



VERTICAL GARDENING 101 GUIDE

by GrowUp

Introduction

Vertical gardens are taking the world by storm, and there's several really good reasons for that.



- The first is that green walls are, quite simply, aesthetically pleasing! Interior designers, architects and decorators are [all turning more and more](#) to vertical gardens as the modern, aesthetic touch. Added to this, in small indoor spaces they've been [proven](#) to have health benefits.
- Secondly, in a rapidly urbanizing world, there's simply less space for farming than there used to be. As populations grow and available, fertile land shrinks, turning to Mother Earth for food simply won't be possible to the scale we need it in the future. Did you know that close to half of the USA is taken up by farmland? A massive [44% of the USA's](#) territory is used for farming, and yet many impoverished citizens live in "[food deserts](#)" - cities without easy access to healthy fruits and vegetables. Many Americans struggle with malnutrition, obesity and early death as a result. Farming gone vertical is a savvy solution to this problem.
- Thirdly, affording a big house with a garden is sadly becoming a financial fantasy for many. Says [Business Insider](#), "The whole real-estate industry now is characterized by extreme scarcity and inventory. There are about — I think it's 15 or so percent fewer homes for sale today than a year ago." Added to this, the US housing market is a [very expensive](#) one. Instead of buying a white picket fence with a garden, people are looking to introduce greenery, gardening and kitchen-ready herbs and organic vegetables in smaller spaces. Naturally, a vertical garden is a clever, affordable and easy-to-maintain way to do this.

This guide was written for all three of the users I mentioned above: the decorator, the urban farmer, and the home-grower. However, it's important to note that we focus on soil-based vertical gardens, and not hydroponics (water based), which are a whole different beast.

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10 most frequently asked questions about living walls



Vertical gardens have been doing the rounds on Pinterest for years, but actually implementing and growing one can be quite intimidating to the beginner. As vertical garden professionals and enthusiasts, and in the time we've spent working with interior decorators, vertical gardeners and urban farmers, we've noticed a series of questions that just keep popping up.

Here are our answers to some of the questions we get asked the most, to help you decide whether or not a green wall is for you.

1. Can I grow a vertical garden indoors?

Definitely. In fact, a green wall indoors can actually serve more than one purpose. Apart from creating living art, your green wall could house herbs and salad greens (producing delicious fresh ingredients for your kitchen), not to mention [the health benefits](#) that indoor plants bring with them, as a bonus benefit.

2. How much light does a green wall need?

It depends on the plant. If your green wall will be indoors, you'll need to select plants that enjoy lowlight conditions. Says light specialists [Lux Review](#), "Put simply, plants will not survive without an appropriate amount of light as poor illumination slows photosynthesis. Photosynthesis requires light levels of at least 1000 lux [lighting measurement] for plants to thrive, with levels of 2500 lux often being required." If there's absolutely no natural light in the room, or if you're growing herbs or vegetables, you may need to include an [LED light system in your set up](#). Choosing the right plants for your vertical garden, depending on where it will be installed, is crucial, so if you're not sure about whether a plant will survive in low-light conditions, ask an expert at your local nursery.

3. Do you need a professional to install a green wall?

This depends on the size and complexity of your green wall. If it's a simple home system, you'll quite easily be able to do it all yourself. However, if your green wall includes hundreds of pots (in an office, restaurant or urban farm, for example) it may be a better idea to use a [preferred partner](#) to help install and maintain your vertical garden.

4. How much do vertical gardens cost to install and maintain?

This depends again on how big you want to go, and how complex your system needs to be. Another factor that influences price is the plants you choose. (The GrowUp system starts at \$79 with our basic ten pot set up .)

5. How much on-going maintenance does a decorative green wall require?

A simple soil-based system requires minimal maintenance. Watering and fertilizing will be your main responsibilities, which we go into in this guide.

6. How do I water a vertical garden?

The irrigation system in the GrowUp system ranges from manual, to fully automated, and on the higher end can include a timer that requires little to no day-to-day maintenance. A simple watering can will do, but be sure to set something up to catch the run-off - especially if your system is set up indoors. Your biggest challenge will be monitoring for over watering; a big risk to any potted plant system and a very common maintenance mistake.

7. How long will it take for my green wall to mature?

This depends a lot on the system you choose. Some systems require a long time for the plants to grow-in and hide all of the hardware, and some systems require small plants to be planted directly to the system and allowed to grow in. The unique hexagonal design of the GrowUp system allows for an instant effect, if desired. 4" or 6" plants can be transplanted off-site and the wall can have a beautiful, full and finished look the day it is installed.

