

Hydroponics!

Bethel Park High School Freshmen 2019-2020

Introduction to Problem

According to Journey 2050, the world population will reach 10 million people in approximately 30 years.[1] As number of people increase, so does the demand for proper housing and food requirements. Since both of these demands compete for land usage, it creates a land scarcity. New methods of farming need to be created to alleviate the land scarcity and to increase our current food production. Hydroponics has the potential to reduce land usage and to keep up with the demands of the growing population.

Mission Statement

As a team, design a simple and practical hydroponic growing system for the classroom to grow multiple leafy green vegetable within a small footprint.

Our Target Market

Once our hydroponic unit produces a small yield, our immediate customers include the science students in our classroom. After improvements and expansions, our customers will include the school population eating meals from the cafeteria. In the future and after sustained yield, our customer base can expand to the community members utilizing the local food bank.

Consumer Market

Individuals households interested in a sustainable food supply.

Criteria

- 1) Be free standing
- 2) Support several growing plants
- 3) Hold water for plants
- 4) Circulate water

Constraints

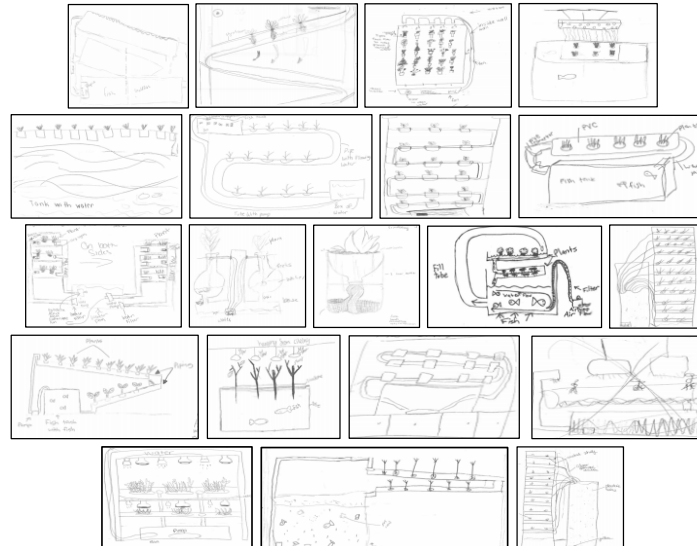
- 1) Size - must fit in window classroom
- 2) Budget friendly - under \$500 to construct and start up materials

Brainstorming

Teams used the internet to research the available products currently available to customers. Analyzing the various products, we determined the features that we found to be useful and which ones did not need to be incorporated. We then did the 6-3-5 activity to generate ideas and swapped with other teams. Again, we decided which features should be included in our hydroponic unit.



Preliminary Designs



Prototype

We build a paper model of what we would like our hydroponics unit to look like. It is a smaller version of what the final product would be. The main frame will fit in the classroom windows. The first design included the boxes to hold the water and the plants with a hose to circulate the water. As we built the design, we put the boxes too close together and realized the plants would grow and hit the box above. We added adjusters under boxes to move them up and down as the plants grow taller.

Final Design



Link to Video

<https://www.wevideo.com/view/1539196578>