# Urban Gardening Design Brief

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Dr. Emma Rose

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# Overview

Garry Needs-To-Grow is a painter who always needs more fresh vegetables and fruits in his diet. However, due to long work hours, he has a hard time finding the best deals for fresh foods. As a result, his diet is less healthy than he would like it to be. The Sustainable Stacker was envisioned as a way to get fresh and sustainable food to those who need it the most, are of lower income, elderly, and hobbyists trying a new way to garden. To refine our ideas of the sustainable stacker, our team interviewed users from both our target and tertiary audiences. In addition to interviews, each team member compared existing products to our intended idea and took inspiration from the more successful aspects of them. Finally, our team built a prototype and conducted usability tests on it to see if users understood our product or had any feedback that would help improve the design.

# Problem Statement

There is a lack of urban gardening and composting space in the Pacific Northwest for apartment and condominium residents. This project is focused on creating a spatially conscious, customizable, effective urban gardening kit. Sustainable Stackables looks to solve space inconveniences and provides customization options that makes urban gardening in limited spaces easier. This way one can maintain sustainable living practices and healthy eating habits.

# Audience

Much like the design of this product, our target audience has also evolved over time. The first version of this product targeted lower income families who would ideally benefit the most from this product. However, after interviewing potential users, our team found that there was a market for more casual gardeners that were not in need of a massive yield. As a result, we changed the design to fit both groups' needs. Once it came to usability testing we decided that a more intune product would help gather more attention from users. It was not until the usability test that our team learned that almost everyone in the Pacific Northwest would have vested interest in a product such as ours.

# Usability Summary

Our usability study consisted of three main parts: pre-qualification questioning, interaction with the product, and a post walk through. During the pre-qualification section of the study, the goal was to understand the interest of our user and to determine whether they fall into our target audience. This played an important role in the validity of our data and helped us find users that would be interested in this project. The interaction section is discussed in further detail in the “Scenarios” section. The post walk through was divided into two parts: first by focusing on showing, then discussing the capabilities and functions of the product to the user.

## Scenarios

### 1. Cognitive Walkthrough

This is where the user was presented with a cross-section model of a Sustainable Stackable. Sticky notes were labeled as the additional components of the kit. With very little explanation, the user is asked to place the items as if they are setting up the kit without directions and use basic knowledge. We wanted to know if the urban gardening kit was as intuitive as we planned it to be.


Figure 1: Labeled pod, outside.


Figure 2: Labeled pod, inside.

### 2. Customization

The user was asked to customize their own Sustainable Stackables as if in their place of residence. The idea was to find out what the majority would do with the space they have and why. We also wanted to know if the customization efforts of the stackables would fit user needs. By using cardboard cutouts that represented miniature stackables and including the pieces that would be required with the products, the user would stack and arrange the pods the way they like them. Afterwards, we would ask why they chose to arrange them the way they did.

### 3. What Will Grow

This activity went hand in hand with the last one. Here we are trying to further understand how intuitive the customization properties of this product are. For instance, what would users want to plant? Not only did this tell us more about what kind of seeds need to be offered to attract users, but it would let us know what limitations we need to make the user aware of. Sustainable Stackables are not very large which means there are limitations about what one can plant in them, which needs to be communicated with the user.

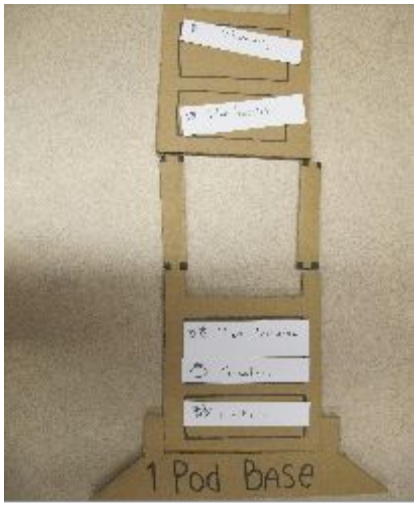



Figure 3: 1x2 config. with Strawberry, Blueberry, Tomato, and Lettuce labels.

