

GARDEN

- **Indoor Garden Size, Type and Variety of Nutrition**

According to the National Gardening Association (NGA), 35 percent of households in the US grow food either at home or in a community garden. This means that two million more families are involved in gardening, up 200 percent since 2008. All of these statistics were calculated by a special five-year report by the NGA, Garden to Table: A 5-Year Look at Food Gardening in America. The study tells us that many things have changed over the past five years -- which age groups are most likely to garden, the types of food that people are most popular to grow, why people garden, and garden location and size.

"This report clearly shows that there truly is a food revolution taking place in America," said Mike Metallo, President and CEO of the NGA. "We are seeing more people, particularly young people, actively engaged in growing their own food. The growth in just five years is pretty spectacular." While Metallo is right, he also highlights the fact that not everyone has access to food.

"Right now, there are 16 million children in America struggling with hunger. Food deserts are still commonplace and obesity coupled with poor nutrition remains at epidemic proportions."

Metallo stresses a few important points. First, we should be aware of hunger in our community and be willing to take action to eliminate it. He also makes it clear that people, especially children, should have a healthy understanding of the food system (i.e. understanding what part they play in the food system). Most importantly, we should know where our food comes from and appreciate farmers, the people who do the hard work to grow it for us.

Organizations like Farmer Foodshare support farmers and teach us about the importance of having a healthy food system so that everyone has access to fresh, healthy food. Gardening is just one of many ways to participate, and its popularity and importance continues to grow.

Types of Indoor Gardening

Container Gardening

The most common technique for indoor gardening is container gardening using pots, terrariums, and any other upcycled vessels you'd like to try, such as coffee cans, vases, or old paint cans. If you plan to use anything other than a typical plant pot, be sure your container has either drainage holes to allow excess water to escape or at least a few pebbles in it's base to create some level of drainage. When using pots or any other container for your plants, be sure to repot your plants as they grow to give their roots the room they need.

Hydroponics

You can also grow plants indoors with hydroponics, which is growing your plants in sand, gravel, or water without soil but by using added nutrients. Hydroponics can allow plants to grow much faster as their nutrients are readily available to them and they do not need to expend their energy searching for them within the soil. Hydroponic gardens can be as simple as some glass jars with a little water and nutrients or as complex as a fully irrigated table set up to grow a vast garden of herbs and veggies.

Living Walls and Edible Walls

Living walls are a unique technique you can use to create your indoor garden in a small space. They use irrigation tanks to provide the plants with a steady supply of water and nutrients. These walls can be constructed simply as a beautiful piece of decor or can be used to grow a small farm filled with lettuces, herbs, peas, or strawberries. Some herbs, fruits, and vegetables will grow better than others on a living wall so do some research before trying to set up a potato farm along your hallways.

Vertical Garden

Another critical aspect when hydroponic farming is space. To take full advantage of your space, many people choose vertical gardens. With vertical farming, you plant your veggies in vertically stacked layers. You can create your own vertical growing system with some basic materials, or you can take the shortcut and buy one. Here are some of the best vertical growing systems:

Indoor Herb Garden

Growing an indoor herb garden is the best first step for indoor gardening for beginners. They are simple to grow and maintain and help develop the skills needed to move onto indoor vegetable gardens. Plus, herb gardens can help you cut down on your grocery bill by helping you to stop buying expensive herbs at the grocery store. Perennial herbs, such as rosemary, oregano, thyme, chives, bay laurel and mint are easiest to grow from young plants that you buy at a garden center.

Basil, oregano, parsley, thyme, and tarragon are all excellent herbs for growing indoors. These herbs want to live, and so they'll work very hard to make sure that happens.

Indoor Vegetable Garden

While planting an indoor herb garden is a great first step, planting an indoor vegetable garden is where you will really see some savings on your grocery bill. Unfortunately, not all vegetables are ideal for indoor gardening, simply because of space. Here is a run down of some popular vegetables and fruits you can easily grow with your indoor vegetable garden.