8. What plants can I grow in my green wall?

Essentially, anything leafy with a shallow root system is going to do well in a vertical garden. If you're planting edibles, you can plant a wide range of leafy salad greens, herbs and smaller plants (like strawberries). As far as decorative plants go, most small to medium indoor plants and creepers (like ivy) can be grown in a vertical garden. Vertical gardens are also a great way to showcase your succulent collection.

9. If I move, can I take my vertical garden with me?

Sometimes. One of the main benefits of a simple green wall system, especially one that uses a pot system, is that you can take it with you whenever you move. This is great for families that are renting their homes, and don't want to put time, effort and money into somebody else's garden. Some vertical gardens - take note when purchasing yours - can simply be disassembled, transported and reassembled (plants in pots intact) on the other side.

10. Is it possible to plant a green wall as a room partition?

Yes. You'd need to set up two system's back to back, to be able to get the full effect of greenery on both sides. A green wall could be a great way to partition a room - especially an open plan area like an office or restaurant.

Choosing your plants



If you're anything like me, heading to the nursery is a thrilling experience that fills you with unrestrained glee... but sometimes your logic is tempered by your enthusiasm.

When choosing plants for a vertical garden it's pivotal to consider three things:

1. What is the purpose of your garden?
Decorative green walls need very different plants to the home food grower, which again has very different needs to the grow-for-profit urban farmer.
2. Where will your green wall live?
Is it indoors, under cover, outside in the sun? The light, heat and dryness conditions all affect what plants will grow well in your vertical garden.
3. What level of maintenance are you prepared to put in?
Some plants do just require more work, more nurturing, and more maintenance to stay at their best than others.

Based on our experience, green tropical plants work best for decorative indoor walls, and leafy salad greens and herbs with fairly shallow root systems for the best results for edibles, and a lush look.

DECORATIVE LIVING WALLS



If you're not looking to get yield from your plants, you need to look more at beautiful, low maintenance plants. Indoor plants can also be quite difficult to maintain, especially with the lower natural light levels indoors.

Here's a list of 9 low-maintenance indoor plants, that will liven up your living space, cleanse the air in your environment, and help you, your family or your staff stay happy and healthy.

1. Boston Fern

Boston Ferns basically only require two simple things to ensure ideal living conditions: indirect sunlight and a cool, humid room. They enjoy medium exposure to sunlight and can grow to be up to four feet tall if planted in a large enough pot. These plants stay green all year round, and are way tougher than their lacy leaves let on... Keep your ferns moist (but not soaked), and you'll have a luscious, classic display of intricate, arched fronds for decades to come.

2. Calathea

Looking to add a pop of color to a room? Calathea (otherwise known as the prayer plant) is famous for its bright, mottled leaves. Calathea comes in all sorts of vibrant colors, including yellow, rose, green, and white. Each plant is unique, and the mottled leaves vary from spots or blotches to stripes. Calathea grows in low-light conditions and should be kept out of direct sunlight. This is why it grows so well indoors.

3. English Ivy

English Ivy is both beautiful and extremely functional inside the home. This romantic-looking creeper is highly effective as an air purifier and can reduce airborne mold (responsible for asthma and allergies) by up to 60%. English Ivy is easy to propagate (by simply taking a five-inch cutting, and putting it in moist soil) and even easier to look after. It enjoys medium to direct sunlight and should be kept moist. As a creeper, Ivy is particularly well suited to being grown vertically, as the stems will drape downwards, creating a shower effect. It's important to note, however, that Ivy is poisonous if ingested, so it's not a great option if you have small children or pets that are likely to eat the leaves.

4. Kalanchoe

With its delicate flowers, Kalanchoe might look very dainty, but it's a hardy little plant. There are loads of varieties of Kalanchoe, from red to pink, orange, yellow and white, and they're a great choice to add splashes of color to a room. Being a succulent, they don't need much water to survive. Even the most forgetful plant owner is unlikely to kill their Kalanchoe.

5. Peperomia

Peperomias are a variety of attractive, mottled creepers, which grow well in medium to full sunlight. They have a slightly waxy-textured leaf, which helps them to store water - making them much harder to accidentally kill. Peperomias have beautifully variegated leaves and can create a brilliant display - especially if grown vertically.

