses are just fine for research facilities and when tourists are going to be walking through them, but what about private greenhouses in someone's backyard? Just how common are these?

It is true that keeping a greenhouse will mean a bit of yard space, which might be why they're not as common as you might assume they would be. When you have limited backyard space you need to choose between the swing set, the trampoline, the badminton set, and room for the kids and pets to play - and your desire for a greenhouse.

But thinking that your space is just too limited is a mistake. Some commercial greenhouse kits sell units that are as small as ten feet by eight feet - smaller than the tiniest of garages and easy to fit into just about any space, even a side yard.

Greenhouses are becoming more and more popular these days as people are taking more of an interest in growing their own food and doing their own gardening. And as they become easier to construct of course their manufacturers will continue to offer simpler kits.

But what about you? Are you still filled with some doubt about how easy or how difficult a greenhouse can be to build and maintain?

Before you "throw in the trowel," let us help!

In this book we're going to share with you:

- All the technical information you need to know about greenhouses, from their design and material to how they actually work.
- Some insider tips and secrets when it comes to assembling and maintaining your greenhouse, including some the manufacturer would never share with you!

- How to get your plants started from seed and how to maintain them once they're no longer seedlings.
- Ways you can cross-pollinate plants and flowers so that you can actually make your very own personalized blooms!
- Ideas on how to try hydroponics gardening and organic gardening in your greenhouse.
- How to turn your greenhouse into a fun and profitable business!

If you've been curious about whether or not you could really maintain a greenhouse, wonder no longer! After reading this booklet you're sure to be confident about what type of greenhouse is right for you and how to keep and maintain healthy, thriving plants in that environment.

So if you're ready to shop for a greenhouse, let's get started!

Before You Begin Shopping ...

Before you actually start shopping for a greenhouse and definitely before you make your purchase, you need to make some hard and fast decisions about just what you're looking for in the first place.

You may think that you're going to have some difficulty in this section because you may not yet know much about greenhouses - so how can you pick the style and design that's right for you? Isn't that like putting the cart before the horse, as they say?

In reality, giving some thought as to what you're looking for by way of a greenhouse including your budget and your space considerations are all important elements even before you go shopping. You might compare this to shopping for a new home - you don't just go out to a realtor's office and ask them to show you what they have available, but you think about how many bedrooms you need, how much you can afford, your most desirable location, and so on. Having these things in mind beforehand are what will make that shopping so much easier.

So with greenhouses, what do you need to think about before you start shopping around? Let's cover the major aspects of a greenhouse purchase so you can make some notes to yourself.

Important: One thing you should do first before you make any decisions is to call your local zoning board to find out if there are any restrictions as to greenhouses in your area. You definitely need to make sure that you build within those restrictions, if you're allowed to build at all. You may even need a building permit even if you're putting together a kit, so make sure you're following those laws as you make your decisions.

Space Considerations

Greenhouses can be very compact, such as this six foot by eight foot model that still offers plenty of room inside to work.

How much room do you have for a greenhouse? Your only consideration in this regard is that you don't want your greenhouse to be in a shady area, so just about any place in your yard will be sufficient as long as it gets good sunlight. As mentioned, some greenhouses are even built onto the exterior wall of a home like a sun porch. Your space considerations are going to be unique to your own yard area.

One thing you can do is imagine how much room you think you'll need in comparison to a particular room in your house, keeping in mind that greenhouses keep their plants on shelves rather than being planted in the ground. To explain what we mean by that, think of standing in your kitchen. The actual footprint of that room might be ten feet by ten feet but you have counters that jut out from the walls. Your greenhouse will be the same way - the footprint will be a particular size but will have shelving that needs to line up against the walls. So stand in your kitchen or bedroom or another room that you imagine will be a comfortable size for your greenhouse and imagine shelving coming out from the walls. Will that be sufficient space or too much space? When you have your comparison to a room in your home you can then measure the floor space to give yourself a good idea of how big your greenhouse should be. You can then take those measurements outside and make sure you have sufficient room in your yard for such a structure.

Of course if you live on a large lot with few space limitations you can shop for a greenhouse of whatever size you want. But for most, you're going to need to do some measuring before you start shopping.

Budget

What's your budget for a greenhouse? For the typical structure on a private residence you might want to figure at least $1,000 but of course there's no limit to the amount of money you can spend. Larger structures can run up to $5,000 and even more.

Every greenhouse is going to need accessories. This includes shelving, benches, heaters, grow lights, vents, shade cloths, thermometers, hydrometers, and electrical extensions. Not all of these are required for greenhouses and of course you may already have some benches or shelves you can use, but it's important to remember each of these components for your budget. Let's take a closer look at each of these so you can better understand their need and get an idea of their costs as well.

Heaters

Whether or not you're going to need a heater for your greenhouse is going to depend a lot upon the types of plants and flowers you want to raise and the climate in which you live.

Many tropical plants need a consistently warm and humid environment and of course desert plants need a very hot environment as well. You might be looking to grow less finicky plants but if you live in a cold environment or have a short summer you may need to keep the greenhouse heated no matter what.

Heaters for greenhouses range from simple space heaters like you would use in your home to more complex models that you can program to shut on and off the way you would your home's thermostat. Once you've given some thought as to what you want to grow and have a realistic idea of whether or not you'll need to heat your greenhouse, you can look around at different heaters and get an idea of their price.

Grow lights

Many who grow indoor gardens or who have very short growing seasons find that grow lights are imperative for their plants' health. Unlike regular household lamps or fluorescent lights, grow lights concentrate the important parts of a light's spectrum that plants need for growth. Healthy plants need a good eight hours of quality light every single day to thrive which is often why houseplants fail to grow if they're not in the right spot of a home.

Think seriously about your growing season. To keep your plants healthy during the off-season you may very well need grow lights. While they are a bit more expensive than regular lights and bulbs, they're well worth it for the health of your plants. People can even grow plants in a basement if they invest in the right grow lights!

One thing to remember is that plants need rest just like humans do; if you purchase grow lights be sure to turn them off in the evening rather than run them all night.

As with other accessories, the price of grow lights will depend on their size and whether or not you purchase one of the fancy models that can be programmed to go on and off automatically. Of course you can also hook up your grow lights to a timer like you would use for your indoor lights when you go on vacation, and timers are relatively affordable. Simply think

about the size of your greenhouse and then you can shop around for grow lights.

Vents

An important part of a thriving greenhouse is maintaining the right temperature. As greenhouses are so well sealed in order to keep the heat in, this might mean that they get too hot and humid during the warm summer months. The way to correct this is by vents that are either part of the greenhouse design itself or that you purchase and incorporate into the design. Very fancy vents are hooked up to thermostats or timers so that when the temperature gets to a certain level the vent will open by itself, allowing heat to escape. When the temperature drops to an appropriate level the vent closes itself so the greenhouse can get warm again.

One thing to consider about vents is how hot your summer typically gets and how much time you plan on spending in your greenhouse. If you plan on making your greenhouse an everyday hobby then you may be able to install manual vents that you can open and close yourself. And of course this will typically depend upon your environment as well. If your summers don't get unbearably hot you may only need a manual vent that needs to be opened on the warmest of days.

Shade cloths

Another part of keeping your greenhouse at the appropriate temperature may include shade cloths, which are just large cloths you drape over the top of the greenhouse to block out the sun. If you live in an environment that gets a lot of direct sunlight for many hours during the day you may need to invest in a shade cloth. While plants need sunlight more than humans do, think about how comfortable you would be in that direct

sunlight for hours and hours at a time. If you live in Florida or Arizona or someplace where it would obviously be uncomfortable for you to be outside and exposed to the sunlight, this might be damaging to your plants as well.

You can of course use just about anything for a shade cloth but the ones you purchase that are made specifically for greenhouses are typically designed with locking clips so that you can fasten them to the side of your greenhouse and they stay in place. They are also made of a very durable fabric that will hold up against the elements.

Shade cloths are sold usually by size and material so the size of your greenhouse and how much you're willing to invest in a durable material will affect the amount you pay.

Thermometers and hydrometers

Depending on the plants you want to grow, the temperature and humidity levels of your greenhouse will be vitally important. Tropical plants especially need a warm and humid environment. The best way to ensure that you are providing the more finicky plants with the environment they need to grow is to use both thermometers and hydrometers.

