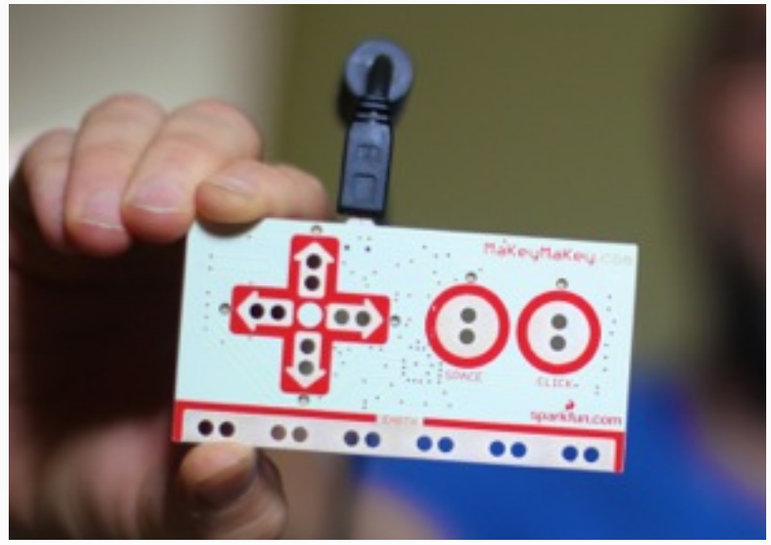
Programming with bits and atoms

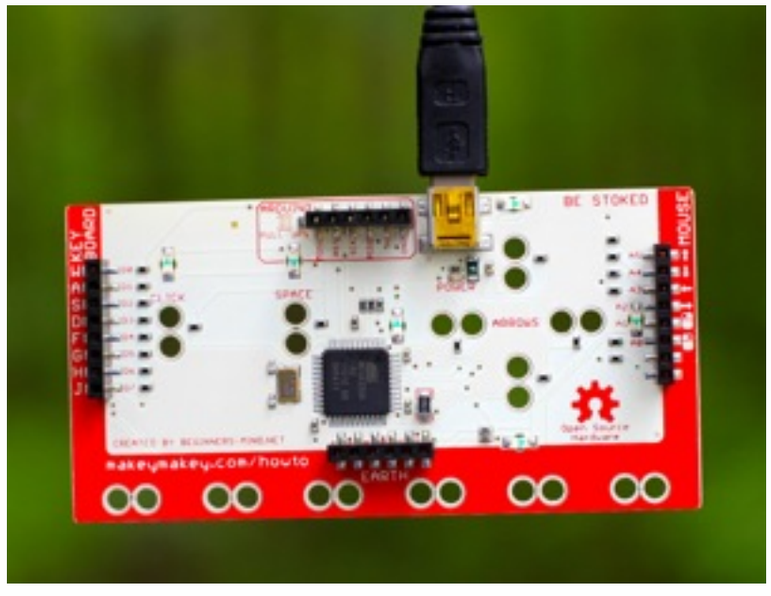
Makey-Makey workshop

30 SECOND INTRO

What is a MaKey Makey?

- "An invention kit for the 21st century."
- Turns everyday objects into touch pads. Make + Key = MaKey MaKey
- Created by Jay Silver and Eric Rosenbaum at MIT Media Lab's Lifelong Kindergarten group in 2011.
- Aimed at artists, kids, educators, engineers, designers, inventors, makers... everyone.





If you're looking for technical specs, scroll down to the "Seriously, I Am a Geek, Tell Me All the Krazy Tech Stuff" section of the makeymakey.com homepage.

Image credit: makeymakey.com

2 MINUTE INTRO

What is a MaKey Makey?

Kickstarter campaign video: http://vimeo.com/60307041

MaKey MaKey - An Invention Kit for Everyone

from **jay silver** 1 year ago NOT YET RATED

GETTING STARTED, OVERVIEW

How to use a MaKey Makey?

1. Connect a computer to the MaKey MaKey via USB.
2. Connect wires and/or alligator clips to the MaKey MaKey.
3. Touch objects (anything conductive) with the alligator clips.

Successful electrical connections are mapped to keyboard commands.

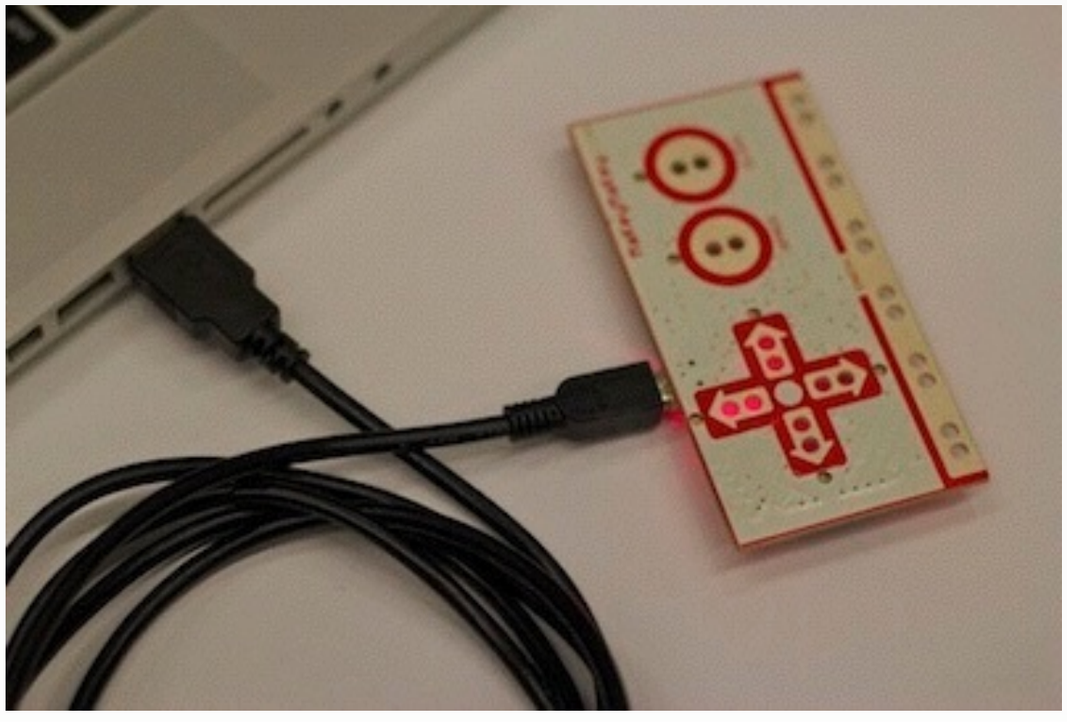
e.g. Up/down/left/right arrows, return key, space bar, letters (A, S, D), numbers (1, 2, 3), etc.

Image credit: makeymakey.com

GETTING STARTED, STEP 1

Connect computer

1. Plug the MaKey MaKey into your laptop using the Mini-B USB cable.



2. Dismiss any popups for drivers or keyboard setup.
   The MaKey MaKey doesn't need any drivers for regular usage. (It does if you want to re-flash firmware on it though.)