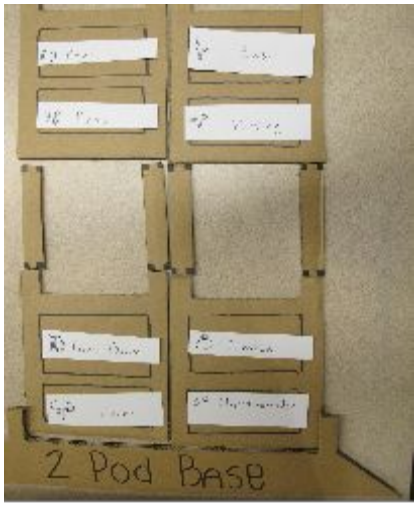



Figure 4: 2x2 config.

Figure 5: 1x3 config.

# Findings

Our usability tests went smoothly, despite new found flaws in our design. None of the participants were able to successfully set up or identify the garden kit components, which is something that should be intuitive without instructions. Fortunately, all of the participants stated they would use some sort of detailed instructions on setup and how it works. It was apparent that instructions would need to be drafted.

The rest of the study showed that this product is useful and a good size, which is important since it is targeted at spatially limited areas. Most would recommend it, are interested in it, and would purchase one for $25 to $100. The produce that was prefered also works well with the design, including:

- Tomatoes / cherry tomatoes
- Lettuce / Kale
- Berries
- Beans

# Recommendations

We recommend that our product be tested further, including:

- More Usability testing
- Test the yield this product can support
- Test the structure and strength of the product
- Test if shipping the kit is viable

After testing, we recommend that the product be produced by a larger corporation as they will be able to mass produce this product and reach more people. Also

according to our own research we suggest that users respond better to the product when the product is made from a recyclable material.

# Design

## Early Stages

The concept for the Sustainable Stackable began as a loose idea centered on creating an indoor garden that could be easily setup and installed in the limited space of apartments, shared homes, low income urban spaces, and condominiums. The initial design emerged as two separate ideas morphed into a more hybridized and user friendly cohesion with common goals and structural size requirements. It took the idea of the staggered staircase base, a three tiered grow box with a compost bin inside the unused portion of the garden base.

Once this concept for individual pods became the focus, the design leapfrogged forward.  The only thing left was to find a way to incorporate the composting feature with the customization demands while still remaining true to the minimalist, limited space application.

## Second Stage, Initial Iterations

The first true design change came about as the specifications of the individual pod narrowed and the team settled on the idea to create an all in one system that combined both the compost and the grow pods, wherein the benefits of live worms and active, specified compost would be used to maximize the organic growing potentials.

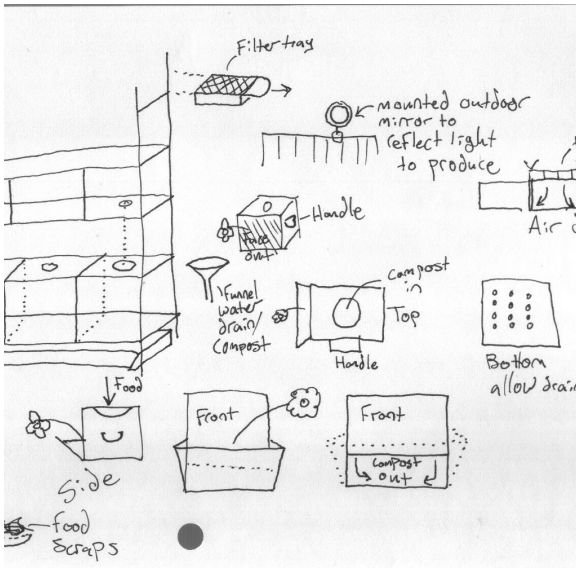



Figure 6: Initial ideas.