6. Philodendron

Known for its stunning heart-shaped leaves, the Philodendron is another hardy indoor creeper. This particularly tough species will survive a holiday or two - so you won't come home to a pot filled with parched sticks and sand. There are many different varieties of the Philodendron, which come in all sorts of shapes and sizes, all of which can handle their fair share of neglect. However, like English Ivy, this creeper is poisonous when ingested - so it's not a good choice for parents of small children or pet owners.

7. Pothos

Pothos (also known as Devil's Ivy), like the Philodendron (with which it's often confused), has a distinctive heart-shaped leaf. It's a great beginner plant and can tolerate low light - so it can survive in bathrooms and offices. The level of variegation in the leaves depends on how much light the room gets - the better the lighting, the more exciting the patterns will get.

8. Shamrock Plant

Bring a little Irish luck into your home by planting Shamrocks. These cheerful little plants sprout delicate white blossoms and grow well in a cool space with indirect lighting. They only need to be watered about once a week (depending on climate), making them an easy plant to care for.

9. Spider Plant

Spider plants (also known as hens and chicks) enjoy medium light, moist soil, and moderate temperatures. If you can get these three things right, you'll have a constant supply of happy greenery in your home. These self-propagating plants are easily identifiable by their green and white striped leaves. Their "babies" sprout, like spider webs, in tendrils from the main plant and, can be re-potted to start new plants. Spider plants have been popular for decades, and add a very vintage appeal to a room.



HOME GROWERS AND URBAN FARMERS

Any beginner gardener will have great success with the following:

- Basil
- Cilantro
- Arugula
- Strawberries
- Chives
- Lettuce
- Kale
- Thyme
- Oregano
- Green (spring) onions
- Parsley

Herbs love vertical gardens, and with appropriate watering and fertilizing, they flourish and show a [marked yield increase](#) compared to traditional gardens. Naturally vegetables like potatoes, carrots and parsnips, which grow underground, won't flourish in a vertical garden.

If you're farming for profit, there are other factors to consider aside from simply considering if the plants will grow well in a vertical garden.

Bright Agrotech points out two other factors to consider when urban farming:

1. Is it economically viable?

You need to consider factors like demand - are you growing things people want to buy - and production costs, and how these impact your profit margin.

2. Turn over

Says Bright Agrotech, "A 'turn' is the time it takes from the seedling going into the system to the mature plant coming out and going to market. Focusing on crops with really fast turns (lettuce, mustard greens, collard greens, basil, mint) allows you to minimize your liability by never being more than six weeks or so away from production. Slow-turn crops (like herbs and fruiting crops) are typically a bit trickier but can have higher margins than greens, depending on your local markets. We typically recommend a high greens-to-herbs ratio. For example, a new farmer could start with 80% of his space planted with greens and 20% planted with herbs."

Starting your system in seed trays and transplanting to the green wall for their final two to three weeks of growth is the most efficient way to use the space.

COMPANION PLANTING

Another good rule of thumb, especially if you're looking at urban farming or a small home system, is to use the principle of companion planting. Companion planting is a great organic pest control solution, lessening the need for harmful pesticides that could affect your family or pets.

Put very simply, companion plants are plants that keep bugs away (the bad bugs) and attract a healthy ecosystem of the helpful insects into your yard. Companions also offer other added benefits, apart from providing a natural insect repellent. For example, in horizontal gardens, taller plants can provide shade for smaller plants, creating a more efficient use of space. Planting certain plants close together can also stimulate the crops, leading to higher yields and better flavors.

Another surprising benefit of companion planting is that many of these plants are also very attractive. Companions add splashes of color to your herb garden, creating a very aesthetically pleasing display.

Basil

Basil is a tasty herb, which is used regularly in the kitchen. It's also a natural mosquito repellent. When planted near crops like tomatoes and lettuce, basil acts as a flavor enhancer. Basil can easily be planted in amongst other varieties of herbs in your vertical garden. As an added bonus, basil and tomato together make a wonderful salad or pizza topping.

Borage

Borage (also known as a starflower) is an annual herb the sprouts distinctive (and very pretty) blue and purple blossoms. Borage attracts insects like bees and butterflies which help with pollination. The leaves of the borage plant have a slightly prickly texture and a cucumber flavor. You can use borage in salads, or brewed as a herbal tea. It has various health benefits including being a good source of essential fatty acids which help to fight pain and inflammation in the body.

