Summary Description: Utilizing Window Space With An Aeroponics Tower

Tags: electronics; nature projects; aeroponics; hydroponics; garden; tower; water pumps

Why I did this: I’m grow greens in my hydroponics bin on a desk near my window, but the hydroponics box doesn’t hug the window as much as I like (it doesn’t utilize the available window space). I learned about these aeroponics towers and love the idea that they can be freely 3D printed and they utilize cramped spaces (perfect for urban farming). This also can be a good trial test for finding info for my university club’s greenhouse (to possibly utilize space in there).

(summary pic of system)

Design Walkthrough:

Parts: 3D printer (and, optionally, modeling software, like fusion 360, for modifying prints), small water pump (at around 3.3V for my height tested) and hose, water reservoir with nutrients

I really only followed the review of Brian’s YouTube video to see the ins and outs of the system; it was very well described.

(pics of system)

Lessons Learned and Future Changes:

3D printing and modeling to fill in the gaps. I had a small container that could fully sit on the windowsill and wanted to use that as the reservoir, but it didn’t natively fit with aeroponics tower, so thankfully the tower’s 3D files had included STEP files which are meant to be semi-universal workable models across different modeling applications. I was using Fusion360 and was able to modify one of the files to include the circular base locking mechanism overtop a rectangular platform so I could lock the tower on top the container.

3D printing will take a looooong time. It took about 8hrs to print the 2-way section of the tower, so making 8 or more of those will take a long time (and lot of printer filament). A viable alternative could be to buy a 4.5” diameter PVC pipe and fit holes along it (a heat gun could also help shape the holes to better contour a slope for holding plants and catch the dripping water). The 3D printed models could just be a guide on what parts you would need for a PVC setup.

Good seedling growing techniques are necessary to maximize these systems. I found you cannot ideally put small seedlings (or seeds) into this system without first growing them in a separate hot medium that isn’t constantly being run over with water, otherwise they rot. They need to under a lamp growing until like ‘finger’-size then moved to the tower with a rockwool, coco coir, grow sponge, or peatmoss medium.

References:

Brian’s YouTube explanation of aeroponics towers: <https://www.youtube.com/watch?v=5VMlcasPe9M>

Prusa’s versions of the tower (with STEP files): <https://www.printables.com/search/models?q=hydroponic%20tower&o=popular&ctx=models>