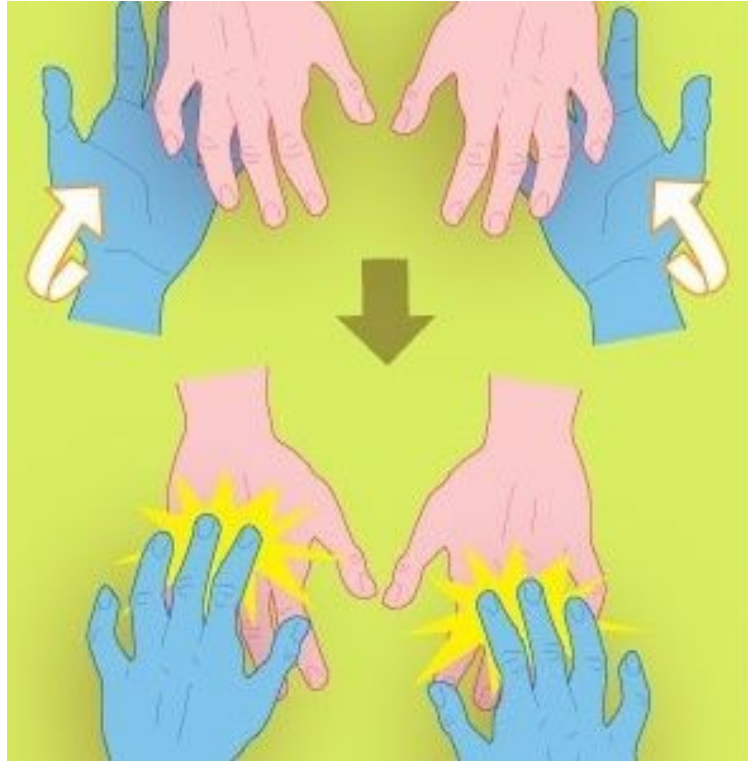


# **2018 NCSU Glove Controller Workshop**

Kaho Abe  
NCSU  
April 18th, 2018

# Hand Clapping Game



Source: American Grandparents Association

**What if these were functional?**



Walmart.com



Etsy, GoFollowRabbits