Borage can grow up to two feet tall and is a bit too large to plant in your vertical garden. However, it can easily be cultivated in pots which you can stand nearby your green wall system. Adding companion plants in small pots near your living wall will create a beautiful (and functional) display.

Chives

Chives are a delicious addition to salads and dips and are used extensively in the kitchen. Surprisingly, they also have delicate, lavender-colored blossoms which bring a flash of purple into your garden (they look fantastic alongside the deep blue and purple hues of borage). Chives repel aphids and Japanese beetles and improve the flavors and growth of other plants nearby.

Dill

Dill (not to be confused with the very similar-leafed fennel) has a distinctly mild, warm flavor that pairs particularly well with seafood. Dill can also be brewed into a herbal tea, which is good for colds, flu, and digestion. Dill attracts beneficial wasps which feed off of cabbage worms and other pests. If you're looking to cultivate leafy salad greens in your vertical garden, it's a good idea to include dill in a small pot nearby.

Marigolds

Mosquitos can't stand marigolds. They're also great for repelling most pesky insects from bean beetles to aphids, potato bugs, squash bugs, nematodes, maggots, and flies. These beautiful little flowers are very easy to propagate and come in a variety of bright, happy colors. Apart from their bright blossoms and incredible insect repellent qualities, marigolds are an affordable substitute for saffron in the kitchen. They're a great plant source of vitamin A and can be used in casseroles, bread, omelets, and soups. Marigold plants are relatively small and can slot neatly into your vertical garden in between other herbs and salad greens for a hint of color.

Nasturtiums

The word Nasturtium (directly translated from Latin) actually means nose twist - and these little plants live up to their reputation. Nasturtiums have a distinct, peppery flavor that goes well in stirfries and salads. If you're not a fan of their strong flavor, their bright blossoms can be used decoratively, to dress up dishes at dinner parties or in vases on the table. Nasturtiums serve two important purposes as companion plants. Firstly they attract predatory insects (like spiders and ground beetles) into your garden - which are vital to a healthy ecosystem. Secondly, their pungent, peppery flavor repels aphids, potato bugs, striped pumpkin beetles, Mexican bean beetles, and white-flies. You can include nasturtiums on your green wall, or alternatively, you can grow larger quantities in pots around the base of your vertical garden.

Oregano

Oregano repels most pests and is an essential herb for every kitchen. Whether fresh or dried, oregano is one of the staple herbs for any Greek or Italian dishes. This leafy little herb grows pretty much all year round, and slots beautifully into a vertical herb garden. It's a great source of fiber, plant-based vitamin A, vitamin C, E and K. Oregano also contains iron, calcium, and magnesium. When used as part of a balanced diet, Oregano can help decrease the risk of cardiovascular diseases and diabetes.

Rosemary

Rosemary is a versatile herb which can be used in cooking, medicinally and aromatically. It's a relative of the mint family, and its leaves look similar to lavender but are dotted with tiny blue flowers. As a companion plant, rosemary repels bean beetles, carrot flies, and cabbage moths. It's extremely hardy and does well both outdoors and inside. It has a woody, slightly citrus flavor and is a great addition to roasts. Medicinally, it's known for its antibacterial, antifungal and antiseptic qualities. Rosemary is a fantastic addition to your vertical garden.

Sage

Sage is closely related to rosemary and shares a similar woody fragrance. It's used to treat a variety of ailments, from inflammation to immunodeficiencies, digestion problems, and skin conditions. Like its cousin rosemary, sage repels cabbage moths and carrot flies. Sage is also an excellent companion for tomatoes, as it stimulates their growth. It can easily be part of your green wall, adding aesthetic variety with its unique, fuzzy, gray-green leaves.

Tomatoes

Cherry tomatoes are a must have in every garden. These delicious, versatile crops grow well in conjunction with basil and sage. Tomatoes also repel diamond moth larvae - protecting your cabbage and leafy greens from caterpillars which destroy your crops. Planting your tomatoes near to your sage will boost their growth and yield, and basil will enhance their flavor. Tomatoes are natural creepers, so they'll do well growing vertically. The best part of including tomatoes in your edible garden is you'll always have a fresh supply for salads, and other dishes - right outside your kitchen door.

If you choose the GrowUp system, you have an immediate advantage over your competitors: with [the honeycomb system](#), your greenwall looks lusher than its competitors from the start. (The honeycomb design also allows for a lot of flexibility in your designs and is easy to lay out around any existing structures in your desired space). In layman terms, the honeycomb pattern is the most spatially efficient design, leaving minimum wasted space between objects. Nature has truly mastered mathematical perfection - and humans are only just catching up!



