

Hwa Chong Institution

Project Work

Category 3 Inventions Log Book

Title of Project: Growing Organic Plants on walls

Group Name:3-27

Group Members:

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1. Problem Finding

(The beginning...)

Identify a problem you would like to solve. You may want brainstorm for problems using different approaches eg thematic, survey or general brainstorming etc.

1 A Document a list of problems you have identified. Your documentation should show clearly how your group came up with the problems.

- *Singapore relies too much on imported vegetables and herbs.*
- *Commercially farmed vegetables tends to have high level of pesticides.*
- *Most families do marketing once a week and they stock up vegetables in the refrigerator, often they have to throw away rotten vegetables by the end of the week and this results in wastage.*
- *Consuming imported vegetables increases carbon footprint from refrigeration and transportation*

1 B You should have selected a problem based on some considerations. Identify and justify these considerations.

The main problem is that Singapore has very limited land and a large part of the land are for commercial use. We made this conclusion based of the solvability and extent of the problem and the availability of other solutions.

1 C List some problems your group would like to solve. List also the considerations for selection of problem in the evaluation grid below. Score the considerations, against the problems, with points 1 (least significant) to 4 (most significant). Sum up the total points for each problem. Identify that problem you would like to solve.

Problem Evaluation Grid

*add more columns and rows where necessary

Considerations for Selection	Problems		
	Limited land	No natural resources	Singapore is producing very little
solvability	2	1	3
Scale of problem	4	3	3
Are there other solutions?	2	1	1
Total Score	8	5	7

2. Define the Problem (This is one...)

Now that the problem has been identified. It is important to gather information on the extent of the problem and/or evaluate the usefulness of existing solutions based on *some criteria*. You may need to conduct surveys and research on existing solutions.

2 A Extent of problem (Research and discuss the problem and write down the problem statement)

Singapore imports 90% of vegetables and herbs which are commercially farmed with high level of carbon footprint due to the use of synthetic fertilizer and transportation.

Besides carbon footprint, it is also for health reason to consume more of domestically grown vegetables which uses less insecticide.

Our inventions is a planter for growing vegetables and herbs easily and conveniently without the use of insecticide.

2 B Compare and contrast the existing or similar solutions.

We are comparing our planter with commercial vertical farming technology.

Vertical farming requires massive set-up with use of technology, it is for big scale production and is not suitable for households.

Our planter does not require much space and cost, and can be placed in homes. Small families can opt for the single module and big families can install more modules to allow them to have an adequate amount of vegetables.

3. Your BIG IDEA#

(Developing the idea....)

Write down your proposed invention and why you want to do it. State also how you think your proposed invention is better.

3 A Describe your proposed invention.

The prototype of our planter is made from wood, though acrylic is a better material. It is of the shape of a drawer. Each module is installed with an 8W LED light to ensure that the plants receive enough light. More modules can be added by stacking one on top of the other.

3 B Explain the purpose of your proposed invention and the potential benefits to users.

Our planter helps households to grow vegetables and herbs at the comfort of their home. Users can have a wide range of options for growing their own plant.

3 C In what ways would your proposed invention be different and/or better than existing solutions, if any?

We have a fan installed at the side of our planter which allows the plants to have optimal air-flow, regardless of where the plants are placed. According to our research, lack of proper ventilation can cause the growth of mildew or other harmful fungus.

Also, there is the option of installing a net which prevents insects from infesting the plants, therefore eliminating the need for insecticide on the plants.

3 D What are some problems you expect in the course of your proposed invention?

We lacked the technical skills to built the planter. Our first prototype collapsed as it could not support the weight when we added soil. We changed our design to the drawer shape which we are able to built but it does not harness much of the natural sunlight around us.

3 E What and when are the major milestone (project timeline) in your invention?

By the end of June, we expect our prototype, along with other features that we might find useful should have built.

Once we are satisfied with the prototype, we will begin the testing phase, that is, we grow plants in it to see if it serves the intended purpose. At the same time, we observe and make modification to perfect it.

#must be able to be constructed based on current / emerging technologies, must not violate the laws of Science or go against the laws of nature.

4. Construction or Modelling Process*

(This first... then that...)

You are now onto the fabrication of your prototype/ product. You need to select material and understand how to put them together so that your prototype/ product can perform its function.