## Nintendo Power Glove (1989)



## Peregrine Game Glove (2010)



# Laser Tag



vice.com



# Cosplay



# LARPing (Live Action Role Playing)

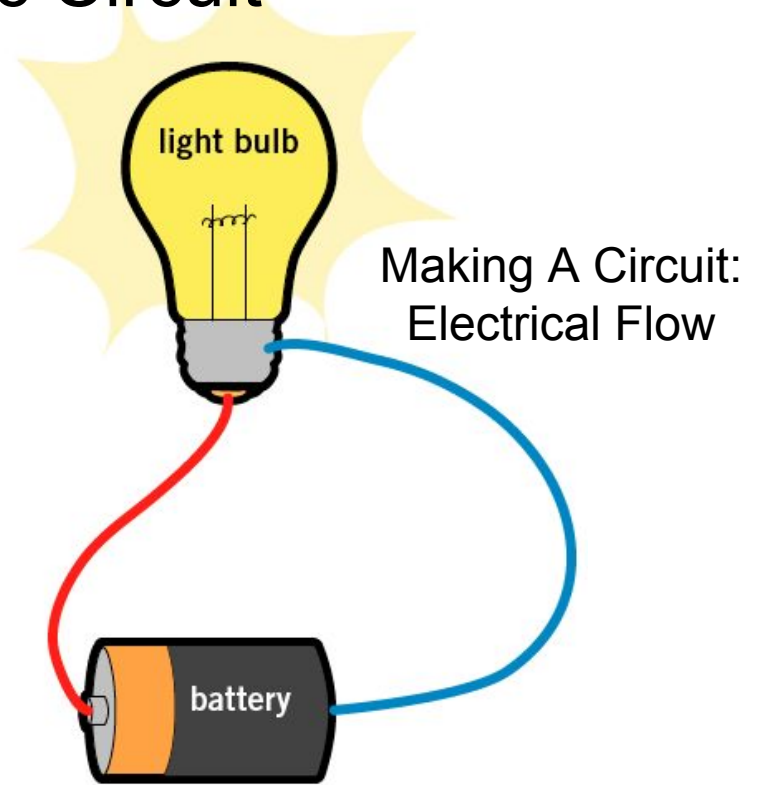
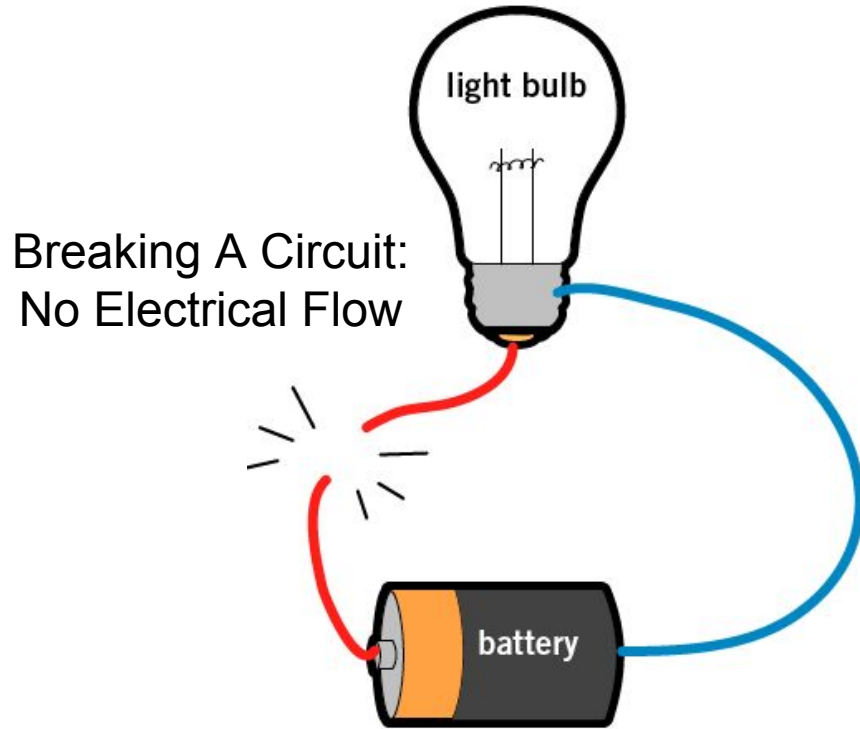


LARPING.org

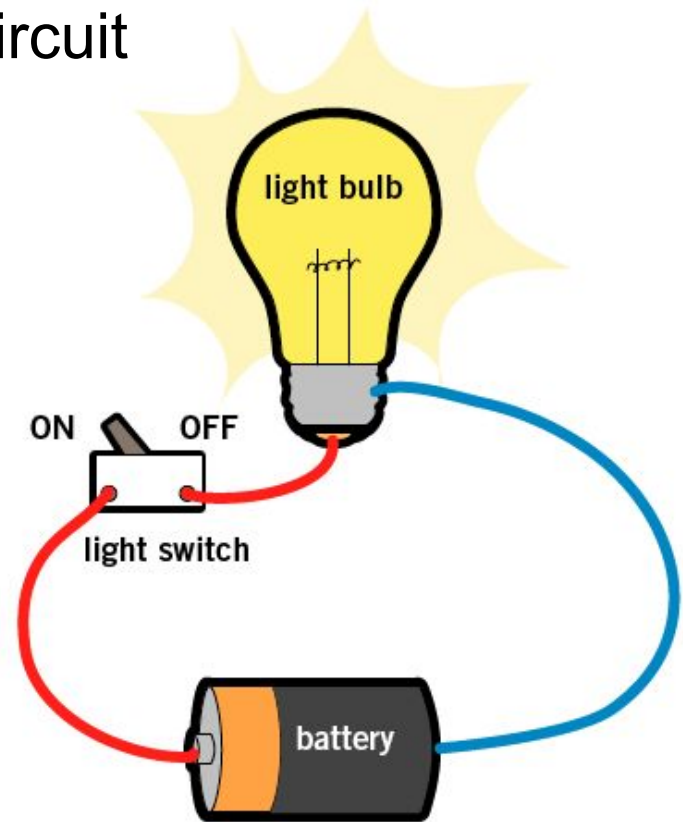
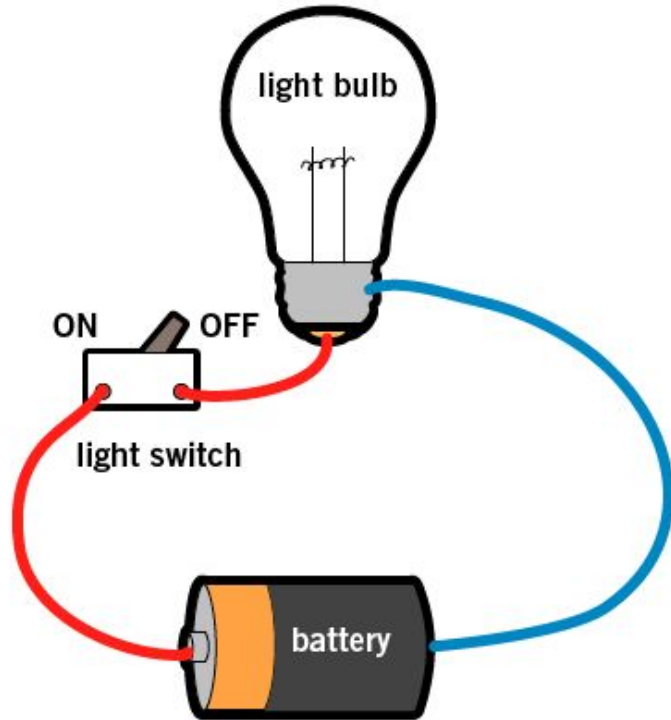