5 common rookie errors (and how to avoid them)



There's a reason they talk about green thumbs! Sometimes it feels like plants require a "magic touch" to bring them from simply puttering along to actually flourishing and radiating health from every emerald stomata. However, if you follow these tips you can be sure your green wall will stay, well, green!

1 NEGLECTING SOIL NUTRIENTS

If you thought planting a seed and remembering to water it was all there is to gardening, think again! Whilst plants can survive on water alone, if you want your crops to grow lush and full, you'll need to ensure they're well fed too. Adding compost to their soil is a fast and simple way to ensure your plants are receiving the right nutrients. Compost should be readily available from your local garden center, but you can also make your own using kitchen scraps and off-cuts. To see how easy it is to make your own organic compost, take a look at our post, [How to make your own compost \[in a small space\]](#) .

As we explain in the next chapter, it's also important to add nutrients in the form of liquid fertilizer to your plants on a weekly to fortnightly basis.

2 TRYING TO GROW CROPS TOO DENSELY

When planting leafy greens, you'll want to leave your crops space to fill out. It's tempting to tightly pack your seedlings together to get a "fuller" look from the start - but this will inhibit their growth potential, yielding smaller crops in the long run. With our hexagonal system, you won't need to do this to create a "full" effect from the get go.

3 NOT PRUNING OR "THINNING"

Pruning (otherwise known as thinning) is done by clipping the smaller sprouts on your plants. These little offshoots sap the nutrients from the main plant, and if they're not removed, will restrict the growth of your crops. As soon as your seedlings begin to develop into mature plants (a couple of inches high) you need to start pruning.

4 UNDER-SOWING SEEDS

Not every seed will sprout into a viable seedling, in fact only between 40% to 80% of seeds (depending on the plant) will germinate, and develop into seedlings. If you're planting from seeds, you'll need to invest in a

couple of trays, and plant two to three seeds per slot in the container. Once they sprout into seedlings, you can transplant these into your green wall system.

5 PLANTING TOO MANY OF THE SAME CROP

Nature is inherently diverse. When you plant too many of the same crop, you lose the benefits of this biodiversity. Companion planting (or crop pairing) is a handy trick to ward off unwanted pests and disease. This will help lessen the need for any poison or pesticides, keeping your vertical garden in top shape. Herbs like oregano, when planted amongst other crops, act as a deterrent to pests like aphids, who are notorious for destroying vegetable and herb gardens.

By following these simple tips, you'll have a beautifully lush green wall and, if you wish, a constant supply of fresh, organic herbs and leafy greens in no time!



Soil and nutrients



One of your initial expenses, apart from the hardware and system itself, is the soil you use in your system. Luckily in a new vertical garden you're starting from scratch and can make sure you've got the best possible soil in your garden right from the start.

Here is a quick summary of the types of soil you'll find in traditional gardens (provided by nature):

- Sandy: light in colour, water runs quickly through it. Plants grow easily in it, but it lacks nutrients. Gritty to touch.
- Loamy: Often dubbed the perfect soil, loamy soil both drains well and retains moisture, is nutrient rich and has a good structure.
- Clay: Drains poorly, dries rock-hard, but nutrient rich. If the drainage is improved, plants can grow extremely well in it.
- Peaty: Full of organic matter, peaty soil is quite acidic which inhibits the organic matter in it from decomposing. Unfortunately, this means the soil has few nutrients and struggles to drain properly. Chalky:
- Stony, alkaline and free-draining, chalky soil can make plants go yellow unless fertiliser is added.

In a vertical garden, chances are high that you'll be buying soil straight from your nursery and won't have to go through the process of identifying and correcting the soil you're left with.

What you need to get is high quality potting soil.

Explains [Epic Gardening](#), "Potting soil is a man-made creation that is in some ways superior to normal garden soil when it comes to growing plants in containers or pots." Made from composted tree bark, sphagnum peat moss and vermiculite or perlite, potting soil has the perfect amount of breathing room for plants to grow and lets them take full advantage of the container they're planted in.

However, even a good quality potting soil will need to be topped up with nutrients and fertilizers. This mainly applies to walls producing edibles; if you're providing a decorative wall, very little fertilizer is needed.