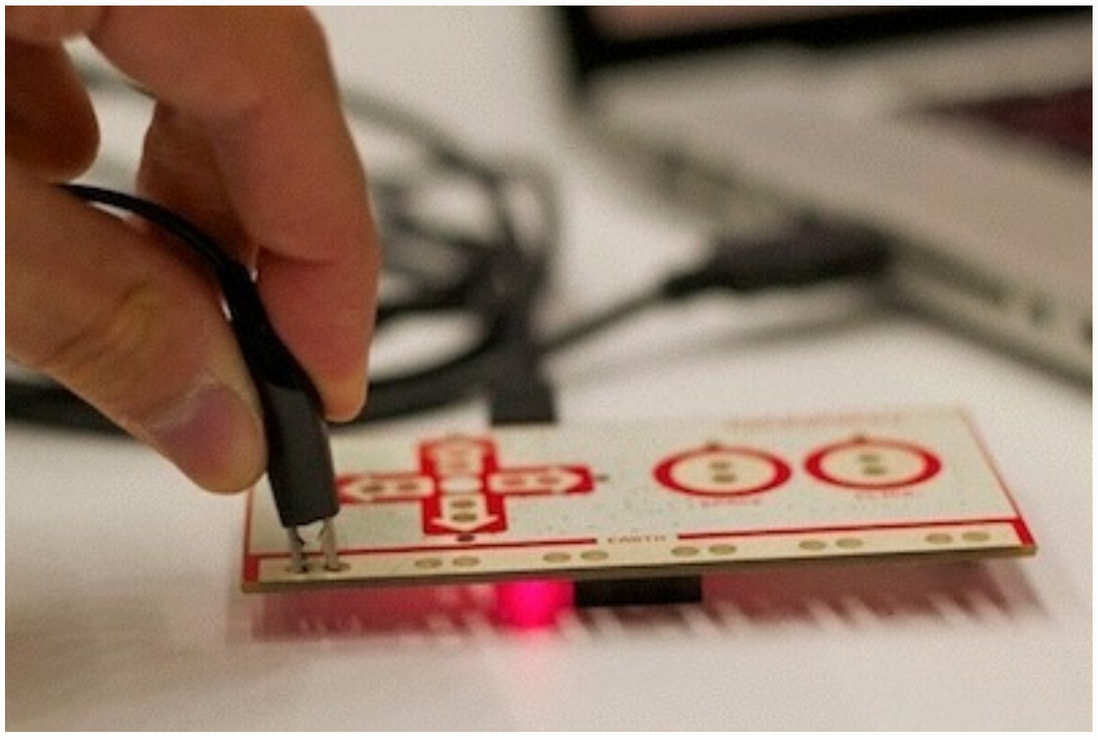
3. Open up a text editor
   (e.g. Notepad, TextEdit)

Image credit: makeymakey.com/howto.php

GETTING STARTED, STEP 2

Connect alligator clips

1. Connect alligator clip #1 to “Earth”.



2. Connect alligator clip #2 to “Space”.

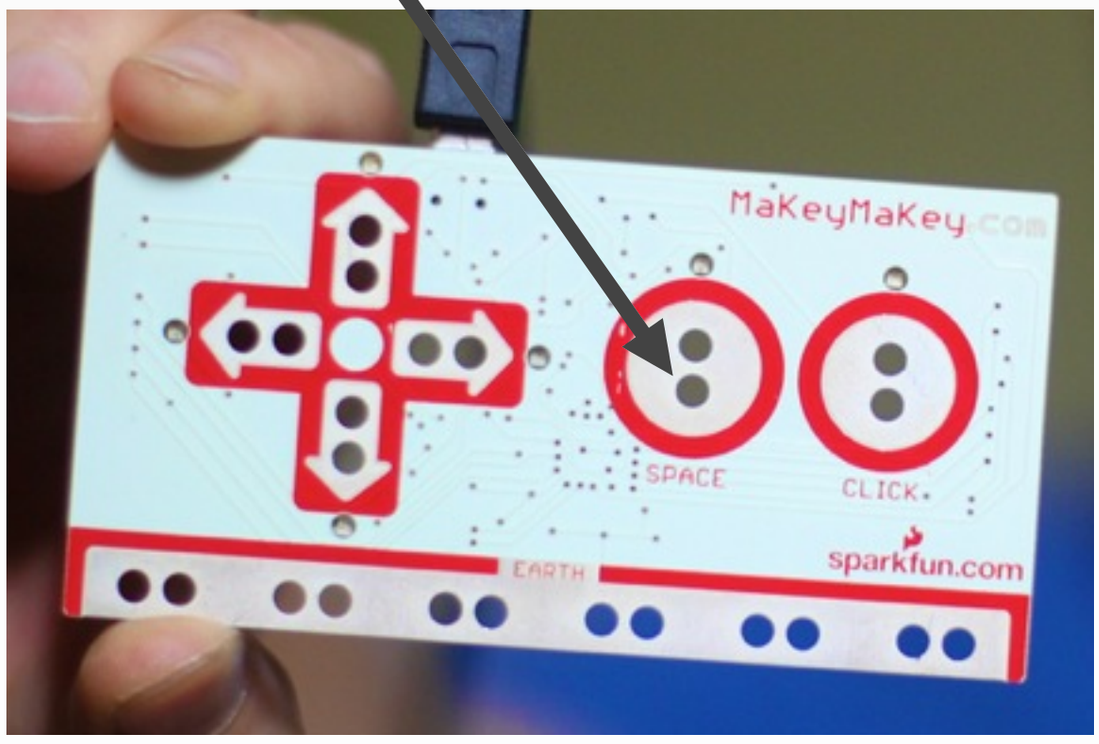
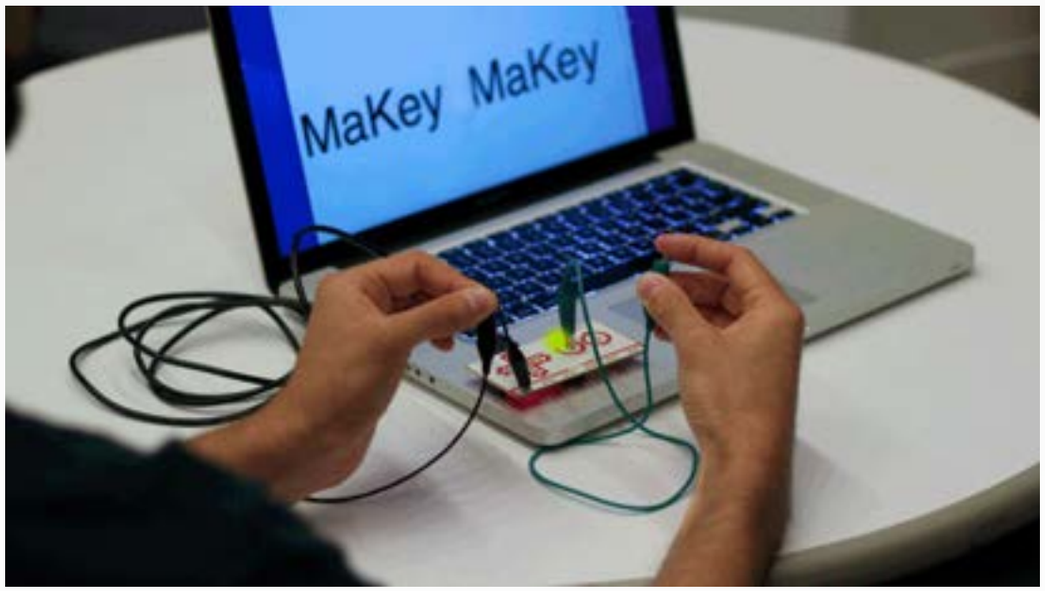