# Making & Breaking a Circuit

# Making and Breaking a Electric Circuit



# Making and Breaking a Electric Circuit



This concept exists all around us!



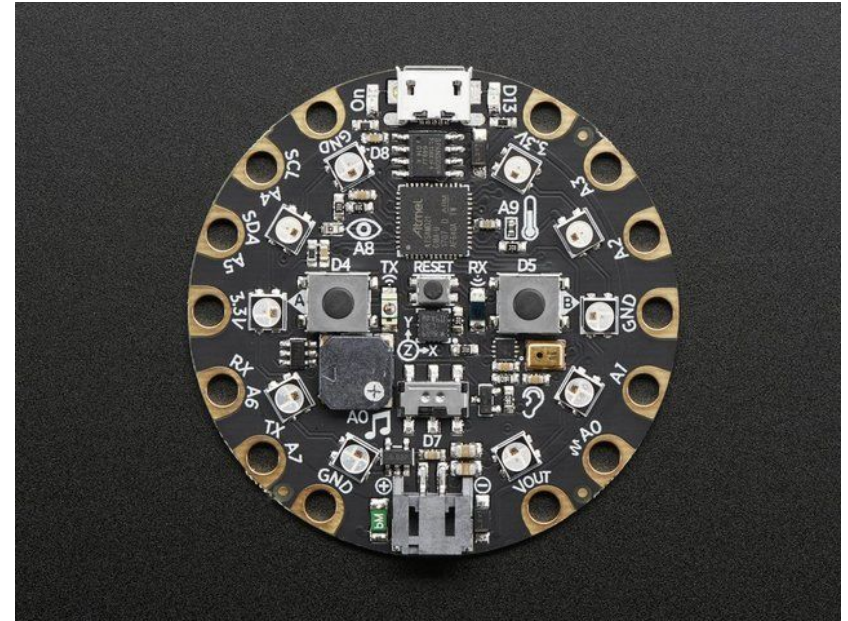


**A keyboard and mouse  
is a bunch of switches!**



# Circuit Playground from Adafruit

- All-in-one board designed for those who want to learn about programming hardware
- Can be programmed using a variety of methods: block-based, Javascript, CircuitPython, Arduino
- Is open source
- Has many sensors and other features built in
- Can act as USB keyboard, mouse
- Great for wearables



More Information: <https://learn.adafruit.com/adafruit-circuit-playground-express>