Fertilize your vertical garden weekly or every two weeks using an organic fertilizer, if you're growing edibles.

An organic, water-soluble plant food is key. Firstly, this allows you to add nutrients to your green wall quite easily when you're watering it, and it allows you to spray the plants with the nutrient-rich mix (plants absorb a lot through their leaves!). Secondly, a synthetic fertilizer can [hurt your plants](#), or burn the roots, if you don't follow the instructions properly, and is not recommended for potted plants.



The best fertilizers to use are:

- Time-release fertilizers. "Soil microbes activate organic fertilizers, which slowly release their nutrients to plants," says [Better Homes and Gardens](#).
- Liquid fish or kelp. Nutrient rich and easy to apply, this is one of the cheapest and most efficient ways to nurture your plants. It's available quite affordably from Amazon. It does have quite a strong odour so if

you're fertilizing indoors, it might be best to either avoid this option, or to use only a tiny bit every other time you water your plants.

If you're planting leafy greens in your vertical garden, be sure to use a nitrogen rich fertilizer. Explains [Planet Natural](#), "...nitrogen, which promotes lush, green growth and overall plant health. A fertilizer high in nitrogen is a good choice for leafy vegetables grown in containers, such as lettuce and Swiss chard. Natural sources high in this nutrient include blood meal, feather meal and liquid fish emulsion."

Watering



Quite honestly, "the biggest risk you face with plants potted in containers is that the plants are overwatered and drown from lack of oxygen", or face root rot and fungus because they can't dry out properly. Drainage is one of the most important parts of your vertical garden, and to be water savvy it's best to catch the water and reuse it if possible in a closed loop system (you also don't want a mess all over your office, for example, if you're keeping it indoors!)

According to the [Missouri Botanical Gardens](#), "Overwatering is one of the more common causes of plant problems. The dying roots decay and cannot supply the plants with nutrients and water. Damage caused by overwatering is frequently misdiagnosed as pest damage."

GrowUp's watering system, and using a watering can, mimic nature's "flood" methodology: a sudden deluge of water, with a period to dry off afterwards, instead of constant moisture.

Before you water your plants, it's important to check that the soil is actually dry. Simply do this by [sticking your finger](#) in the soil. The soil should feel cool and damp - if you can feel a lot of water, you'll need to drain the pot. Overwatering will kill your plants just as fast as under watering.

[Signs](#) your plants are being overwatered:

1. Stunted, slow growth
2. Leaves wilt and drop off
3. Yellowing leaves
4. Leaf scorch, or leaf burn
5. Water soaked spots and blisters (oedema). Explains [Home Guides](#), "When the roots of overwatered plants absorb water faster than the plant can use it, the water pressure begins to build in internal cells. The cells will burst, killing them and forming blister-like areas, generally on the undersides of the foliage."

6. The crown of the plants may rot

7. Rotting roots

If you have overwatered your plants, Home Guides shares some steps you can take to correct the problem:

1. Lift the plant out of the pot gently. Turn the pot on its side and slide the plant out gently to minimize damage to the root system.
2. Work as much soil from the roots as possible with your fingers, taking care not to break the roots.
3. Cut off any overly soft, rotten roots with clean shears. Remove any roots that appear dead or are badly damaged.
4. Fill a new clean pot a third full with pasteurized potting soil. Use a pot the same size as the old one that has at least one bottom drainage hole.
5. Set the plant in the pot, spreading the roots out over the soil. Adjust the depth of soil beneath the roots so the top of the root ball sits 1 inch beneath the pot rim.
6. Add soil to the pot until the plant is at the same depth it was growing at previously. The crown of the plant where the stems emerge from the roots must sit even with the soil surface.
7. Water the soil lightly to settle it. Keep the soil slightly moist. Empty the drainage tray after watering so the soil doesn't absorb the excess moisture



Lighting



Lighting is pivotal to plants, and absolutely essential to create a lush, happy space with productive greenery.

As we mentioned in the beginning of the ebook, light specialists [Lux Review](#) say, “Put simply, plants will not survive without an appropriate amount of light as poor illumination slows photosynthesis. Photosynthesis requires light levels of at least 1000 lux [lighting measurement] for plants to thrive, with levels of 2500 lux often being required.”

