MaKey MaKey Kit
Librarian Reference Manual

sparkfun ELECTRONICS

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MaKey MaKey Kit: Librarian Reference Manual

The **MaKey MaKey Kit: Librarian Reference Manual** is a guide to using, managing, and troubleshooting the MaKey MaKey in your library. This guide has activities that your patrons or visitors can use with the MaKey MaKey to supplement the activities that are found on the the MaKey MaKey website: http://makeymakey.com/lessons/

Assembly Instructions

Purchase:

- MaKey MaKey Deluxe Kit from Spark Fun (https://www.sparkfun.com/products/11511)
- 1 Sterilite Large Clip Plastic Box Container with lid (14x11x3 ½) – Sold by Target online (www.target.com) in sets of 6 or in stores individually.
- 3 quart size resealable plastic bags
    - Put the alligator clips that came with your MaKey MaKey in one
    - Put the copper tape that came with your MaKey MaKey in one
    - Put the jumper wires that came with your MaKey MaKey in one
    - Place all these bags in the kit
- To restock you will need to purchase copper wire, alligator clips and jumper wires periodically.
- Book rings to assemble card packs. Available from Office Supply Store
- 1-inch binder available from Office Supply Store. Try to get one with pockets on the inside covers.

Download, Print, and Prepare:

- This Guide! "MaKey MaKey Kit: Librarian Reference Manual"
    - Put the first page (with the title) on the front of the binder.
    - Punch holes in the other sheets and place in the binder. If it will get a lot of use you could always skip punching the holes and place them in plastic sheet protectors and add them to the binder that way.

- Labels for the MaKey MaKey kit.
    - Cut out the labels once printed. The larger one that states, "You need a computer to use this kit" should go on the top of the plastic Sterilite container. The others should go on the sides that will be visible to users when the kits are stacked on shelves. Adhere these to the kit with clear packing tape.

- MaKey MaKey User Guide
    - Print one to be placed in the kit and one to include in the "MaKey MaKey Kit: Librarian Reference Guide."
    - Laminate and bind with spiral attachment

- MaKey MaKey cards.
    - Make one set to go in the kit and one to include in the "MaKey MaKey Kit: Librarian Reference Guide."
    - Print, fold in half, and tape. Laminate the cards and using a hole punch create a hole in the upper left corner. Secure the cards with a book ring.

Catalogue

- Add to catalogue as kit
- Take a photo of the kit with the lid off. Attach photo to the kit with a note that says, "Please let your librarian know if any of these items are missing."

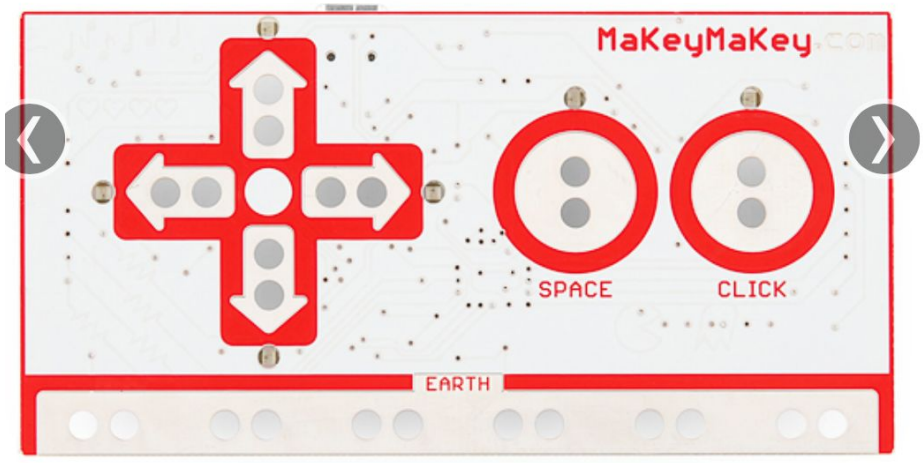
What is the MaKey MaKey?

The MaKey MaKey enables you turn anything to a key to use with your computer. It is an invention kit that tricks your computer into thinking that almost anything is a keyboard. This allows you to hook up all kinds of fun things as an input. You can play a game with a banana as your controller or practice the piano with some carrots!