# Let's make the gloves!

## Playable Fashion Weekend Workshop: Glove Worksheet

with Kaho Abe & Ramsey Nasser  
November 2013 at Eyebeam Art & Technology Center

### Materials:

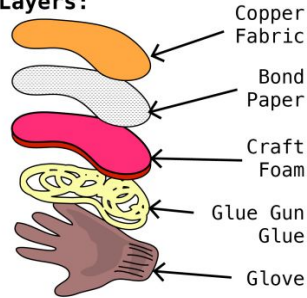
- Copper Fabric (LessEMF)
- Work Gloves (Home Depot)
- Bonding Paper (Amazon)
- Craft Foam (craft stores)
- Flora & USB cord
- 2 Alligator Clips

### Tools:

- Glue gun
- Scissors
- an Iron
- Scrap cotton fabric



### Layers:



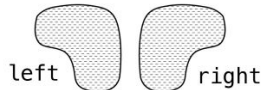
### TEMPLATE FOR CONDUCTIVE PADS

### Cutting:

- Cut 2 pieces of Color Foam
- Cut 2 pieces of Copper Fabric
- Cut 2 pieces of Bonding Paper

\*\* For bonding paper, note smooth and rough sides. Must cut mirrored paid for right and left gloves.

Cut along dotted line



Note: make sure you print at full scale or the scale of the template will be changed.

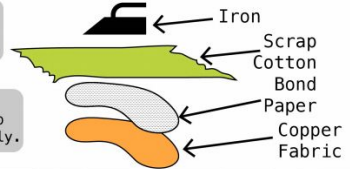
### Step 1:

Place bonding paper rough side down, on top of copper piece. Cover with scrap cotton fabric, and iron for 3 seconds. Make sure you cover all areas.

tip: use scrap cotton fabric when ironing to stop iron from getting destroyed with glue from bonding paper.

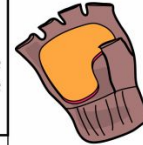
tip: don't over use iron or glue will get all over the place.

tip: steam should be turned off on iron to melt the glue properly.



### Step 2:

Wait til it's cool to the touch. Carefully peel paper from glue. There should remain a adhesive layer on the copper piece.

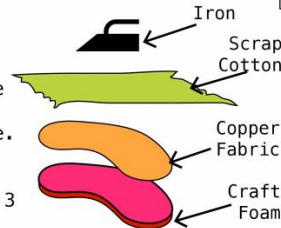


### Step 4:

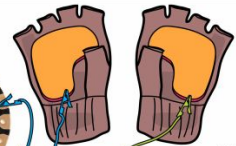
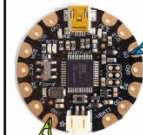
Use glue gun to glue copper/foam piece down to glove, copper side up.

### Step 3:

Place copper piece, adhesive side down, on top of foam piece. Cover with scrap cotton and iron for 3 seconds.

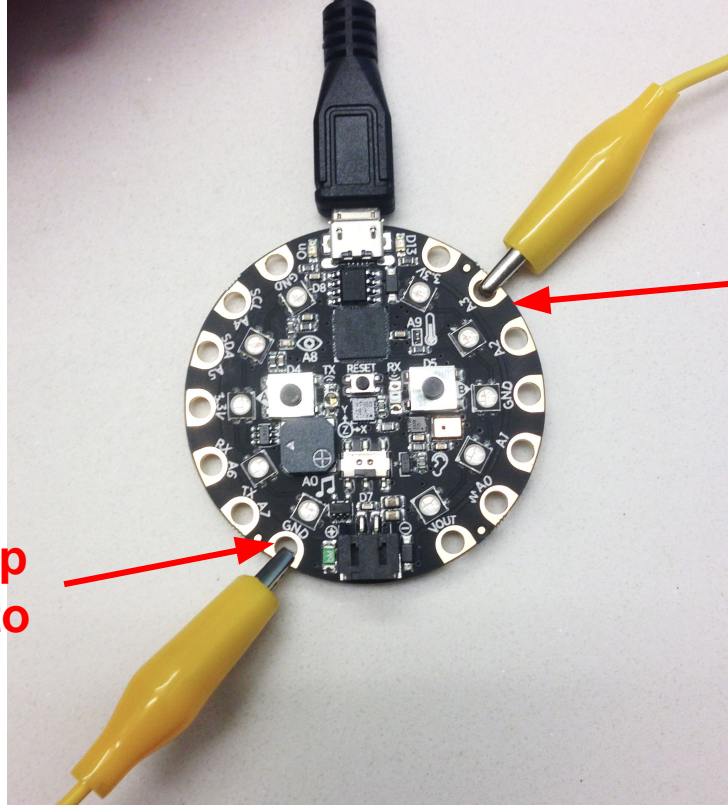


### Step 5: Flora



With alligator clips, connect pads to D9 and GND on Flora.

