

# HSD3: Build Your Own Project!

STEM workshop at ASA Now

# *Available Components*

# What we're doing today

- Today, you all will have the opportunity to design and build a custom Arduino project using your imagination and the wide variety of components available in your kits!



LAFVIN R3 CH340 1PCS



Breadboard 1PCS



USB Cable 1PCS



Obstacle Avoidance  
Module 1PCS



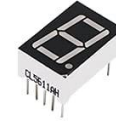
Soil Humidity Sensor 1PCS



Sound Sensor Module 1PCS



Water Level Detection  
Sensor Module 1PCS



1 Dight 7-segment  
Display 1PCS



DHT11 1PCS



Passive Buzzer 1PCS



Active Buzzer 1PCS



Potentiometer(10K) 1PCS



Button Switch 6PCS



3 Kinds of Resistor 30pcs



M-M Dupont Wire 10PCS



Photoresistor 2PCS



Tilt Switch 1PCS



Thermistor 1PCS



RGB LED 1PCS



Yellow/Red/Green  
Led each one 5PCS

*ENCYCLOPEDIA  
ARDUINOANICA*

If you don't know something Google it!!  
– Wise man

Youtube is also a great source. . .  
– Wise man

# *Standard Components*



# Standard Components

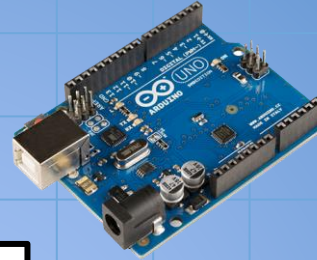
These are components that you will likely be using regardless of what project you end up deciding to create.

They include:

- Arduino Uno
- USB Cable
- Breadboard
- Wires
- Resistors (Normal)

## Arduino Uno

Use this to receive signals from sensors and control other electronic devices.



## USB Cable

Connection between the Arduino and computer, allowing the upload of code.



## Breadboard

Plastic boxes with holes that are interconnected underneath with wires.

## Normal Resistors

Resist the flow of current in a circuit.



## Wires

Used to connect components



# Inputs

- Things that can tell your circuit what to do

They include:

- Soil Humidity Sensor
- Obstacle Avoidance module
- Button
- Tilt switch
- Sound Sensor Module
- Photoresistor
- Water level detection sensor module
- DHT11 (Humidity sensor)

# Outputs

They include:

- 7 Segment display (Numbers and letters)
- Simple Buzzer (Active Buzzer)
- Custom Tone Buzzer (Passive Buzzer)
- Normal LEDs
- RGB LED

*Sensors and Other inputs*

# Sensors and Other inputs

These are components that you can use to have your project receive input from the environment.

Whether it's by detecting a change in temperature, hearing a loud sound, or reading that a physical knob was turned, these components give you a variety of ways your project can detect input from the real world around it.

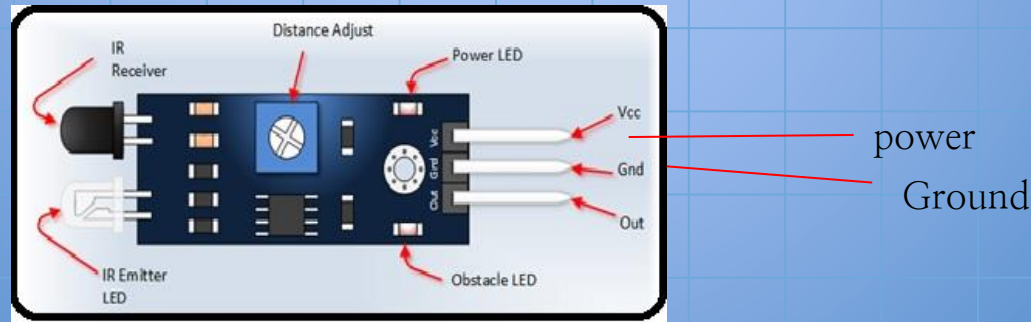
This category includes:

- Obstacle Avoidance Module
- Soil Humidity Sensor
- Tilt switch
- Sound sensor Module
- Water Level Detection Module
- Button switches
- Humidity sensor (DHT11)

\*Note: the order of the components on this list and in the following slides reflect how difficult we think they will be to incorporate into your project (code, wiring, etc.).