The MaKey MaKey uses high resistance switching to detect when you've made a connection even through materials that aren't very conductive. It could be leaves, pasta, fruit or people. This technique attracts noise on the input, so a moving window averager is used to lowpass the noise. The on-board ATMega32u4 communicates with your computer using the Human Interface Device (HID) protocol which means that it can act like a keyboard or mouse.

There are six inputs on the front of the board, which can be attached to via alligator clipping. There are another 12 inputs on the back, 6 for keyboard keys, and 6 for mouse motion, which you can access with jumpers via the female headers.

Info taken from: https://www.sparkfun.com/products/11511



Set Up

These steps are included in the MaKey MaKey User Guide that is included in every kit. This is a quick reference guide in the event that a patron has a question or needs additional assistance.

Step 1: Turn on your computer.

Step 2: Take the USB cable and connect it to the USB slot in your computer and the slot on the MaKey MaKey board. The small side of the USB cable plugs into MaKey MaKey and the big side plugs into your computer.

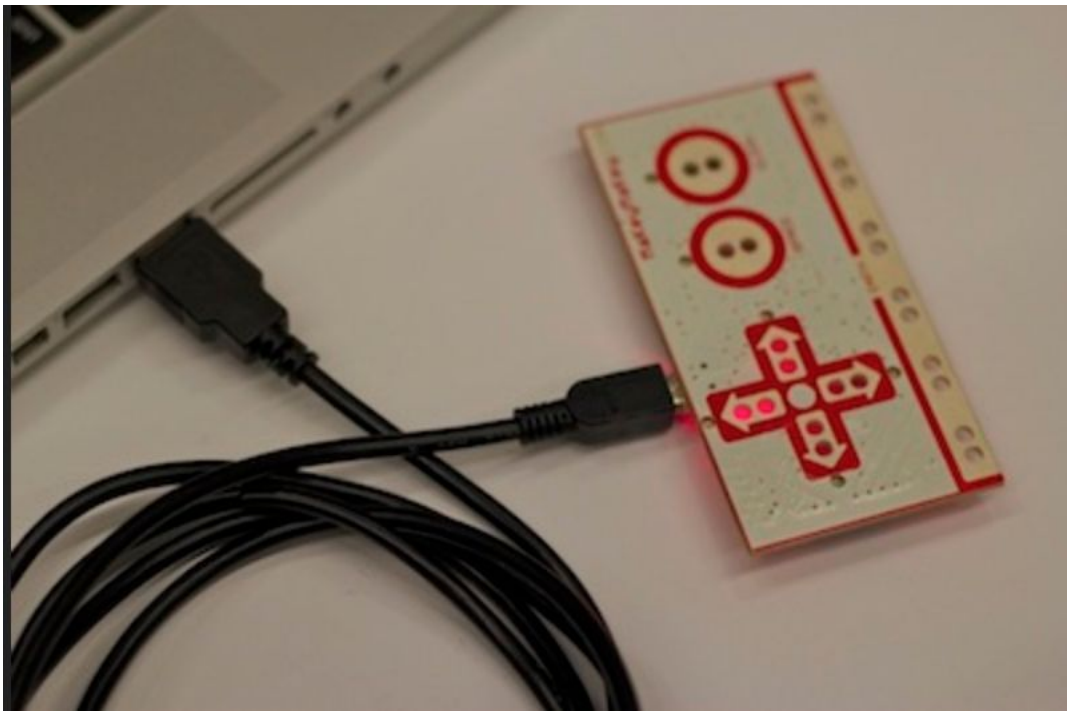


Photo from: http://www.makeymakey.com

Step 3: Install Drivers

- Mac or Linux Instructions

  If you are using a Mac or Linux there are no drivers to install. When you plug your MaKey MaKey in, you will see a pop up screen that says "Keyboard Setup Assistant". There will be a rectangle in the lower right corner that says, "Continue" and you can click on this. That should be followed by a pop up screen that states "Identifying Your Keyboard". Close the pop up by clicking on the small red circle in the upper left corner. These screens will only appear the first time you use your MaKey MaKey.