Image credit: makeymakey.com/howto.php

GETTING STARTED, STEP 3

Touch objects



4. Use free ends of alligator clip #1 and #2 like discovery probes...
   Touch the two clip ends together...
   What else will trigger the keyboard?

Goal: You're trying to "complete a circuit".

Imagine an electron originating from "Space" on the MaKey MaKey. It needs to get to "Earth" before anything can happen.

If there's a gap or a roadblock, the electron can't get to "Earth". The electron will try to travel through anything conductive in it's quest to get to "Earth".

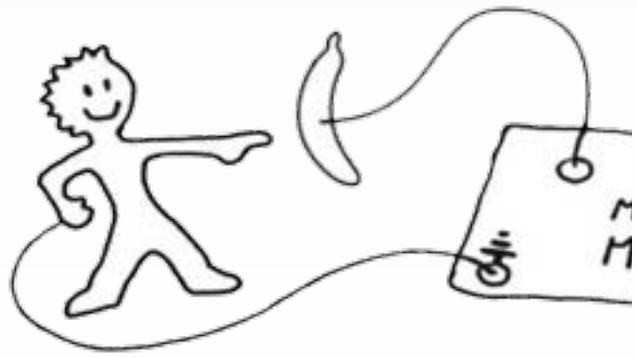


Image credit: makeymakey.com/howto.php

GETTING STARTED, STEP 3

What works with it?

Almost anything that contains metal or moisture is conductive:

- wires and alligator clips
- copper tape
- tin foil
- pencil graphite
- paper clips
- non-distilled water
- humans and animals
- plants and fruit
- Play-Doh

Note: You can chain any of these objects together.
e.g. Two people hold the open ends of the alligator clips and joust with a metal stick.

GETTING STARTED, STEP 3

What doesn't work?

Sometimes you need a layer of insulation.

These don't conduct electricity:

- plastic
- wood
- paper
- rubber gloves
- wool mitts
- felt swatches

Note: If any of these are damp, the water will conduct electricity.
So avoid humidity, sweat, and general wet things.

USING THE MAKEY MAKEY FOR:

Rapid Prototyping

- Quickly augment software that is ***already written*** to accept keyboard commands.
- Focus on ***software first*** (visual UX, audio design, networking APIs, etc), ***hardware next***.
- Involve your ***entire team*** with prototyping; no programming knowledge required.
- ***Low cost*** way to experiment with new physical interactions.
- Opens your eyes to ***look harder at everyday objects*** and user experiences.