# Obstacle Avoidance Module

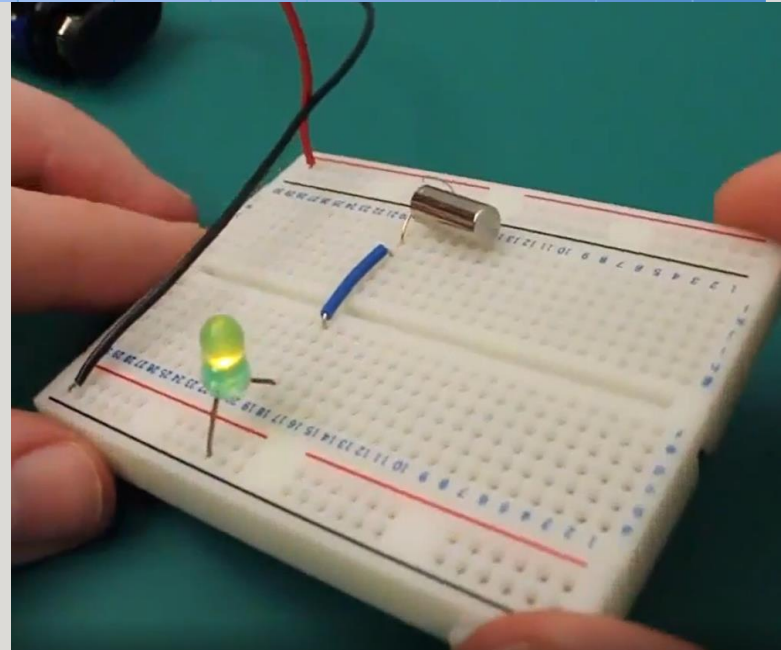
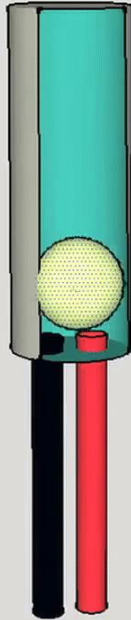
- Uses infrared to detect whether or not something is directly in front of it
- Output will be high if there is nothing in front of it
- Obstacle LED will be on if it detects something in front of it
- You can turn the distance adjust button in order to increase or decrease the distance of detection to a max of 95 millimeters





# Tilt Switch

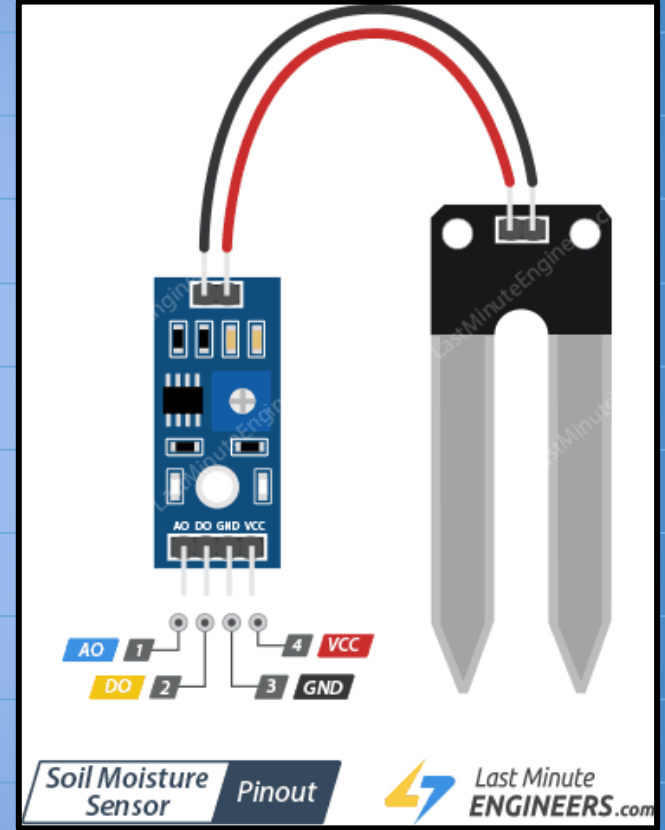
- A switch that when tilted to the right angle, will turn on and off
- Often placed horizontally to maximize switch tiltification