These tools of course won't tell you the optimal temperature and humidity level for your plants but learning about what your plants and flowers need is all part of the fun of growing your own. You simply need to make sure your temperature and humidity levels are within those healthy levels for your particular plants.

Other accessories

There are many other accessories you can purchase for your greenhouse which may or may not be necessary for your own growing needs. For example if you purchase anything electrical such as an automatic venting system, you may need an electrical hookup system. This might be an electrical generator that you have plugged into another electrical system such as in your garage or home and that has outlets you can use in the greenhouse. Some greenhouses have electrical systems already running through the walls but of course you would need to run some type of electrical wiring or cord to the greenhouse itself.

You can also install an automatic misting system throughout your greenhouse; many simply hook up to an outside hose or faucet. These too come in many different varieties, from those with built-in thermostats and hydrometers that click on automatically to those that are not much more than long, thin garden hoses you work manually.

There are also compost makers for greenhouses which are covered tubs on a spindle you turn when necessary. These work well for greenhouses because the covering cuts down on the typical odor created by a compost heap and because they're very compact, so they fit nicely in your greenhouse or just outside of it. And of course there is no end to the number of benches and shelves you can purchase, along with indoor gardening supplies that make working in your greenhouse that much easier.

Taking all these expenses into account is going to be important when considering the type and size of your greenhouse. Spending every dime you have on the frame is going to be a mistake if it means you have no money left over for benches and shelves or if you thought a shade cloth was unnecessary, and all your delicate flowers wilt under the harsh summer sun.

There are other considerations when planning on what greenhouse you want to purchase; let's take a look at some of those now.

If you're really pressed for space and money, you can try a lean-to greenhouse which is attached to the side of a house, garage, or even your tool shed!

Location

Just where you put your greenhouse is going to depend on a few factors. What type of plants are you planning on growing? If they're tropical they may need maximum sun exposure. Most houseplants and flowers need good exposure but not always direct sun exposure all the time.

This will also depend upon your environment - again, if you live in a climate with extremes when it comes to temperature you may need some partial shade. If you have a long cold season then you need maximum sun exposure.

Remember that the sun shines in different spots throughout the year. A very sunny spot in June might not have much sun at all in January when you need it most. Try to note the best area of your yard throughout the entire year so that you can choose the best spot.

And of course you can manipulate these factors by using heaters, misters, and shade cloths. Just take all these factors into consideration; if you thought of putting your greenhouse in the side yard because you have more room there but notice that this part of the yard is shaded by the house, you might need to rethink this. Your ideal location because of how the greenhouse will look might not be the ideal location for your plant's health and growth.

Construction Materials for Greenhouses

A greenhouse is a greenhouse, right? Four walls and a sloped ceiling and there you have it.

In reality, there are as many different types of greenhouses as there are different types of actual houses. From large school greenhouses that you could park a plane in to very small shed-like structures that are designed for the hobbyist, there is no doubt a greenhouse available that suits your needs and your budget perfectly, whatever they may be. There are even portable mini greenhouses made for those who travel often or who have very limited space, and you can even build a greenhouse as a type of addition to your home the way you might build a sun porch.

Let's take a closer look at some of these different varieties so you can better understand the options available to you.

Frame Type and Material

The shape and design of your greenhouse is just going to be a matter of taste more than anything else. If you notice a Victorian style that appeals to you or prefer something simpler and more basic, the appearance of a greenhouse rarely has anything to do with its function. Remember however that your greenhouse may become a permanent part of your property, so a nicer greenhouse can actually add value to your home. Keep in mind how visible your greenhouse is as well - a functional but bland one might distract from your home's curb appeal if it's visible from the street.

No one can tell you exactly which style or design you should get; buying a greenhouse is like landscaping or putting up a new garage. You'll need to

consider all the different factors of how it's going to look versus the money you can spend, and then make your decision.

Smaller greenhouses for the hobbyist typically have a metal, wood, or plastic frame. The sturdier the frame, the longer your greenhouse is likely to last since the frame is what will keep it in place and not allow it to crumble under the weight of outside elements.

Wood greenhouses are often chosen for their aesthetic appeal.

Your environment will also have something to contribute as to the type of material your greenhouse should be. Harsh winters mean that you should invest in the sturdiest frame as well as stronger glazing on the glass or plastic and be sure to get a peaked roof so that snow doesn't build up. Milder weather year-round may mean you can save a few dollars with a less costly wooden frame. Rust-proof aluminum is best for wetter or more humid climates.

So that you can make the best decision as to what type of material is best for your greenhouse, consider the typical building materials:

- Galvanized steel is probably the sturdiest and most durable of building materials for a greenhouse but is also typically the most expensive. Some greenhouse kit sellers have actually dropped galvanized steel options because of the cost, not just of the material, but also of the shipping involved because the material is so much heavier than most. If you can afford galvanized steel and

can find it, this material might be your best bet especially in those harsh environments.

- Plastic or PVC frames are typically inexpensive and easy to assemble; this makes them a favorite for the hobbyist or those just starting out with greenhouses. However because they are so light you might want to think twice about using this material if you live in an area with high winds, and may also consider how you can anchor it for support. In extreme conditions plastic can bend or break, so be mindful of your local weather conditions.

- One of the most common reasons for choosing wood frames is that they look very nice, especially when you use glass rather than plastic for your windows. Wood is also a natural insulator and absorbs heat during the day; however, it also typically absorbs moisture and may rot faster which means it requires more maintenance than other framing. For drier climates this may not be as much of an issue but of course in the more humid environments it may be better to choose a different material.

- Aluminum is one of the most common materials for greenhouses since it does not rust and withstands the most extreme weather conditions. Aluminum is also compatible with most window types such as plastic, glass, or polycarbonate. Usually they are also very easy to put together, something good for a person without a lot of mechanical skills!

Covering Materials

The greenhouse covering actually refers to what you would call the windows. There are many different types available, just like with the

frames. Here is a general description of the types of coverings commonly offered:

- Glass - Greenhouses don't typically use just ordinary glass but glass that has been glazed; this glazing is what allows light in but doesn't allow the heat from that light to escape. Glass is heavier than other materials and may not be recommended for very light aluminum and it also breaks much easier. You should definitely consider your family and your neighborhood if you're considering glass - tossed balls and hyperactive pets aren't going to stop for your greenhouse! If your home or neighborhood is very busy with children and pets you might consider the fact that you will probably be replacing glass panes very often, and may want to open for something else.

- Plastic and polycarbonate - Many greenhouses today offer fiberglass, acrylic, or polycarbonate greenhouse coverings because they are very strong and hold up well against the harshest elements. They are also very lightweight despite their strength and so may work well with any type of frame. If you have a busy yard or neighborhood and are afraid of what those running children might do to your greenhouse, a good sturdy plastic might be your best choice.

- Polyethylene film - Many commercial greenhouse growers use polyethylene film but unfortunately there are many cheap varieties sold in home improvement stores that just aren't sufficient. If you decide to use polyethylene film, make sure you purchase it from a true greenhouse manufacturer.

Lean-To Greenhouses

We're going to include this special section about lean-to greenhouses because many people don't even realize this type of construction exists as an option for greenhouses. You may have actually seen this type of design before but not even realized what it was, assuming it was some type of sun porch - which is exactly what they resemble.

An example of a lean-to greenhouse. While they're perfect for those with limited space, some are so large and roomy that they can actually function as a sunroom or porch!

A lean-to greenhouse simply incorporates the wall of another structure for its own and is built as a sort of addition to your home or garage or even your tool shed. This can be a great option for those living with limited outdoor space or who have a limited budget.

Most lean-to greenhouses are secured with silicone that causes little or no damage to the structure to which it's attached. They are often available in the same types of materials as typical greenhouses and assemble very easily.

If you have limited space or funds you may want to consider a lean-to greenhouse. They easy to install and economical and while they may not afford as much space as you had expected, they are certainly sufficient for the majority of uses you're expecting from your structure.

Floors or Base

You may not have given much thought to this but your greenhouse will need some type of floor or base. Some do not come with a base which means you'll be walking on whatever surface you put your greenhouse on. If you just install it in your backyard, this can mean mud as well as insects and pests. You might already have some concrete in the area where you plan on putting the greenhouse but if not, you should check if a base is included with your kit or not. Some bases or floors can be purchased separately if your kit does not come with one. Concrete floors are typically recommended especially for the serious grower as they make the best place on which to put benches and other materials. Wooden floors are also acceptable for the hobbyist.