If you’re growing indoors, artificial lights or ‘grow lights’ can be used either to supplement sunshine, or to replace it completely. It’s also important that the lights mimic the sun with their blue and red waves, and you can do this with three types of lighting:

1. Fluorescent lights
2. High-pressure sodium (HPS) sometimes referred to as HID (High intensity discharge)
3. Light emitting diodes (LED)



	Pros	Cons
Fluorescent lights	• Cheapest investment • Use only 20% - 30% of the energy of traditional incandescent light	• Need to be close to the plants to work well
High-pressure sodium (HID)	• Very powerful and efficient • Significantly cheaper than LEDs	• Expensive to set up • Difficult to maintain (heat and ventilation requires extra complications in the setup process) • Emit high levels of heat which affects plant quality
Light emitting diodes (LED)	• Incredibly efficient: "They regularly have light efficiency above 20%. Recent LED models have had over 60% light efficiency," says Urban Vine . • Can be placed far away from plants • Near-zero heat production • "Specific wavelengths can be targeted within color spectra, resulting in customized "plant therapy" lighting that can even improve lighting over sunlight," says Urban Vine . • "Additionally, LED lights install in just minutes, last 10+ years and deliver cost savings from the first electricity bill. Typically users see a return on investment (ROI) within <1 to 3 years," says Bright AgroTech	• Most expensive system