- **Squash:** Despite what you may have heard, squash can be grown indoors. Crookneck and butternut squash are the most appropriate for indoor growing. Use a pot of 12 inches deep with a diameter of 24 inches. Make sure the container has drainage holes. Plant at least three seeds per pot, leaving a few inches between them. Water on a daily basis. Seed usually germinate in 10 days.
- **Tomatoes:** The best tomato varieties for growing indoor are Petite, Red Robin, Toy Boy, and Tiny Tim. Use a pot with a depth of six inches and good drainage. Plant the seeds about ¼ inch in garden soil. Seeds usually germinate within 5 to 10 days. The best temperature to germinate is between 70 F to 80F. Make sure the plant receives between 14 to 16 hours of light per day.
- **Bell Peppers:** Plant three seeds in each pot. Bell peppers require a nutrient-rich growing medium, mix vermiculite, peat moss and coarse sand in equal proportions. Place the pot in a room with a temperature between 65°F and 75°F, where it can get direct sunlight. Seeds will germinate in about ten days. Bell peppers mature in 70 to 90 days.
- **Lettuce:** Use a pot of at least four inches deep. Place the pot in direct sunlight or use a lamp to stimulate growth. The most suitable lettuce varieties for indoor growing are Tom Thumb, Baby Oakleaf or Black-Seeded Simpson. Seeds will germinate in around 12 days. Most lettuce varieties mature in 45 to 55 days.

- **Cucumbers:** Cucumbers are vines, so make sure to create a climbing structure and place it in the pot. Use a large pot as cucumbers need a lot of space during development. Make sure the temperature is between 73°F and 79°F. Cucumbers also need a lot of direct sunlight, so you should place your pot near a window. Seeds will germinate between 3 to 10 days.

Indoor Mushroom Garden

Mushrooms are low in calories and fat, high in fiber, and contain a high amount of potassium, therefore they are a healthy addition to any diet. Mushrooms can be easily grown indoors with the right light and temperature conditions.

The best variety of mushrooms for indoor gardening are Oyster, White Button, and Shiitake, and they tend to be the easiest to grow too.

Necessities for Indoor Gardening

Space

General vegetable garden is about 1/10th of an acre and grows nearly 1/3rd of our food. The rest of our diet is comprised of eggs, duck, pork, shiitake, and perennial fruits and vegetables produced on two additional acres. Depending on who you ask, what you eat, and your growing methods, it takes between ¼ to 2 acres of well-managed, fertile land to feed a family of four. You can start small and expand annually. However, if food self-sufficiency is your goal, then be realistic in your space planning. A lack of outdoor garden space may be the reason you have turned to indoor gardening, but at least some indoor space is still required. You may have a full living room you can dedicate to growing an indoor farm or perhaps a single windowsill with a long, narrow pot full of dirt to grow some herbs. The needs of your specific plants and their root systems will need to be considered when planning your garden so they will have the space they'll need to properly grow and thrive.

Light

Some plants require very little natural light to thrive while others absolutely cannot go without it. Sunlight is an obvious choice to help your plants grow but for an indoor garden, you may not have much direct sunlight available or it likely won't be available for as many hours as your plants need. If you plan on growing some basic houseplants, standard incandescent light bulbs may do the trick. For herbs and seedlings, fluorescent lights might suffice. Any plants that produce fruit or flowers will need **LED or HID grow lights** in order to flourish. Different types of plants will have different lighting needs so investigate your specific plants and what they'll require while planning out your indoor garden.

Soil and Nutrients

Choosing the right soil for your plants is essential if they are to grow to their full potential. Indoor potted plants require soil that is light and fluffy so the soil can drain properly when watered. A medium weight soil is good for plants that will be in direct sunlight as it will retain water better than lighter soil. A light soil is better for hanging plants or plants that will not be in direct sunlight. Fertilizer can be added to your indoor garden as well to replenish the nutrients in the soil. Repot your plants and give them fresh soil as often as they need it to keep them happy and healthy.

Water

Water is the simplest but one the most important things you indoor garden will require. It sounds easy, but watering your garden is more involved than pouring a bit of water over them every few days. Every plant is different and some will require more or less water than others. Some like to be watered from above while others prefer bottom watering so the leaves don't get wet and the lowest roots can soak up the moisture. Under-watering can dry plants out and give them crunchy leaves while over watering can turn their leaves yellow and eventually kill them. Temperature and humidity will also affect how much water they require at any given time of the year. You can gauge how much water your indoor garden needs by checking that the top few inches of the soil isn't dry and that the soil near the drainage holes isn't soaking wet. It's important to research how much water your specific plants need to keep them in the healthiest condition.