Putting it All Together

Now that you have all this information about greenhouses, how do you actually put it all together in order to make your best decision? Here are some key pointers you should walk away with:

- Consider your space. Remember that your greenhouse should have a great deal of direct sunlight. If that side yard is larger but mostly shaded, you may do well with choosing a smaller model that will fit into your backyard or a lean-to model that will fit against the side of the house.

- Shop for those accessories and consider which ones you're going to need. If your summer is short then a heater will be a good investment, and a thermometer will probably be a necessity as well. For longer and hotter summers, that shade cloth will also be a necessity. Add up all the accessories you plan on buying

whether it's because you absolutely need them or just prefer things like timers and automatic vent openers.

- When you've figured all your accessories then you can consider your budget much closer. You may be surprised at what a chunk those accessories have taken out of your budget. Remember that your greenhouse is an investment that you want to enjoy for years to come, so rather than settling on a smaller model than you want or one that's poorly made; you might instead consider waiting some months so that you can save up what you need.
- Remember to check with your local zoning board about permits and restrictions. Get this done before you even shop!
- Remember that while wood greenhouses may look aesthetically pleasing, you may be better off to opt for another material if your environment calls for it. It's better to have a durable greenhouse that lasts than one that looks good but rots after a few seasons!

And the last bit of advice we can give you when it comes to choosing a greenhouse is to shop around. There are many models available in all sorts of sizes and materials; don't just purchase the first one you see or fall in love with. Take your time shopping for this as you would shopping for a new car;

Be sure to shop around - you're bound to find the right greenhouse for you that is not only functional but that looks beautiful as well!

after all, like a car or regular house or anything else, you want to enjoy and use your greenhouse for many years to come so of course it's best to take your time and make the right decision.

Getting Started

So how do you get started with your greenhouse?

If you've ordered a greenhouse kit then of course you should prepare yourself for a major assembly job. Putting together a greenhouse isn't exactly like putting together a dresser or dining room table.

Let's go over some important points to remember when it comes to assembling and preparing your greenhouse.

Assembly

Most greenhouses are very tall and are going to require some help especially when putting on the roof. You should probably have your needed assistance lined up beforehand so you're not left with a half-finished structure.

Important: Because the way it's sealed and constructed is important for how a greenhouse functions, it's imperative that you assemble it properly. Some people have a real aversion to reading and following instructions but this is one time when you should be sure you're doing exactly what you're told, exactly how you're told!

If you're going to use a concrete foundation you may actually want to construct the greenhouse first and then pour the concrete after as many plans are not exact. That 16' x 16' structure you get might actually be fifteen feet and ten inches by sixteen feet and two inches, which can be a problem if you've poured your concrete in a perfect square.

Tie-down kits may be included with your greenhouse kit but if not, you might want to consider purchasing them. These work much like tent stakes which you drive deep into the ground and to which your greenhouse is tied.

Preparing Your Greenhouse for Plants

The steps needed to have your area ready for plants are going to rely a great deal on what plants you actually want to grow. Typical houseplants or items like tomatoes, cucumbers, and so on aren't usually as finicky as tropical hothouse flowers.

It's often advised for new greenhouse owners that they start with some hearty plants as they get used to the routine of maintaining their greenhouse and become more confident and capable of controlling the temperature, humidity, and so on.

Simply putting your greenhouse together is not going to create the right environment under which you should grow plants. You'll need some time for it to reach the right temperature and humidity. Most common houseplants and vegetable plants do well at what is a comfortable temperature for humans and will still survive and thrive under some variations. Tropical varieties of plants and flowers such as orchids will require higher heat and humidity.

The best thing you can do is to research the types of plants you have or care to grow to see if they need any special treatment or conditions. To get you started, below is a helpful chart of common plants and their temperature requirements, in Fahrenheit.

Cool temperature flowers and plants are those that prefer an environment that is between 50-60 degrees during the day and 45-55 degrees at night.

Azalea

Cacti

Camellia

Cast-iron plant

Chrysanthemum

Citrus

Creeping fig

Daffodil

Easter lily

Euonymus japonica

Ivy

Hyacinth

Hydrangea

Japanese aralia

Jasmine

Jerusalem cherry

Miniature rose

Mock orange

Norfolk Island pine

Persian violet

Primrose

Tulip

Tree Ivy

Wandering Jew

White Calla lily

Zephyr lily

Medium or moderate temperature plants thrive at temps between 60-65 degrees during the day (or what you might consider a cool room temperature) and 55-60 degrees at night.

Amaryllis

Asparagus fern

Avocado

Baby's tears

German ivy

Gold-dust tree

Hibiscus

Kangaroo vine

Begonia

Bird's nest fern

Bromeliads

Bush violet

Cast-iron plant

Citrus

Coleus

Crown of thorns

Earth star

Easter lily

English ivy

Living stones

Palms

Panda plant

Pepperomia

Pilea

Purple passion plant

Schefflera

Shamrock plant

Snake plant

Staghorn fern

Strawberry begonia

High temperature plants grow best between 70-80 degrees during the day (a very warm room temperature) and 65-70 degrees at night. Most of these are what you might call your exotic or tropical plants and flowers

African violets

Bromeliads Golden

Cacti and succulents

Caladium

Calathea (peacock plant)

Chinese evergreen

Geranium

Pothos

Hen and Chicks

Impatiens

Kangeroo vine

Living stones

Coconut palm	Peace lily
Copperleaf	Philodendron
Cordyline	Prayer Plant
Croton	Purple velvet plant
Dracena	Snake plant
Earth star	Staghorn fern
False aralia	Swiss cheese plant
Ficus	Veitch screw pine

Controlling temperature and humidity.

Your thermostat and hydrometer are the tools to tell you about the levels of temperature and humidity in your greenhouse. The temperature will rise after your greenhouse has spent some time in the sun; this will be dependent on the season in which you put up your greenhouse, outside temps, position of the greenhouse, and so on. It's impossible to tell you exactly how long it will take for the temperature and humidity levels inside your greenhouse to get to a comfortable level.

Opening a vent is what will allow some of that heat and moisture to escape. If your greenhouse is in direct sunlight in the middle of summer you may want to use your shade over a good part of it for some time.

You may very well want to spend the first few days after your greenhouse is assembled just practicing how you control the temperature before you actually move plants in, especially those finicky and delicate plants.

Grow lights.

If you've purchased grow lights for your plants you want to make sure they're installed properly and are secured to the frame or to your benches or shelves. If you're installing them to a timer then you need to make sure the timer is set and may want to double-check it over the course of a few days. Remember that plants need rest for at least eight hours per day just like humans; you're not going to make them grow faster or better if you run your grow light all night.

Growing Your Plants

When you've got your greenhouse installed and have your benches and shelves all ready and have gotten the hang of controlling your temperature, you're ready for some plants.

Growing plants in your greenhouse is going to be a lot like growing your plants in a garden or in your home. You can grow them from seeds, seedlings, or maintain full-grown plants.

Growing from seeds

Growing plants from seeds isn't as difficult as some people believe. Many just lack confidence when it comes to putting seeds in soil and expecting them to bloom. Growing healthy and beautiful plants from seeds is not as difficult as you might

Be gentle and be mindful of your seedlings - they're very delicate at this stage.

assume; you just need to know a few basics.

One thing to remember is that not all seeds should actually be buried in soil. This is a common mistake that many people make, digging little holes in the potting soil and burying their seeds deep inside. Think of what happens in nature - seeds are scattered by wind and animals and simply drop to the ground where they are covered only slightly by the soil because of more wind and rain. For most seeds only a slight covering of soil is recommended. Many also need sunlight in order to start the germination process, something that won't happen when they're buried deep in the dirt.

Here are some other tips for growing from seed:

- Planting pots are great but aren't the only things you can use to grow your seeds. Anything from milk jugs to yogurt cartons are useable; just make sure you have holes drilled in the bottom so that water can drain away.
- Larger seeds for larger plants should be planted one at a time in those pots but smaller seeds may do better if you plant several at once.
- If you purchase flats from a garden supply center for planting, save those trays. They work perfectly for starting seeds and are great for saving space even when you want to grow many seeds at once.
- Be mindful of your potting mix. Some with plant food already mixed in can work wonders for seeds; just remember that if you use this type of potting soil that you don't give your plants any food while the seeds germinate or you could upset their delicate balance and actually kill the seeds.