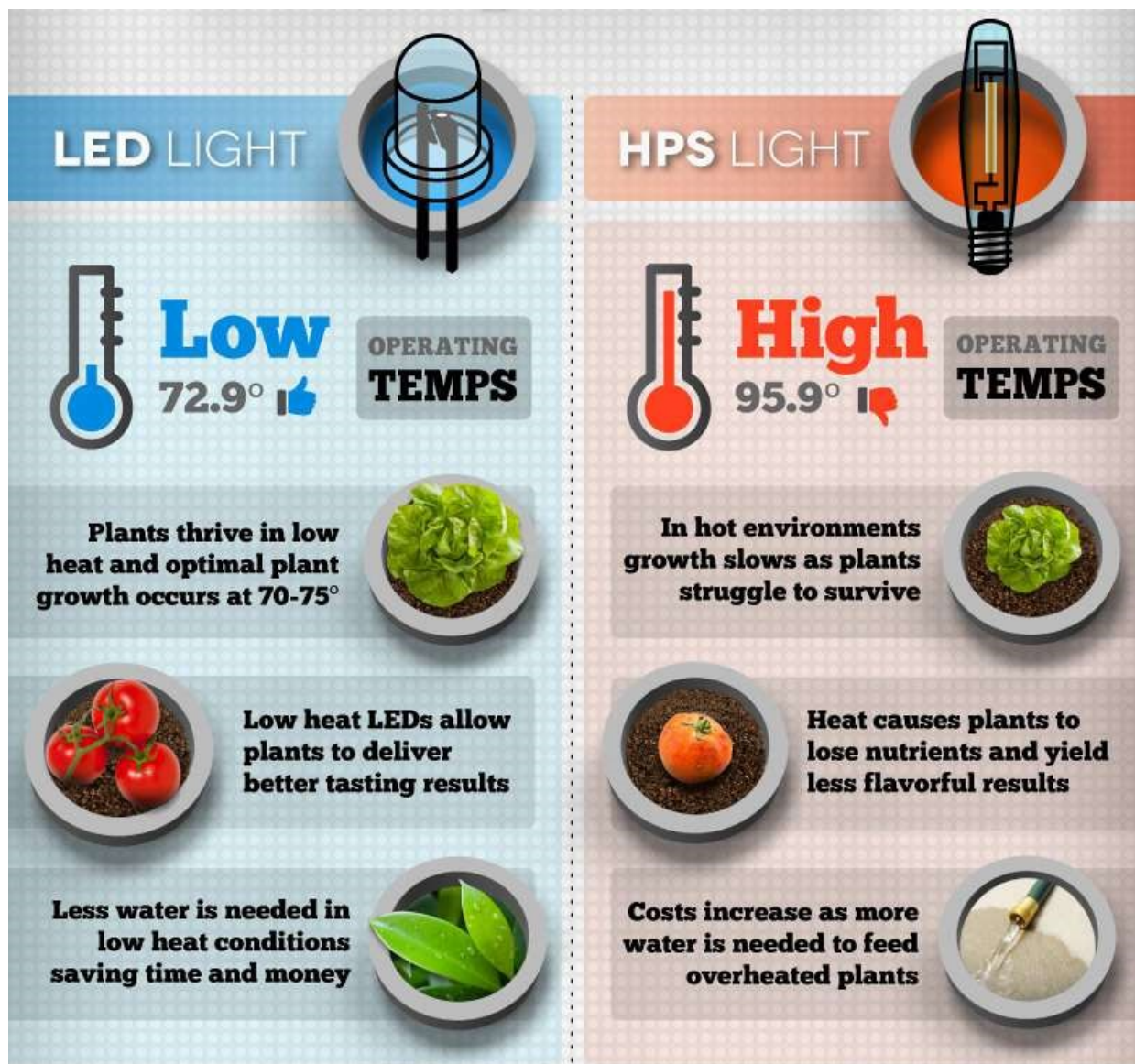


Image from <https://www.urbanvine.co/blog/...>

If you have an indoor green wall, like in an office or home-system, you may not need to invest in lighting at all. Depending on the environment, you may need to supplement the lighting with LED lights or enhance the beauty of the wall with accent lighting. It's only when you are looking at return on investment and urban farming that you need to look more seriously at lighting as an investment.

As [Bright AgroTech](#) says for the urban farmer, "The recommendation? Don't cut any corners when you are working to understand the true costs of your lighting solution, including depreciation expense and energy costs. Do the numbers and understand that many costs like bulb replacement, maintenance labor, etc. are often hidden."

How to install a GrowUp green wall



The [GrowUp green wall system](#) is a hassle-free system which, unlike other vertical gardens, doesn't require an extensive understanding of things like hydroponics. Our system is designed to be as simple as possible - so that the whole family (both young and old) can get involved in creating living art.

GROWUP SYSTEM HARDWARE OVERVIEW

The GrowUp green wall system can be tailored to fit any space. Our range starts with a five pot kit and you can add as many pots as you need to fit the space where you plan to install the living wall. The system comprises of the following components:

What you'll need to set up your green wall

The cleverly designed hexagonal pots fit together to create a honeycomb pattern which ensures that your vertical garden looks full and lush right from the start. One of the key benefits of the honeycomb design is that you won't be left with bulky, unattractive hardware peeking out between your plants.

The result? A stunning green wall display that works beautifully both indoors and outside

TUTORIAL | HOW TO INSTALL YOUR GREEN WALL

You don't need to feel overwhelmed by all the bits and pieces, putting your green wall together is as simple as counting to fifteen.

Step 1 | Mounting the master tank

Install master tank level in bottom right corner of the wall.

Step 2 | Joining Tanks

Insert the grommets and push them through the connector pipe to join the tanks

Step 3 | Mounting the secondary tank

Set the spacing between the tanks to between 0"- 1.58" to adjust the width of the system. Install the tanks level with each other and insert the stopper on the last tank.

Step 4 | Install the drop sheet (optional)

The drop sheet redirects water that escapes the pots due to installation or maintenance errors

Step 5 | Attach the rails to the tanks

Use the pilot holes provided on the tanks to install the bottom screw on each rail

Step 6 | Level the rails and secure them

Level the rails and install the top screw on each of them

Step 7 | Stack and cut the rails

Cut the rails on notches provided, to your desired height

Step 8 | Pump assembly

Attach the first section of the irrigation pipe to the pump as shown below

Step 9 | Pump installation

Place the assembled pump into the master tank, then place the irrigation pipe through the notch provided in the master tank

Step 10 | Install irrigation pipe

Install the irrigation pipe using the supplied cable ties to secure to the wall. Use the pipe connectors provided to join the pipes.

Step 11 | Install drippers

Punch holes in the pipe above the rails. Install the dripper and make sure it's inserted at a 45° downward angle.

Step 12 | Extend drippers

Extend the dripper and insert it into the pot.

Step 13 | Plant your seedlings

Transplant your plants into the planter bags. Tie each bag into a hex pot

Step 14 | Pot installation

Clip the pots onto the rails and ensure they're all properly aligned. It's easier to load pots from bottom up.

Step 15 | Test the Irrigation System

Check that all the drippers are inserted correctly into the pots. Test run the irrigation system for 1 to 2 hours and look out for leaks.

Once you're sure the irrigation system is working properly, your green wall is complete.

As you can see, the GrowUp system is designed to be user-friendly, and is a great starter kit for someone looking to introduce vertical gardens to their design portfolio, or the first-time [vertical garden enthusiast](#).



Need help installing a green wall?

If you need a consultation, assessment, or want to work with a preferred installer to get your GrowUp green wall up or running, [contact us](#)

Contact us