- **Essential Equipments**

1. Grow Lights

For indoor gardening, lighting is paramount. Without adequate light, plants become leggy (i.e., tall, thin and weak)—if they grow at all. I've found that even when grown next to a sunny south-facing window, most plants tend to struggle. For best results, you should supplement natural light with grow lights. If you don't, you're probably going to be disappointed.

There are several types of grow lights to choose from, ranging in both cost and effectiveness. As you read about the pros and cons of each below, keep in mind that there is more to a grow light than just the bulb. Unless you purchase a complete kit, you'll need to also find compatible reflectors, cords, ballasts and other parts.

Note about light color: The whiteness of a light's output is measured in Kelvin units (K). The higher the degree of Kelvin, the "cooler" (bluer) it appears, and the lower, the "warmer" (redder) it appears. Blue light encourages compact, bushy vegetative growth. Red light initiates the flowering stage. Lights between 4,000 and 6,000K are known as "full-spectrum" lights because they produce both cool and warm light colors, much like natural sunlight.

Incandescent

Not much about the incandescent light bulb has changed since Thomas Edison invented it in 1879. While inexpensive and readily available, incandescent lights are the least efficient option for indoor gardening. They'll increase your utility bill, produce more heat than light, and burn out more quickly than other options. I wouldn't recommend using these to grow plants.



Fluorescent

A common—and perhaps the most popular—choice for home gardeners, fluorescent lights use $\frac{1}{4}$ the energy, last about 10x longer, and produce more light compared to incandescent lights (energy.gov). They're great for starting seeds and growing greens, herbs and other plants with low to medium light requirements.

The primary drawback with fluorescent lights is they don't produce enough light to effectively grow fruit-bearing plants, such as squash and tomatoes.

There are a few different kinds of fluorescent lights commonly used for indoor gardening:

- T5, T8 and T12 bulbs are long and tube-shaped. T5 is the narrowest and most efficient of these. Because of its smaller surface area, a T5 bulb produces the most intense light with the least energy. Plus, it doesn't produce much heat, so it can be positioned very close to plants to maximize its effect.
- Compact fluorescent lights (CFLs) are the same size as a typical incandescent light—but much more efficient. CFLs are useful for lighting individual plants or seedlings, but not necessarily an entire Tower Garden.

High-intensity Discharge (HID)

HID lights are typically used for larger growing spaces, such as commercial greenhouses. Producing a greater intensity of light, they're more efficient than fluorescent lights. But they're also large and expensive, which makes them less popular among home gardeners.

There are 2 kinds of HID lights commonly used for indoor gardening:

- Metal halide (MH) lights produce cool colored light (which, remember, is best for compact, leafy growth).
- High-pressure sodium (HPS) lights emit warm colored light. But using HPS lights alone often causes plants to become leggy.



Light-emitting Diode (LED)

Relatively new in the world of indoor gardening, LED grow lights are incredibly light, compact and efficient. But as with HID lights, they often cost a pretty penny up front compared to fluorescent lights. Or at least they used to.

Tower Garden now offers LED Grow Lights that are both highly effective and pleasantly affordable.

2. Timer

A timer isn't required, but it will make your life easier. For healthy development, plants need sleep (i.e., darkness), just like we do. Using a timer to automatically turn your grow lights on and off will save you the trouble of remembering to do it.

Note: The Tower Garden LED Grow Lights feature a built-in timer. Cool, huh?

3. Fan

It's important to facilitate air circulation around your plants, and running a small fan is an easy way to do this. Keeping the air moving will help prevent problems, such as leaf fungi and garden pests.

Best Plants to Grow Inside



Vegetables:

- Arugula
- Broccoli
- Broccoli Raab
- Brussels Sprouts
- Cabbage
- Chinese Cabbage
- Cauliflower
- Chard
- Collards
- Endive
- Escarole
- Kale
- Leeks

Herbs:

- Basil
- Catnip
- Chamomile
- Chives
- Cilantro
- Cumin
- Dill
- Garlic Chives
- Lavender
- Lemongrass
- Marjoram
- Mint
- Oregano

- Lettuce
- Mesclun Varieties
- Mustard Greens
- Pak Choi
- Radicchio
- Sorrel
- Spinach
- Rosemary
- Sage
- Stevia
- Thyme

Ideal Conditions for Indoor Gardening

Creating the right conditions for a successful indoor Tower Garden is easy. In addition to typical maintenance tasks, there are just a few important variables to manage:

1. Light

Running your lights for at least 14 hours a day should yield good results. But you can experiment with longer durations, as long as your plants still get 6+ hours of darkness.

