

Hydroponics

UCA Lewis Science Center Atrium

Green Bear Coalition

Materials - PVC

- 4in SDR-30 Pipes for the main towers
- Cut to whatever height you wish.
- You can use schedule 40, but it is harder to heat up and mold



Materials – 4” PVC

- Smaller segments to make up the base of the towers
- We cut ours to 10.5in to have a slightly smaller footprint and fit through our doors.
- The base acts as the reservoir for your nutrient solution. Longer segments will increase your water capacity.



Materials – 4” PVC connectors

- Make sure they match the type of PVC used: sdr-30 or schedule 40.
- Three T-connectors
- Four 90 degree elbows
- One wye
- Five caps
- One drain access with screw-on cap



Materials – 2” and ½” PVC

- ½ in PVC was used for the main water delivery.
 - One slightly longer than the entire setup is high
 - Four smaller segments to distribute water from the center to the top of each tower
 - Four short segments that will send water down into the towers
- 2 in PVC was used to shape the plant cups. We cut a short piece at an angle to use in the molding process (shown later)
- 2 in PVC was also cut into small rings to hold the plant baskets



Materials – ½” PVC connectors

- One 5-way splitter
- Four 90 degree elbows
- Five ½ inch threaded adapters
- Four ½ inch mushroom sprinkler heads
 - https://www.amazon.com/dp/B09JCLC3T2?ref=ppx_yo2ov_dt_b_product_details&th=1

Pump

- We used a fountain water pump.
 - Designed to pump water up to 10 feet high.
 - Model: VIVOSUN 800GPH from Amazon
 - https://www.amazon.com/dp/B07L54HB83?psc=1&ref=ppx_yo2ov_dt_b_product_details
- We had to sand off the feet of the pump to allow it to fit in the T connector.

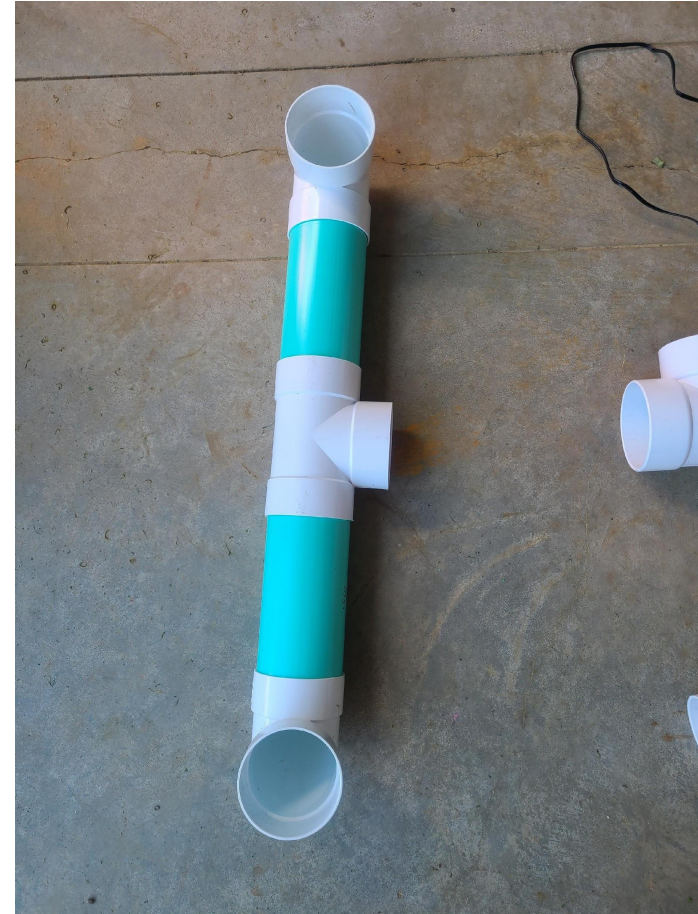


Other items

- Aquarium sponge filter
 - Protects the pump from root debris that may fall into the reservoir
 - https://www.amazon.com/dp/B09J2MG4XS?psc=1&ref=ppx_yo2ov_dt_b_product_details
- 2 inch net pots to hold plants
 - https://www.amazon.com/dp/B07W9H8ZRH?psc=1&ref=ppx_yo2ov_dt_b_product_details
- Seed starter sponges or coconut pellets
- Nutrient solution
 - We are using AeroGarden Liquid Nutrients

Assembling the base

- Use the smaller sections (10.5") to build each individual side of the base. Elbows face up to hold the tower and T connectors face inward.



