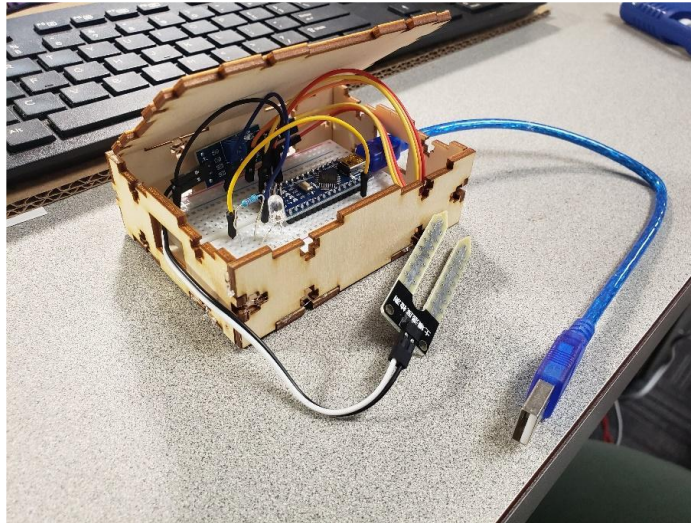




## DIY Plant Moisture Sensor



### The supplies included in this kit are:

- Wooden box to be made
- Glue
- Brush
- Arduino Nano
- LED Light (2)
- Soil Hygrometer Humidity Detection Module Moisture Sensor Geekcreit for Arduino
  - 1 x Soil moisture detector module
  - 1 x Probe
  - 1 x 2P Jumper Cable
- Resistor 220
- Jumping cables male to male (3)
- Jumping cables male to female (3)
- Breadboard

### You'll need these items to start

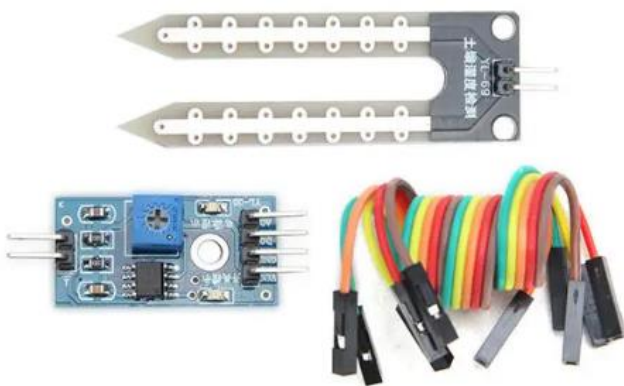
- Plant, Scissors, X-Acto Knife, Computer or Laptop to run the code

Soil moisture is generally the amount of water that is held in spaces between soil particles. It's a very important factor that determines the growth of crops and their health.

The soil moisture sensor used for this tutorial uses electrical resistance of the soil to determine the soil humidity. The electrical resistance of the soil reduces with increase in the amount of water in the soil. The electrical resistance in the soil, however, increases with reduction in the amount of water in the soil. The sensor consists of a probe and a comparator with an adjustable potentiometer which can be used to set the sensitivity of the sensor.

### Program

The plan for this project is to build a soil moisture sensor that can be used to detect moisture, when the soil is dry, the module outputs a high level, whereas output low.



Operating voltage: 3.3V~5V.

Adjustable sensitivity (shown in blue digital potentiometer adjustment)

Dual output mode, analog output more accurate.

A fixed bolt hole for easy installation.

With power indicator (red) and digital switching output indicator (green).

Having LM393 comparator chip, stable.

Panel PCB Dimension: 3cm x 1.5cm.

Soil Probe Dimension: 6cm x 2cm.

Cable Length: 21cm.

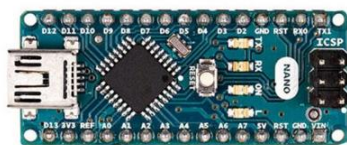
### Pin description:

**VCC: 3.3V-5V.**

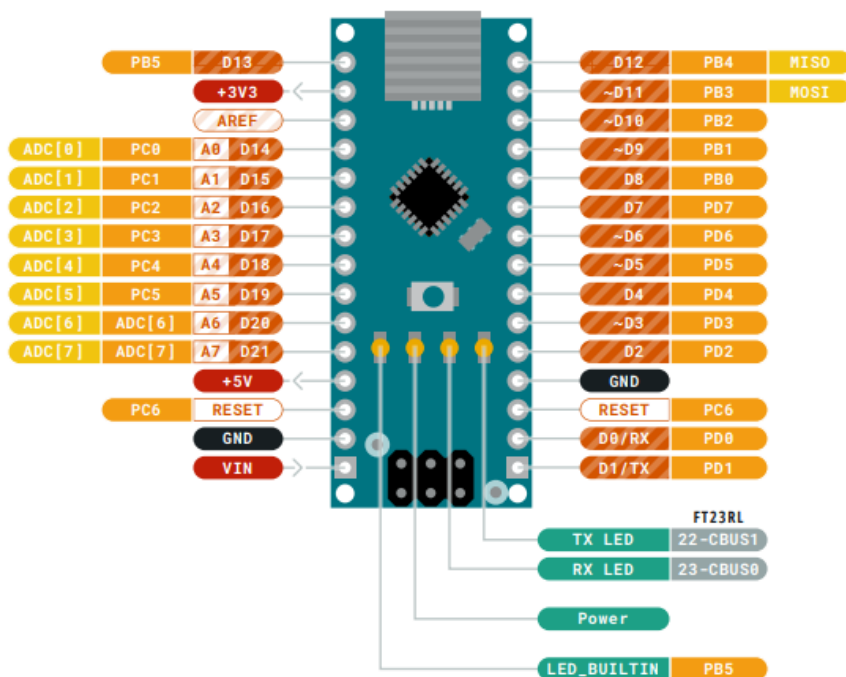
**GND: GND.**

**DO: digital output interface (0 and 1).**

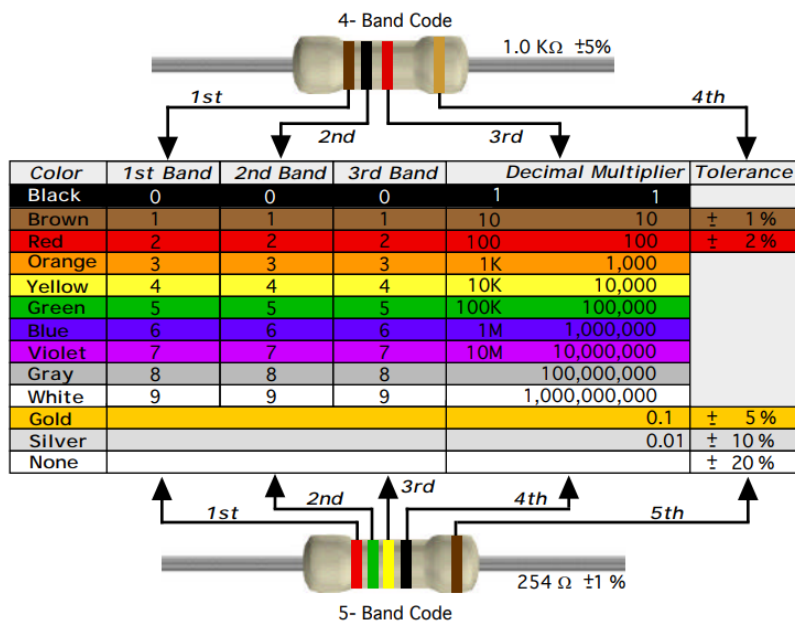
**AO: analog output interface.**



The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328 (Arduino Nano 3.x). It has more or less the same functionality of the Arduino Duemilanove, but in a different package. It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one.