2. Pump Timer Setting

When growing outside, you should set your pump timer to 15 minutes on and 15 minutes off. But in a cooler, climate-controlled environment, plant roots don't dry out as quickly as they do outside. Changing your timer to 15 minutes on and 45 minutes off when growing indoors is a way of both saving a little energy and preventing over-watering.

3. Temperature

Most plants will grow best between 65-75°F.

- **Benefits of Gardening**

Plants are essential for our survival. They provide food, fiber, building material, fuel, and pharmaceuticals. Plants also produce intangible benefits for people, such as improving our health. These benefits occur with plants outdoors and indoors. People have been bringing plants into their homes for thousands of years. We increasingly work indoors, and we are making ample use of plants in these spaces as well. Plants indoors have many benefits. Physically, they contribute to cleaner, healthier air for us to breathe, thus improving our well-being and comfort. They make our surroundings more pleasant, and they make us feel calmer. Interior plants have been associated with reduced stress, increased pain tolerance, and improved productivity in people.

Improved air quality

Plants filter the air around them, absorbing gases such as benzene, formaldehyde and/or trichloroethylene, and emit oxygen. They also increase humidity levels. Cleaner, more oxygen-rich air will keep your family and pets healthier. What's the top-rated plant for improving air quality? According to NASA, English ivy does the trick perfectly.

Educational opportunities

Different plants thrive on different combinations of sunlight and water. A cactus may be fine for a windowless room, but other plants will wilt and die almost immediately. Teaching younger family members about tending houseplants can be a fulfilling experience for elders, and it's a great way to spend quality time with each other.

Veggies and herbs.

Perhaps one of the best benefits about growing plants indoors is the opportunity for year-round fresh vegetables and herbs. Basil, parsley and tomatoes all cost money at the store and can be difficult to keep fresh for lengthy time periods. In addition, it's hard to know for certain if store-bought produce has come into contact with pesticides or preservatives. However, with a thriving basil plant in your window, you can just pluck off a couple healthy, homegrown leaves every time you need them for a recipe.

Plants improve our air quality by filtering toxins that get trapped indoors. The improved air quality lowers risk of respiratory disorders, as well as chronic headaches and eye irritation. Plants teach us how to be attentive and responsive to their needs. This improves our levels of empathy and compassion. Research in environmental psychology has shown that a connection with plants improves human mental wellbeing as well as productivity levels. An indoor garden can provide you with fresh kitchen ingredients. Growing your own food reduces our risk of chemical ingestion which you find in foods that have been transported to your local grocery store. Gardening is an excellent conversation starting point in gaining more attention about the need for improving our environmental impact. In an indoor environment, gardening is a lot less maintenance and plants are relatively safe from pests and disease.

Physical Benefits of Plants and Gardening

Plants boost physical health in several different ways. For example, you can help purify the air and add calmness to the environment merely by adding a single plant to a room. Here are the top reasons to welcome plants into your home, yard or community.

1. Boosts Air Quality

Indoor plants look gorgeous in any office, classroom or home, and they also help clean the air. According to an article published in "Water, Air and Soil Pollution," the majority of urban residents spend their time indoors, where air pollution can be several times higher than outdoors. Indoor air pollution can lead to sick building syndrome, which includes symptoms such as headache, dizziness, loss of concentration and throat irritation. Scientists have identified over 300 toxins in indoor air called volatile organic compounds, which indoor plants help remove. For example, according to this article, plants removed high doses of benzene from the air within 24 hours. Outdoor plants also reduce air pollution.

2. Promotes Exercise

The majority of American adults and children do not get enough exercise. Lack of exercise can lead to a range of health issues, from heart disease to depression. The Physical Activity Guidelines for Americans recommend children and adolescents get 60 minutes or more of moderate to vigorous exercise every day. Adults should aim to get at least 150 minutes of moderate-intensity exercise a week. By getting adequate exercise, adults and children reduce their risk of heart disease, cancer, diabetes, anxiety and depression. Working with plants helps individuals get the physical activity they need to stay in shape or improve their current condition.