- If you're going to grow the seeds for the purpose of transplanting them to an outside garden, make sure your timing is right. Most seeds take about 6-8 weeks to bloom before they're ready for planting, which usually should happen around late May for most areas. Make sure you don't start too early or too late in the growing season or transplanting won't be successful.

- Seeds usually need a very warm and somewhat humid environment in which to grow. If you start in your greenhouse make sure you mind the temperature and humidity. One trick that many experienced gardeners use is to cover the top of the tray with plastic wrap so that as the water from the soil evaporates it gets caught in the wrap and creates a warm and moist environment. You might even call this a tiny little greenhouse you're creating for each seed! As soon as the seeds start to sprout however you want to remove the wrap so that it can grow properly.

How to Cross-Pollinate

Being able to cross-pollinate flowers and plants to make up your own shade of roses or to control the growth of plants is one common reason that many start and maintain a greenhouse. Cross-pollination or hand pollination is not as difficult as some might think but remember that there is no absolute guarantee regarding the success of this endeavor either. When you try your hand at cross-pollination it's good to develop some patience with your hobby and remember that the work you put into breeding your plants is half the fun!

It's also good to remember that in a greenhouse your plants are not as exposed to the bugs and other agents of nature that handle this pollination so you may actually need to give your plants a helping hand in any case.

How Pollination Works

To be successful at hand pollination or cross-pollination, it's good to have a basic understanding of how pollination actually works. Imagine trying to breed dogs without understanding how puppies are actually made! It seems somewhat silly because of course everyone no doubt understands that breeding animals means mating a male and a female, but sometimes even experienced gardeners are very ignorant as to what pollination is and how it works. With just a basic understanding of this process you're going to be much more successful at trying it for yourself.

Male and female plant parts.

Plants of course are not thinking creatures like humans or animals, but they do have parts that make them either distinctly male or female. While they

do not breed through any type of sexual intercourse the way humans or animals will, they do require a mating of the male and the female parts much like any other mating process.

An amaryllis with both the male stamen (top) and the female pistil (near the lower part of the flower). The stamen is showing pollen which is ready to be used for fertilization.

The male parts of flowers are called stamens and the female parts are called pistils. Pistils of the female part actually contain what are called ovaries and which function much like the ovaries of any mammal. Pollen grains from the male part of the flower get transferred to the female part and will meet the egg cell contained in the ovaries. This male part of the flowers, often called sperm, meets with the female egg and produces a seed.

If all this sounds a lot like the process of human reproduction, you're absolutely right. With humans, when the male sperm meets the female egg it produces a "seed" or cell that grows into an embryo. With plants this "meeting" or fertilization is necessary for that seed to form which will grow into a new plant.

In nature, pollination or the transfer of the male sperm to the female ovaries and eggs typically happens when insects rest on flowers to gather nectar. Pollen is typically very sticky and so gets stuck on the legs and body

of those insects and then when they land on the female part of the flower, it gets transferred.

Most flowering plants will produce flowers of both the male and female variety. You can pollinate these flowers on your own by moving the pollen from the male to the female flowers of the same plant. Some plants produce flowers that have both the male and female parts, as shown in the photo of the amaryllis above.

How to Pollinate

If you're looking to help pollination along simply because your plants are being grown in an indoor environment, you really don't need to do much. Very often just shaking the plants gently will cause the pollen to fall from the male to the female part of the flower. There are plants that self-pollinate including peas, beans and lettuce which means they do not need your help at all.

When pollinating by hand you can simply take a small cotton swab (Q-tip) or tiny paint brush and dab the pollen from the stamen to the pistil. Remember that insects usually do this job in nature so imagine the light touch they must have, and be sure you don't overdo it with your efforts. You're not trying to crush your flowers together! Many even use a small feather with a straight tip to help them; all of these methods are typically very successful.

Why cross-pollinate?

Mixing breeds of plants and flowers isn't always going to be successful; if you think you can make a climbing ivy that blooms roses, you're mistaken. Just like humans and animals, breeds need to be compatible for fertilization to work. However you can try some cross-pollination within compatible

breeds to come up with some amazing flowers and plants. Crossing different varieties of lilies or roses or some other type of flower can yield blooms of various sizes and colors, many of which you've probably never seen before.

Many flowers that you purchase are the result of cross-pollination and you may find that you enjoy experimenting with different colors and varieties to see what you can create.

For example, if you pollinate a purple lily with a white lily you may very well get lilies that are white with amazing purple stripes coming from the stems. You can try to cross-pollinate white roses with red roses to get pink roses, and so on.

Cross-pollination is a fun and interesting hobby for those who garden since you're never guaranteed the outcome. Those pink roses may be a dark or light shade of pink, or those lilies may come out with purple spots rather than stripes. With time and experience you may start to become much more skilled at it and find that it's well worth the time and patience it takes.

Tips for Pollination

Cross pollinating or hand pollinating takes some time and patience. It's a mistake to try to force the process too much; there are too many variables involved in pollination and plant fertilization to absolutely guarantee your

results. This means that you don't want to get impatient or discouraged when things don't happen as quickly as you imagined or you don't get the results you were aiming for.

To be as successful as possible with pollination you should be mindful of a few things:

- Try pollinating in the morning when flowers are fully opened. Many varieties and breeds begin to close up in the heat of midday so plan on trying you're pollinating as early as possible.

- Seedlings need a good environment in which to grow and thrive and of course they're more vulnerable than mature plants. Make sure you're minding the temperature and humidity of your greenhouse during this delicate growing season.

- Be very gentle with your pollination methods and be sure you use a clean swab or paintbrush. Usually just dabbing the pollen onto the pistil is all that's needed for fertilization to occur.

- Be sure you don't over-fertilize during this time. Fertilizers high in nitrogen are best during the growth cycle, but once the plants are ready to flower it is important to switch to a fertilizer higher in phosphorus and potassium. These types of fertilizers will be advertised with "bloom" on their label. The numbers you see on fertilizers also give you a clue of this ratio; usually they are numbered with nitrogen then phosphorus then potassium. In other words, fertilizers that have a 1-2-2 ratio are lower in nitrogen and higher in phosphorus and potassium and these are the ones you should use after pollination and seeding.

- Plants that grow both male and female flowers will often see the male flowers arriving first. Very often inexperienced gardeners wonder if something is wrong since they don't see the female

flowers. It's usually just a matter of patience while waiting for the female ones to bloom.

- To more readily identify the female flower, look for a small baby fruit or flower nearer to the stem. These babies are more visible on larger fruits and vegetables such as watermelon or cucumber, but with some practice you'll be able to identify them much easier.
- Pollen from the male is ready to be used when it comes off onto your finger when you brush it delicately. Before it's mature the pollen will stick to the flower and be somewhat brittle.

Indoor Gardening Tips

One thing that you may notice when you begin and maintain a greenhouse is that indoor gardening is much different than soil gardening in the yard or on a farm. This is because your plants and flowers are now in a more controlled environment and because growing in a pot is very different than growing in the soil outside.

Here are some general tips to remember when it comes to gardening indoors.

Bugs and Pests

A benefit of indoor gardening is that your plants are less likely to be bothered by harmful insects. However they will still occur since even the highest quality greenhouse will still have tiny openings that those insects will find and because of course they'll sneak in through the flooring and when you open the door to go in and out.

While your plants may be more protected from harmful insects, they're also missing out on the visitations of what are called beneficial bugs, those who help plants along in one way or another.

You need to be mindful of the damage that can still be done by harmful insects to your indoor plants. Keep an eye on the leaves and stems to see if they seem to have holes in them; this is a sign that they're being eaten by bugs. While a little bit of munching is not typically a problem, when leaves and stems start to wilt and fall off this might be a sign of something that needs to be addressed.

One good way to address this problem is to introduce beneficial bugs to your plants. Beneficial bugs help your plants either by turning the soil or by feeding on those harmful insects. Beneficial bugs include ladybugs, butterflies, and earthworms.

Do you know why ladybugs are beneficial for your plants, both indoors and out?

Your greenhouse might not be big enough for you to purchase ladybugs and butterflies at your garden supply center and then releasing them, but many people have a greenhouse because they have plants in a soil garden which they move inside when they're ready. By releasing these insects into your soil they can help your plants be ready for their indoor environment and of course many will come with the plants when they get uprooted and put into a pot. If you have kids, you can even turn this into a fun activity for them - have them see if they can catch ladybugs in the backyard to bring into the greenhouse, or you can have them dig up earthworms that you can put into larger pots of plants.

