

Makey Makey

Tinkering with Circuits and Makey Makey

Guide for teachers to set up circuit stations with Makey Makey and paper circuits.



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Tinkering With Circuits and Makey Makey- a Teacher's Guide



by MakeyMakey

This is a guide for teachers to set up circuit stations with Makey Makey and paper circuits. Each station takes between 8-10 minutes to complete! The goal is for this whole activity to take about 45 minutes. Feel free to pick and choose stations. This is a great way to start a unit on circuits, but it is an even better way to end a unit on circuits. Tinkering and playing with circuits allows students to synthesize their learning!

<https://youtu.be/vleosEM5Hm8>

Step 1: Station One: Create a Paper Circuit

Use the attached template to create a simple circuit.

Supplies for this station per student:

- [Simple Circuit Template](#)
- Copper Tape
- 3V Battery
- LED

Student instructions:

1. Place the copper tape on the template.
2. Bend the legs of your LED and place the longer leg (the positive leg) on the positive copper tape trace. Place the shorter leg on the negative tape trace.
3. Use regular tape or copper tape to hold the legs to the traces. Make sure that the positive trace and the negative trace never touch.
4. Place the battery positive side down on the template and fold the paper as indicated so the electrons can flow in a loop!

Troubleshooting tips:

- Double check that the long leg is on the positive trace and the negative leg (short leg) is on the negative trace.
- Make sure the battery is connecting to the positive side and the negative side.
- Make sure when the paper is folded that the positive trace and negative trace do not touch.

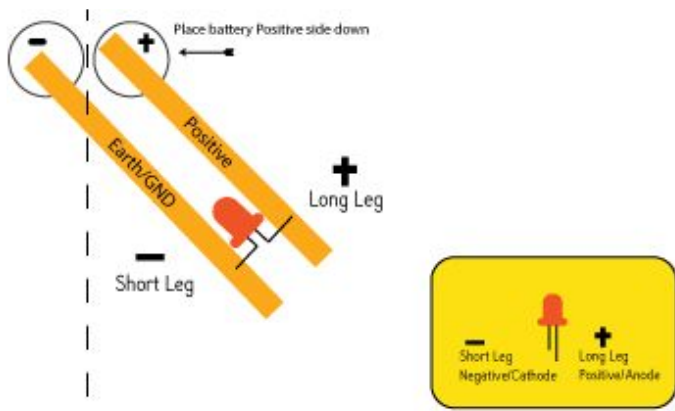
(Optional: [Parallel Circuit](#), same directions, but see how many LEDS you can power!)

Educator Tip:

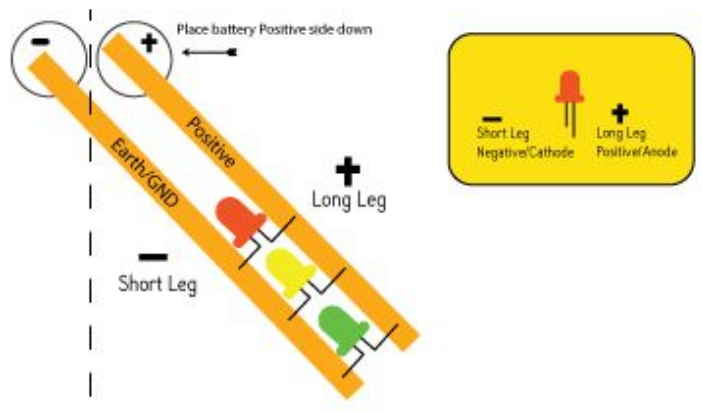
Electricity flows in a loop! Before attempting the paper circuit, challenge your students to get the LED lit up with just the battery. It helps them understand that the LED will only light up if the long leg is placed on the positive side and the negative leg is placed on the negative side of the battery. This also tests the battery and LED before making the paper circuit and eases in any shorted frustrations!

After successfully lighting with just the battery, explain that the copper tape can extend the legs of the LED. and show students how to make the LED light up with copper tape using the instructions for the template above.

We want to give a nod to the High-Low Tech group and [Chibitronics](#) as inspiration for our templates!



Make a Simple Circuit with a 2032 battery



Make a Parallel Circuit with a 2032 battery



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Step 2: Station Two: Is It Conductive?