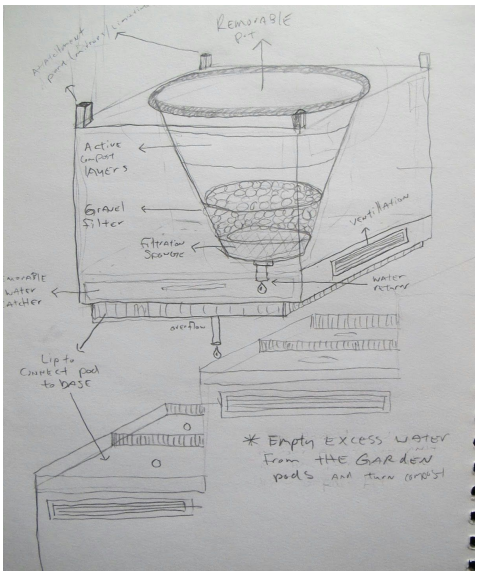



Figure 7: Hybrid design.

This design was again closer to what the team was envisioning but there were still design flaws which limited its overall usability. Height had a definite design in the limited space application of the product which meant having the compost access door on the back of the unit would limit the functionality of the feature. A second design constraint that went along with the early sketches was the inability to turn or cycle the compost.

This prompted three key changes:

1. The compost door was moved to the side of the unit, and was to be considered a made to order customization. Increasing the potential application of the design.
2. The internal compost chamber was given a forty five degree slant, using gravity and live worms as a means to cycle the compost and aerate the soil.
3. Lastly, there were two growing chambers that shared root space in the main chamber of the unit. These growing chambers were staggered in order to maximize light penetration and the upper grow chamber was increased in size so it could accommodate larger plants such as tomatoes and peppers.

