GNG1103 - Deliverable C: Design Criteria
Hydroponics
Group B4

Introduction:

In order to meet customer needs, we must take their comments and translate them and define different design criterias. These criterias would be used to design our final project.

"Limited access to fresh fruits and vegetables has resulted in the need for a Hydroponics System that is capable of growing fruits and vegetables in temperatures ranging from -40 degrees C to 30 degrees C, is easy to operate and maintain, and can support the 50 members of the community."

Design Criteria:

Ranking	Customer Needs	Design Criteria
1	Greenhouse must be usable all year round to grow fruits and vegetables	Durability Lasts for all-seasons (degC)
2	Ease of operation and maintenance	Simple Controls (min) Minimal Maintenance Cost ($)
3	Flexible to grow different kinds of plants	Variety of Crops
4	The community has about 50 people. Trips to grocery stores are long and costly, and access to fresh vegetables is limited in the winter	Dimensions (m) Can grow enough crops
5	Animals may eat crops or damage the greenhouse	Shape of system Protection against predators

Functional Requirements

- Able to grow a variety of crops to sustain the needs of 50 people
- Simple controls (min)

Non-Functional Requirements

- Durability/Product Life
- Aesthetics
- Protection against corrosion and sunlight
- Protection against predators
- Ease of operations

Constraints:

- Dimension (Length x Width x Height)
- Cost ($)
- Operating Conditions (°C)

Benchmarking: (Green = 3, Yellow = 2, Red = 1)

Specifications	Hydroponics System		
	Miracle-Gro AeroGarden Sprout with Gourmet Herb Seed Pod K	SuperPonics 16 Hydroponic Grow System	Hydroponic Site Grow Kit Garden Vegetable Planting System Kit + opaque 20L water reservoir
System Cost ($) (4)	🟩 $89.99 CAD	🟥 $450	🟨 $159(Kit) + approx $20 = $179
Weight (kg) (1)	🟩 1.5kg	🟨 5kg	🟥 8.5kg
Dimensions (2)	🟩 11” x 11” x 6”	🟨 29’’ x 22’’ x 12’’	🟥 38’’ x 39’’ x 28’’
Ease of Use (7)	🟩 Prompts user when to water, add nutrients, etc. Requires little to no knowledge of plants.	🟨 Requires knowledge of plants. User must adjust to each plant type.	🟥 Requires knowledge of plants. Roots grow into pipes, making plant changes difficult.
Types of Crops (3)	🟥 Small Herbs Only (Basil, Thyme, Dill) Unable to plant fruits or vegetables	🟩 3 inch potting cups. Can plant small-medium sized fruits and vegetables.	🟨 Small Herbs, Small Fruits/Vegetables, or Saplings of larger plants before transplanting
Build Quality & Maintenance (5)	🟩 Easy assembly and simple maintenance. Comes with easy to follow instructions.	🟨 Easy assembly, but requires occasional cleaning	🟥 Easy assembly but it is not a kit solution so it will be longer to assemble. Difficult to maintain.
Planting Capacity (6)	🟥 Up to 3 plants at a time	🟨 Up to 16 small-medium plants	🟩 72 1.2 inch planting holes.
Total	**66**	**55**	**47**

* 1 = Less important and 7 = Most important

EDS Functional Requirements

Number	**Design Specifications (Functional Requirements)**	**Relation (=, <, >)**	**Value**	**Units**	**Verification Method**
1	To be able to grow plants	=	yes	n/a	Test
2	Automatic watering system	=	yes	n/a	Test
3	Easy to use and maintain	=	yes	n/a	Test
4	Able to support good volumes of crop	>	50	people	Analysis, test
5	Can support multiple types of plants	=	yes	n/a	Analysis, test

EDS Non-Functional Requirements

Number	**Design Specifications (Non-Functional Requirements)**	**Relation (=, <, >)**	**Value**	**Units**	**Verification Method**
1	Durable/Animal proof	=	yes	n/a	Test
2	Ease of use	=	yes	n/a	Test

EDS Constraints

Number	**Design Specifications (Constraints)**	**Relation (=, <, >)**	**Value**	**Units**	**Verification Method**
1	Cost	<=	100	$CAD	Analysis
2	Size when deployed	<	60’’ x 36’’	inches	Analysis
3	Operating Conditions	=	> -30	degC	Test

Sources:

1. Miracle-Gro AeroGarden Sprout with Gourmet Herb Seed Pod Kit
    a. https://www.amazon.ca/Miracle-Gro-AeroGarden-Sprout-Gourmet-Herb/dp/B01EHSMSXW/ref=asc_df_B01EHSMSXW/?tag=googleshopc0c-20&linkCode=df0&hvadid=292964388196&hvpos=1o5&hvnetw=g&hvrand=17120753636825100255&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9000668&hvtargid=pla-374167247914&psc=1
2. SuperPonics 16 Hydroponic Grow System
    a. https://supercloset.com/product/hydroponics-systems/superponics-16-hydroponic-grow-system/
3. Hydroponic Site Grow Kit Garden Vegetable Planting System Kit + opaque 20L water reservoir
    a. https://www.amazon.ca/Hydroponic-Garden-Vegetable-Planting-1-layer/dp/B079R8QXTL?th=1