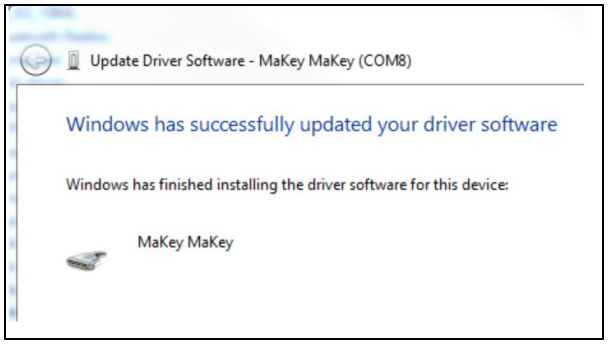
- Windows Instructions

  The first time you plug in your MaKey MaKey Windows will try to find drivers for it. An error message will display stating "Device driver software was not successfully installed". Install drivers so you can use MaKey MaKey to do a range of things, including reprogramming the board once you get comfortable with it.

  Open your **Device Manager** either by going to your **Control Panel**, then **System**, then **Device Manager**. In **Device Manager** scroll down to **Other Devices** there you will find **USB IO Board**. Right click and select **Update Driver Software**

  Windows will now ask you how you want to search for the driver. Select **Browse my computer for driver software.** On the next screen click **Browse** and then navigate to the folder where you stored the driver (most likely in **Downloads**) then click **Next.** Windows will now have a pop up from Windows Security stating "Windows can't verify the publisher of this driver software" but you can click on **Install the driver software anyway.**

  After a couple of minutes you should see this:



Troubleshooting

- If your MaKey MaKey is not responding try to unplug the USB cable from both your computer and the MaKey MaKey and then plug it back in.
- Make sure the cable is securely attached to the MaKey MaKey.
- Restart your computer.
- Make sure your MaKey MaKey is plugged into the computer.
- The MaKey MaKey should have a red light on the back showing that the power is on. Is it lit? If not something is wrong with the computer, the USB cable, or the circuit board.
- If the USB connector on your computer is blue, it's USB 3.0, and may not work with MaKey MaKey. Try using a USB 2.0 port.
- Try making a connection in the simplest way you can. One way is to connect an alligator clip to "earth" and then touch other end to "space."
- When you make a connection, you should see an LED light up on the front of the MaKey MaKey
- When you are making a connection using everyday materials they need to be at least a little bit conductive. For example, PlayDoh, a banana, your skin, or aluminum foil should work, but plastic, most fabrics or paper will not work directly. You can always combine materials, for example by wetting the paper or putting PlayDoh onto the plastic.
- If you are having trouble installing drivers please do not hesitate to contact the technical support team at SparkFun (techsupport@sparkfun.com)

One of the keys won't stop pressing over and over! What should I do?

- Try unplugging the MaKey MaKey from your computer, then plug it back in again
- Disconnect all of you alligator clips from the MaKey MaKey, then start reattaching them one by one
- If your stuck key is still pressing, have a look at your connections. They might be touching accidentally somehow. Try taking things apart and putting them back together again.

- Perhaps one of the things that you are using as an insulator (or non-conductor) isn't insulating enough. Try using a different material.
- If one of the objects connected to the MaKey MaKey is your own body, then perhaps you are "grounded" to the earth via touching your computer's metal case, or by not wearing shoes. Take a step back and see what you are touching.
- Perhaps one of the objects connected to the MaKey MaKey that you think is well insulated is not. For example, if you connect a banana to your MaKey MaKey and it's sitting on a wooden cutting board, is that cutting board moist or dry? If it's moist then perhaps all of your bananas on the cutting board are connected to each other through the cutting board. Try a dry table instead.
- Is it raining? Is it extremely humid? Are you in a rainforest? This can sometimes cause porous materials, such as paper or clothing, to become conductive.

It works sometimes, but not other times.

- Your materials might not be conductive enough. For example, if you are making a connection with your fingertip, it can help to moisten your skin by licking it.
- If you are using a drawn graphite line from a pencil, make sure the line is heavy and dark. Draw your line on a hard smooth surface, such as a table without any grain in it. Take care in folding the paper, because it can sometimes break the graphite connection. Once you are expert at drawing the lines, you don't have to follow any rules, but if you can't get it to work try the tips mentioned.