Assembling the base

- Connect each side with the two other short segments, linking them together with an upward-facing T that contains the pump.
- This entire base structure should be watertight. This was the only part of the 4" that we cemented together. All other 4" pipes and connectors are held on with friction to allow disassembly for transport or cleaning.



Filter installation

- Cut the aquarium sponge filter to fit within the elbows.



Assembling the quick access pipe

- The wye, quick drain access with screw-on cap, and a standard PVC cap were assembled with very short pieces of PVC.
- A small hole was drilled in the PVC cap to allow the power cord and the center distribution pipe to fit.
- This will be used to monitor liquid levels and refill as needed



Installing the distribution pipe

- A threaded connector was used to couple the ½” PVC with the pump.
- The previously drilled hole in the cap allowed clearance for both the pipe and the pump power cord.



Creating the towers

- Small slits were cut into the towers using a small circular saw.
- A jigsaw was used to clean up the slits and set them at 3.25" long.



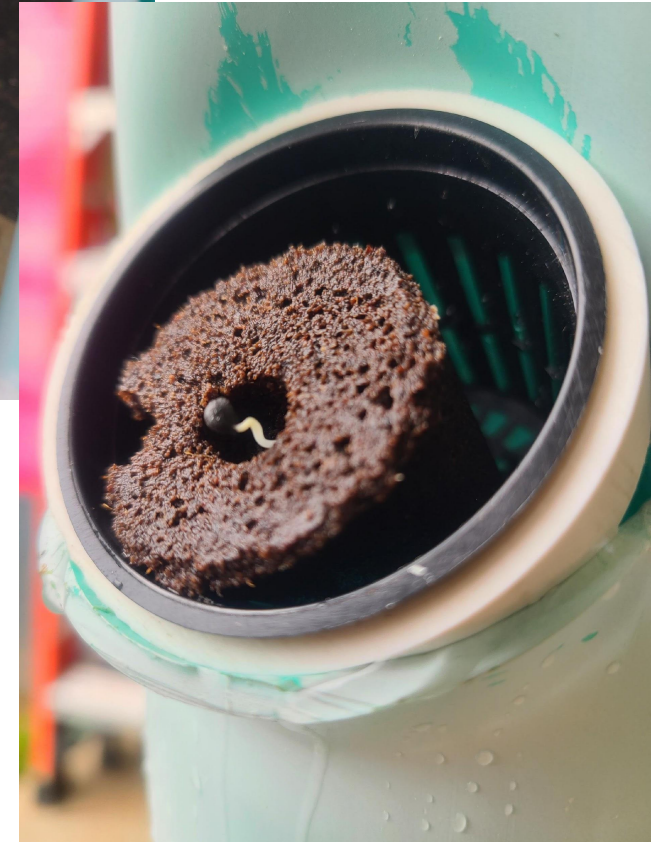
Creating the towers

- A heat gun was used to make the PVC pliable.
- A short segment of 2" PVC was used to mold the holes.
- We put 6 holes on each side of every tower spaced 6 inches apart.



Assembling the towers

- Small rings of 2" PVC were cut and placed in each molded cup.
- These perfectly hold the 2" netted pots that will then hold the plants



Assembling the towers

- The towers will sit in the elbows on the base
- Do not cement the towers in place. You will need to lift them up to clean out the aquarium sponge filters periodically.



Finishing the distribution system

- The ½" 5-way adapter will send water from the central distribution pipe to each tower



Finishing the distribution system

- An elbow and a ½” threaded adapter is needed above each tower
- The mushroom sprinkler will be threaded to this.
- A small hole needs to be drilled in the PVC caps to allow this to go through



Finishing the distribution system

- The 5-way splitter can then be put on the top of the central distribution pipe
- Each sprinkler end goes inside of a tower as shown



Tower complete

- Add your nutrient solution with water, and turn on the pump.
- The sprinklers can be individually adjusted to limit the amount of water dripping into each tower.



Additional Consideration

- The slits we cut for our plant cups were slightly too long.
- Water tends to trickle out at these end points on a few of the cups. It's a very small amount but can add up over time.
- Cutting the slits shorter could help eliminate this.
- We will have to mend this another way, possibly with a small amount of silicone sealant.