# Step 5 on Worksheet



Connect alligator clip from GND (Ground) to a glove.

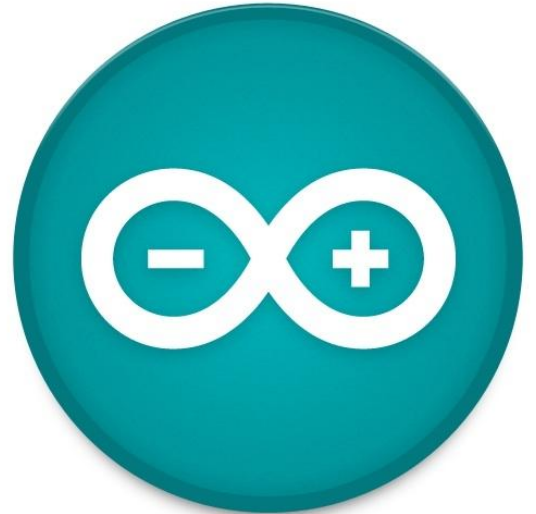
Connect alligator clip from A3 to the other glove.



# Arduino Code

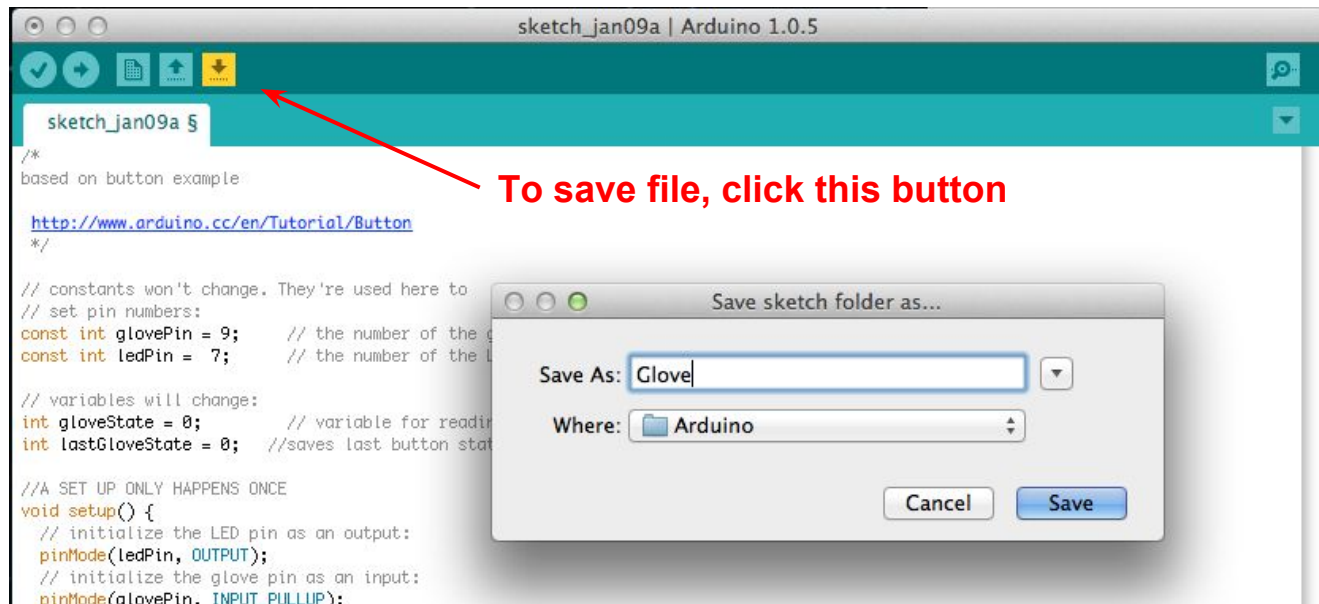
<https://github.com/kahodesu/NCSU-2018-Workshop>