MaKey MaKey Hotsheets (Activities)

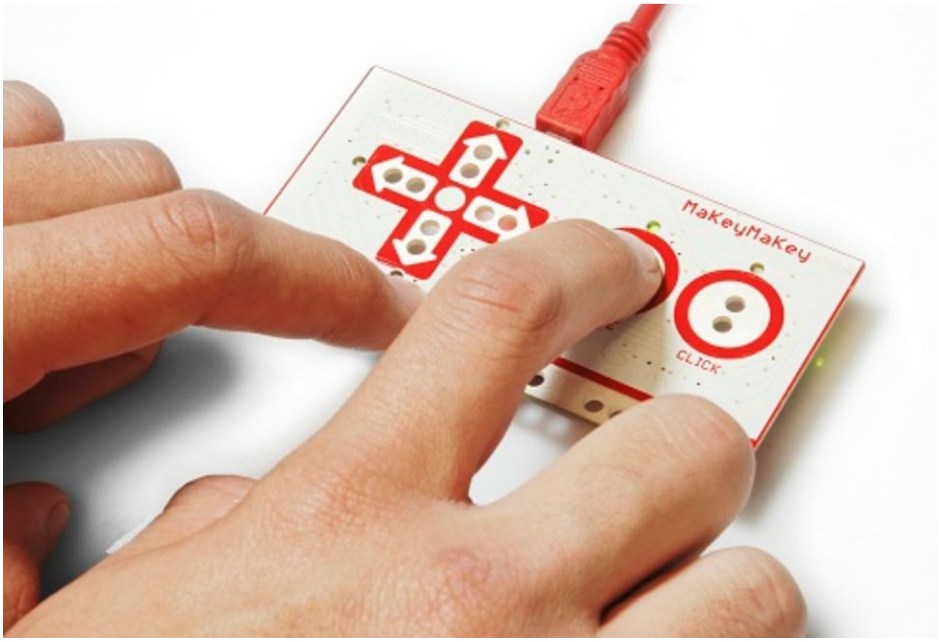
Activity 1: What is Conductive?

- Before getting started with your MaKey MaKey it is helpful to know what is and isn't a conductor. You can use any material that is conductive with your MaKey MaKey to create your own controllers and buttons for your computer.
- Conductive:
    - A material is a conductor if it allows electricity (even just a tiny bit of it) to flow. Anything metal will almost certainly conduct electricity. The "standard" conductors are copper, silver, gold, etc. But with the MaKey MaKey our conductor scope grows. Most organic materials - things like human skin, liquids, foods, and frog legs - are at least a little conductive. And that's really all the MaKey MaKey needs.
- NOT Conductive:
    - If an object isn't conductive, it's an insulator. Common insulators include plastic, glass, ceramic and wood. You can usually tell just by looking at something whether it's an insulator or conductor. Watch out for objects like this, as they just won't work with the MaKey MaKey. To get around that, though, you can line them with a conductive material (like copper tape, or just regular old wire), to create the illusion that they're conducting electricity.

NOTE: When you use your fingers with the MaKey MaKey there is no more energy flowing through you than if you held a AA battery between your fingers. You have probably held batteries many times before and never realized energy was flowing through you.

Activity 2: Get Going

- Open a Word document or email and type - but instead of using your keyboard, let's use the MaKey-MaKey.
- Touch the EARTH bar and SPACE circle on the MaKey MaKey. Can you see that your computer thinks you are touching the Space Bar?
- A small light above the SPACE circle should light up, and your computer will think you are pushing the space bar.
- What happens when you touch one of the other "buttons"? Try the up, down, right or left arrows. What happens when you touch the circle labelled "click?"
- Take your finger off of the EARTH bar. Now touch the SPACE circle. Nothing happens? This is because you must complete a circuit between the signal wire (SPACE circle) and EARTH.



Activity 3: Alligator Clips

- Take an Alligator Clip, you should have a plastic bag filled with them in your kit. Attach one alligator clip to a pair of holes on the Earth section on your MaKey MaKey. Now hold the metal portion of the other end of the alligator clip in your fingers. You are now "grounded". While you are still grounded, or holding on to the metal portion of the alligator clip, touch the round spot on the MaKey MaKey. What happened this time? Did your computer thing you were pressing the space bar? Just for fun, open Windows (or another word processing software) and type some words adding spaces using the MaKey MaKey to get a feel for how it works.

