Deliverable H - Prototype III and Customer Feedback
Team: C02
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Prototype Test Plan

Why are we doing this test?

*This is an introduction. Capture the reasons for the test, giving enough background information to justify doing **any** prototyping at all. Is the **general** objective one of: learning, communication, de-risking, etc.*

The general objective of the prototype is to create a cost effective hydroponic system that is more convenient for the children who growth the products. The main focus for this prototype was to complete the construction of the system and ensure that it was fully functional.

Test Objectives Description

*What are the **specific** test objectives?*

When developing the prototype the following test objectives were used:

- Ensure the water reservoir can be removed from the frame.
- Ensure there are no leaks near the connection to the pump.
- Ensure that the water is being delivered to the plant modules.
- Ensure that the plant modules can be removed from the frame.
- Ensure that the pump is functional.

*What **exactly** is being learned or communicated with the prototype?*

This prototype (besides a few minor details) is our finished product. We are displaying our solution to our clients in its fullest form. We have physically built everything and have tested to make sure everything is up to standard. We are showing our water reservoirs, and how they not only take up no space, but can also be easily removed and disassembled for easy cleaning.

What are the possible types of result?

There are several possible results for the prototype that could result in either a success or a failure. For the prototype to be fully successful all the objectives will have to be met; however, a failure will be when one or more objectives are not met.

How will these results be used to make decisions or select concepts?

If the results for the prototype are successful, then it means the prototype is complete and functional.
If the results for the prototype result in a failure (meaning one or more objectives are not met) then the prototype would not be ready or functional. Since it is the third and final prototype, decisions on how to proceed are slightly more difficult. The overall decision would be to try and find a simple solution, or try and fix the issue. For example, if the failure is that there are leaks where the pump is connected, a simple fix will do. However, if the prototype fails because the pump is not working, that is a harder issue to fix. In that case, the possible scenario might be to try and replace the pump if the time permits, otherwise it might not be a possible fix for the prototype.

What are the criteria for test success or failure?

The criteria for test success or failure is based upon the test objectives.

Objective	**Criteria**	**Method of Testing**
Assembly	The water reservoir can be removed from the frame	Experimental Testing
Assembly	The plant modules can be removed from the frame	Experimental Testing
Water	The water is being delivered to the plant modules	Visual Testing
Water	No leaks near the pumps hook up	Visual Testing
Pump	The pump is working	Experimental and Visual Testing

What is going on and how is it being done?

*Describe the prototype **type** (e.g. focused or comprehensive) and the reason for the selection of this type of prototype.*

This prototype is comprehensive. After testing our water reservoirs by itself, this will be the first prototype that tests them with the rest of the grow wall. We chose this prototype as we are nearing the final product and we need to know how well the water reservoir will work with the pump and the drip system. All our subsystems should be working separately and the only changes to our design should be slight adjustments to make our subsystems work together and be as optimized as possible.

Describe the testing process in enough detail to allow someone else to build and test the prototype instead of you.

1. Assemble the frame along with inserting the plant modules and water reservoir
    a. The plant modules should be able to be inserted when the frame is assembled.
2. Fill the water reservoir with water
3. Check for leaks.
4. Power the pump
    a. Make sure the pump is working or else you cannot proceed
5. Once pump is running check for leaks again
6. Check that the water is coming out at the top of the plant modules efficiently.

*What information is being **measured**?*

The measurable data is the size of the of the system (its dimensions), also how far to place the plants. Other data was based on observations.

*What is being observed and how is it being **recorded**?*

The following observations are being made:
- Checking whether the reservoir and plant modules can be removed from the frame
- Ensuring there are no leaks
- Ensuring the water is being delivered and the pump is working

All observations are being made note of and shared among the group.

What materials are required and what is the approximate estimated cost?

Material	**Quantity**	**Cost (without tax)**
7/16” (5/16”) tubing - 20ft	1	$6.98
4” PVC pipe	1	$15.28
½” pipe - 5ft long	1	$1.69
Wood 1”x4”	2	n/a
Pump	1	$19.74

What work (e.g. test software or construction or modeling work or research) needs to be done?

Depending on the results of the tests, minimum adjustments may need to be made. Improving connections so no leaks occur, strengthening frame so there is no movement, and adjusting drip placements are all things we may need to do depending on the results of the test.

When is it happening?

*How long will the test take and what are the **dependencies** (i.e. what needs to happen before the testing can occur)?*

The duration of the testing will depend on whether the prototype passes or fail the tests. In order for the testing to occur, the prototype needs to be fully assembled. Since this is a comprehensive prototype, multiple subsystems need to be connected in preparation for the tests.

When are the results required (i.e. what depends on the results of this test in the project plan)?

Since this is the final prototype, the results need to be available before the presentation at Design Day. Ideally, the results should be gathered a few days before in order to allow minor tweaking and optimizations to be done.

Prototype 3

For this prototype, the main focus was to complete the overall design of the hydroponic system. It was important to ensure that the system was fully functional, and few complications were met.