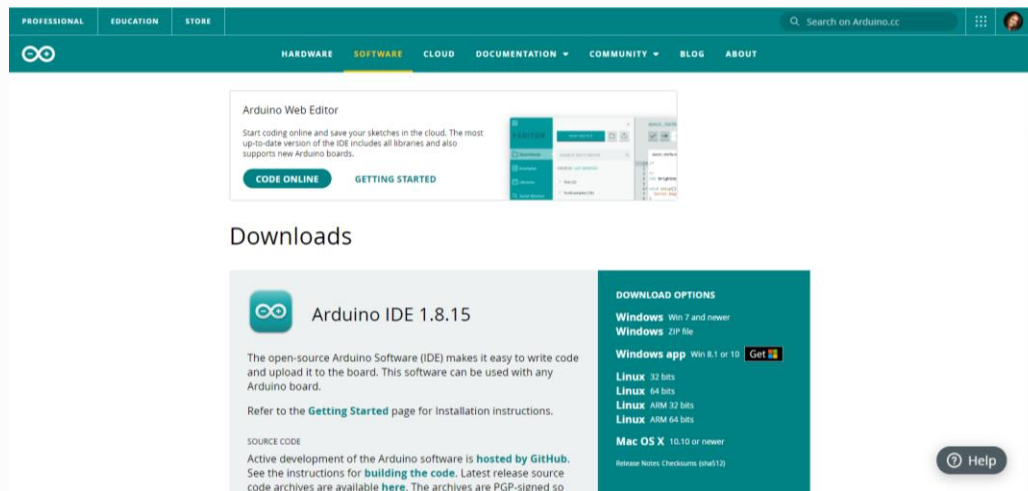


## RESISTOR COLOR CODE GUIDE



## Instructions:

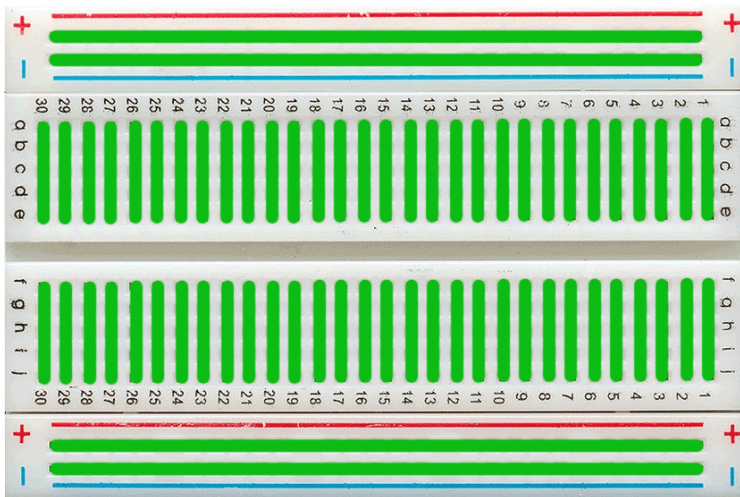
1. Go to <https://www.arduino.cc/en/software> and download the Arduino IDE 1.8.15  
The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board.



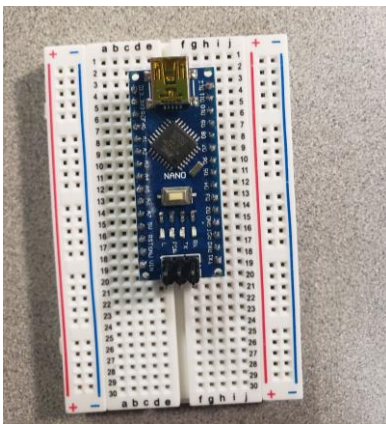
2. Assemble the small wooden box using the glue and brush provided.
3. Use the following [URL](#) and download the document provided - this contains a code sample that can be used with the kit.
4. Open the Arduino IDE and copy/paste the code provided above into the editor. At this point, you can read through the code to see how the sensor will be used.
5. Once the code is pasted in the editor, click the 'check' at the top left to verify the code functions. You will be prompted to save the code. Save it somewhere you can get to again!
6. If you copied the code successfully - the editor will report that it is 'Done compiling'. You are ready to upload!  
NOTE for Windows users: The Nano provided requires a different driver compared with the official Arduino, so please use the driver from [this link](#). Once you've downloaded the zip, run the included executable and restart the Arduino IDE program.
7. Remove your Arduino Nano from its box and connect your Arduino using the provided USB cable to your computer.
8. Once connected, using the 'Tools' dropdown at the top of the editor - select
  - a. the board: 'Arduino Nano', the processor 'ATmega'
  - b. the processor: 'ATmega 328P (Old Bootloader)'
  - c. the port: You should see a new port appear when the Nano is plugged in - select this one. It may be easiest to remove / restore the connection to determine which one to choose.
9. If you connected successfully - you can now click the 'arrow' button at the top left, next to the 'check' you selected earlier. This will upload the code to your Nano.
10. If successful - the editor will report that it is 'Done uploading'. You are ready to assemble the kit!
11. Unplug your Arduino from the computer before continuing assembly. The code will be ready to run when you restore the connection next time.

