

What your invention does:

Interest in sustainability has taken on new meaning as research reinforces the threat of climate change. One great way to practice personal sustainability is by growing food at home. However, agriculture is complex, and in urban environments, limited availability of space and sunlight can prevent individuals from starting their own gardens.

The Grea Plant Tower addresses all of these needs by providing an easy-to-use hydroponic plant growth system that is compact, quick to assemble, cost-effective, and self-monitoring. It allows users with limited budgets, restrictive spaces, and busy lives to engage with sustainability and create a positive impact on their own health.

Where you got your inspiration:

Our team enjoys growing plants, and comes from a diverse range of locales around the United States. Several of us come from explicitly urban environments and all of us are college students with limited budgets and a rigorous curriculum limiting our time. This was the impetus to consider developing something that would benefit both ourselves and our peers.

The team selected hydroponics for its economic and environmental advantages: reduced use of water and land, high crop yields, and low requirements for upkeep versus traditional agricultural systems. We drew upon the dynamics of existing consumer hydroponic systems that demonstrated good aesthetic value and efficacy of plant growth, endeavoring to provide improvements to flexibility and expense.

How it works:

The Grea Plant Tower is a modular system. Users can stack up to 6 tower layers, each providing a storage compartment for water and plants. Plants stay hydrated using wick watering: a piece of polyester draws water up from the container to the plant's roots. Each layer interlinks with a stabilizing structure, ensuring no spillage.

Optionally, users can elect to install a sensor module, providing monitoring of fertilizer and water levels as well as automated control of tower lighting.

How you developed your design:

After defining the scope of our project, we performed a complete evaluation of different agricultural systems: traditional agriculture, aquaponics, and every permutation of hydroponic irrigation we could identify. This evaluation was used in combination with investigation of the ease of growth and space requirements for food crops and the condition of existing market products.

Once we identified the system we wanted to develop, we iteratively designed prototypes in conjunction with user testing, inviting both our peers and members of the community to interact with our system.

What sets it apart

Although there are already commercial hydroponic systems for indoor use, the Grea Plant Tower was constructed for less than 100 USD, far less than the competitive systems which currently cost hundreds of dollars, sometimes upwards of a thousand dollars. Its modular design, small form factor, low cost, and appealing aesthetic are 4 characteristics that, in combination, we have not been able to identify in existing offerings on the market.

What the future holds for it:

We believe that this project does hold a significant amount of value for the end user. We plan on continuing to work on this project through the end of this academic term, making further refinements. We are releasing our work for this project to the public, posting our design, files, and documentation [to our GitHub repository](#). Anyone in the world can access it, modify it, and use it for themselves.