Introducing beneficial bugs is a common practice for those who are trying organic gardening as they can often forego the harsh pesticides and chemicals needed to address harmful insects.

About pesticides

If you're tempted to use pesticides on your indoor plants you should be very careful about this practice. Because your plants are in a controlled and sealed environment, this means that those chemicals are going to get trapped inside the greenhouse as well and won't have as much of a chance to dissipate into the atmosphere. Try using organic products as these are made from natural ingredients rather than synthetic chemicals and are less harmful for plants and the air inside your greenhouse. Very often just sponging off your plants can wash away harmful insects as well. And if you do decide to use pesticides on your greenhouse plants, do so very sparingly. Remember that when you're in the greenhouse you'll be breathing those fumes as well as your plants!

Use Compost or Plant Food

This is probably some of the best advice you can remember about nurturing an indoor garden. Why?

Soil outdoors gets replenished by the elements around it. When the ground is wet nutrients travel all around under the surface of the ground, meaning that whatever you take out of the ground because of your plants will be replaced because of nutrients the soil draws from the surrounding ground.

This of course is just not possible with potted plants. All the nutrients that the soil will have are contained in that little pot. When your plants draw out those nutrients, the soil has no way of replenishing itself.

Using compost or plant food is vitally important for indoor plants. Compost that is prepared properly is full of nitrogen and carbon, two important elements needed in the soil. Commercial plant food does the same thing.

You don't want to overfeed of course as this may interrupt the necessary balance of nutrients, but usually you add something to the soil every two weeks or so. With compost you simply spread it around the stem of your plant; it will get naturally absorbed into the soil every time you water your plants. Plant food brands will tell you how often they should be used.

Remember that plain water is not enough to keep your plants healthy and nourished. Water doesn't contain the vital nutrients that plants need and that are being stripped of the soil. You absolutely must use some type of food with your potted indoor plants on a regular basis.

Sunlight and Temperature

One common mistake that many greenhouse owners make is to keep the interior of their structure too warm and humid. They often believe that if a little bit of heat is good then even more will be better.

This just isn't the case. Unless you're growing all tropical flowers that need it to be very hot and humid all year long, you should have a moderate amount of sunlight and heat in your greenhouse. Most common houseplants, flowering plants, and vegetable plants need comfortable temperatures and a good degree of sunlight, not a very humid environment and direct sunlight for many hours per day.

Don't be afraid of opening the vents of your greenhouse or of using that shade cloth during the warmest days when the sun is out for several hours. Your plants need that sunlight but think of how you feel as a human sitting out in the hot sun for hours - after awhile it gets to be too hot and the sun is damaging to your skin. Your plants are the same; they do need some sun and heat, but not an obscene amount of either!

Trying Hydroponics

Have you ever heard of hydroponic gardening? It's not as science fiction as it sounds - hydroponics simply refers to growing plants and flowers in a water-based solution rather than in actual soil. Many who have greenhouses find this is a perfect chance to try hydroponics since the environment is much easier to control in a greenhouse than a basement or other area of the home. And hydroponics is actually typically much more successful than typical soil gardening since you control the nutrients the plants get, unlike soil where it's more hit-or-miss.

How Hydroponics Work

Plants grow when their roots absorb a certain mixture of carbon and nitrogen. These elements exist naturally in the soil. However if plants can get these elements from another medium they will grow just as well. You might compare this to how humans need protein, vitamins, minerals, amino acids, and other important elements to grow and maintain their systems. Typically we get these things from the food we eat. However these things can also be gotten from a solution such as what you might get at a hospital through an IV. As long as that solution that the doctor hooks into your arm has all those vital elements, you'll survive just fine.

With hydroponics, plants survive much the same way. Usually their roots are held in place with what is called a growing medium, usually just pebbles or gravel and then a special water-based solution is washed over those roots on a regular basis. The roots then absorb what nutrients they need from that solution.

It's important to note that hydroponics is not just watering plants; plain water doesn't contain any of those important elements that plants need to survive. Instead you would use a special solution made just for hydroponic gardening. These solutions are readily available at just about any gardening supply center.

Hydroponics might seem a little high-tech or difficult to understand but in reality it's actually very simple. Many who try it say that it's one of the simplest, most effective ways of growing plants and flowers, and keep in mind that you can grow virtually anything in this type of system.

The System

One of the keys to the success of a hydroponics system is how it's built. While you can go to the supply store and purchase an entire hydroponics system, building one of your own is very easy no matter your experience - or lack of it - with building and construction.

A very simple hydroponics system. The roots are being held steady with pebbles and gravel and the pipe provides the room for the water-based solution.

A hydroponics system is really very easy. One favorite way of building a homemade system is to use some PVC pipe which you may very well already have in your home, or can purchase at a salvage

yard. The reason this pipe works so well is that the round design makes for a perfect "cup" to hold the water solution as it washes over the roots of the plants.

The top will need some holed drilled in it so the plant stems can grow out of these, or some just cut off a portion of the top of the pipe. A growing medium such as pebbles, gravel or sand needs to be in the bottom of the pipe; this is what will hold the roots in place and give your plants stability and balance. Any hydroponics gardening system will offer a wide range of mediums.

Usually it's best to start with seedlings rather than actual seeds when starting with a hydroponics system. This is simply because seeds might get washed away by the inexperienced gardener. You simply need to transplant your seeds very carefully to the growing medium and nestle them inside so that they're steady and stable.

Working the Hydroponics

When we say that water washes over your plants we don't mean that it really just runs over them quickly but instead the water fills the pipe or other structure and stays there while it gets absorbed by the plants. Once the plants have absorbed all the nutrients they need the water then runs off and is discarded.

Some hydroponics system work a bit differently; the water never actually runs off but fills the system and stays there until the plants have absorbed about half of it; then it's time to refill the system with more nutrient solution.

So how can you tell which system works for you and what to do with your own hydroponics system? Knowing how much solution to add to water to get the right pH level for plants is going to be your first step. The pH of the

solution tells you how much feed you have in your solution versus plain water, and you want to maintain your pH at a certain level for healthy plants. Most plants need a pH of around 6.

The solution you purchase for your hydroponics system will then instruct you on how much to add to a certain amount of water to maintain the right pH. For example suppose you have a PVC pipe system and to fill it so that it's full it takes ten gallons of water. Your solution might instruct you to add 1 tablespoon for every gallon of water to maintain proper pH. So of course you need 10 tablespoons of solution for that right solution.

Testing your pH in between fillings is important. Most hydroponic gardeners purchase a pH tester much like you use for a swimming pool - you simply scoop up a bit of water, add some chemicals or use a test strip and the tester will tell your pH.

Benefits of Hydroponics

If you are planning a greenhouse because you like "puttering" around with flowers then hydroponics might not be for you since you don't need to worry about weed pulling or transplanting into larger pots as the plants grow. But if you want a greenhouse because you want to successfully grow plants and vegetables for your own use or for transplanting in your yard, then you should definitely consider a hydroponics system.

This is because most gardeners have a lot more success with hydroponics than they do with other gardening systems. When you put plants in the soil, you're taking a risk with how unreliable soil really is. It's virtually impossible for you to monitor and maintain soil's health.

With hydroponics you're raising your plants in a very controlled environment. You know that they're getting the right combination of carbon and nitrogen, which plants use for food.

It's also true that when you try hydroponics at an indoor location you have far fewer problems with bugs and pests. You will of course occasionally get insects and other pest problems but nowhere near what you would face when raising plants in soil.

And since the plants usually do so much better with hydroponics you may find that you can raise plants in a healthy way. You have fewer reasons to use insecticides and other harsh chemicals. Most plant foods also have synthetic chemicals and elements and when you don't need to use those to supplement the soil then the plants don't absorb these either.

Hydroponics FAQs

You might still be unsure about whether or not hydroponics is the right system for you and your greenhouse. Here is a quick rundown of hydroponics FAQs (frequently asked questions) for your review:

How large do the systems need to be?

As with all gardening projects you can construct a hydroponics system that is big enough for all the plants you wish to grow or that will accommodate only one or two plants. We've suggested using PVC pipe simply because it's very easy for most people to work with, but hydroponic systems have been made from items as small as disposable plastic cups - you simple drill some holes in the bottom, put your growing medium in along with your seedling, and place the cups in a tray or other receptacle that will hold the water solution.