<https://bit.ly/2qGUtBT>



# Cut & Paste into Adafruit Arduino IDE

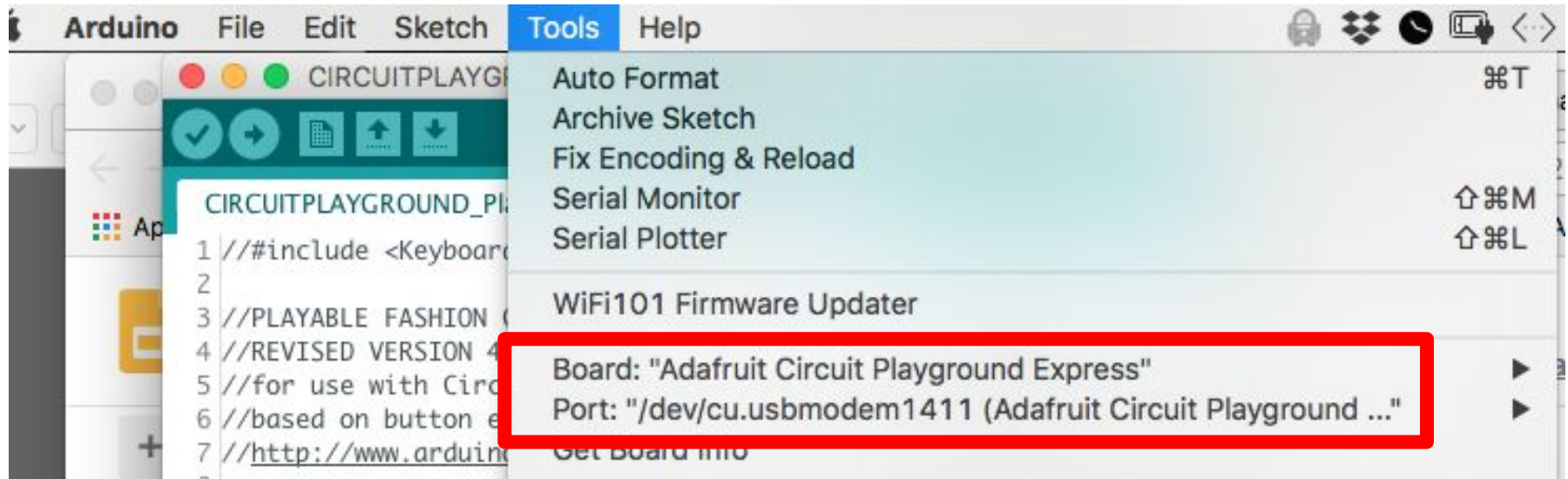
- Cut and paste code into Adafruit Arduino IDE window
- Save Arduino file with new name (whatever you want!)



