A-2 Logbook
Wednesday, January 18, 2023 2:18 PM

THE GREEN POD LOGBOOK

A COMPREHENSIVE LOOK INTO THE DESIGN PROCESS BEHIND THE REVOLUTIONARY ARUGULA GROWING DEVICE

Design process:

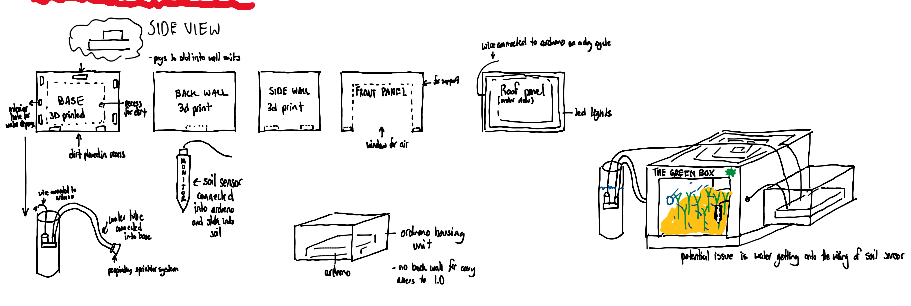
- 3D print the side walls, bottom as well as the roof
- For the sides and bottom, we are going to 3D print the connecting point, so the parts can be easily detached, or removed
- We are going to connect the parts with a dove tail joint, so no fasteners or glue is required

1. Make the designs in fusion 360 and preferably start printing next week(week of jan 30) so we are ready to present the prototype.
2. Start designing the arduino code and testing the code in tinkercad
3. Figuring out how to use the soil moisture sensor

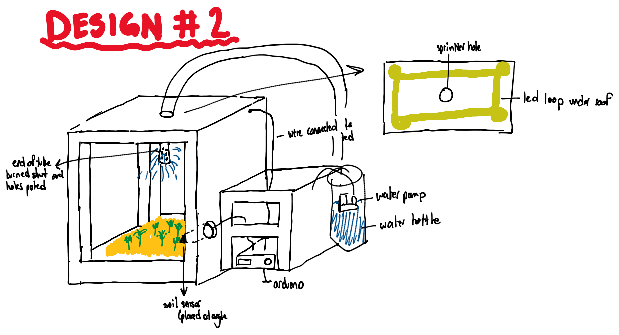
Plant growing conditions (Astro Arugula):

- Full sun type plant (relatively stable)
- Maturity 30-40 days
- Temp cool conditions (Bolts with heat)
- Soil PH 6.5-7.0
- Can grow in dense conditions
- Root depth required outdoors (15cm)
  - Indoors we can consistently apply fertiliser/water directly to the roots so (7.5-10cm) will work
- Plant height at maturity (15-25cm)
  - In our plant cell we will assume the user uses the 'cut and come again method' with the larger outer leaves expecting they will never break the 15cm leaf length.

DESIGN #1



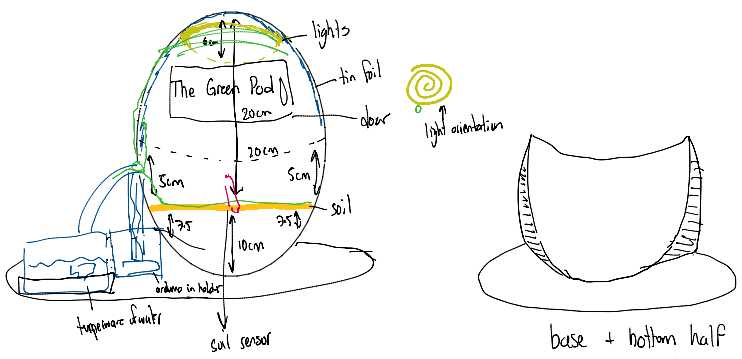
DESIGN #2



The Issues with Designs 1 and 2:

Designs 1 and 2 both did not depict enclosed surfaces, which when coupled with the strange water dispension method, would make a mess around the structure. Having an open structure would let exterior light in which would skew the results of whether our design works on its own with the lightstrip inside. Both are extremely similar as well with the significant differences being where the water is dispensed from. The open wires from the lights and soil sensor were also not taken into account while designing.