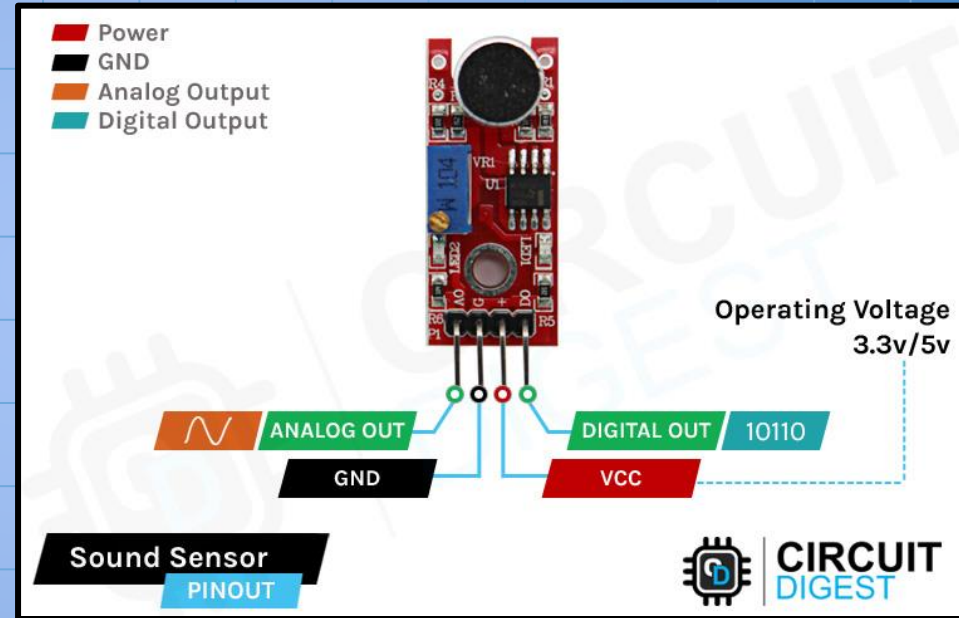
# Soil Humidity Sensor

- It checks the humidity of the soil it is shoved in.
- Features 4 connections.
  1. +5 volts
  2. Ground
  3. Digital or Analog output
- Potentiometer to adjust level at which it sends an output.



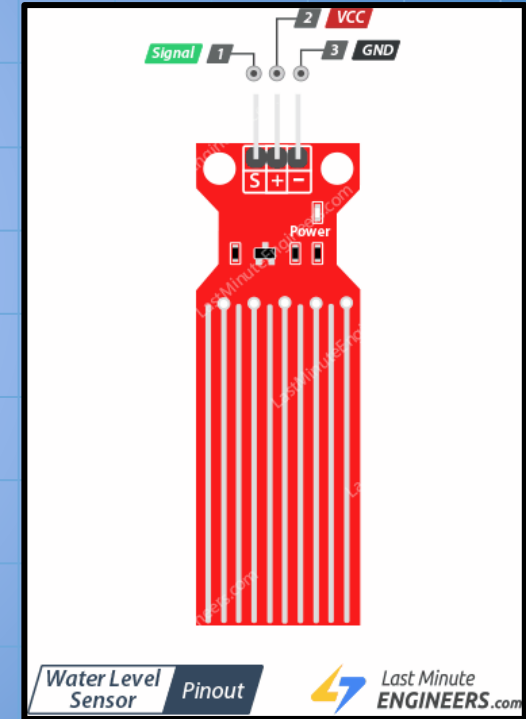
# Sound Sensor Module

- Listens to sound!
- Has digital and analog outputs
  - Digital sends a signal to the Arduino when the sound reaches a certain level (controlled by tiny potentiometer on the component)
  - Analog output outputs current that increases or decreases depending on the sound volume



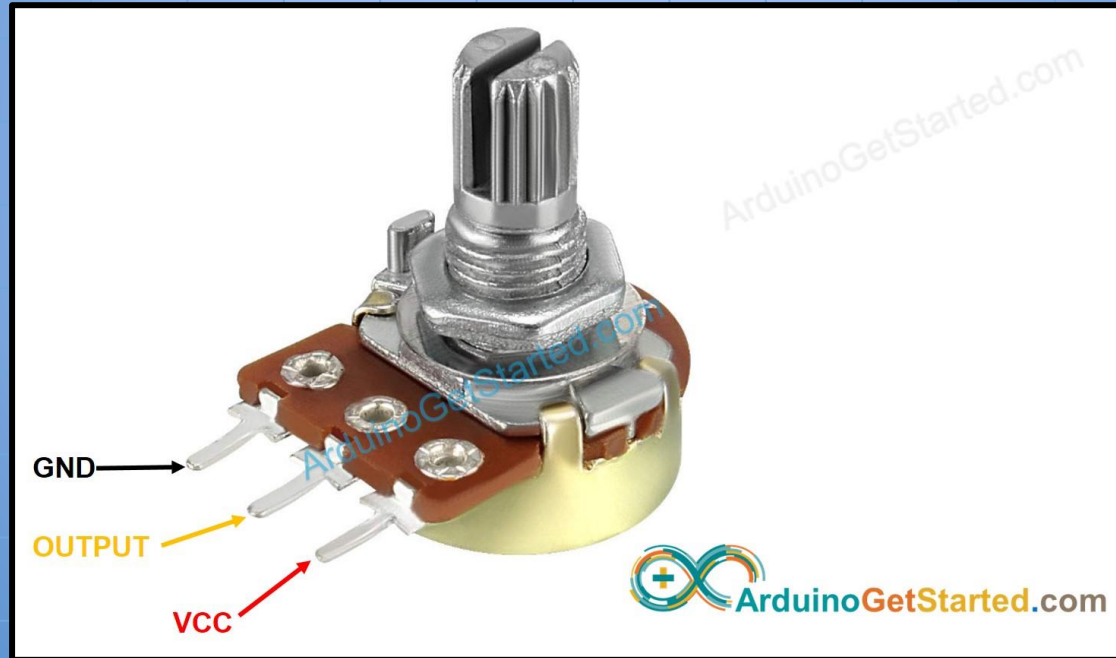
# Water Level Detection Sensor

- Parallel columns of conducting material, which act as a variable resistor depending on how much water they are submerged in.
- More water = better electricity flow = less resistance
- Analog output (The voltage varies).