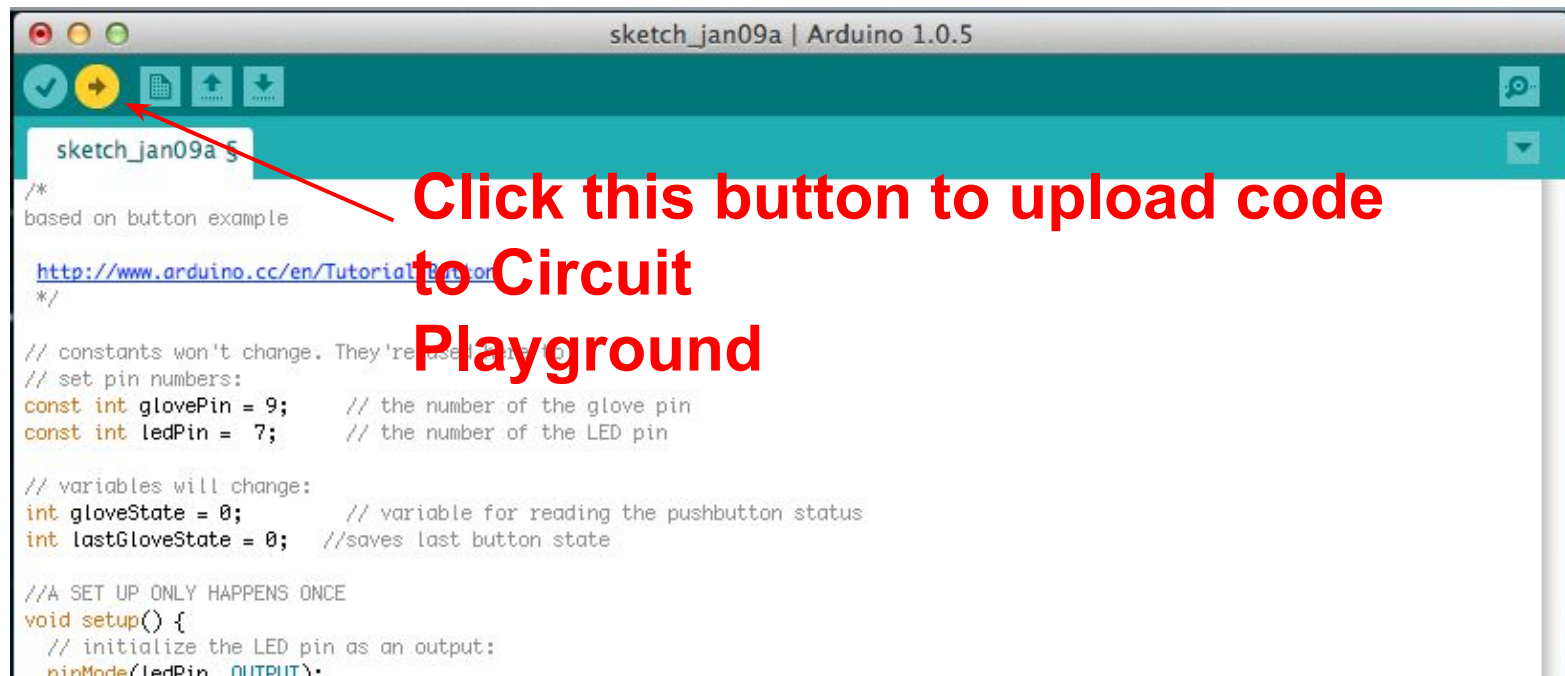
# Set “Board” and “Port”

Make sure Tools>>Board>> Adafruit Circuit Playground Express

Tools>>Port>> USB port with Circuit Playground



# Connect Circuit Playground to Computer via USB and Upload Code

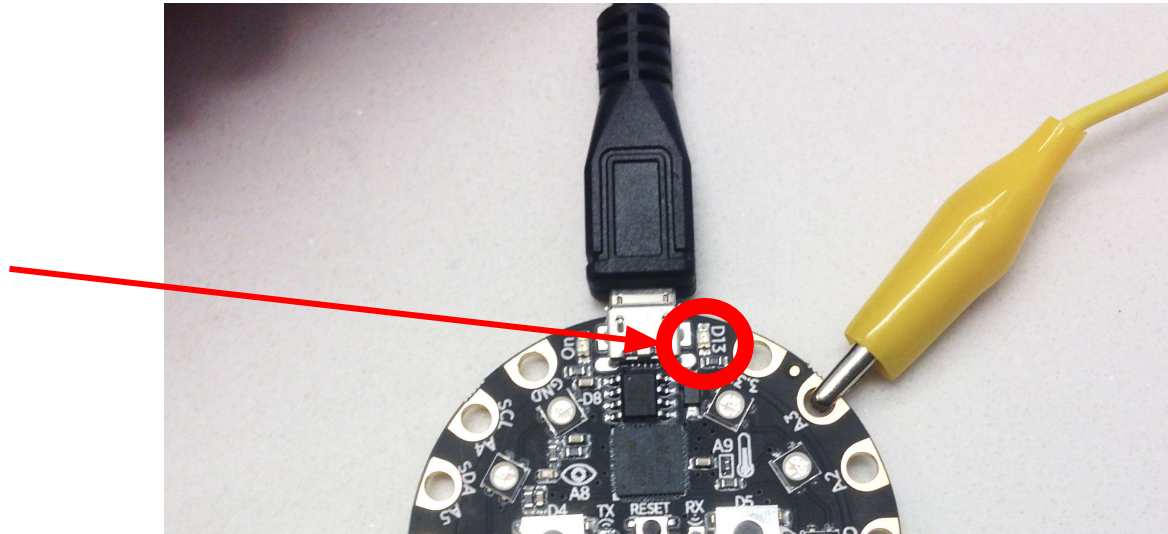
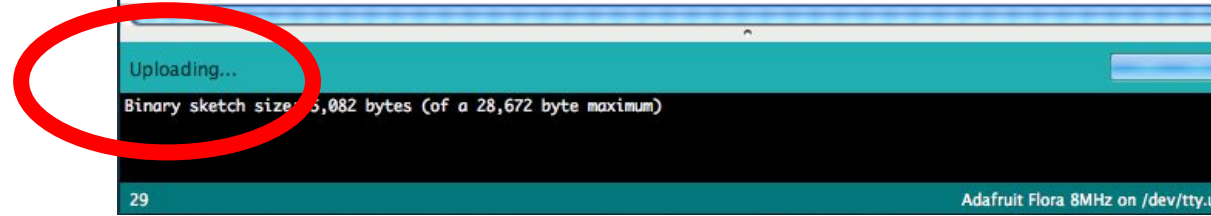