DESIGN #3 (FINAL)

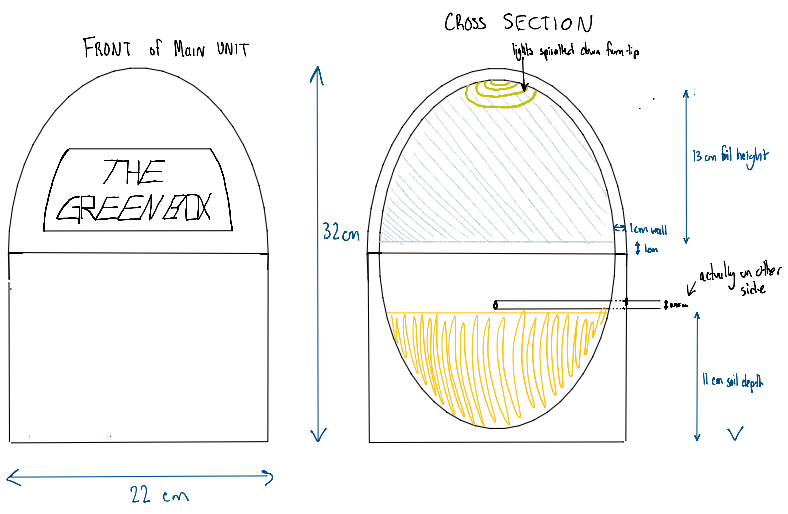


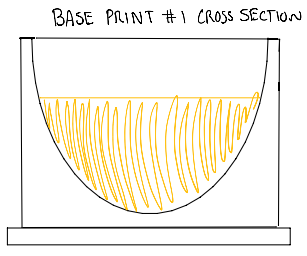
Why Design 3 was chosen

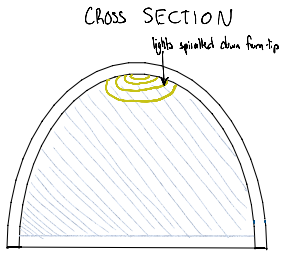
Design 3 was able to fix many of the issues detailed with designs 1 and 2, being an enclosed surface with the coverage of open wiring being taken into account. The foil on the inside should also help to disperse light better around the inside of the structure.

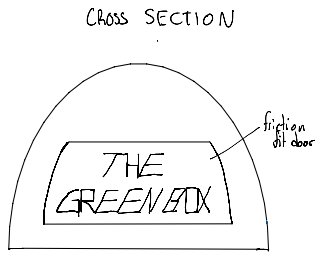
THE BLUEPRINT

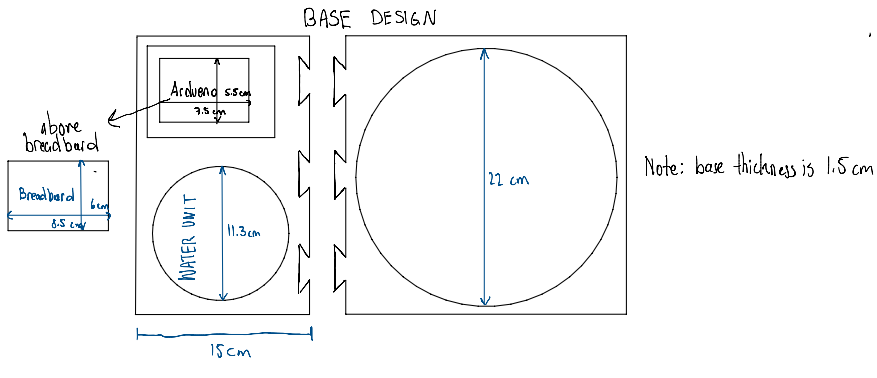
Note: All dimensions were scaled down 10% to fit on build plate



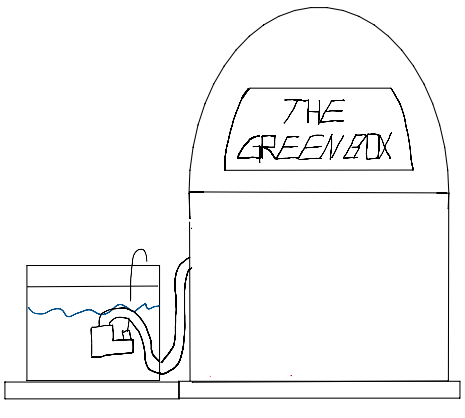




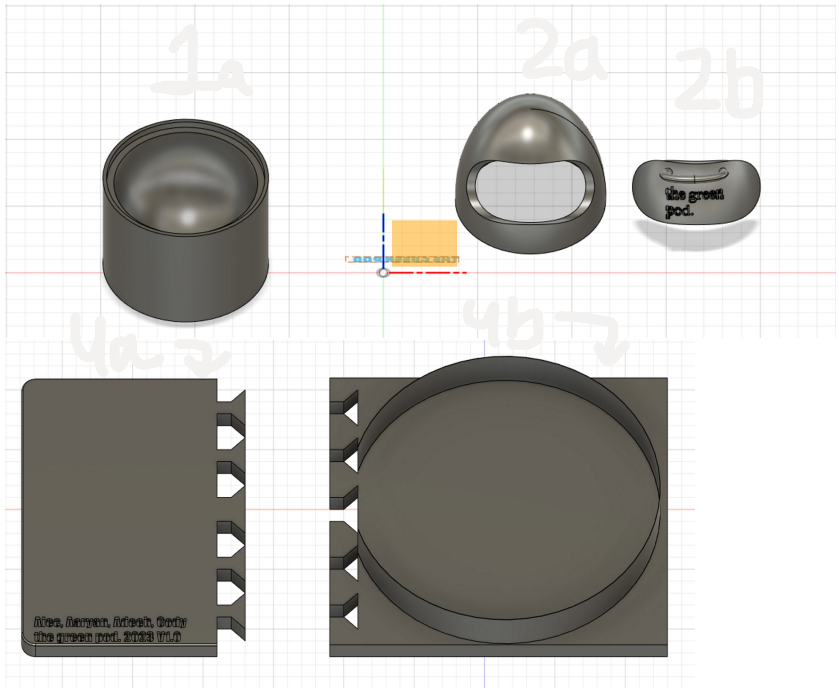




Note: base thickness is 1.5 cm



THE FINAL 3D-MODEL



Parts 1a and 1b:

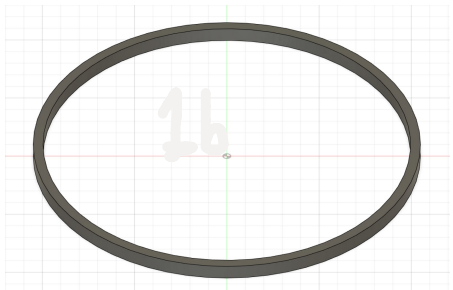
Parts 1a and 1b fit together to create the bottom half of the garden enclosure. The inside of 1a follows the negative space left behind by an ellipsoid shape. The top lip of 1a coupled with 1b allows for a proper friction fit of part 2a.

Parts 2a and 2b:

Parts 2a and 2b create the top half of the garden enclosure and continue the rounded ellipsoid shape from 1a. Part 2b fits into 2a with a friction fit to allow for easy access to the inside of the structure.

Parts 4a and 4b:

Parts 4a and 4b fit together with a dovetail joint ot create a full base for the garden. 4a is used to hold the water container and Arduino circuitry while 4b is used to house 1a. The wall is very thin and fragile as the outer diameter of 1a is very close to the limitations of the build plate.

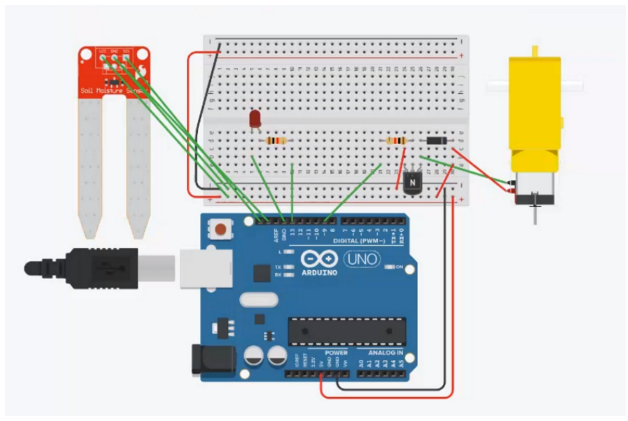


NOTE:
"Gasket" part 1b shown on the left was designed to alevitae a small discrepency in the clearance between parts 1 and 2, with the gasket creating a tight, strong friction fit.

THE CODE:

```
#include <Adafruit_seesaw.h>
Adafruit_seesaw ss;

int LEDoutput = 13;
int PUMPoutput = 9;
bool lightON = true; //sets light as on
unsigned long prePumptime = 0; //stores previous pump time
unsigned long preLighttime = 0; //store previous light time
const long pump_on_interval = (10000); //2hrs for pump/ moisture check
const long light_on_interval = (10000); //16hrs for lights on
const long light_off_interval = (5000); //8hrs for lights off


void setup() {
   // put your setup code here, to run once:
   ss.begin(0x36);
   Serial.begin(9600);
   pinMode(LEDoutput, OUTPUT);
   pinMode(PUMPoutput, OUTPUT);

}

void lightFunction(){
   if (lightON){ digitalWrite(LEDoutput, HIGH);} //light on
   else{ digitalWrite(LEDoutput, LOW);}
//light off
}

void pumpFunction(){
   int capread = ss.touchRead(0);
   Serial.println("Capacitance of soil:");
   Serial.println(capread);
   if (capread <= 450){
   digitalWrite(PUMPoutput, 150); //Turns water pump on for 3 seconds
   delay(1500);
   digitalWrite(PUMPoutput, LOW);
   }
}

void loop() {
// put your main code here, to run repeatedly:
unsigned long current_time = millis();
if (current_time - prePumptime >= pump_on_interval){
   pumpFunction();
   prePumptime = current_time;
//Time stamp
 }
if (current_time - preLighttime >= (lightON ? light_on_interval :
light_off_interval) ){ //checks if light is on(true), if its on it checks if it has
been 16hrs,
   lightON = !lightON; //Reverses the boolian //If light is off(false), then if
   checks if light has been off for 8hrs
   lightFunction(); preLighttime = current_time; //Time stamp
   }
```

THE CIRCUIT:



```
    delay(1000);//change time later to 10 min
}
```