Of course if you're very ambitious you can create large reservoir systems that accommodate dozens of plants; it's really up to you and will depend upon your space available more than anything.

Do plants really grow this way?

Many who try hydroponics report that their garden actually grows much better than every before! This is probably because you have more control over the nutrients you're feeding your plants so they won't suffer because of poor soil the way many gardens do.

Is hydroponics organic?

If you use organic hydroponics solutions then yes, it can be considered an organic way of growing. It may also be one of the safest ways of growing because when you plant a soil garden you can use organic products yourself but the soil will always absorb the chemicals and elements that your neighbors are using as well. With hydroponics you don't have that problem.

Hydroponics is not as difficult as you might think; as a matter of fact, many who try this hobby wonder how they ever did without it. You can grow plants in a basement or garage (provided its warm enough) with a hydroponics system, and when you introduce your plants to the combination of a warm and sunny greenhouse and the controlled maintenance of hydroponics, you may have the best plants you've ever grown! So don't shy away from these systems and from trying your hand at it. You'll be glad you did!

Going Organic

Another great benefit to a greenhouse is that you completely control the soil and environment under which you grow plants. Many people use this opportunity to start an organic garden in order to grow the healthiest plants and vegetables possible.

What is Organic?

The technical definition of organic is food that is grown or manufactured without synthetic chemicals and other elements.

To some people however the term organic actually means much more than that. Many who practice organic gardening find that it's important to take as little as possible from the soil and to give back what they do deplete. Organic can mean trying to reduce consumption of virtually anything - utilities, food, packaging products, etc. - so that your lifestyle uses less energy and produces less pollution. It can incorporate simple principles such as driving less and recycling more.

Organic soil gardening can simply mean using plant foods, pesticides, and fertilizers that are made from all-natural ingredients but for those who want to take the concept one step further, it also means replenishing the soil with natural compost and giving that soil a rest every few years so that it can heal itself as well. Many who maintain an organic garden in their home will often section off their garden space and rotate an area of unused space every year, so that the soil gets a rest on a regular basis. This allows it to renew its own nourishing elements. So if the garden is sectioned off into seven parts, every year a new section goes without planting so that the entire garden gets a rest every seven years.

Of course, the application of organic principles varies from person to person and means something different to every individual.

Benefits of Organic Growing

Just about every day there is some new story in the news about some bacteria or other impurity showing up in the food you buy at the supermarket. Very often these contaminants are not just from the growing process but the manufacturing process as well. You would think that with all we know these days about germs and contaminants that food manufacturing and preparation processes would be about as clean as a hospital's operating room, but unfortunately that's not always the case. Very often things like E. coli, salmonella, and so many other harmful elements are traced back, not to the farms where food is raised, but to the canning and packaging facilities.

Organic gardening also means that you're not only avoiding pesticides and harmful chemicals in the food you're eating; it also means that you're not encouraging this practice either. Most studies have revealed that these harmful substances make their way not just to the crops they're supposed to be treating but also get absorbed through the soil and rainwater and spread to other areas.

Obviously the connection between these chemicals and diseases is difficult to prove and of course this is a complicated issue, but many people find that if they can avoid ingesting at least some of these chemicals by growing their own vegetables in an organic garden, then its well worth the effort.

It's also true that the price of food is going up in just about every area of the world, and produce items are usually the hardest hit. Being able to

grow even a few vegetables that the family eats every day can mean saving literally hundreds of dollars from the grocery bill every single year.

Tips for Organic Gardening in Your Greenhouse

It can be very simple to incorporate at least some basic organic methods into your greenhouse gardening. Avoiding synthetic and artificial fertilizers and other elements is of course the first thing to do. When you shop for gardening supplies make sure everything you use is certified organic. This includes your potting soil for your pots as this often has plant food added into it; if it doesn't say organic on the label then you're probably starting your plants off in harsh chemicals from day one!

The importance of compost

While you can purchase organic plant food and other items very easily, you might also want to consider starting a compost pile for your organic plants. Why?

A very good compost pile contains all the best ingredients for your plant's health and also helps to nourish the soil as well; this part of the organic thinking that involves giving back what you've taken out of the soil. As compost breaks down it becomes the best nourishment you can get for soil whether for potted plants or for the garden when you transplant them into the ground.

The real key to success however is creating a compost pile the right way. Unfortunately many people think that compost should contain just about any and all forms of kitchen garbage. Not only does this fail to produce the good nourishment that soil and plants need, it can actually work to release harmful elements into the soil and the atmosphere as well.

The best compost is made from plant-based items; this means anything that once grew in the ground even though it might not be in plant form. As examples of what we mean, ideal ingredients for a good compost pile may include:

- Bread scraps (they were once wheat or white flour).
- All vegetable and salad scraps, including peelings and cores.
- Other plant clippings or dead plants, including dead flowers.
- Fall leaves.
- Coffee grinds.
- Grass clippings in moderation.
- Wood chips in moderation.
- Straw or hay in moderation.

Avoid putting the following items in a compost pile:

- Meat products, including bones and fat.
- Dairy products including egg shells.
- Items like old clothes or anything else made from cloth - even though these may have started as cotton or other natural fibers they are usually mixed with so many synthetic materials and treated to such an extent that they no longer break down as they should.
- Pet hair or human hair.

- Colored paper or paper with a lot of writing or design - the ink is very poisonous for the soil.
- Sawdust as this breaks down very slowly and often contains harmful chemicals from treated wood.
- Pet droppings.
- Garbage items such as vacuum cleaner bag contents, lint from the lint trap of your dryer, and so on.

To understand whether or not something should be added to a compost pile, ask yourself if it's completely biodegradable and free of synthetic chemicals such as dyes or inks as well as pesticides and other chemicals you're trying to avoid.

Making compost

Adding all your items to a compost pile is really very easy; the biggest mistake that many people make is to keep turning it on a regular basis, but this doesn't give these items a chance to decompose the way they should.

Your compost should stay untouched for a good two to three weeks and then you can turn it, moving outside stuff to the inside and inside stuff to the outside. Sometimes steam will escape from compost when you turn it; don't worry about this as that's actually a good sign that things are decomposing nicely.

When your compost pile is crumbly and resembles thick, dark soil then it's ready to use. You may also notice earthworms now crawling around inside and this too is a good sign - it means that your compost is rich enough for them to make their home, so it's obviously rich enough for you to use!

Compost can be made in a corner of your yard or of course you can use any plastic or wooden container. You might even be able to check your garage or basement for something that's useful, such as a child's small plastic wading pool they've outgrown or toy bin they no longer use. You can even purchase compost bins of all sorts of shapes and sizes.

Using compost in your greenhouse garden.

When you have plants in a container of soil they are obviously going to use up the nutrients in that soil which will not be able to renew itself since the soil is in an enclosed container. This is one of the reasons you must use plant food for any container plants, even houseplants, on a regular basis.

If you want to try organic gardening your compost now becomes your plant food. Every other week you should sprinkle a good portion of compost around the stems of your plants and water over this. The compost will be absorbed into the soil and will replenish what you've taken out of it.

When your compost resembles dark, rich soil then it's ready to be used.

Don't make the mistake of thinking that if a little is good then more is better; putting compost onto your plants too often will upset the natural balance in the soil. Every two weeks or even once per month is probably going to be perfectly sufficient.

Other Tips on Organic Gardening

There are plenty of products you can purchase for pest control that are certified as organic but while these products are natural, this doesn't mean they're the best choice for keeping harmful pests at bay. Often they're made from harsh extracts from predator insects and can still be irritating to humans and other animals, and when used in excess they can upset the delicate balance of carbon and nitrogen in the soil.

Organic gardeners learn to deal with problems they have with plants in a natural way as much as possible. For example when there are problems with harmful insects they typically introduce what are called beneficial bugs, that is, bugs that will feast on those harmful insects and in turn help your plants. Ladybugs and certain types of butterflies are two such examples. You can usually purchase boxes of these at garden supply centers.

Very often you can plant beneficial flowers as well; these are the type that produces certain nectars that attract beneficial bugs or that will act as a natural pesticide for damaging insects. As an example, anise hyssop is so named because their flower spikes have licorice-scented leaves and produce an abundance of nectar. These attract butterflies and other beneficial insects.

Other beneficial flowers include golden marguerite whose flowers attract ladybugs, flower flies, and lacewings; fennel which attracts caterpillars, and pussy willows which attract all sorts of beneficial bugs.