# Uploading

You can check status at bottom left of IDE.

When you clap, RED LED should light up.



# Review Code

**variables**

**setup()**

*occurs once at start*

**loop()**

*occurs over and over again*

```
CIRCUITPLAYGROUND_Playable_Fashion_glove_code | Ar
CIRCUITPLAYGROUND_Playable_Fashion_glove_code
1 //include <Keyboard.h> FOR KEYBOARD
2
3 //PLAYABLE FASHION GLOVE CODE
4 //REVISED VERSION 4/18/2018
5 //for use with Circuit Playground
6 //based on button example
7 //http://www.arduino.cc/en/Tutorial/Button
8
9 // constants won't change. They're used here to set pin numbers:
10 const int glovePin = A3; // the pin number of the glove pin
11 const int ledPin = 13; // the pin number of the LED pin
12
13 // variables will change:
14 int gloveState = 0; // variable for reading the pushbutton status
15
16 void setup() {
17 // initialize the LED pin as an output:
18 pinMode(ledPin, OUTPUT);
19 // initialize the glove pin as an input:
20 pinMode(glovePin, INPUT_PULLUP);
21 //Keyboard.begin(); //FOR KEYBOARD
22 }
23
24 void loop(){
25 // read the state of the glove value:
26 gloveState = digitalRead(glovePin);
27
28 // check if the glove is clapped.
29 // if it is, the gloveState is LOW:
30 if (gloveState == LOW) {
31 //Keyboard.press(' ');//FOR KEYBOARD
32 digitalWrite(ledPin, HIGH);
33 } else {
34 // turn LED off:
35 //Keyboard.release(' ');//FOR KEYBOARD
36 digitalWrite(ledPin, LOW);
37 CircuitPlayground.clearPixels();
38 }
39 }
```

**libraries**

# Web Games Demo

Canabalt <http://adamatomic.com/canabalt/>

Flappy Bird <http://flappybird.io/>

# Flowers Demo

- Change code so that instead of “space”, when gloves are clapped “A” is typed out.
- Go to <http://kahoabe.net/flowers> and clap!



# Hand-to-hand examples:



# Role of Technology

Tech as Facilitator

Tech as Judge

Tech for Feedback

Tech for Spectacle



# What to do next?

## Software:

P5.js <https://p5js.org/>

Processing <https://processing.org/>

Unity <https://unity3d.com/>

## Maker Websites:

Instructables

<https://www.instructables.com/>

How to Get What You Want

<http://www.kobakant.at/DIY/>

Local Maker Spaces/Communities

Local Independent Game Dev  
Communities

## Materials:

Adafruit <https://www.adafruit.com/>

Sparkfun <https://www.sparkfun.com>

lessEMF.com <https://lessemf.com/>

# Thank you!

Website: <http://kahoabe.net>

Twitter: [@kahodesu](https://twitter.com/kahodesu)

Github: <http://github.com/kahodesu>