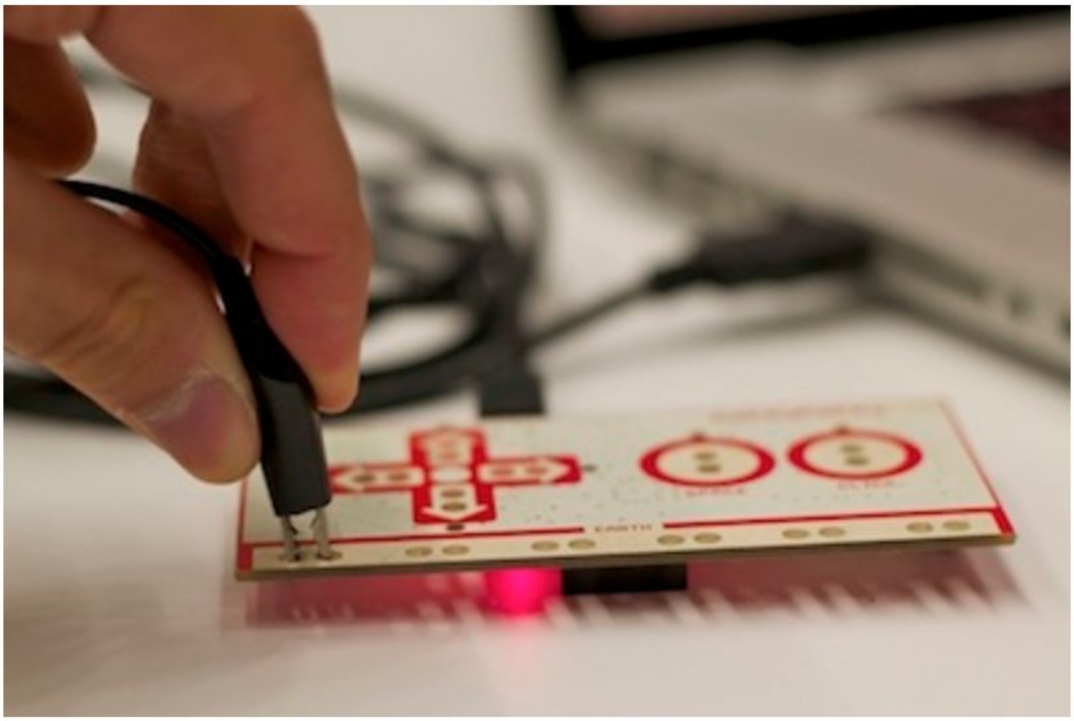


Photo from: http://makeymakey.com

Activity 4: Bracelet

- Now you are going to really get going so you should create something that will make playing with the MaKey MaKey much easier. Rather than holding on to the alligator clip all the time let's make a bracelet to keep you "grounded".
- Take something that will conduct electricity like aluminum foil, the copper tape in your kit or even a pipe cleaner. Make a bracelet and then attach the alligator clip to the EARTH section and the other end to your bracelet. Now try to use the space bar on your MaKey MaKey. Remember, the bracelet has to be touching your skin.
- You could also take a ball of PlayDoh® and smush the ball of PlayDoh® on your wrist, attach the alligator clip to the PlayDoh® as a way to ground yourself.

Activity 5: Try it with a Friend!

- Try holding hands with a friend, or they can even just touch your arm. Make sure you have some connection to the EARTH space on the MaKey MaKey.
- What happens if they touch the SPACE bar? What about if they take their hand off your arm and touch the SPACE bar? Does it work? What about if they touch the EARTH spot on the MaKey MaKey and then the SPACE bar