You may assume that since your greenhouse is built to be virtually airtight that no bugs will ever make it inside to be attracted by these plants but don't be so sure! Bugs get in under the foundation and through vents, and will make their way in every time you open the door. So don't discount the good that these flowers can do for your other plants when you keep them healthy and hearty in your greenhouse.

And remember to take your organic principles with you when you transplant your flowers to your yard or garden. Be mindful of putting back into the soil what you take out of it and of using products that are only certified as organic.

Making Money From Your Greenhouse

If you have a successful greenhouse that grows beautiful plants and flowers, why not consider making some money from your hobby? You might not have ever thought about your hobby as a profitable business, but if you have at least a little bit of extra time and patience, you can actually make quite a nice income from your greenhouse.

Becoming a Business

One of the first things you should do before you actually start conducting business is become a business. This means getting a business name, typically done through your county clerk's office. Most who start a small business use a Doing Business As or Assumed Name; this means that income from your business is the same as income from any other place. You simply add up your income and subtract your expenses and report the final amount on your tax return at the end of the year.

Unless you plan on opening a retail flower store you probably don't need to collect taxes from your customers as you would be considered a wholesaler. However, if your business grows and you're concerned about your need to collect taxes, you can probably quickly speak to a CPA over the phone and ask. Usually applying for a tax ID is very easy and probably done at your county clerk's office as well.

These certificates - your Assumed Name and tax ID - are typically very affordable, usually less than twenty dollars each. Don't hesitate to call your county clerk's office first if you want to be sure your chosen business name isn't already taken or aren't sure which certificate is right for you. You can probably also check online as many counties have their own website where you can run off the forms you need and can find out the charge.

Once you have your business certificates you can open a commercial checking account at just about any bank and may also want to check to see if you can reserve a website name that is at least close to your business name.

Important: When coming up with a business name you can of course have it a bit whimsical; people often assume a greenhouse or flower shop has a bit of whimsy or creativity. Just make sure that it still sounds professional and is easy to remember and spell so that potential customers can remember it and find it again very easily. For instance, you might want to avoid "Debbie's Total Supply of Flowers and Plants From Her Own Greenhouse to Your Table" since it's incredibly long and wordy, but "Deb's Greenhouse and Flower Supply" is much easier to remember!

Finding Customers

So how to find customers and what type of items should you sell? Here are some things you want to consider.

First, make sure your gardening is reliable and that you can grow enough of an inventory on a regular basis so that your customers won't be disappointed. Being able to produce one flowering lily plant is all well and good, but if you want to actually make money from your business you're going to need to produce beautiful flowers on a regular basis.

This will of course mean being very attentive to your greenhouse and your plants. No one wants to buy their flowers from someone who comes through with deliveries only when they can. Yes, you'll lose some flowers here and there and of course can't always count on how many flowers you can actually grow, but to be successful with your business you're going to need to have a pretty reliable idea of what you can and cannot deliver.

Next you'll need to consider what type of customers you can support with your inventory. Flower shops sometimes have their own greenhouse for their supply and supermarkets may have a floral shop but because of how many flowers they need, they may want to deal only with a large commercial greenhouse facility. However there are many other possibilities when it comes to customers that you can support. For example:

- Do you have any mini markets or corner stores near your home that sell a small quantity of flowers? Even if you don't see them selling flowers now, if you were to talk to the manager or owner of the store you might be able to convince them to carry a small inventory.

- Restaurants sometimes want fresh flowers for their tables. You may be able to speak to a manager about providing carnations or other colorful blooms for their dining area or décor.

- Retirement communities also sometimes have fresh flowers on their dining tables; you may be able to provide these for them on a regular basis.

- Businesses often give flowers to their employees on secretary's day or when someone has had a baby or other occasions. If you're priced cheaper than large, national florists you may be able to provide for local businesses when the occasion calls for it.

- Weddings of course are a big business for many florists. While you may not be ready to supply to very large weddings on a moment's notice, if you spread the word among your friends and relatives you might find that someone you know is interested in working with you, especially if your costs are lower than national

florists. Many brides today are looking to save money in any way they can so they may be happy to simply choose from the flowers you have available.

- Your friends and family too may want to see what flowers you have available on special days and occasions. They may check with you for anniversaries, birthdays, and holidays.

Very often getting the word out there among your friends and family and local businesses is all that's needed to get your first order, which in turn can lead to so many other orders down the road!

Some Important Considerations

Before you just run out and start talking to those retirement home managers and restaurant owners, consider some of the following points.

- Consider getting a website even if you don't plan on selling online. A website is actually a great marketing tool because potential customers will often bookmark your site and visit again when they're ready to purchase. A website address (www.sitehere.com) is often easier to remember than a phone number, so customers might visit your site looking for your actual contact information. Websites are usually very affordable if you just need a few pages with your contact info and a few photos of your product.

- Most places that purchase flowers from you may expect some type of special packaging. For example, that corner market might be interested in purchasing single blooms that they keep by the cash register for one-at-a-time purchases. However these blooms

are usually wrapped in cellophane and may have additional ferns or baby's breath inside. Be prepared with these extra materials and for the wrapping involved; don't just show up with an armful of single blossoms.

- Stores may also expect you to provide the large vase that these flowers are kept in near the register. View this as a marketing opportunity; put a card with your business name and phone number or website address on the front of it.

- Get to know the accessories you need for many of your products. If you're going to provide bridal bouquets, you'll need the little handles they fit into. Boutonnieres for groomsmen usually are attached with a pin. That retirement community may also ask you to provide vases. Shop for wholesale items online so you can purchase these things very cheaply.

- If you're very dedicated about making this greenhouse into a successful business, take a flower arranging class. Putting together bouquets and arrangements is usually part art but part science. Sometimes certain colors or sizes of flowers are just too busy or may look overdone when used together. At the very least, study bouquets you see online and practice some on your own before trying to sell them to a customer.

Another thing you might want to consider about getting customers and selling is to have some marketing material available. At the very least you should have professional business cards made up so that when you call upon potential customers you have something you can leave with them so they have your contact info handy.

You might also be able to make up a flyer or brochure with some featured products. If you can't do this on your own you can easily hire someone with a marketing degree to do this for you; chances are you might even have a friend with some talent that can easily design some business cards or marketing material. Any nearby office supply center can probably print these things out for a very affordable price.

Be prepared to offer your product in vases or arrangements such as this one pictured above. A simple flower arranging class can go a long way toward giving you ideas in this regard.

How to set your own prices?

Setting your own price might be a difficult prospect; don't worry, most first-time business owners struggle with the question of what to charge their own customers.

There is no right or wrong answer when it comes to the price you should charge others, just some things to consider to come up with your own answer:

- Remember that when you sell flowers to a store for them to sell to their customer, they're going to expect to mark up the price they pay by at least half over again, and usually twice the amount they've paid. This means that if they charge a customer $1.50 for a single bloom, they expect to pay their supplier (that's you) about 75 cents for that bloom. If you think a customer at a store

is going to pay $1.50 for that bloom of course you don't charge your customer that much or otherwise they wouldn't make a profit and won't have any reason to sell your item. Consider the price they need to charge and make sure you're being reasonable as their supplier or wholesaler.

- If you don't incur a lot of costs with your own greenhouse you can pass this savings along to your potential customers and gain more business. Larger greenhouses employ a lot of people and have those labor costs as part of their overhead. If you are working alone or it's just you and your spouse, and don't incur a lot of costs for your greenhouse, then you can sell for a much cheaper price than most.

Another thing to consider is just how much of a profit you really want to earn. If you're working with friends and relatives for a wedding or other occasion then of course it's only right that you be compensated for your work but do you need to make as much of a profit as those larger greenhouses and commercial growers? If you're reasonable about your pricing and what you can provide you may get many more customers in the long run.

Remember too that you'll probably make a few mistakes in the first months of your business and may need to raise your prices down the road; don't worry too much about your decision in this regard since many first-time business owners need to make adjustments to these things as they learn more about running their business.

Your New Greenhouse in 10 Easy Steps

If you've gotten a little overwhelmed by this point, don't fret. We're going to outline for you the selection, purchase, installation, and maintenance of a greenhouse in ten easy steps. You will probably need to do some additional research to make sure you understand all these steps completely, but if you use them as a guideline you're sure to have a beautiful new greenhouse up and running in no time.

Step #1 - Call your local zoning board.