Gardening is a fun and easy way to incorporate exercise into your or your child's daily routine. Children usually enjoy working with soil and learning about plants. A child may not even notice they are exercising while they dig, move soil or water plants in the sunshine and fresh air. Gardening also helps children develop motor skills and overall strength, and it can even combat childhood obesity. For example, according to Harvard Medical School, just a half hour of general gardening activities burns 135 calories for a 125-pound person.

3. Encourages Healthy Eating

It can feel difficult to get the recommended amount of fruits and vegetables every day, especially for those who do not prefer the taste of these foods. According to the Centers for Disease Control and Prevention (CDC), most Americans do not eat enough fruits and vegetables. For example, only one in 10 adults eats the recommended amount of fruits or vegetables every day. Gardening encourages individuals to add healthy foods to their diets and break free of poor eating habits. Children and adults will feel better all around when they enjoy nutritious foods every day. Children and parents can choose the foods they wish to grow, and they don't have to worry about pesticides. Homegrown food tastes better and is more appealing because of the time and effort it requires to grow and harvest. Children can easily grow delicious cherry tomatoes, zucchini, radishes and flavorful herbs — just to name a few. A child will likely feel excited to eat what they grew. According to Saint Louis University research, when families grow food, they create a positive food environment. Children served homegrown food are more than twice as likely to eat five servings of vegetables and fruits a day than those who do not or rarely eat homegrown produce. Children who eat homegrown food also prefer the taste of fruits and vegetables to other foods. Gardening and growing produce is a simple way to encourage children and adults to get the nutrients they need for physical and mental health.

4. Decreases Risk of Illness

Indoor plants increase the comfort levels in rooms and decrease the risk of getting sick. For example, a study from Washington State University found plants reduced dust in rooms by as much as 20 percent. The study confirms plants can successfully remove particulate matter from the air. The study also suggests plants may help add humidity to a room. As a result, people in a room with plants may experience less dry, dusty air than rooms without. Greenery helps reduce the risk of irritated airways, runny noses and itchy eyes.

Studies have also found a connection between indoor plants and mental health, including aiding the healing process for hospital patients. For example, a 2009 study found patients in hospital rooms with plants and flowers had lower blood pressure, higher pain tolerance, lower anxiety and lower fatigue than patients who stayed in rooms without plants. This study supports the therapeutic value of plants.

Psychological Benefits of Plants and Gardening

Interacting with nature is essential to maintaining a sense of well-being. Through gardening and spending time around plants, individuals can reap a wide range of psychological benefits. Here are just a few mental health benefits of being around indoor plants and gardening.

1. Improves Mood

Human beings generally feel happier and more optimistic in surroundings with plenty of plants and nature. Consider a survey conducted at four San Francisco Bay Area hospitals. In the survey, 79 percent of patients said they felt more relaxed and calm, 19 percent felt more positive, and 25 percent felt refreshed and stronger after spending time in a garden.

Flowers also evoke positive emotions. For example, in a 2005 study, women who received flowers reported more positive moods three days later. Elderly patients who received flowers also reported brighter moods and improved episodic memory.

While you may only need to place a plant on the windowsill at home to help create a more soothing environment, you can increase happy feelings even more through gardening. Gardening reminds us of our connection to nature, and helps us focus on the bigger picture, which can alleviate symptoms of depression. Also, the physical aspect of gardening releases feel-good chemicals in the brain such as serotonin and dopamine. Finally, working with soil makes us happier. A 2007 study found a bacterium in soil called *Mycobacterium vaccae* triggers the release of serotonin, which lifts mood and reduces anxiety.

2. Relieves Stress and Anxiety

Looking at plants and flowers, whether indoors or outdoors, is a peaceful activity free of worries or conflict. It encourages living in the present moment and engages the senses. When you take time to smell the sweet perfume of a magnolia tree, for example, your cortisol levels drop. Consider a study published in the "Journal of Physiological Anthropology." In this study, one group of participants worked on computer tasks, while another group transplanted indoor plants. After completing their assignments, the groups switched. The researchers found the subjects felt more comfortable and relaxed after the transplanting task, rather than the computer task. The study concluded individuals could reduce psychological and psychological stress by interacting with plants. Another study, published in the "Journal of Health Psychology," compared the effects of outdoor gardening to indoor reading. The study reveals both gardening and reading decrease cortisol levels. However, stress levels decrease significantly more with gardening. Likewise, the study participants enjoyed a fully restored positive mood after gardening.