RESOURCES

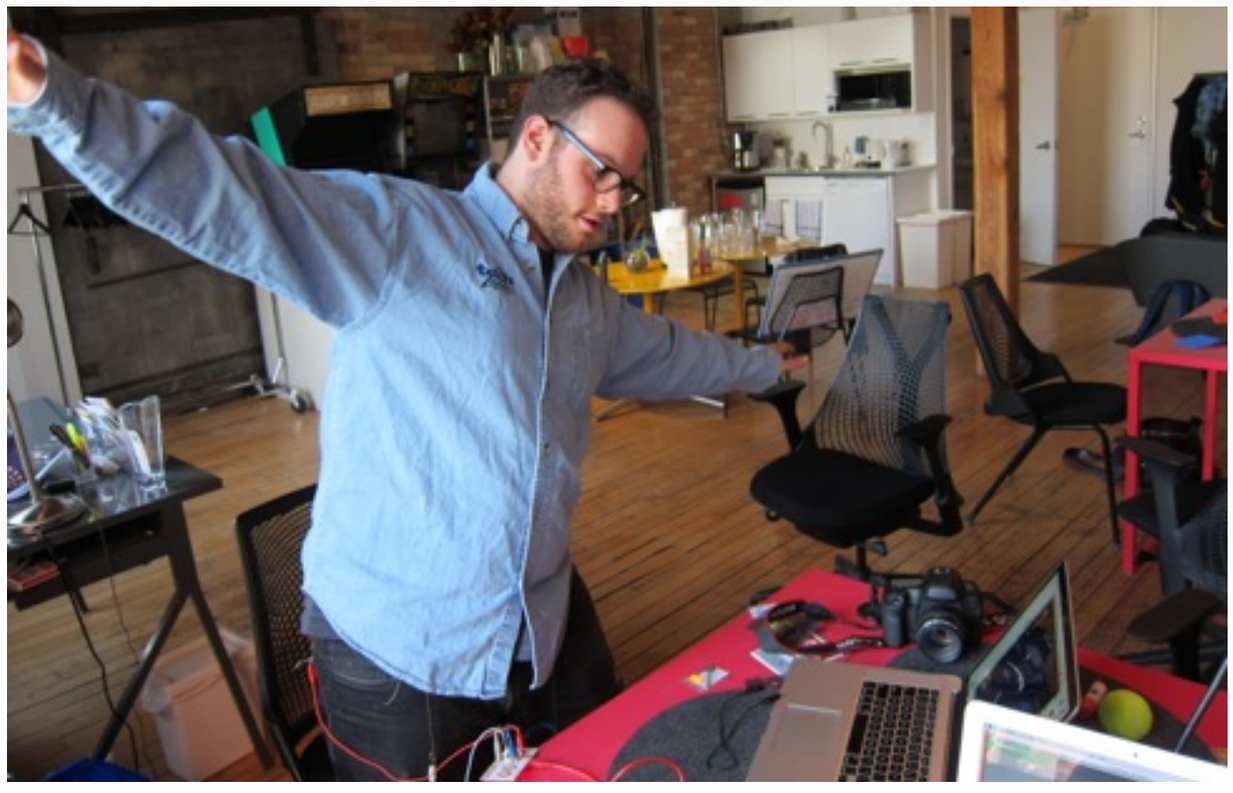
Project Ideas

http://makeymakey.com/gallery/

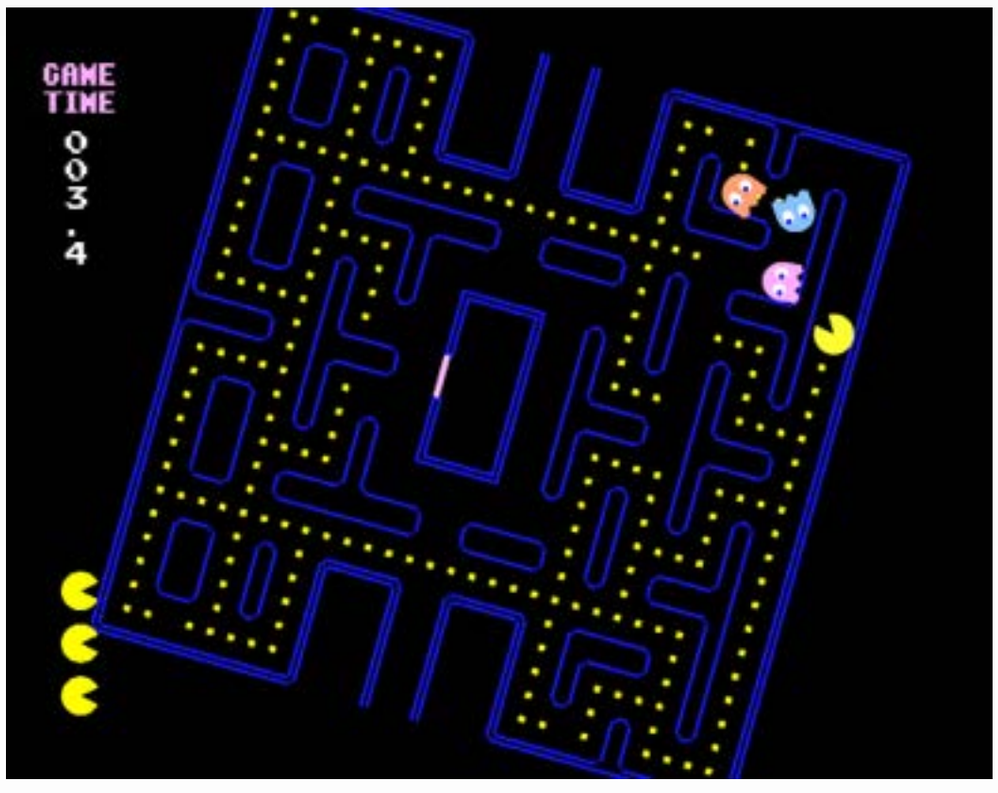
Image credit: makeymakey.com

PROJECT EXAMPLES

Tilt shirt + Not PacMan



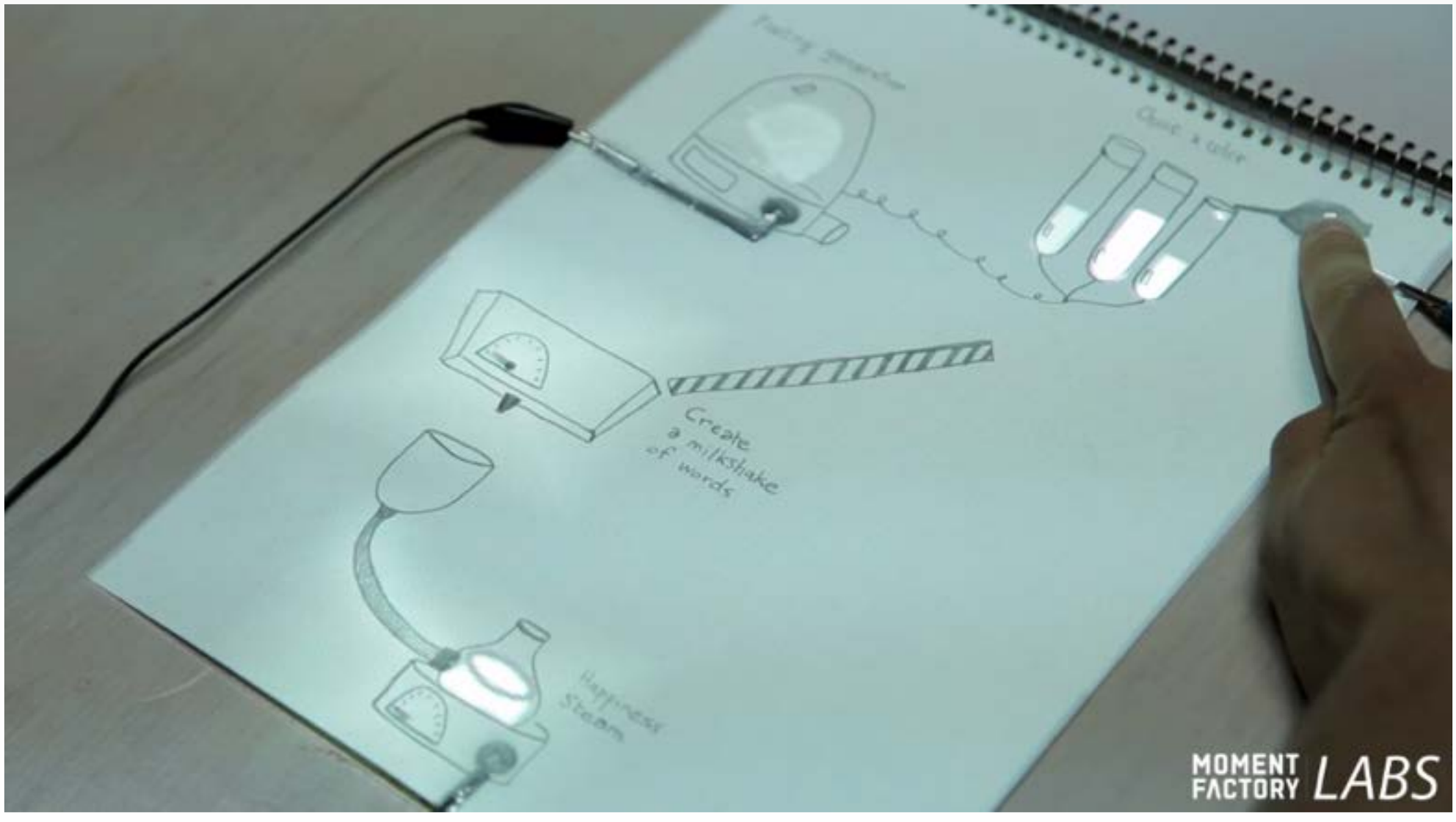
Not PacMan Shirt by Dan Epstein



Not PacMan by Stab Yourself
stabyourself.net/notpacman

PROJECT EXAMPLES

Machine's Sketchbook



Moment Factory Labs
http://vimeo.com/78110845

PROJECTS

Musical Carrots

Musical Carrots
http://youtu.be/pPUDH0ZUTl0

PROJECT EXAMPLES

Four-Handed Sequencer

Wearable Pokey Slappy Makey Four-Handed Sequencer by Brent Dixon
vimeo.com/81055224

PROJECT EXAMPLES

Super Slack Bros.