There's no point in ordering any type of greenhouse if it turns out that you're not allowed to have one of that size on your property and certainly if you need a building permit to put a kit together you should be mindful of that. You might think this is pointless if you're ordering a very small greenhouse but your zoning board might not see it that way!

Sometimes zoning boards are broken up by county but most are run by the city. If you're not sure of where to call, try your county clerk's office first and if they're not the right place they can probably give you the correct information.

Step #2 - Check your space.

Where do you plan on putting this greenhouse? Remember that your perfect space when it comes to aesthetics may not be perfect when it comes to sunlight and easy access. If you have a very large lot you may have imagined your greenhouse way in the back of the yard but how easy will it be to get materials and supplies up there, not to mention getting plants back out? Of course if you plan on having a greenhouse to help your

large soil garden or small farm then having it close to this area may be the best thing.

Remember to check the ground as well. You'll need some type of base and if you plan on pouring concrete you may need level ground or might need to do some work to prepare it. The same goes for a wood floor. Be prepared to bring in some fill dirt or do other work to level the ground especially if you're going to have a large greenhouse.

And if you go without a base or floor this will mean muddy feet and more pests, although it's perfectly acceptable to have a greenhouse out on the grass if that's what you so choose.

Here are some other important factors to remember when it comes to space:

- Your sunlight is going to be different during different times of the year. Make sure you have a spot that's sunny all year or at least offers the most amount of sun you can expect.
- If you're very cramped on space, consider a lean-to greenhouse that can attach to the side of a wall of the house or garage.
- Remember that too much greenhouse can mean a large structure that overpowers your yard or home, so be ready for some compromises when it comes to space.

Step #3 - Consider your budget.

Just what is your budget for your greenhouse? While you might expect to spend some dollars on this structure since it's something that will last for years to come, you also don't want to take out a second mortgage on your actual home just to purchase a greenhouse! Be reasonable and remember that you may need to also purchase:

- Heating units.
- Grow lights.
- Thermometers and hydrometers.
- Benches and shelves.
- Special vents.
- Shade cloths.
- Electrical outlets or generators.
- Timers for the heater.
- Misters and sprayers.
- Compost makers.

Along with all of these things, remember that you might also need to purchase plants, pots, potting soil, seedlings, and all those other tools necessary just for the growing of your plants!

You may have your heart set on an expansive and exotic greenhouse with thousands of tropical plants, but once you really consider your space and budget you may need to downsize your expectations.

Figuring the approximate cost of all these other items is imperative as they can add up to several hundred dollars and can take a chunk out of your budget. Once you've gotten an idea in mind as to the space you have and how much you need to set aside for accessories you can then figure your budget for the greenhouse itself.

Step #4 - Consider the materials.

You may have been imagining a beautiful wood greenhouse that complements the material of your home or that is very eye-catching. This is fine if you remember that too much moisture means that the wood might rot sometime down the road; do you live in a very humid environment?

Thicker coverings mean that the heat will get trapped easier and the greenhouse will work better even though this might be more expensive for you. If you live in an area with extremes in weather then of course you need a frame that's going to be durable and that won't bend or warp.

It's important to really understand and to educate yourself about the various materials offered and to make a careful decision based on the best value for your money and what's best for your particular area. Spending a few more dollars might be wise if it means getting your money's worth for the years to come, but getting the most expensive model available won't make much sense either if you live in a very moderate climate that shouldn't present a problem to your greenhouse.

Since there are only a few variations in greenhouse material this shouldn't be too difficult of a task, but it's also one of the most important ones.

Step #5 - Get some help before you place your order.

Your greenhouse will do you no good if you start assembling the kit and then realize you need another set of hands to help - and there's no one in sight.

Assembling your greenhouse may very well be an all-day or even a weekend project depending on the size you order. You'll probably also need a sturdy stepladder and of course a good set of tools.

Make sure you have all these things, including some help, all lined up before your greenhouse arrives. There's nothing more depressing than seeing a half constructed greenhouse sitting out in your yard without a roof or benches in place!

Step #6 - Start a compost pile.

Whether you want to try organic gardening or not, compost is going to be one of the best things you can use to feed your plants and flowers. It's all natural and full of all the beneficial nitrogen and carbon that the is taken away from the soil. Compost also saves garbage from being dumped down your drain or tossed into landfills where it has such a hard time decomposing.

Compost can also help you to feel completely involved in your garden. When you take your kitchen scraps to your compost pile or bin you know you're doing what you need to do in order to really nourish your plants. It's also a great way to get the kids involved in gardening! Their few vegetable or salad leftovers can be added to the compost pile and they too realize how they're feeding the flowers and may be more interested in gardening and planting.

Step #7 - Install your accessories.

Make sure you have your heater, grow lights, and everything else installed and up and running before you introduce plants. Test your timers if you are going to hook anything up to them.

It's very important to install your accessories before anything else so that you know how much space they're going to take up and can move them around if needed. You may realize that your heater is too close to the shelves and may need to adjust where you keep it. You might need to move your grow light further away as well. It's important to make sure your greenhouse is set up properly well before you bring in plants so that you don't do any damage to your seeds or seedlings once they're brought to their new home.

Step #8 - Practice your settings.

Your greenhouse will probably take several days to achieve optimal conditions for your plants, considering what time of year you install it and your environment. Once the greenhouse traps some heat inside you'll then need to practice using your heater and your vents to control that temperature and the humidity. Remember:

- When the temperature gets too high such as those very bright sunny days, you need to open vents for a few minutes or even longer to let some heat out.
- During the off-season when there's not enough light to capture you'll need to switch on heaters especially later in the day so that there is warmth in the greenhouse to last all night.
- Shade cloths might need to be used during those summer days when your greenhouse is in direct sunlight but they will also need

to be removed later in the day so that some light and heat gets caught in the greenhouse.

These things take some practice; you need to keep track of how much your temperature drops when you open a vent and need to mind how much it drops during the day for the off-season. You might need to switch a heater on at night and keep it on all night or may need to hook it up to a timer so that it goes off during the day.

The point is that you need to be skilled in minding the environment in your greenhouse so that the nighttime temperature doesn't drop below the optimal temp for your flowers and so that it doesn't get hotter than the highest temperature recommended either. This process really isn't as difficult as you may expect; it's simply a matter of being aware of how all those variables - the sunlight, the sun shade, the heaters, and so on - work and affect that temperature.

Step #9 - Introduce and mind your plants.

Moving your plants into your greenhouse is not very difficult; you simply need to mind where you put them and keep your eye on them especially during the first few weeks.

Remember that because your greenhouse is made of glass or clear plastic that your plants are going to be getting direct sunlight for many hours per day. This is very good for them to a certain extent but too much direct sunlight and an environment that's too warm will mean that they start to burn. Plants that start to wilt are sending you a message - they aren't happy or healthy! The environment of a greenhouse might be something of a shock to them especially if you're not mindful of how they're reacting.

You too may also be learning how to adjust the temperature of your greenhouse so keeping an eye on your plants will give you a good idea of how well you're doing. If they seem as if they're wilting against the heat you may need to vent the greenhouse more often. If they don't seem to be flourishing as they should you may need to keep the greenhouse warmer by turning on your heater for more hours during the day.

It probably won't take long for you to really get the hang of taking care of your greenhouse and soon enough you'll find yourself with a regular routine that offers you beautiful and flourishing flowers and plants, but when you first get things set up it's a good idea to be as mindful as possible.

Step #10 - Enjoy!

This may sound like trite and unnecessary advice but it's surprising how often people forget to actually enjoy their own greenhouse! The minute they have one plant that dies or that refuses to bloom they feel frustrated and irritated, and soon enough that fun hobby becomes a dreaded chore. And of course if you're trying to cross-pollinate plants and they don't come out exactly as you imagined you may get irritated and be tempted to give up.

A greenhouse shouldn't be resented or seem as if it's a chore to maintain. Your gardening should be a fun hobby that you love and really look forward to. The fact that you can't absolutely control the soil and your flowers should be a large part of the fun! Your plants are something like children - you really can't control exactly how they'll turn out, so it's good to just sit back and enjoy the process of tending to them and allow yourself to be surprised by the result.

Your greenhouse, if tended to properly, should provide you with a fun and enjoyable hobby for years to come. So make sure you understand all the steps involved with maintaining it and if you do, you're sure to enjoy some beautiful plants and blooms for the rest of your life!