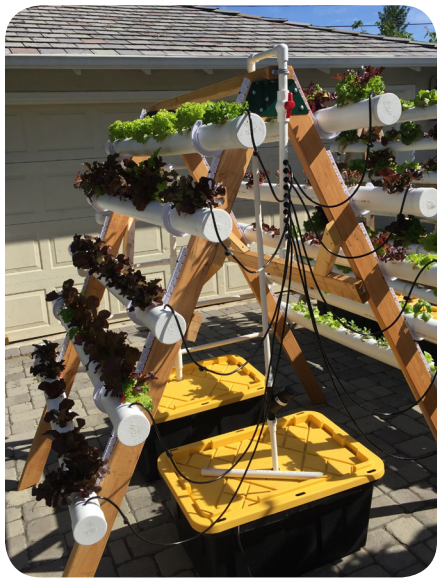
Backyard Hydroponics

Hydroponic A-Frame System

Part list

- Wood (6 - 2″x4″ x 8′, about $15 at Home Depot/Lowes)
- Metal braces 4 (or two) EZ Frame Bracket by Swing-N-Slide ($8 each at Amazon)
- PVC pipes 5 - 10′ x 3″ diameter PVC pipes ($12.67 each at Ewing Irrigation)
- PVC pipe caps 20 - 3″ diameter ($1.50 each at Home Depot/Lowes
- Plastic pipe hangers 10 - 3″ diameters ($10 for 10-pack at Lowes)
- Misc ¾″ PVC connectors and pipe (pretty cheap at Home Depot/Lowes)
- Uni-seals 12 - ¾″ diameter (about $1.50 each on eBay)
- 12 - ¼″ Microtube grommets ($.30 each at Horizon Hydroponics)
- 2 - 27 gallon heavy duty bins (about $9 each at Home Depot/Lowes
- Water pump PonicsPump PP53006 ($32 on Amazon)
- 2 Inch White Slotted Mesh Net Pot 100 pack ($17.50 on Amazon)
- pH and EC meter $15- $100 on eBay
- Oasis Horticubes growing medium 1″ # 5225, 162 units/sheet ($11.99 sheet at GrowHome.com or American Hydroponics, $100 for 20 sheets)
- Nutrients 2-part mix $15 at Amazon or American Hydroponics for larger quantities.



Directions

Cut pieces for wood frame

Cut the wood pieces. Optionally, coat with a protective stain.

- 4 support legs - 68″ x 2″ x 4″, 30° angle cuts at bottom
- 1 top support - 48″ x 2″ x 4″
- 2 side support - 44″ x 2″ x 4″
- 4 braces - 16-18″ x 2″ x 4″ - 45° angle cuts

Assemble Frame

Use wood screws to attach legs to metal braces. You can either use one or two braces per set of legs. Connect 48″ top support piece to each brace. Then screw in the side supports to each side, and then the 45° angle braces.

Prepare PVC Pipes

Pipes come in 10 foot lengths. Most often the pipes have a flange at the end to connect pipes to each other. Cut those off the flange section, then cut PVC pipes to desired length. Use a 2 ⅛″ hole saw to cut holes in the pipe. When cutting holes, use a reverse direction in your drill to give a smoother cut in the pipes. Measure about 8″ to 9″ space between each hole for full sized plants. For starter plants spacing can be half that distance. Use a ratio of about 3:1 between starter plant pipes and full size pipes.

One end of the pipe will be used for the drain. Drill an extra 2 ⅛″ hole above the drain hole. Then drill a 1 ¼″ drain hole at the bottom. Insert a ¾″ Uni-seal in this hole.

Connect pipe caps at the end of each pipe. Tip – instead up using a PVC cement to hold the cap in place, try using a plastic bag (or bags) over the end of the pipe and then put on the cap. This give a tighter fit, but the cap can be removed to clean the pipe in the future. Trim the extra plastic and it will hardly be visible.

Attach PVC Pipe Hangers to Wooden Frame

The plastic pipe hangers are often longer than required for the A-Frame. Cut off 1"-2" from the arm of each hanger. Also, although the hangers come with nails, screws (1 ¼" #6 screws are good replacements) may be a better choice to more easily move the pipe hangers to be level.

It is best to start at the top of the A-Frame and work downwards. Use a level to ensure that the pipe is even before connecting the second side. Continue installing the hangers.

Drainage System

Use PVC various ¾" pipes and connectors to collect the drainage water to be recycled in the system. Since the water flow and pressure is low, the pipes can be connected in a variety of designs. The bottom of drainage system feeds into the storage tanks.

Storage Tanks

Tanks specifically designed and sold for hydroponics can be quite expensive. Try using the heavy duty storage bins (about 27 gallons, black with yellow lid) that available at Costco or Home Depot. If you connect two bins together using Uni-seals and ¾" PVC pipe, the total capacity is over 50 gallons and gives a larger safety margin in case of leask and can last weeks or more between refills.

Pump and Distribution system

The water pump is a critical component to make the hydroponic system work reliably. The pump needs to have enough "lift" to reach to top level of the A-Frame. Get a pump that can lift to at least 7'. Connect a ½" PVC pipe to the pump. A PVC adapter is likely required. Use a ½" pipe instead of ¾" pipe since this is less water to lift.

The Distribution pipe is a ¾" PVC pipe with holes drilled to fit in the ¼" Microtube grommets. Connect a ¼" drip system hose to the grommet and feed into the 3" PVC pipes.

More to Come!

Sorry that this sheet is not a complete set of instructions. It was created the night before the start of Maker Faire! For updates or question, please go to:

www.WaterWorks-Hydro.com
or contact us at info@waterworks-hydro.com