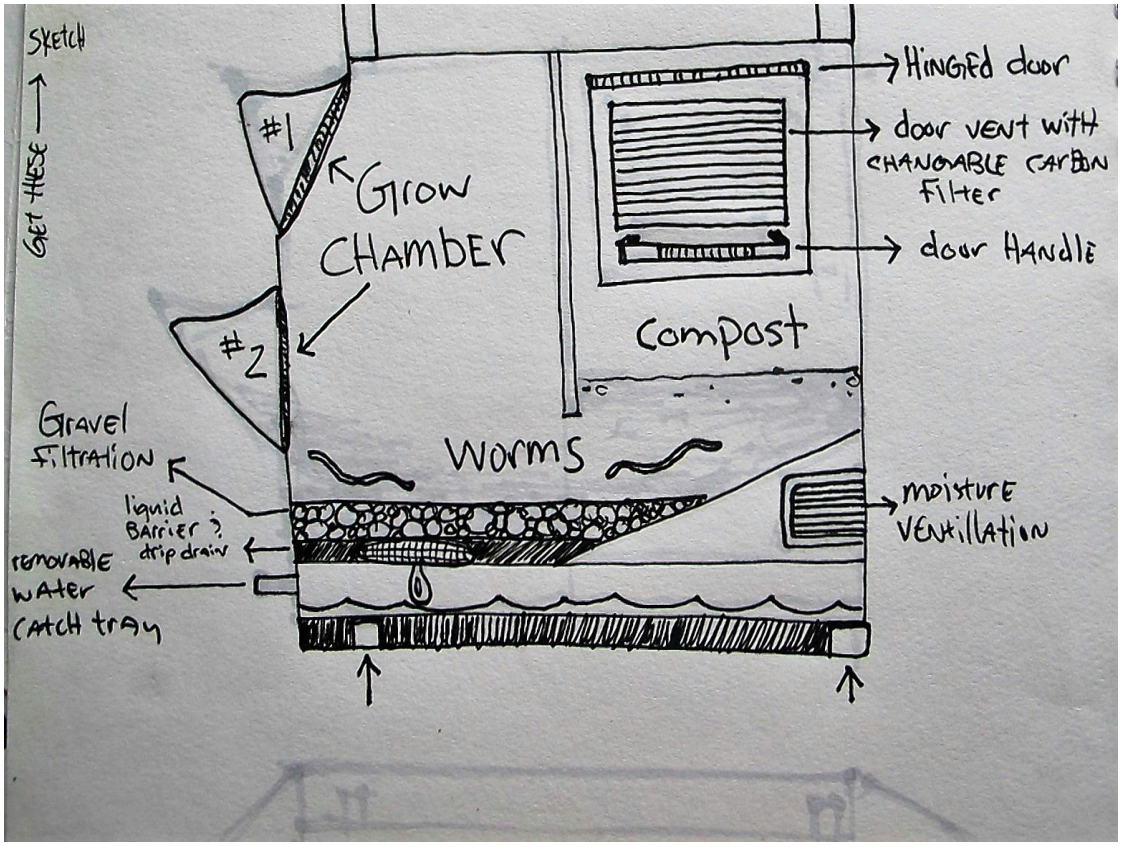



Figure 8: Later stage of the pod design.

With a cubed shape and interior access door options the design had taken shape. Ports above and below the unit were added and the ability to combine and stack units helped transform the design into a truly unique product, giving the user complete control over size and shape of their gardens. Extension arm size options

were added, allowing for garden height to be increased in one foot, two foot, and three foot increments. Finally, garden base options were added, letting the user choose from one unit, two unit, and three unit base options.

## Final Iterated Design

The Sustainable Stackable was born; an indoor gardening kit designed to produce a highly productive, all seasons garden. Each kit, or pod, can be used as an individual garden or it can be combined with other pods to create a larger, more customized garden space.

The pod will be constructed from 100% recycled plastics and use materials such as the HDPE sheets produced by Reprosessed Plastics, INC (http://www.gipo-rpi.com/recycled-hdpe-sheet-manufacturer/), always maintaining high standards in regards to eco-conscious materials and environmentally sound product production practices.

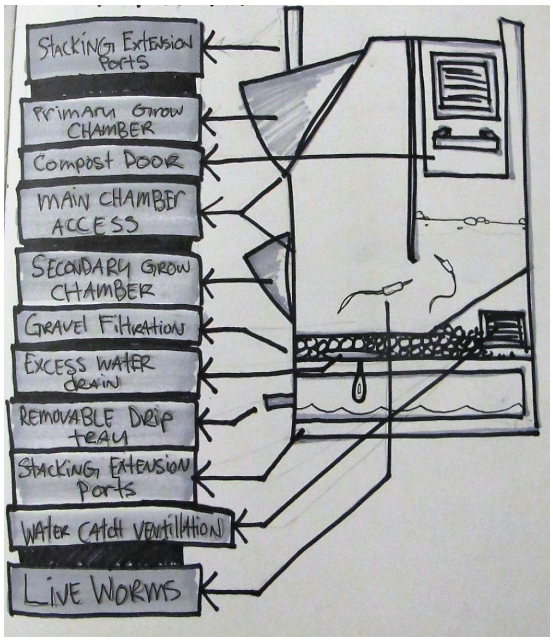



Figure 9: Pod side view.