Steps for building the sensor:

Just a note about breadboard: each socket on a breadboard is connected to another differently depending on where you are on the breadboard. You can reference this diagram to understand how sockets in each row are connected. The green lines indicate connections:

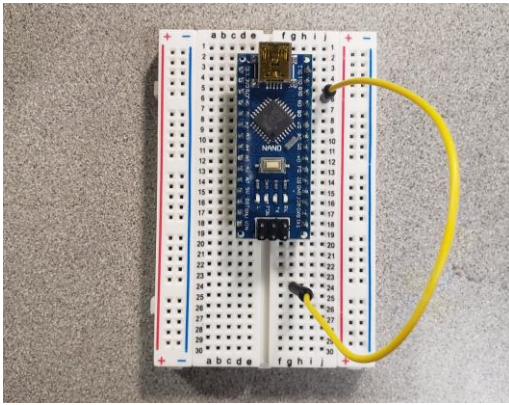


1. Remove the plastic from the Arduino nano and attach the Nano to the included breadboard. Make sure that the pin labeled 'D13' is plugged into hole 'd4' on the breadboard. NOTE: Be careful not to bend the pins when inserting the board!

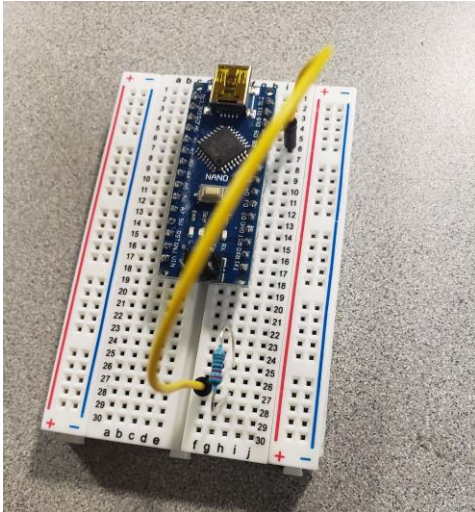


2. Create the LED circuit. From the bag of cables, select a jumper that has a lead on both ends. On your breadboard, we'll make connections by inserting leads into sockets on the breadboard. Connect one end of the lead to a socket on the same row as pin 'D10' on the Nano. Connect the lead on the other end of the jumper to an empty row on the breadboard - away from the Arduino Nano. We used slot f27.

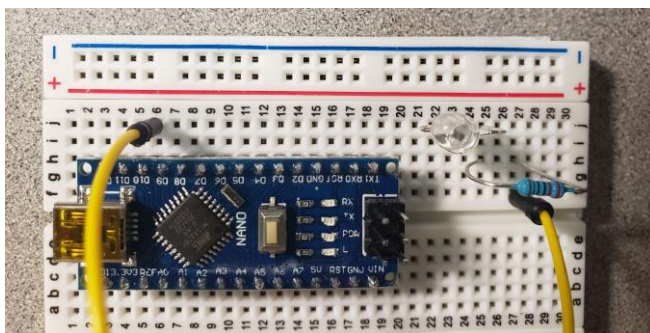




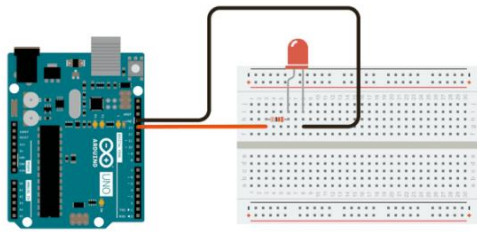
3. Connect the resistor included in your kit to the previous lead by inserting one end into a slot on the same row. We used h27. Now insert the other lead of the resistor on a separate row. We used slot h25.



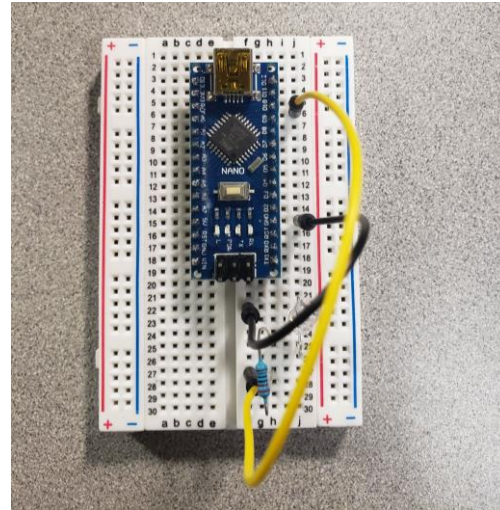
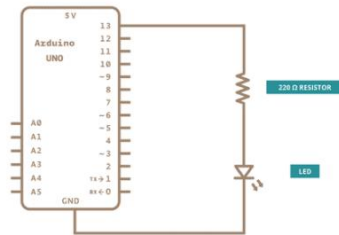
4. Connect one of the LEDs included in your kit to the previous lead by inserting the longest lead (the long leg) into a slot on the same row. We used j25. You can also connect the other lead (the short leg) by plugging into a slot on an empty row. We used j22.