3. Prolongs Attention Span

Gardening and being around plants strengthens attention span, which can aid concentration and learning. For example, a study published in the "American Journal of Public Health" examines the impact of green or natural settings on children with attention deficit hyperactivity disorder (ADHD). Researchers found activities carried out in green settings significantly reduce symptoms of ADHD compared to other settings. Many children can benefit from spending time in nature. According to the CDC, an estimated 6.1 million children in the U.S. have received an ADHD diagnosis. Gardening also helps children to achieve academically. A study published by the American Society for Horticultural Science demonstrates the impact of gardening activities as part of a science curriculum. Students who gardened scored significantly higher on a science achievement test than students who studied science in a traditional classroom setting.

4. Boosts Self-Esteem

Low self-esteem is a common experience among adolescents and young adults. It's normal for teens to compare themselves to others on social media or feel pressured to look or act a certain way. Children and young adults can benefit from taking technology breaks and heading outdoors. Gardening is one way to generate excitement about connecting with nature and the world outside. When children take care of plants and watch plants grow, they observe a transformation. A child can gain an understanding of his or her transformation from child to young adult. Children can also learn it does not matter what they look like or if they have a mental health issue — they can be nurturers and contribute their love and attention to the world. Gardening is one way to gain a sense of self-worth regardless of social pressure. Lastly, any gardener feels proud when it's time to harvest the beautiful produce. Children can enjoy the taste of the vegetables they grew or the sight of the colorful flowers from their garden and the confidence boost that comes with it.

- **Gardening with Children**

Young children can practice locomotor skills, body management skills and object control skills while they move from one place to the other carrying tools, soil and water. They will be moving their bodies using large muscles and using muscles to balance and manage objects too. Fine motor skills such as whole-hand grasping and the pincer grasp (necessary skills for writing) are employed in gardening when children use a trowel or rake and pick up tiny seeds to plant. Further, being outdoors in the fresh air and moving around a lot is a good way to get exercise.

Another aspect of physical development is the sensory stimulation that you can experience in a garden. Water is a critical part of gardening and, if your child enjoys nothing else, playing with the hose or the watering can be a highlight. Feeling the texture of the soil or the plant leaves is also interesting, as is the smell of the fresh garden and its plants.

Of course, most gardens are a visual explosion of colors, tones and shades. If you plant edible plants, this is one of the few areas where you can actually safely employ your child's sense of taste. Children are often more willing to try a new food if they have been involved in the process of growing it.

Literacy skills can be part of gardening, too. Learning the names of different plants and reading what their growth requirements are on the seed or plant packages is a literacy activity. Another reading/writing activity could be making a map of your garden or your yard and labeling the plants in it. A map of the area that you plant can be really helpful when those seeds start to sprout and you are not sure which one is a weed and which is the vegetable or flower you planted!

Cognitive development is all about intellectual skills such as remembering and analyzing information and predicting outcomes. You can do plenty of that in your garden with children. By asking open-ended questions about what you have already done in your garden and what they think you should do next, you are helping them think through the processes of preparing the soil, planting, watering and weeding. Ask them to tell you about the differences between the various plants you are growing or the different parts of the plants themselves. Show them the entire plant—roots, stem, leaves, flowers and seeds—or let them draw the plant at different stages of growth.

- Responsibility – from caring for plants
- Understanding – as they learn about cause and effect (for example, plants die without water, weeds compete with plants)
- Self-confidence – from achieving their goals and enjoying the food they have grown
- Love of nature – a chance to learn about the outdoor environment in a safe and pleasant place
- Reasoning and discovery – learning about the science of plants, animals, weather, the environment, nutrition and simple construction
- Physical activity – doing something fun and productive
- Cooperation – including shared play activity and teamwork
- Creativity – finding new and exciting ways to grow food
- Nutrition – learning about where fresh food comes from.

Getting children interested in gardening

- Keep it simple.
- Give children their own garden space. (This does not have to be big. You can start with a large container or a few pots.)
- Involve older children in the planning and design of the garden.
- Use lightweight, easy-to-handle, correct-sized tools and garden equipment.
- Encourage children to dig in the dirt. (Younger children love making mud pies)
- Grow interesting plants such as sunflowers, corn, pumpkins, tomatoes and strawberries.
- Use a trellis or teepee to grow beans or sweet peas.
- Plant flowers that attract butterflies, ladybirds and other interesting insects or birds.
- Make a scarecrow.
- Install a water feature, a birdbath or a sundial.
- Set up a worm farm.
- Visit community gardens, children’s farms or botanic gardens for ideas.

