

# Hydroponic Garden Set Up

This covers the hardware to get started. These are plans to make a fairly portable, and very inexpensive water culture (advanced hydroponic) system. These plans only explain how to make the garden itself, and do not explain how to use/maintain it.

## Materials:

1 5-10 gallon bucket  
2 Pieces of PVC or ABS pipe, 8-10" long, 5" or greater diameter.  
4 Caps for PVC/ABS pipe ends.  
1 waterpump capable of about 50 Gallons Per Hour (you will need a bigger pump if you choose to make this a larger system)  
4' of hose that will fit the waterpump (often 3/8")  
1 TEE joint (or Y-splitter) that fits the water hose  
4 clamps for the water hose (one for pump to hose, and 3 for hoses to TEE fitting.)  
1 Airpump, airstone, and some airline from a fish tank.  
1 Can White epoxy based spray paint  
1 Can Black Epoxy based spray paint

## Instructions:

Everything must be made light tight. Paint all hoses, the bucket, the PVC/ABS (which will be called PVC from now on) and the lid of the bucket with a layer of black paint. Let it dry overnight, and then cover it with a layer of white paint (to make it reflective, and reduce the temperature of the nutrient solution).

Take each of PVC pieces and drill a 1" hole in the side, about one inch from the end. Then epoxy the caps onto the ends of the PVC. Drill the inlet/outlet holes (these should be located on the caps of the PVC),

The inlet hole should be as low as possible (as close to the wall of the PVC), and the outlet hole should be as high as possible)

Now cut two 5" holes in the sides of the bucket (close to the top), and epoxy the PVC in place, so about 2" of pipe (and the outlet hole) are inside the bucket, and the 1" hole is facing straight up.

Place the airstone in the bottom of the bucket, and find a place for the airpump. If you are planning an indoor garden, with enriched CO<sub>2</sub> in the air, then the pump should be OUTSIDE of your enclosure. The idea of the pump is to dissolve oxygen into the nutrient solution, and not to dissolve CO<sub>2</sub>.

CO<sub>2</sub> can kill rootsystems. If you are growing outside, or not enriching CO<sub>2</sub>, then the pump can sit anywhere.

Place the waterpump in the bottom of the bucket (assuming it is a submersible one) and attach a hose to it. long enough to reach the top of the bucket. Cut a hole in the lid of the bucket for this hose to go through. Then attach the TEE fitting to the hose. Now attach hoses to the free ends of the TEE, and run them to the inlet holes on the end of the PVC pipes. Use clamps on the TEE fitting and on the pump itself, but use epoxy to attach the hoses to the PVC. This seal must be completely water tight. Let them dry for 24 hours.

Put some water in the bucket and turn on the pump. What should happen is the PVC pieces will fill with water, and then when they are full, they should begin to continuously

drain out the outlet holes, and back into the bucket. If you are getting leaks anywhere, fix them immediately. If water is coming out of the 1" hole on the top of the pipe, then either your pump is too strong, or your outlet hole is too small. Fix one or the other.

Empty the system (hint, remove the hose from the pump to drain the arms), and replace the water with some form of hydroponic nutrient solution (look in a hydroponics book for details on what exactly to use, or visit a gardening store, and ask)

Place your plants into the system. The best way I have found to do this is to take a 1 1/8" garden hose and cut a 1" tube off of one end. Then slit the tube down one side.

Wrap the stem of your plant (just above the roots) with polyester fluff (available at aquarium stores, for stuffing into external water filters) and then wrap the garden hose around the fluff. Then force the hose into the hole at the top of the PVC arm. People also have used rubber stoppers.

Turn on the air/water pumps, and let your garden grow.

Comments:

This is obviously just a small setup, but these plans can easily be modified for much larger systems, using longer pieces of PVC, or more than one pair of arms, and a larger bucket to hold the nutrients.

Starting Seeds:

This system is not for seeds. Either purchase small plants, or start your seeds in a pan of vermiculite, flooded with 1/2 strength hydroponic nutrient fluid. When they are about 4-6 inches tall, they are ready to be moved to the system. Remove them gently from the vermiculite, using clean water to get every last chunk off of the roots. Then wrap the stems in polyester fluff and garden hose.