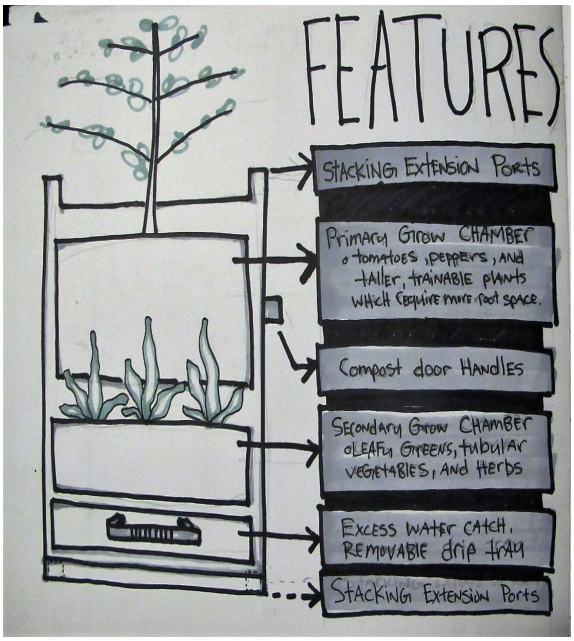
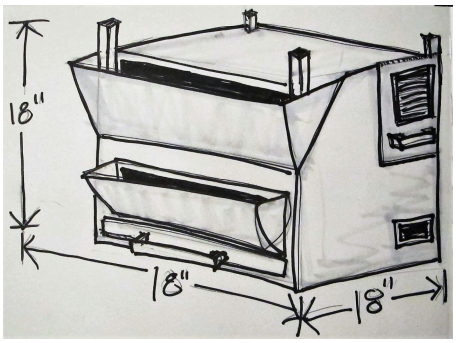



Figure 10: Pod front view.

The garden kit is currently designed as an eighteen square inch cube, but has yet to be tested and is open to change after further, longer usability studies have occurred. The garden kit will include:

1. Organic soil starter
2. Organic compost starter
3. Seed starter packets
4. Filtration gravel
5. Live worms



6. Base: single unit or multiple unit base, dependent on number of units ordered
7. Instruction Pamphlet or User's Manual.

The design has a number of features:

- Two grow pots; large upper and smaller lower. Pots are slightly staggered to minimize light blockage and both grow pots share root space in the main pod chamber.
- The upper grow pot is for taller fruiting plants or large rooted vegetables and the lower pot is for leafy greens or low hanging plants.
- Gravel filtration keeps soil and compost from sitting in residual water and a drain in the main chamber which drips into a removable, water catch tray.
- The compost chamber is accessed through the units side entry door, which can be order to specifications.
- The door and lower catch tray chamber will come equipped with replaceable, carbon filtered vent ports.
- One unit, two unit, and three unit base options are available along with one foot, two foot, and three foot height extension.
- Units come with extension ports which are permanent fixtures as male ports on the top and female ports on the underside.
- Forty five degree angle assists gravity and live worms in the aeration of soil and in the digestion of compost materials ensure optimal organic plant health.

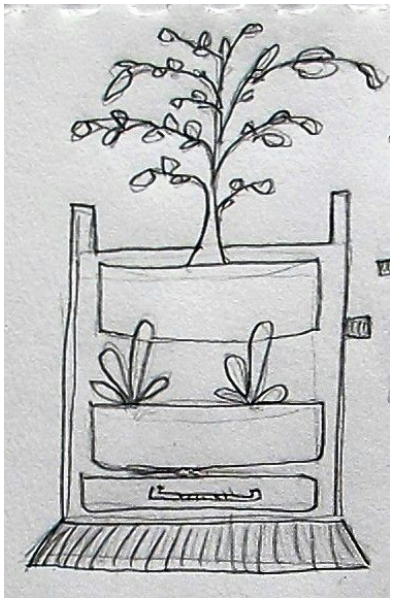


Figure 12: 1x1 config.

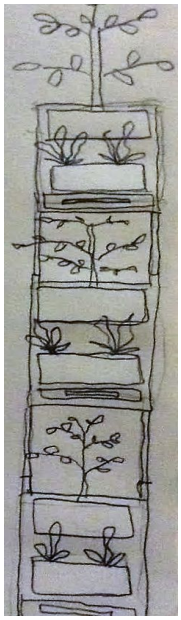


Figure 13: 1x3 config.