Yuri Santos | EDSI Brazil
http://esdint.com.br/index.php/super-slack-bros/

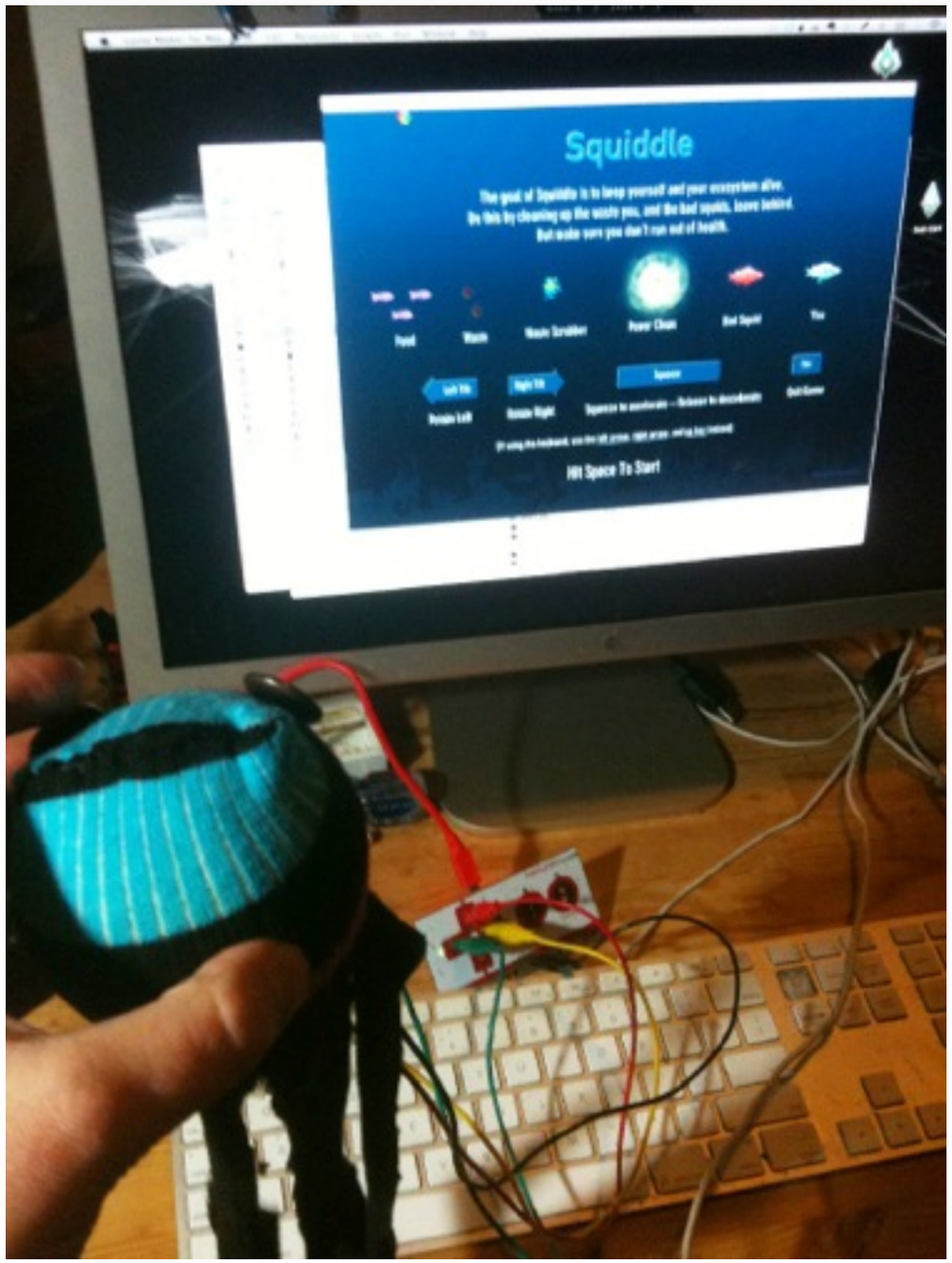
PROJECT EXAMPLES

Frustration Game

MediaLAB Amsterdam
http://youtu.be/faTJQ-RaARY

PROJECT EXAMPLES

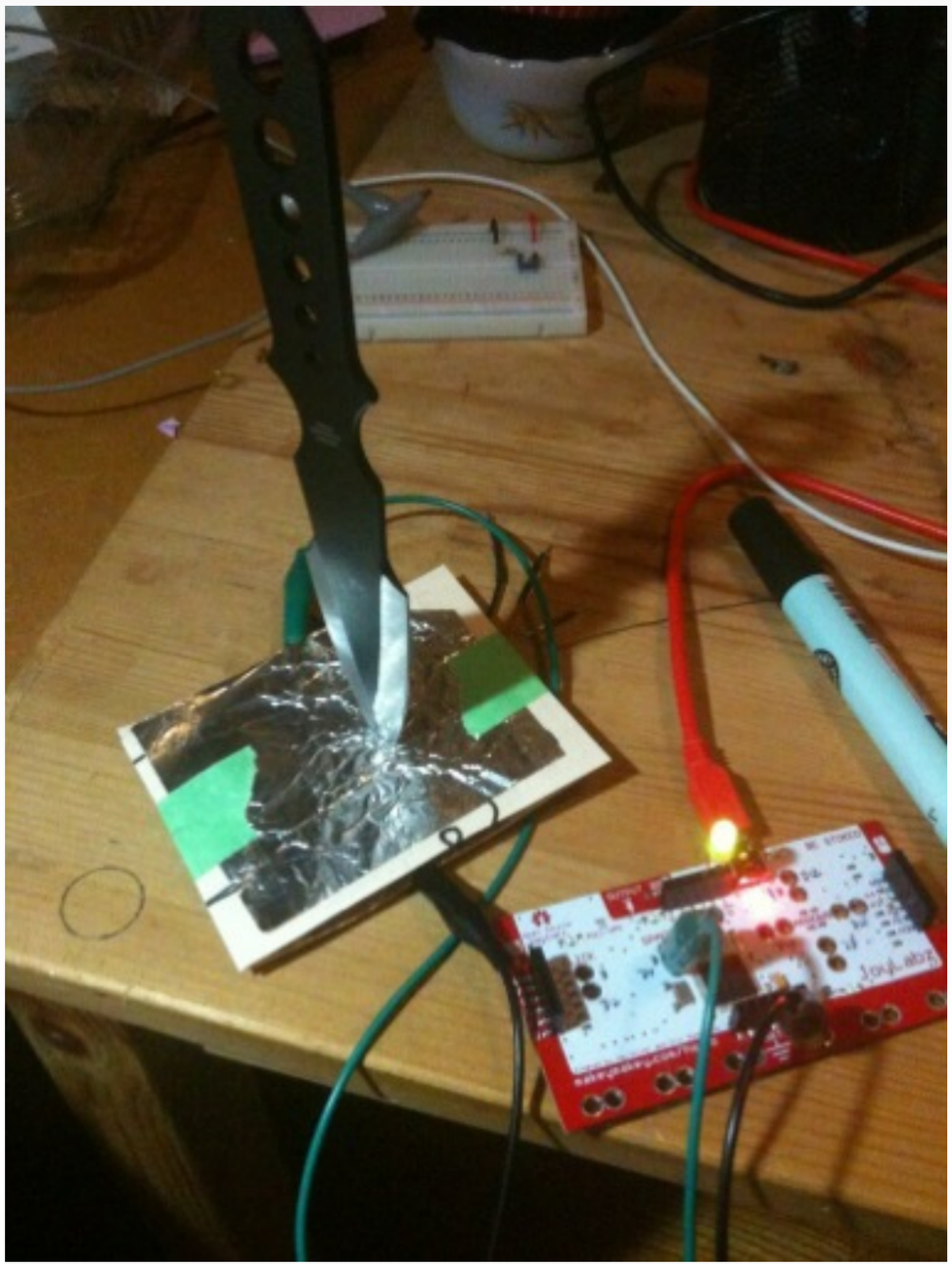
Squiddle



by Nadine Lessio
http://nadinelessio.com/2012/12/10/no-jam-and-squiddle/

PROJECT EXAMPLES

Long Time Coming



by Nadine Lessio
http://nadinelessio.com/2013/04/17/knife-board-for-long-time-coming/

RESOURCES

Exploring further

Image credit: makeymakey.com

EXPLORING FURTHER

Go wireless

MaKey MaKey can be connected to a computer via a Bluetooth adapter.

Bluetooth and LiPo Add-On for Makey Makey
~$45, sparkfun.com/products/11378

EXPLORING FURTHER

Go mobile

Connect MaKey MaKey to phones or tablets!

- OTG adapter for supported Android devices
  ~Under $10, amazon.com

- USB adapter from Apple Camera Connection Kit for iPhone/iPad
  See makeymakey.com/forums/index.php?topic=5743.0 for required firmware tweaks.