Activity 6: Go Bananas

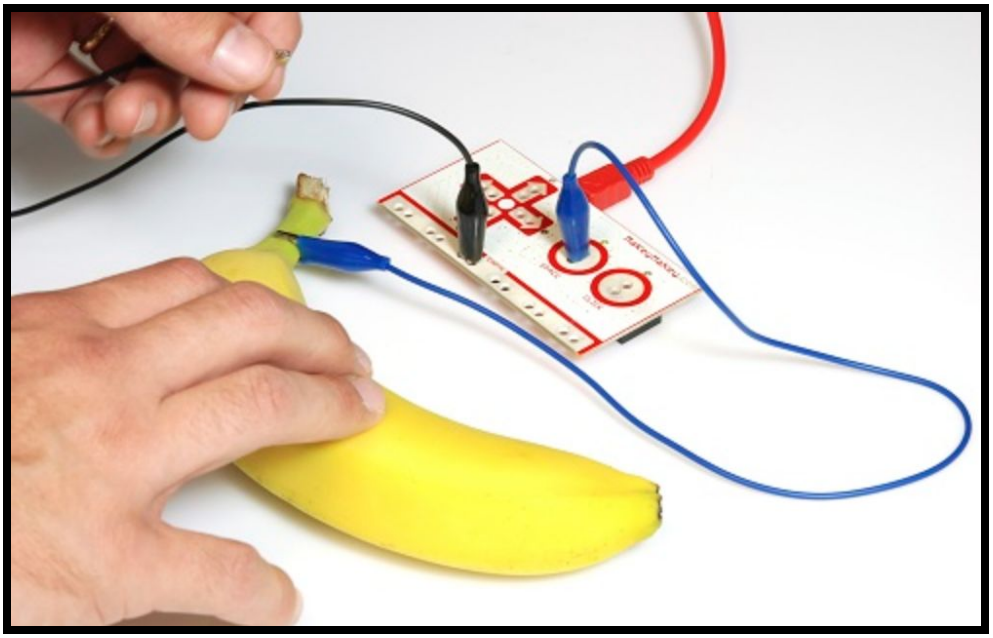


Photo from http://www.sparkfun.com

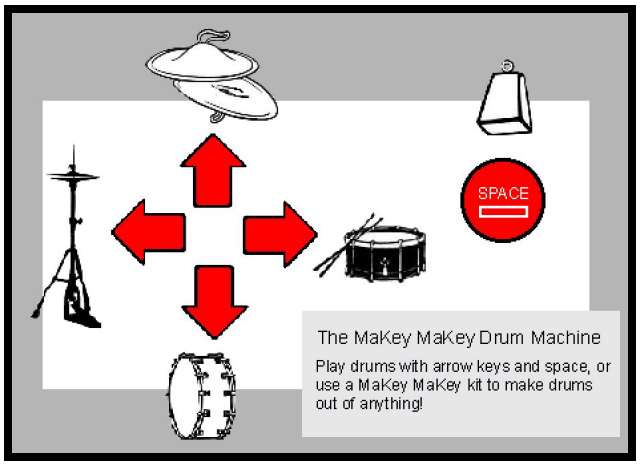
- Find a banana, or something else that conducts electricity. Some items that work well are fruit, some plants (as long as they are not too dry), metal (coppertape, tinfoil, coins), PlayDoh®, Pencil graphite. Things that do not conduct electricity are plastic, sugar, Lego®, cardboard (but you could cover cardboard with tinfoil to make it sturdier, then it would work), wood, paper (unless you color on it with graphite pencil), veneer and glass.
- Take an alligator clip from your kit and attach one end to the SPACE spot on the MaKey MaKey and the other to the banana. Make sure you have a nice connection.
- Now try to type something and use the banana as your space key. Fun! It will make writing essays much more appealing.

Activity 7: Make some Noise: Drum

- Open up your favorite internet web browser, and type this address:

  http://bit.ly/19SWH1Q

- Click on the green flag to get started. Now you can use your MaKey MaKey to play the drums. Did you notice that the space bar will play the cowbell? While you are grounded, touch the different arrow spots and SPACE on the MaKey MaKey.



- To have more fun connect the arrow keys and SPACE to something that will conduct electricity using the alligator clips.