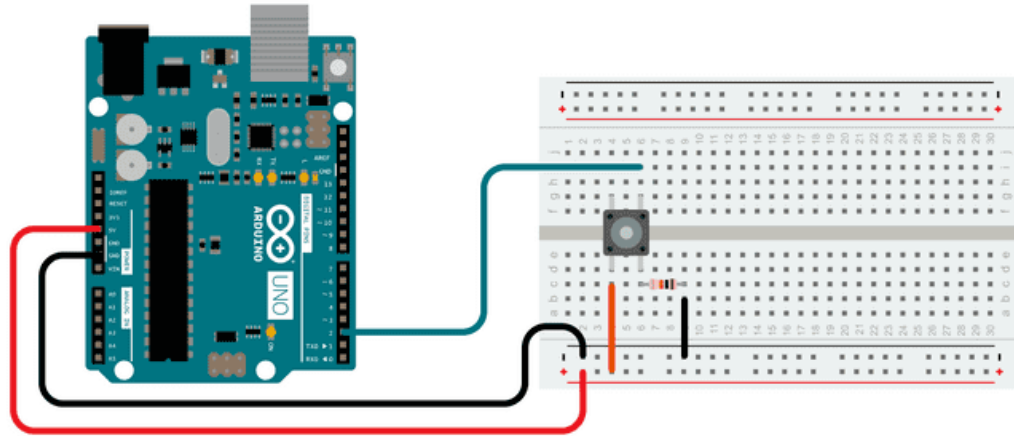


# Potentiometer

- A resistor that can have it's resistance manually adjusted by turning a knob



# Button Switches



# Humidity Sensor (DHT11)\*

\* If you wish to use this component, you will NOT be able to use the block code programmer, and will have to instead directly write text code on Arduino

Thankfully, this is a component so easy to code with text that it's actually easier to use without blocks.

# *Output Devices*



# Output Devices

These are components that you can use to have your project interact with its environment.

Whether it's by detecting a change in temperature, hearing a loud sound, or reading that a physical knob was turned, these components give you a variety of ways your project can detect input from the real world around it.

This category includes:

- LEDS (Normal & RGB)
- Buzzers (Active & Passive)

\*Note: the order of the components on this list and in the following slides reflect how difficult we think they will be to incorporate into your project given the code required to use them and their wirings within the circuit.



# (Normal) LEDs

Diodes are a special type of electronic component that only allow for current to only flow through them in one direction, these diodes emit light.

# RGB LED

An LED with 3 connections, one for each color:

**R**ed, **G**reen, and **B**lue

Common = ground

You can change the current to each color pin (use resistor/potentiometer) to produce different combinations of the three colors in the LED.



# Buzzers (Active and Passive)

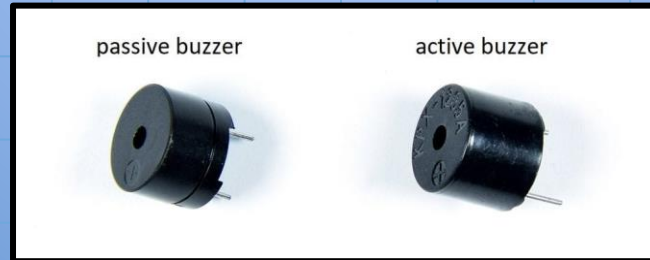
Active Buzzers require DC (from digital pins) to emit noise.

- Cannot change frequency of the sound

Passive Buzzers require AC (from analog pins) to make noises of different frequencies.

- Can change how sound sounds

Active buzzers come with a seal on them



# Kit Used

[https://www.amazon.com/LAFVIN-Starter-Breadboard-Compatible-Arduino/dp/B09HBCMYTV/ref=sr\\_1\\_9?keywords=lafvin+arduino&qid=1655434611&srefix=lafvin%2Caps%2C136&sr=8-9](https://www.amazon.com/LAFVIN-Starter-Breadboard-Compatible-Arduino/dp/B09HBCMYTV/ref=sr_1_9?keywords=lafvin+arduino&qid=1655434611&srefix=lafvin%2Caps%2C136&sr=8-9)

# Credits

Thank you to Benjamin Arbit and Manish Reddy for helping with the creation and formatting of this slideshow.