  ~$30, store.apple.com

EXPLORING FURTHER

Send mouse input

Connect analog sensors to the female headers on the back using male-to-male (or male-to-female) jumper wires.

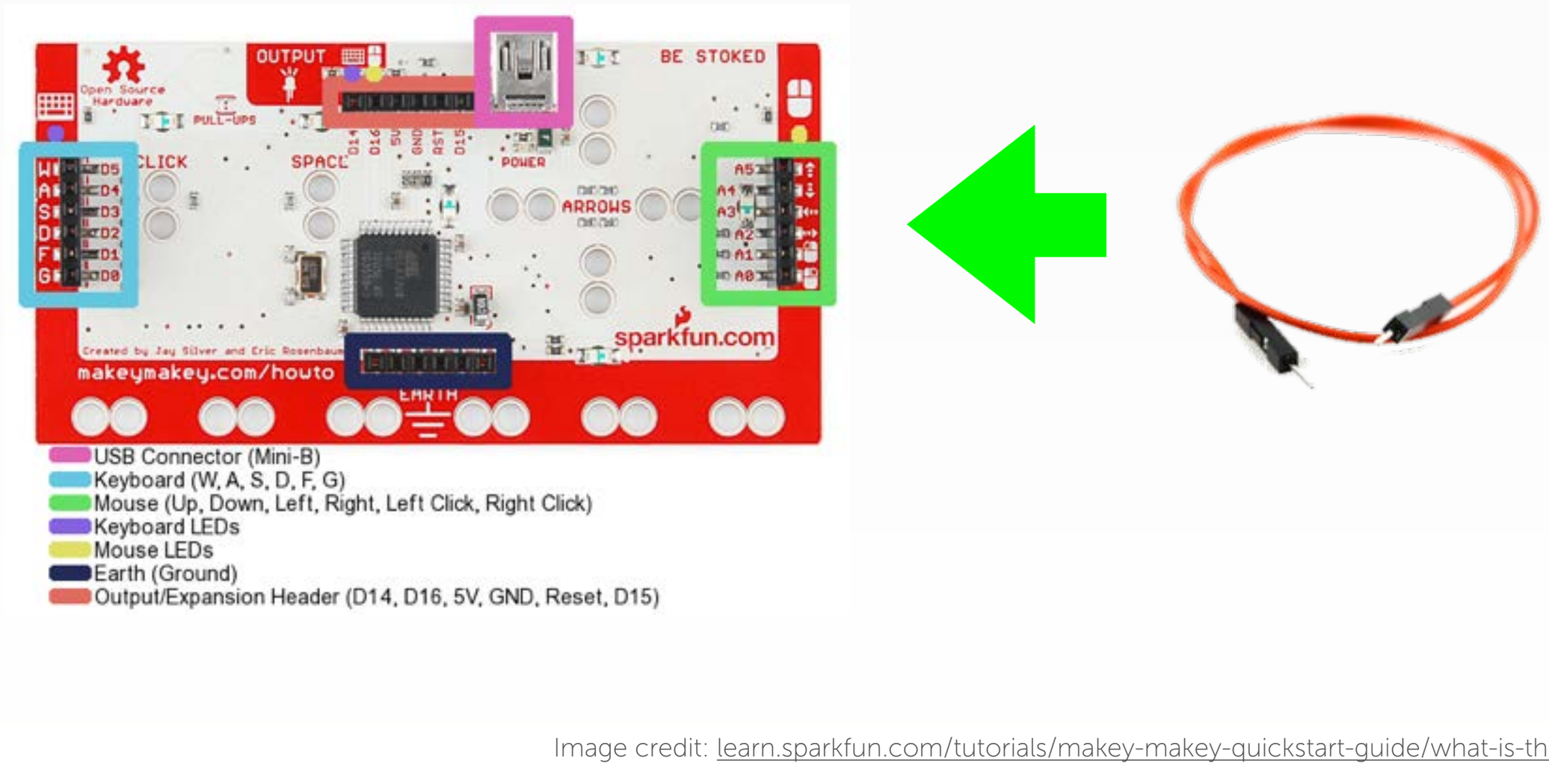


Image credit: learn.sparkfun.com/tutorials/makey-makey-quickstart-guide/what-is-the-makey-makey

EXPLORING FURTHER

"Arduino mode"

You can flash new firmware when you need to:

- update the firmware to the latest (see github.com/sparkfun/MaKeyMaKey)
- ***map a different set of keys*** (edit settings.h file)
  (Note: works on Mac but may not work on Windows.)
- ***add new functionality**** (edit makey_makey.ino Arduino sketch)

To do this:

- Use the Arduino IDE (arduino.cc) to write the firmware
- Follow the "Installing the Arduino Addon" guide
  https://learn.sparkfun.com/tutorials/makey-makey-advanced-guide/installing-the-arduino-addon

* Depending on what you're doing, you might need to cut the trace on the back of the board to disconnect the large pull-up resistors.