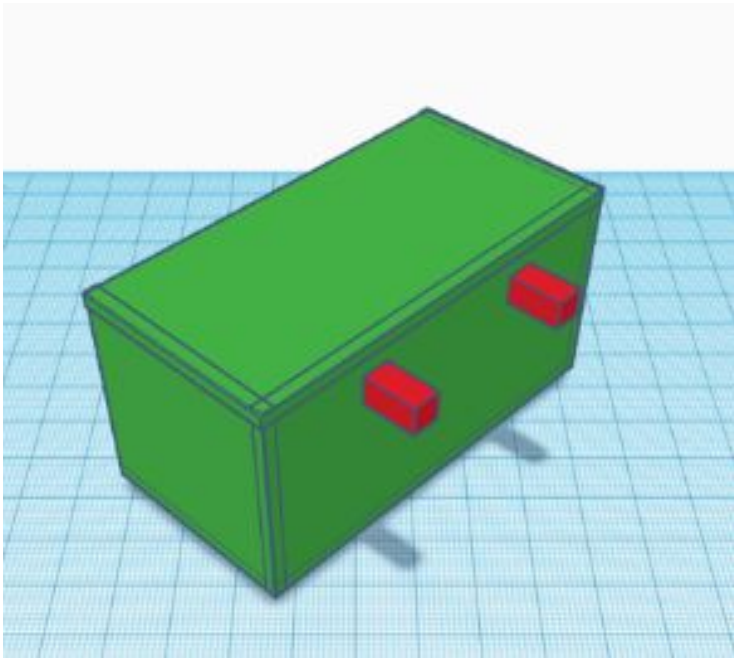
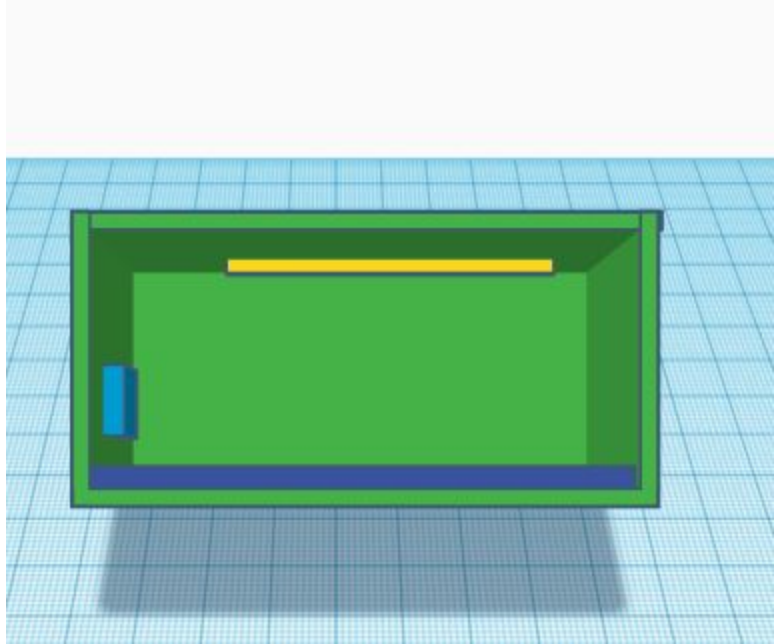
4 A Explain how and why the materials were chosen for the prototype/ product of your invention