Child safety in the garden

- To make the garden safe for children:
- Select the correct-sized tool.
- Keep sprays and fertilisers out of reach.
- Do not use chemicals. Garden organically whenever possible.
- Provide safe storage for equipment and tools.
- Secure fences and gates.
- Provide shade in summer with umbrellas or shade cloth.
- Make sure that where it’s appropriate, children wear a hat, sunscreen, suitable clothing and gumboots.
- Do not leave buckets of water unattended around very young children and toddlers.

Plant selection for children

- Children like large, brightly coloured flowers and vegetables that grow quickly. Plants such as sunflowers, corn and pumpkins are good examples.

You should also consider using varieties of plants that have sensory and textural qualities as well. Examples of great sensory plants include:

- Touch – woolly lamb’s ear, succulents (such as aloe vera), bottlebrush species, snapdragons
- Taste – basil, strawberries, peas, rosemary, carrots, cherry tomatoes
- Smell – jasmine, sweet peas, lavender, pelargoniums, native mint bush, lemon balm
- Bright colour – daffodils, rainbow chard, marigolds, pansies, sunflowers
- Sound – corn, bamboo and grasses rustle against each other when the wind blows.

Different-aged children in the garden

- Toddlers, preschoolers, primary-school-aged and older children will all have different expectations and will learn different things in the garden.

Younger children will require careful supervision during activities. Suitable tasks for younger children include watering plants, harvesting produce and planting seeds. Older children are physically capable of handling a greater variety of activities, like digging, carrying, planting, mulching and pruning.

Activities for a child in the garden

- Watering the garden
- Digging
- Picking flowers
- Planting vegetables, fruits and flowers in the correct season
- Feeding the worms and using the ‘worm tea’ from the worm farm as fertiliser
- Picking vegetables and fruits when they are ready to eat
- Preparing healthy food, such as making salads and preparing school lunches
- Craft activities using harvested seeds, plants and flowers
- Composting, recycling and mulching
- Weeding
- Gathering seeds and dried flowers
- Deadheading flowers
- Preparing the soil with organic fertiliser
- Replanting and re-potting.

Hydroponics is the fastest growing type of gardening. It allows gardeners to grow plants in water without soil or in a soilless growing media, such as potting mix or coco coir. Hydroponics rapidly delivers nutrients to the plant’s roots, resulting in plants that grow faster and produce significantly more harvest. It can be used to grow nearly any type of plant and offers schools an alternative to traditional in-ground or raised bed gardening.

However, hydroponics is much more than just an alternative method for growing. It delivers its own unique social and educational benefits. Hydroponics is key to major advances in water conservation, land use and food production. One hydroponically grown plant can produce more than 10x the yield of one grown in traditional soil-based gardening, with less water use and less space required. The social impact this provides for future food production—especially in concrete-ridden, food-desert urban environments—is astronomical. Plus, hydroponic growing is year-round, regardless of weather conditions, which doubles the growing season and further increases potential food production.

In the classroom, introducing students to hydroponics offers exciting and distinct learning opportunities. It allows students to investigate plant needs through a different lens and encourages a deeper understanding of the conditions needed for healthy plant growth and development. Concepts like plant parts, nutrition, recycling and agricultural technology come to life for students and provide opportunities to explore foundational engineering and design principles. Hydroponics gives students year-round access to fresh, healthy food within arm's reach inside the classroom, and as a quickly growing industry, hydroponics may even lead to future job interests and career paths for students.

- **Pros & Cons of Hydroponics**

Modern hydroponic gardening was introduced in the 1920s as a means of commercial plant production. Hydroponic systems use water and nutrients to grow plants, and they provide an alternative means to produce food in areas with poor soil. For example, during World War II U.S. troops used hydroponic gardens to grow fresh fruits and vegetables while stationed in infertile areas of the Pacific Islands.

Efficiency

One of the hallmark characteristics of hydroponic gardening is its efficiency. The guiding principle of a hydroponic garden is that you only use what the plants absolutely require to grow and thrive. Hydroponic systems minimize water waste since the water is applied directly to plant roots. This in turn lessens fertilizer loss due to runoff. You also won't have to worry about weeds taking over your garden, and insect pests tend to be less of a problem. Of course, in order for your system to be effective, you will need to be well acquainted with basic plant physiology and the needs of the specific plants you want to raise.