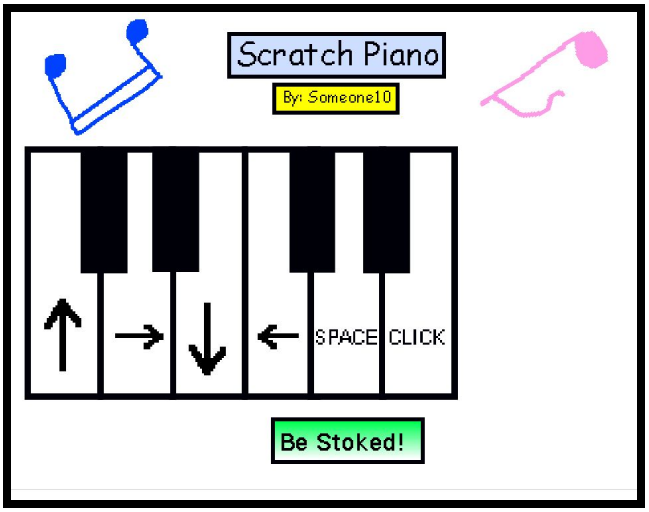
  - Items that conduct electricity:
    - Fruit
    - Some plants (as long as they are not too dry)
    - Metal (copper tape, tinfoil, coins)
    - PlayDoh®
    - Pencil graphite
    - Crayola's Model Magic®

  - Items that do NOT conduct electricity:
    - Plastic
    - Sugar
    - Lego®
    - Cardboard (but you could cover cardboard with tinfoil to make it sturdier, then it would work)
    - Wood
    - Paper (unless you color on it with graphite pencil, make sure the lines are nice and thick)

Activity 8: Make some Noise: Piano

- Open up an Internet web browser and type in this address:

  http://bit.ly/ldggrkM



- Click on the green flag to get started. Did you notice that the space bar and click play the last two keys on the right? While you are grounded, touch the different arrow spots and SPACE on the MaKey MaKey.

- To have more fun connect the arrow keys and SPACE to something that will conduct electricity using the alligator clips.

  - Items that conduct electricity:
    - Fruit
    - some plants (as long as they are not too dry)
    - metal (coppertape, tinfoil, coins)
    - PlayDoh®
    - Pencil graphite
    - Crayola's Model Magic®

  - Items that do NOT conduct electricity:
    - Plastic
    - Sugar
    - Lego®
    - cardboard (but you could cover cardboard with tinfoil to make it sturdier, then it would work)
    - wood
    - paper (unless you color on it with graphite pencil, make sure the lines are nice and thick)
    - Veneer
    - Glass

Activity 9: One-Button Games

- Now you can make your own fun controllers for games you like to play. Set up your MaKey Makey by using something, like a ball of PlayDoh®, or something else that conducts electricity, by connecting it to the SPACE spot on the MaKey Makey using an alligator clip. Put one end of the alligator clip through the two holes on the SPACE spot on the MaKey MaKey and the other end firmly into the PlayDoh ball.
    - Items that conduct electricity:
        - Fruit
        - some plants (as long as they are not too dry)
        - metal (coppertape, tinfoil, coins)
        - PlayDoh®
        - Pencil graphite
        - Crayola's Model Magic®
    - Items that do NOT conduct electricity:
        - Plastic
        - Sugar
        - Lego®
        - cardboard (but you could cover cardboard with tinfoil to make it sturdier, then it would work)
        - wood
        - paper (unless you color on it with graphite pencil, make sure the lines are nice and thick)
        - veneer
        - glass
- Go on to this website using your Internet browser and try out the controller that YOU invented. http://www.potoandcabenga.com
- Visit this site - http://bit.ly/16z3zwv - for a variety of some of the best one button games. You may need to switch your alligator clip from the SPACE spot on the MaKey MaKey to another controller depending on the game.
- Remember that you always need to be "grounded" (like you practiced on the first few cards) to use the MaKey MaKey.

Activity 10: Squishy Stuff: PlayDoh® Game Controller

Photo from: http://makeymakey.com

- Make your own fun controllers for games you like to play. Set up your MaKey MaKey by using PlayDoh® (or something else that conducts electricity) by connecting it to a spot on the MaKey MaKey using the alligator clips. Put the alligator clip into both holes on one spot of the MaKey MaKey (like the up arrow key) and the other end into the PlayDoh®. Make sure you have a piece of PlayDoh® for each of the four arrows on your MaKey MaKey and the SPACE spot. You will need to use five alligator clips.
    - Items that conduct electricity:
        - Fruit
        - Some plants (as long as they are not too dry)
        - metal (coppertape, tinfoil, coins)
        - PlayDoh®
        - Pencil graphite
        - Crayola's Model Magic®
    - Items that do NOT conduct electricity:
        - Plastic
        - Sugar
        - Lego®
        - Cardboard (but you could cover cardboard with tinfoil to make it sturdier, then it would work)
        - wood
        - paper (unless you color on it with graphite pencil, make sure the lines are nice and thick)
        - veneer
        - glass

- Go to the website: http://bit.ly/159XVaA and then play the game using the controller you made with PlayDoh® (or some other items of your choice).
- Remember you always need to be "grounded" to play the game.