RESOURCES

MaKey MaKey "recipes"

Image credit: makeymakey.com

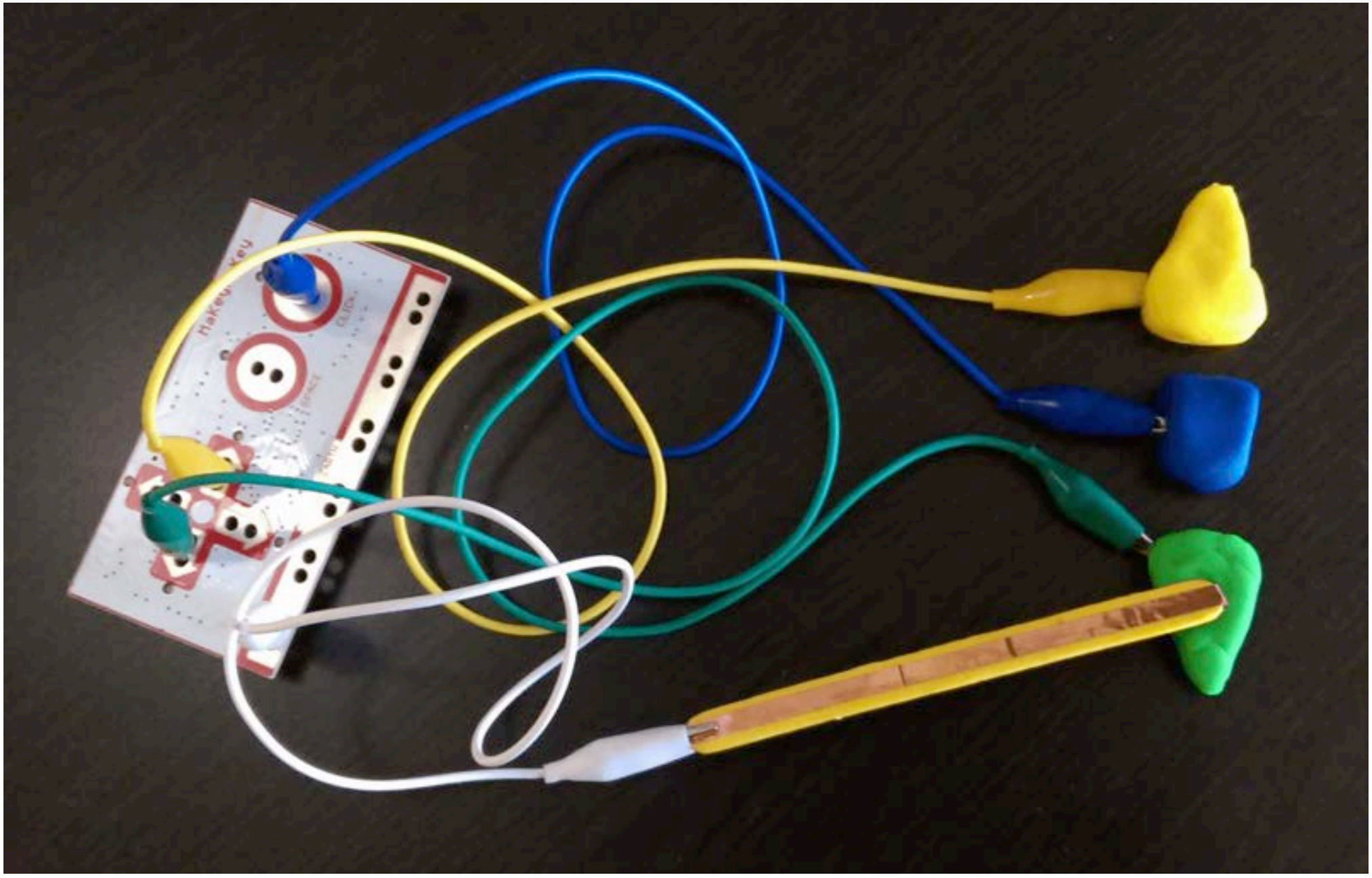
RECIPE

Trigger multiple keys

- Connect the ***1st object to the MK key***
- Connect the ***2nd object to another MK key***
- Connect the ***3rd object to another MK key, etc...***
- Connect ***trigger to EARTH***
- Touch ***trigger to object #1, 2, or 3***

RECIPE

Trigger multiple keys



RECIPE

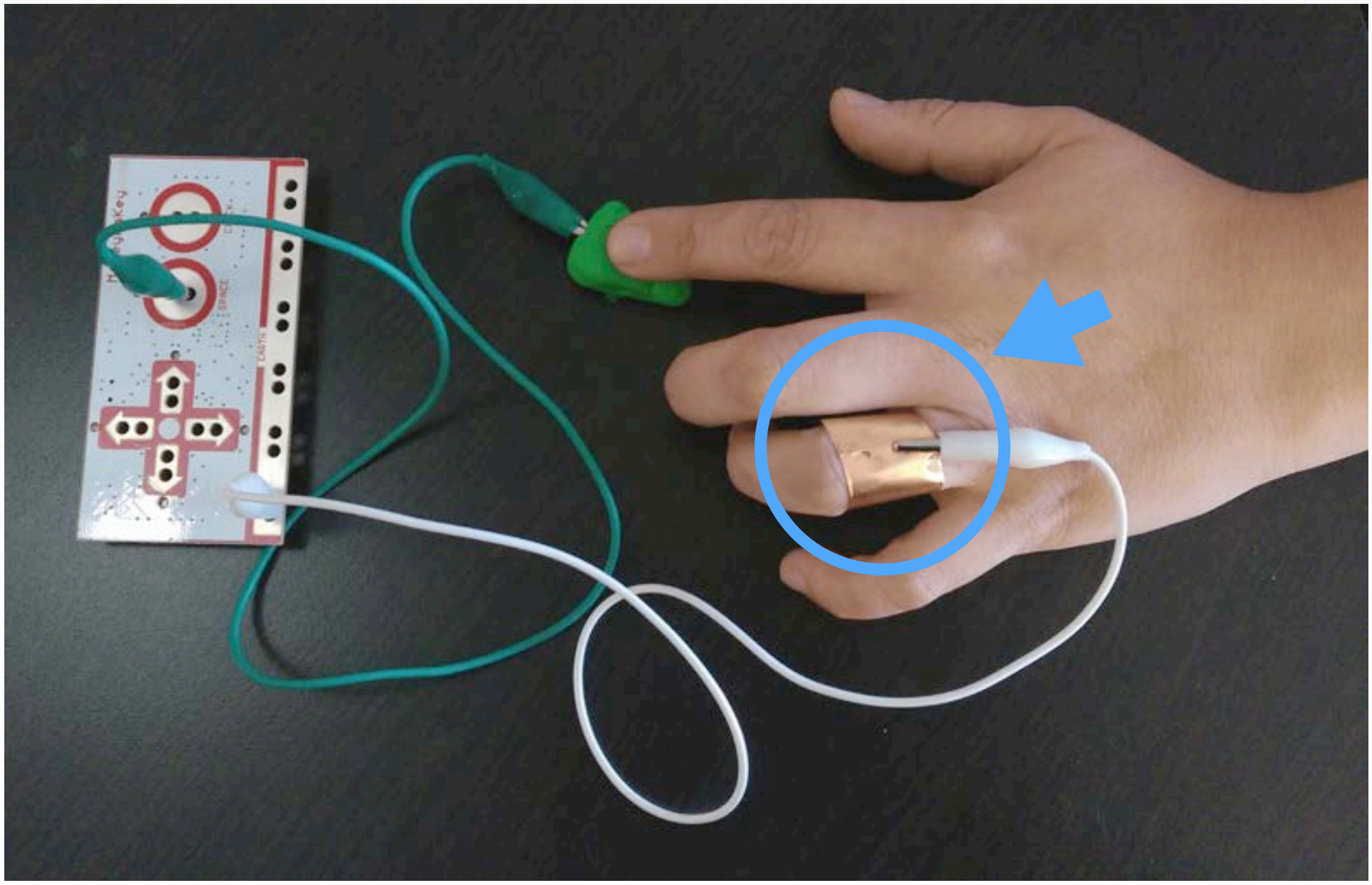
Add a human touch

When you want to use fingers, elbows, or other body parts to trigger a keyboard command:

- Connect the ***object to the MK key***
- Make a ***conductive ring that touches your skin***
- Connect ***bracelet to EARTH***
- You are the trigger! ***Touch the object***

RECIPE

Add a human touch



RECIPE

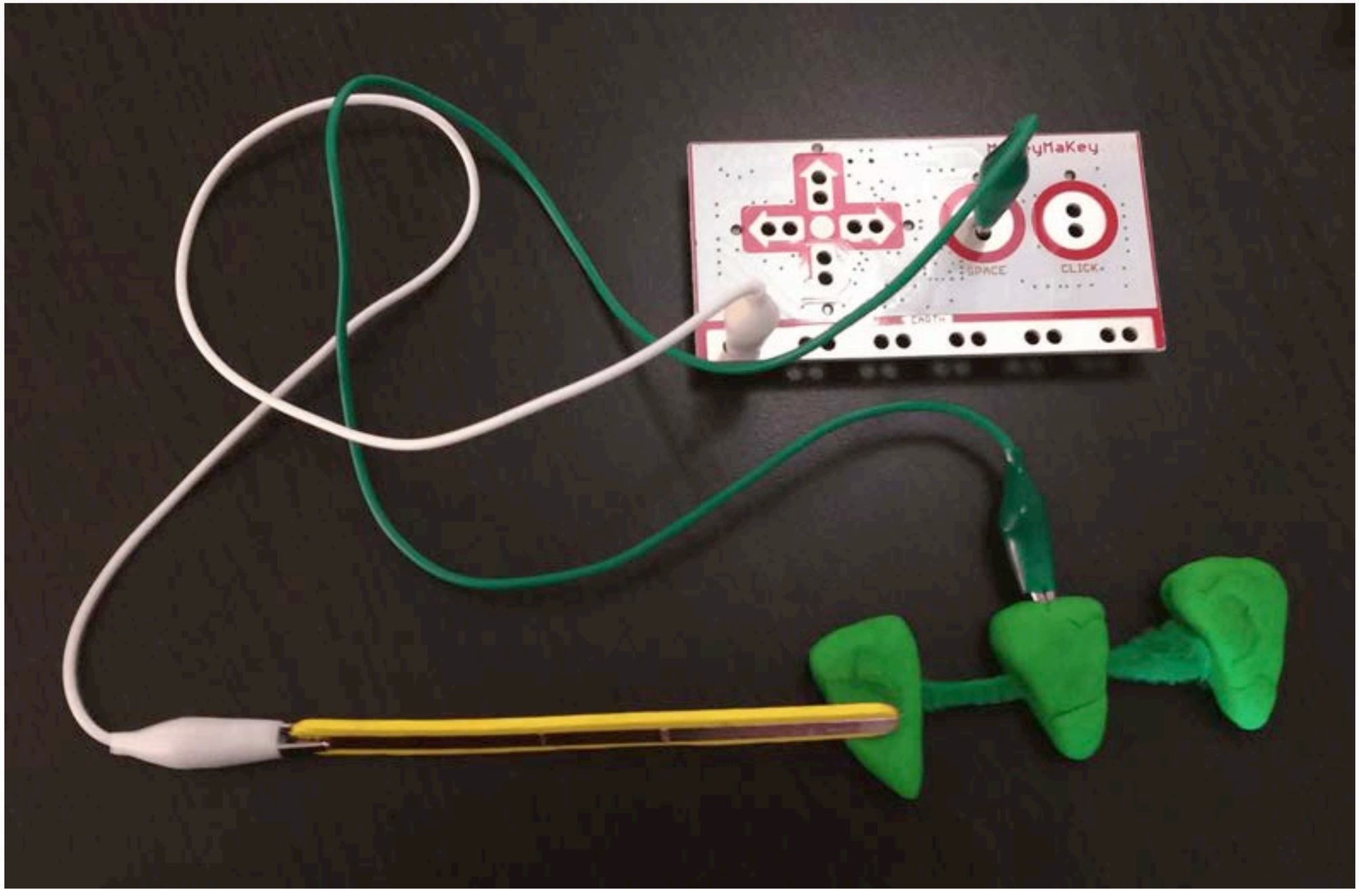
Re-use the same key

In series (aka "daisy chain"):

- Connect the ***1st object to the MK key***
- Daisy chain together any additional objects
- Connect ***trigger object to EARTH***
- Touch ***trigger to any object in daisy chain***

RECIPE

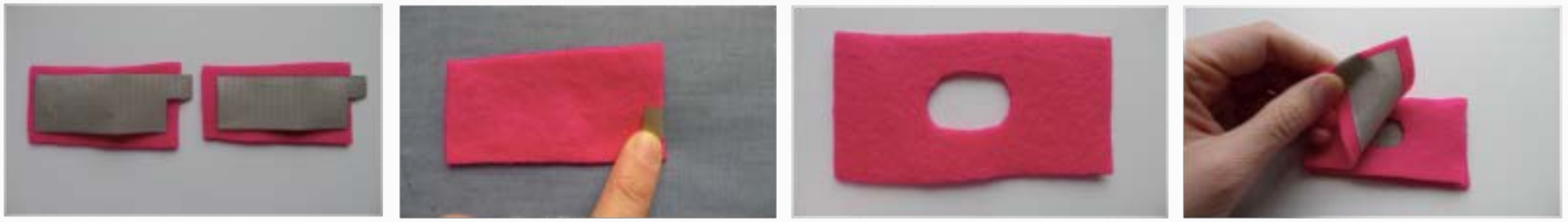
Re-use the same key



RECIPE

DIY switch

Making a soft switch is like making a sandwich:

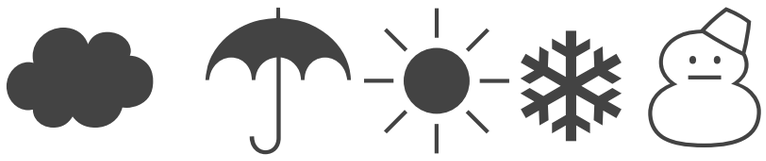


➡ Images from Make: Wearable Electronics

THANKS!

Go Make Something!

Themes:

 or