Goal:

-Carrier board to interface with all the sensors and have it look professional

-Limit the form factor

NPK Sensor: 12V

-Wall power

-Batteries? Probably, for the experience

-Rechargeable batteries, charge controller

-Potentially on the Pico? Might need another component

-Buck converter 12V to 5V

Buck Converter Options:

* 12V to 5V buck converter:
  + <https://www.adafruit.com/product/4739>
* 12V to 3.3V buck converter
  + <https://www.adafruit.com/product/4683>
* These buck converters share the same data sheet, shown in the research folder. Please note page 14 indicating the necessity to have a a 55kohm resistor between Vin and the enable pin.

Voltage Regulator Options:

* 12V to 5V voltage regulator
  + <https://www.adafruit.com/product/2164>
* 12V to 3.3 voltage regulator
  + <https://www.adafruit.com/product/2165>
* Datasheets are in the research folder along with this document.

Pi Pico Input power: 1.8–5.5V DC

[Pi Pico Datasheet](https://datasheets.raspberrypi.com/picow/pico-w-datasheet.pdf).

-[Pumps](https://www.adafruit.com/product/4546)

-0.1A max draw

-3V

-[Relays](https://www.amazon.com/dp/B09G65YFZ6?ref=ppx_yo2ov_dt_b_fed_asin_title): Has to be triggered with 3V (difficulty with RasPi max output 3.3V)

-Can switch up to 10A 250VAC

-Initial Battery Search:

[DigiKey](https://www.digikey.com/en/products/filter/batteries-rechargeable-secondary/91?s=N4IgjCBcoMw1oDGUBmBDANgZwKYBoQB7KAbRACYw4AGANhAIBYAOR8gTgfFoHYexGXMOV6NqXWozDtaAViHlW7eASpha5ckJi1qI7Tw7iC5amD5bVPRu1ZCetKsYrVmHCCZYxyPLuRjSlH7e7NSCJrSSUn7Mrq4gALoEAA4ALlAgAMqpAE4AlgB2AOYgAL4m1Dyc0CDIkOjY%2BESk4OQABABqiSnpkCAAqgV5qQDyKACyOGhYAK45OGUEALRaNXW5M03EkGTyCaXlFC0ARmipqTg5AJ6JpUA)

-Limited to 12V so we can still use the same voltage regulators.

-Limited to a capacity of 7Ah (mostly just to limit the physical size of the batteries shown).

-Physical size is a secondary priority after battery life.

-<https://www.instructables.com/The-Simplest-Rechargeable-Battery-Circuit-and-sav/>

-Battery charger regulator chip initial search:

<https://www.digikey.com/en/products/filter/battery-chargers/781?s=N4IgjCBcoCxgTFUBjKAzAhgGwM4FMAaEAeygG0QYA2ADnngFYQBdIgBwBcoQBlDgJwCWAOwDmIAL5EwATgDsEaCFSRMuQiXIgachTRBEdc%2BHJbsukXgJHipIALSIlKgQFcNpSBSbMJdpxQARhgcHHj8AJ4ABMgAFhj8ouEsEkA>

<https://www.youtube.com/watch?v=rT-1gvkFj60>

<https://www.youtube.com/watch?v=U7D_msy2fHg>

Goal for Next Week:

-We need to focus on data. Moisture data collection for October to calibrate with the watering system. Then when NPK sensor working, can calibrate with fertilizer system.

-Send report on Thursday.

-Battery charging should come later, like maybe a second iteration of the power circuit if we have time or once we have the layout for the non-battery PCB. For now PCB development just with a wall adapter.