Cost

Cost is one of the biggest disadvantages of hydroponic gardening. Both upfront and operational costs tend to be higher for hydroponics than they are for normal soil gardens. Although this may be a disadvantage if you have fertile soil already, if your soil conditions would require extensive amendment, hydroponics might be equally or even less expensive. Larger-scale hydroponic systems tend to be more cost-effective than small-scale gardens, according to the Oklahoma State University Extension.

Space

Hydroponic systems require much less space than normal gardens, which makes them ideal for urban dwellers or gardeners with limited yard space. The plant root systems in a hydroponic garden are much smaller than a normal garden, which means less space between plants. It's also easy to start a hydroponic system indoors with artificial lighting. You won't need to worry about crop rotation in later seasons, which can sometimes be a limiting factor in traditional gardens.

Crop Yields

Although the initial investment may be a bit higher for equipment, a properly planned and executed hydroponic system will produce a surprising crop yield. Hydroponic systems can also encourage plant growth in harsh climates like deserts or areas with poor soil conditions, since they provide the exact amount of nutrients and use water efficiently. Additionally, an indoor hydroponic system produces crops year-round without being limited by seasons. When plant elements are applied correctly, the plants might even yield an earlier harvest than normal gardens, according to the Virginia Cooperative Extension.

Advantages

- No soils needed
- Make better use of space and location
- Climate control
- Hydroponics is water-saving
- Effective use of nutrients
- pH control of the solution
- Better growth rate
- No weeds
- Fewer pests & diseases
- Less use of insecticide, and herbicides
- Labor and time savers
- Hydroponics is a stress-relieving hobby

Disadvantages and Challenges

- Experiences and technical knowledge
- Organic debates
- Water and electricity risks
- System failure threats
- Initial expenses
- Long return per investment
- Diseases and pests may spread quickly

WHY HYDROPONICS?

Hydroponics is the method of growing plants in a nutrient-rich water-based environment. It comes with many incredible benefits over traditional gardening:



Zero soil



2x growth rate



80% less water



No weeds



Nutrient efficiency



Fewer pesticides

- References

1. <https://www.primalsurvivor.net/much-land-need-self-sufficient/>
2. <https://www.maximumyield.com/efficiency-and-the-indoor-garden/2/914>
3. <http://www.farmerfoodshare.org/farmer-foodshare/2017/6/15/gardening-boom-1-in-3-american-households-grow-food>
4. <https://indoorgardening.com/what-is-indoor-gardening/>
5. <https://www.compoundingpennies.com/indoor-gardening/>
6. https://www.towergarden.com/blog.read.html/en/2015/2/see_how_easily_you.html
7. <https://morningchores.com/self-sufficient-gardening/>
8. <https://metrohh.com/2014/01/17/benefits-of-indoor-gardening/>
9. <https://healthtalk.unchealthcare.org/health-benefits-of-gardening/>
10. https://www.actahort.org/books/881/881_111.htm
11. https://www.canr.msu.edu/news/gardening_with_young_children_helps_their_development
12. <https://www.capitalgardens.co.uk/blog/valuable-life-skills-that-children-can-learn-from-gardening/>
13. <https://www.greenandvibrant.com/advantages-disadvantages-of-hydroponics>
14. <https://learn.eartheasy.com/guides/gardening-with-children/>
15. <https://gardenerstpath.com/how-to/beginners/gardening-children/>
16. <https://www.pbs.org/parents/thrive/gardening-with-kids-how-it-affects-your-childs-brain-body-and-soul>
17. <https://www.powerhousehydroponics.com/health-social-benefits-of-indoor-gardening/>
18. [https://www.academia.edu/1493672/How do Community Gardens Impact Social Conditions?auto=download](https://www.academia.edu/1493672/How_do_Community_Gardens_Impact_Social_Conditions?auto=download)
19. <https://hside.org/plants-improve-mental-physical-health/>
20. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6334070/>
21. <https://www.hawthorne-gardening.com/the-future-for-school-gardens>
22. <https://www.betterhealth.vic.gov.au/health/HealthyLiving/gardening-for-children>
23. <https://homeguides.sfgate.com/pros-cons-hydroponic-gardening-72660.html>
24. <https://greenourplanet.org/benefits-of-hydroponics/>