Activity 11: Use your Pencil

- Use a graphite pencil to draw a game controller on a piece of paper that uses the four arrows as the controllers. You can see the picture below as a reference guide.
- Tip: Make sure the line is heavy and dark. Draw your line on a hard smooth surface, such as a table without any grain in it. Make sure to not fold the paper, sometimes it can break the graphite connection.
- Connect an alligator clip to each of the arrow key spots on the MaKey MaKey. You will use four alligator clips to do this. Attach each one to one of the spots you drew on the paper.
- Go to the following website: http://bit.ly/1dfm7e6
- Now you can play games with a controller you drew on paper.

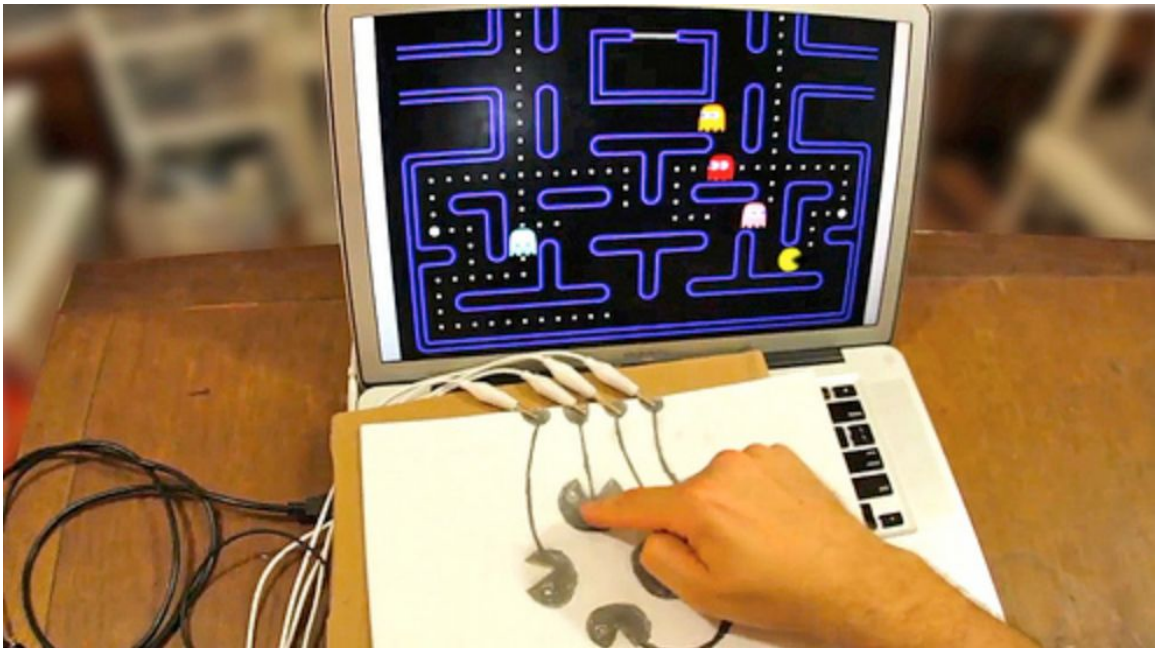


Photo from: http://www.makeymakey.com

Activity 12: What else can you do???

- Come up with some creations of your own. Think about things you like to do and how you could make it more fun. The more original the better!

- Go to the MaKey MaKey forum (http://www.makeymakey.com/forums/) to see what others have made and to post your super cool projects.

- Check out the other SparkFun kits, activities and workshops your library has available.

- Visit www.sparkfun.com to learn more on your own and see what others are doing.