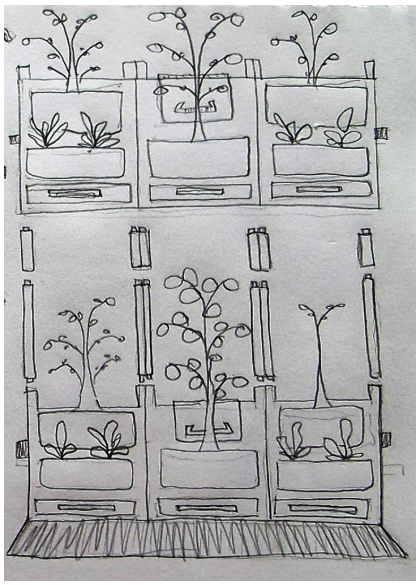


Figure 14: 3x2 config.

## Instructional Pamphlet / User's Manual

I have more to insert here.

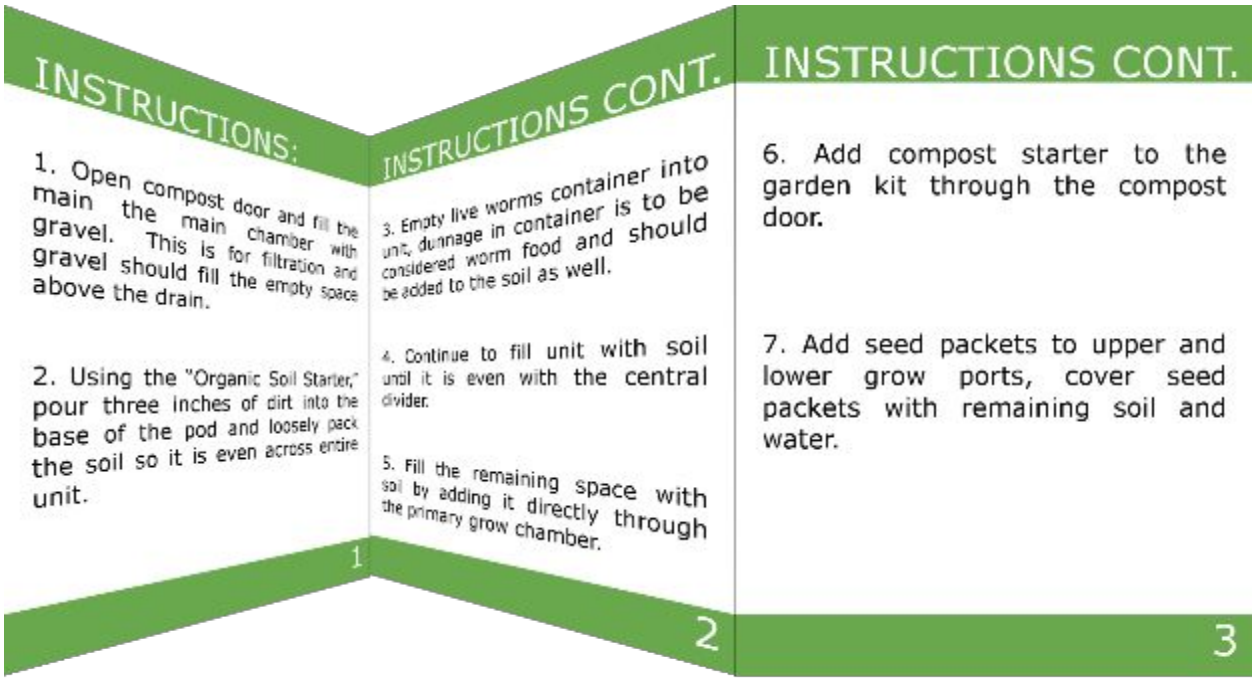



Figure 15: Instruction booklet.

# What's Next?

Although the usability testing uncovered issues, it had also germinated solutions that have pushed our design forward. We suggest that our product is tested more by an entity that can both market and help those in need of our product, stressing the importance of a reusable product to fully encompass the idea of sustainability.

# Appendix

## Roles

- Viveret: Title Page, Findings, Appendix, What's Next, User Manual image, styling, editing.
- Leda: Project Title, Introduction, Problem Statement.
- Calvin: Summary of Background Research, Audience, Overview.
- Kyle: Design, Instruction Manual.