Hydroponic Gardening at Home (published 2026-01-17)
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Somehow, growing flowers and vegetables without soil, digging, weeding, fighting pests, or worrying about weather conditions sounds rather appealing. Hydroponic gardening offers exactly that and more. Let's take a quick dive into the watery science of hydroponics.

This way of growing plants was originally a research method for agriculture back in 1929. In World War II, the US Army used hydroponics to grow food for troops on the Pacific islands. By the 1950s, commercial hydroponic farms were all over the world.

The idea is to grow plants in nutrient-rich liquid that may also include solid materials like vermiculite, polystyrene packing peanuts, coir, or other materials. Good plants for hydroponics are tomatoes, lettuce, cucumbers, and peppers. Herbs and foliage plants also do well.

There are quite a few advantages to using hydroponics. The weather isn't a problem anymore. It is easy to control nutrients, pH, and growing conditions. Plants grow faster because more oxygen is available to the roots. It costs less for water and nutrients after the initial investment in equipment. It is easier – no digging, no weeding, no insects, much lower risk of bacterial and fungal infections, no crop rotation, and less bending by having plants in raised beds. And there are a lot of choices for small ready-made kits.

Of course, there are some disadvantages. If you buy a kit, there is a higher start-up cost than planting a traditional garden or making a DIY system, you need to educate yourself about hydroponics, and some diseases can still sneak in unless you use resistant plants.

So, what do you need to know? There are different types of systems you can use and all of them can be any size you want. The choices include liquid systems versus aggregate systems. Aggregate systems use some type of solid medium, like vermiculite, coir, packing peanuts, or other material. There are also open or closed systems and active or passive systems. These various systems differ by how the system provides nutrients to the plants.

A simple design is the water culture system. Plants sit on a floating platform or raft, often a polystyrene sheet on the nutrient solution. An air pump bubbles oxygen into the liquid. Fancier systems include ebb and flow, drip, the Nutrient Film Technique (NFT), and the high-tech aeroponic system.

The simplest home hydroponic set-up is the wick system. There is no pump or moving parts, making it easy and inexpensive. Plants sit in a base over a wick, such as a lantern wick or candle wick. The wick draws the nutrient solution from a reservoir into sand or a vermiculite mixture and a growing medium such as rockwool or perlite. This system keeps the medium moist. Because the solution is drawn out from the reservoir and there is no recovery method, the solution requires monitoring and refilling. It is refilled with nutrient solution mixed in the right concentration rather than plain water.

The floating raft is another simple system with seedlings sitting on a raft over the nutrient solution. An aeration pump is needed and the roots need to be protected from light to prevent algae growth. This system also requires monitoring of the liquid level and periodic refilling.
A somewhat more elaborate system is the ebb and flow design. A submersible pump delivers liquid to an upper tray where the plant roots are. An overflow valve returns excess solution back to the reservoir. The pump floods the upper tray about every 20 to 30 minutes.

Other considerations for hydroponics are very similar to any other type of gardening. Plants need light, water, nutrients, oxygen and carbon dioxide. Light can be provided through south-facing windows, fluorescent or LED bulbs or grow-lights. Just be sure the plants will receive adequate light for good growth. Most plants will need 8 to 16 hours of light, depending on the light source used.

Nutrients for hydroponic systems are available commercially in premixed combinations. As the plants grow, they'll use more water; therefore, it is important to monitor and refill the nutrient solution. It is also recommended that the solution be replaced periodically. The frequency depends on the type of system being used. A small raft system may need to be changed every 2 months, whereas once or twice a year may be fine for a recirculating system. When you do replace the solution, pour the old solution outside on your lawn or garden. Do not pour it down the drain as it can cause algal growth in rivers, ponds, etc.

Some systems provide oxygen through their design but for best results an aeration pump like those used for fish tanks is helpful.

This is a quick overview of hydroponics. But, hopefully, you, like me, will dig deeper and give it a try. Hint: starting small and simple may be prudent. The resources that follow will provide the detailed information you'll need for successful hydroponic gardening.

Resources

"Home Hydroponics,"
https://extension.illinois.edu/sites/default/files/illinois_extension_hydroponics_handouts.pdf

"Hydroponics," https://extension.okstate.edu/fact-sheets/print-publications/hla/hydroponics-hla-6442-a.pdf

"Hydroponics at Home," https://extension.unh.edu/resource/hydroponics-home

"Building a Home Hydroponic Garden,"
https://edis.ifas.ufl.edu/publication/HS184?downloadOpen=true

"Houseplants, Hydroponics and Greenhouses," https://uthort.tennessee.edu/house-plants-hydroponics-and-greenhouses/

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