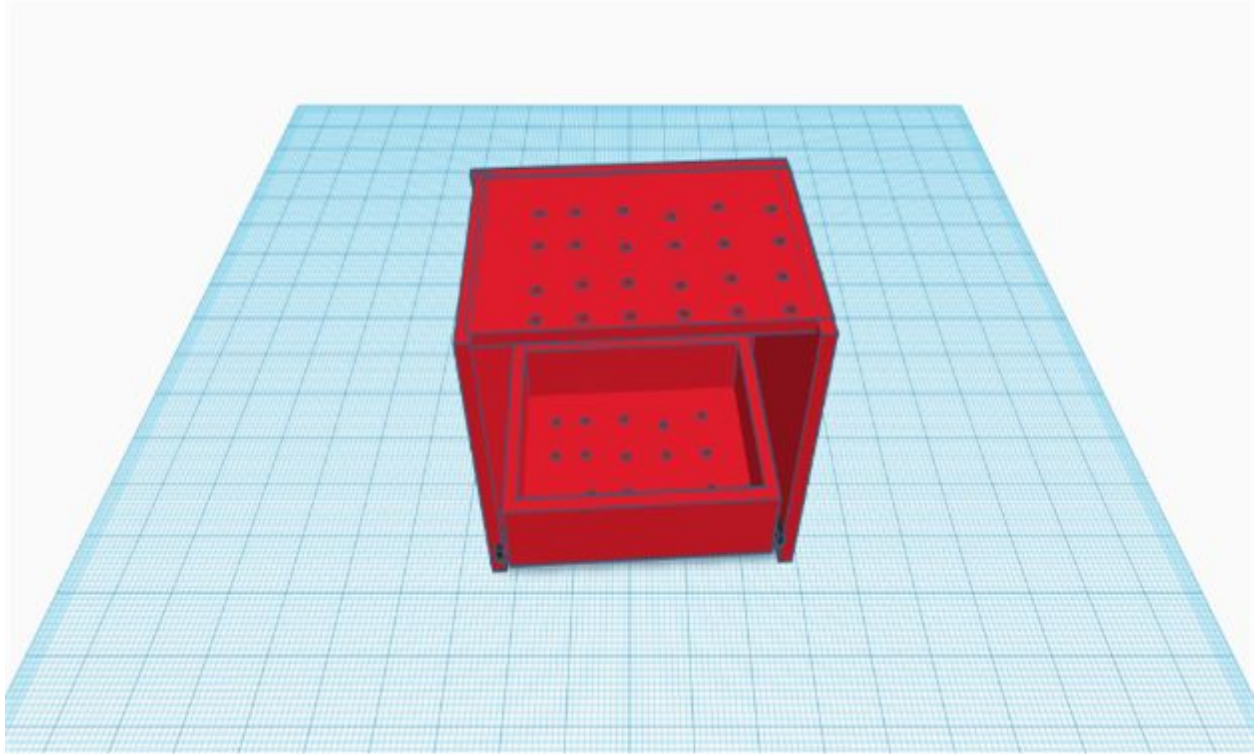
We choose wood to make our prototype as it is strong and environmentally friendly. It is also easy to cut and assemble together.

4 B Explore these considerations that may guide the construction of your prototype/ product.

By using wood, our planter is very secure and strong. However, it has become heavier than we intended it to be, thus we recommend using acrylic which is water resistant, light and allows light to pass through more easily.

4 C Document the prototype/ product development stages. You may use drawings, photographs or videos.





OR

If construction of the prototype is not possible, then you have to create an animation / as a proof of concept that it can be applied in a bigger scale.

- 4A Explain why construction of a prototype is not possible and the proof of concept is needed in your case.**
- 4B Briefly explain how the video / animation can effectively show how your invention will work and the different considerations.**

Warning:

- *Video / animated simulation only if prototyping is absolutely no possible.*
- *Video / animated simulation must be logical and convincing that the invention works.*
- *Constraints must be clearly included in the logbook or the project will be heavily penalized.*

5. Modification and Evaluation

Upon the completion of your prototype/ product, you would need to see if it is working the way you want it to work. Check if your product has met the identified purpose and the user's need; and implement necessary modifications and improvements. This process may take several rounds.

5 A Write down your prototype/ product test criteria and check against it if it works. Identify areas of weakness for modification. Indicate the test iteration and date of test.

Test Iteration:	Tick			Remarks
Test Date:	Pass	Fail	Potential Failure	
Strength of Hooks		X		Too heavy for the hooks
Mobility of Invention			X	Quite hard to move around if user does not have enough strength
Durability of Invention			X	The frame is strong on its own, but may fall apart if the hook breaks

Test Iteration:	Tick			Remarks
Test Date:	Pass	Fail	Potential Failure	
Allows light to enter		X		When placed indoors, or under something, no light can enter
Mobility of Invention			X	Lighter but still quite hard to around
Durability of Invention	X			The frame is very strong, can withstand quite a lot of weight on it

*Add more rows for more criteria

** Repeat table for next test iteration

OR if you are creating an animation / video to show how your invention will work, write down the different possibilities / outcomes [success or failure) if a full-scale prototype is to be constructed.

6. References

Read <http://www.bibme.org/citation-guide/apa/> on how to cite references.

6 A Cite the references you have used for your project work. Your source of reference should come from different types (eg books, magazine, websites, journal articles, interview, photographs, product brochure, reviews etc.)

Organic Foods: What You Need to Know: The Benefits and Basics of Organic Food and How to Keep It Affordable. (n.d.). Retrieved from <https://www.helpguide.org/articles/healthy-eating/organic-foods.htm>

Create 3D digital designs with online CAD. (n.d.). Retrieved from <https://www.tinkercad.com/#/>

Why gardening is so important. (n.d.). Retrieved from <http://thegreencity.com/why-gardening-is-so-important/>