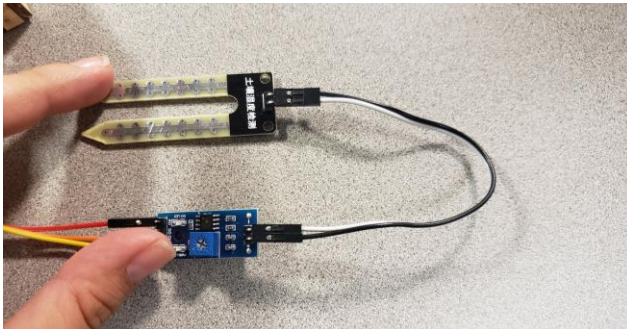
5. Take a new jumper cable from your bag - this should also have leads on both ends. On your breadboard, connect the previous lead by inserting one end of the jumper cable into a slot on the same row. We used slot f22. Now connect the other end of the jumper to the row on your breadboard where the pin labeled "GND" on your Arduino is plugged. You can plug multiple jumpers to this same GND pin without a problem.



Schematic



6. Create the sensor circuit. Remove the sensor from the reflective bag. It should have 3 parts - a 2-part jumper cable with slots on both ends, the two-pronged sensor, and the sensor circuit board. Connect the two-pronged sensor to the circuit board using the included jumper. The sensor connects to the board on the side with two leads.



7. Connect the sensor to the Arduino. From the bag of cables, select the group of 3 jumper cables (leave them connected!) which have a lead on one end and a socket on the other. Make the following connections from the Arduino to the sensor circuit board:
  - a. Connect the lead end of a jumper to the breadboard where the 'A6' pin on your Nano is inserted. Connect the socket end of the jumper to the pin labeled 'A0' on the sensor circuit board.
  - b. Connect the lead end of a jumper to the breadboard where the '5V' pin on your Nano is inserted. Connect the socket end of the jumper to the pin labeled 'VCC' on the sensor circuit board.
  - c. Connect the lead end of a jumper to the breadboard where the 'GND' pin on your Nano is inserted. This can be the same GND pin connection that you used before, or the unused GND pin connection that is available on the Nano.
  - d. The 'DO' pin on the sensor circuit board won't be used.





Your kit is now completely assembled. You can plug the usb cable into a power source (make sure you don't exceed 5V / 2 A ) using your computer's usb connections or a typical mobile phone 'wall wart'.

You should see that the LED circuit you created is illuminated. Exposing the sensor to moisture should turn off the LED.

If you want to observe the sensor readings as they are produced - open the Arduino IDE while the Nano is connected to your computer. Go to the 'Tools' option in the toolbar at the top, and select 'Serial Monitor' to view the values produced.

### What next?

If you enjoyed this kit, here are some other instructions and resources:

- [https://create.arduino.cc/projecthub/nickthegreek82/diy-soil-moisture-monitor-with-arduino-and-a-nokia-5110-d-c8a93c?ref=tag&ref\\_id=garden&offset=40](https://create.arduino.cc/projecthub/nickthegreek82/diy-soil-moisture-monitor-with-arduino-and-a-nokia-5110-d-c8a93c?ref=tag&ref_id=garden&offset=40)
- [https://create.arduino.cc/projecthub/millerman4487/diy-plant-moisture-sensor-474543?ref=tag&ref\\_id=garden&offset=12](https://create.arduino.cc/projecthub/millerman4487/diy-plant-moisture-sensor-474543?ref=tag&ref_id=garden&offset=12)
- [https://content.arduino.cc/assets/Pinout-NANO\\_latest.pdf](https://content.arduino.cc/assets/Pinout-NANO_latest.pdf)
- <https://www.arduino.cc/en/Guide/ArduinoNano>
- <https://create.arduino.cc/editor>
- <https://www.arduino.cc/en/software>
- <https://create.arduino.cc/projecthub/MisterBotBreak/how-to-use-a-soil-moisture-sensor-ce769b>
- <https://docs.arduino.cc/>
- <https://store.arduino.cc/usa/arduino-nano>

