Sensors

For this project, three types of sensors will be used, moisture, temperature, and pH sensors.

Feasibility:

- Must function in soil for a season (six months approximately)
- Must cost < $15 per unit
- Must be compatible with the specified microcontroller

For the soil moisture >> it has to have at least 4 analog output
For the soil temperature >> the preferred range is **-25 - +45 C**, which is (**-13 - +113 F**) and it has to be waterproof
For the soil pH >> the typical range is 0-14, with 7 being neutral

Merit:

- Cost >> the cheaper the better (all of them)
- How close they meet the feasibility range and resolution (temp sensor)
- … (moisture sensor)
- … (pH sensor)

Soil moisture Options:

1. Gravity Moisture Sensor - corrosion Resistant (Cost $7.90 per unit) Source

General Description:

- It measures soil moisture levels by capacitive sensing rather than resistive sensing.
- It is made of a corrosion resistant material (to have longer service life)
- Supports gravity 3-pin interface
- Analog output
- On-board voltage regulator
- Compatible with low-voltage MCUs

Specifications:

- Operating Voltage: 3.3 ~ 5.5 VDC
- Output Voltage: 0 ~ 3.0VDC
- Interface: PH2.0-3P (what does this mean)

2. Arduino Soil Moisture Sensor Hygrometer**:** (Cost $2.75 per unit) Source

Description:

- Arduino Soil Moisture Sensor also known as a Hygrometer is used to detect the moisture levels in soil.
- Perfect for a self watering plant project.

Specifications:

- VCC: 3.3V-5V.
- GND: GND.
- DO: digital output interface(0 and 1).
- AO: analog output interface.

3. SparkFun Soil Moisture Sensor: (cost $4.95 per unit) Source

Soil temperature Options:

1. DS18B20 Waterproof Temperature Sensor: ($9.95 per unit) Source

Description:

- Sealed digital temperature probe
- Precisely measures temperatures in wet environments
- Accuracy: ±0.5°C from -10°C to +85°C
- RoHS compliant

2. 1-Wire Temperature Sensor | 1.2" Stainless Steel Probe: (cost $11.00 per unit)

Description:

- Cable temperature range: - 40 to 105C
- Cable is approx 1ft long
- Digital Sensor (DS18B20) has 12 bit Resolution

Soil pH Options:

1. Gravity Analog pH Meter Kit: (cost $29.50 per unit) Source

Description:

- Analog pH meter designed for Arduino controllers
- LED to work as the Power Indicator, a BNC connector and PH2.0 sensor interface included
- Measuring Range: 0-14 PH
- Accuracy: ± 0.1pH (25°C)

Specifications:

- Module power: 5.00V
- Measuring temperature: 0-60 ℃
- Response time: ≤ 1min
- pH sensor with BNC connector
- pH2.0 interface (3 foot patch)
- Gain adjustment Potentiometer
- Power indicator LED

2. Luster Leaf Digital Soil pH Meter: (cost $10.99 per unit) Source

Description:

- Product specifically designed to be used only in soil
- Easy-to-read digital output
- Instantly measures acidity or alkalinity level
- Includes printed plant list
- Auto-off feature
- Batteries required and included
- Use for veggies, flowers, fruits and landscape plants
- Digital soil ph meter
- The slender redesigned meter style provides an easier-to-read, instant digital read-out
- It measures and displays the acidity/alkalinity of garden and container soil.