Supplies for this station:

- A piece of cardboard with two pieces of conductive tape (Attach to EARTH and Space on Makey Makey)
- A ruler (It helps when testing materials, so you don't accidentally complete the circuit with your touch!)
- Conductive and non conductive items for testing
- Print or Create a chart in your Science journal
- Makey Makey
- Laptop with "Is it conductive" Scratch game by Jpalles open and loaded

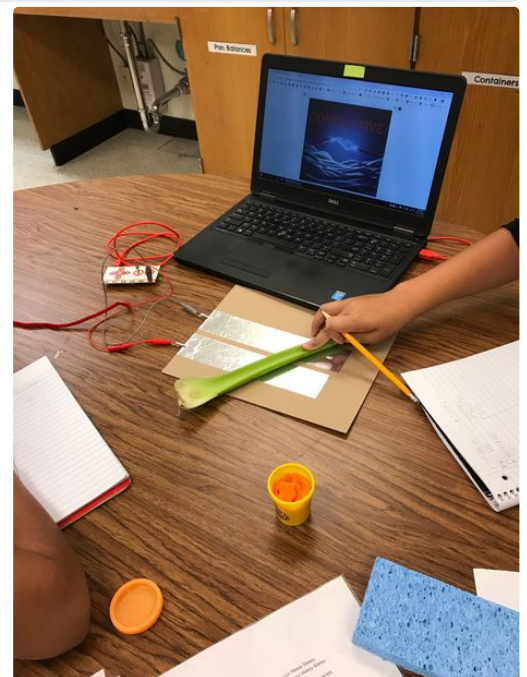
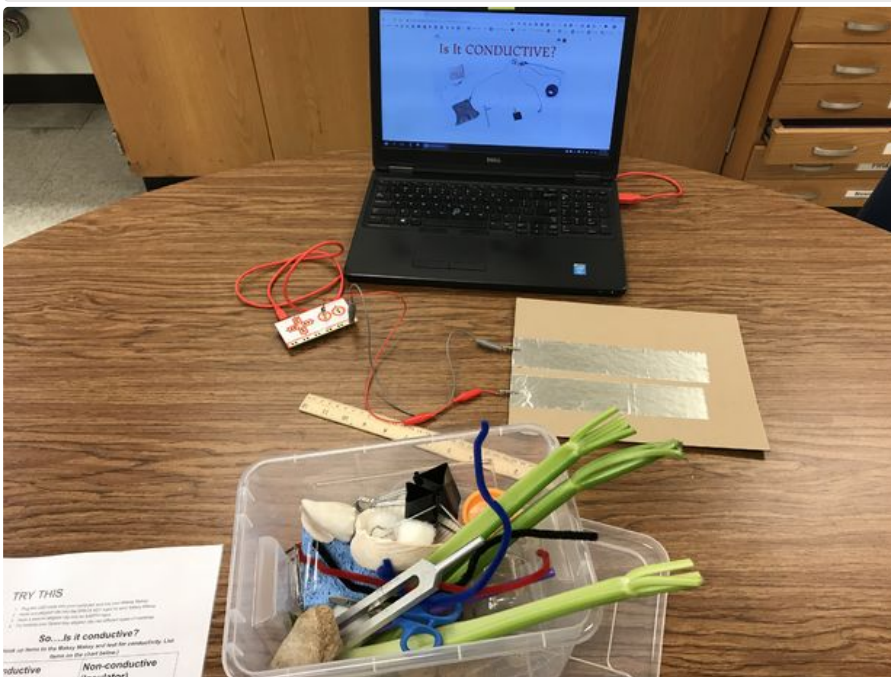
Student instructions:

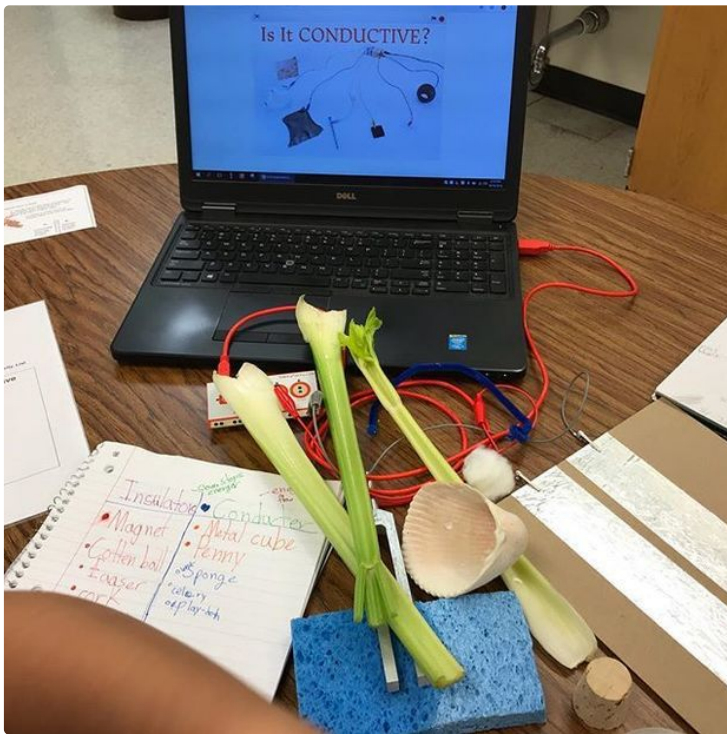
Test an item by laying it across the conductive tape traces. If it is conductive, the game will tell you! Sometimes, it helps to use a plastic ruler to press down on the item so you don't accidentally set off the conductive radar with your hands! Label the item in your t-chart as you test them!

Educator Set up:

1. *Plug the USB cable into your computer and into your Makey Makey.*
2. *Hook one alligator clip into the SPACE KEY input on your Makey Makey and the other end to one piece of conductive tape.*
3. *Hook a second alligator clip into an EARTH input and the other end to the other piece of conductive tape. (Make sure these two tape traces do not touch!)*
4. *Leave a bucket of conductive and non conductive items.*
5. *Show students how to lay items across the tape tracks to see if they are conductive.*

<https://youtu.be/3-gS2ZRVk8>





<https://www.instructabl...>

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Step 3: Station Three: Make a Paper Switch

Supplies for this station per student:

- Foil sheets
- Gluestick
- Construction paper
- 2 Makey Makeys
- Placemats printed out for students (1-2 for the table)
- Two laptops open to Scratch.

Student instructions:

Follow the pictures to make your own switch. Connect it to Scratch and make sounds with your new push button switch.

Take your switch to the next station!

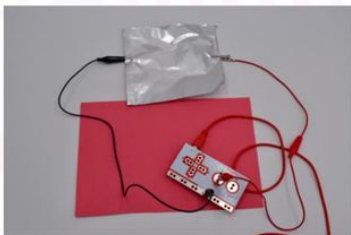
Educator Tip:

A teacher should probably head this station if your students have never used Scratch. While students are creating their paper switches, Open some sounds in Scratch and attach to "When Key pressed" blocks. Ask your students to attach their switch to EARTH and to one of the key presses you've programmed.

If your students have used Scratch before (or if time allows) let them play with triggering different sounds with their freshly made switches. If you want to get students thinking even more about homemade switches, check out this [great video](#) from The Tinkering Studio!

Step One:

Hook Makey Makey to a piece of foil as pictured. This completes a circuit.



From "Tinkering with Circuits" Labz Guide at makeymakey.com

Step Two

Tear the foil to break the circuit. The circuit is now broken and incomplete.



From "Tinkering with Circuits" Labz Guide at makeymakey.com

Step Three:

Turn your experiment into a switch! Attach the foil to paper. This is the same science behind lightswitch at home!



Off



On

From "Tinkering with Circuits" Labz Guide at makeymakey.com

Step 4: Make Office Supply Switches

Supplies for this station per student:

- Cardboard square for switch base
- 2 X brass fasteners
- Paperclip
- 2 X binder clips

Students can share Makey Makey in partners with the Bongo app or each student could use one.

Student instructions:

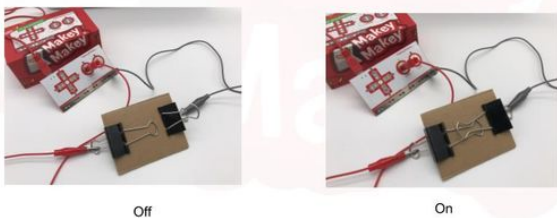
Follow the images to create your own office supply momentary switch and maintained switch, then attach to Makey Makey to see how the differences in a momentary and a maintained switch.

Educator Tip:

We love making DIY switches. We've seen a ton of great idea over the years. If you want to tinker with more great ideas for making cheap switches out of everyday stuff, be sure to check out Michael Carroll's Scrappy Circuits! He has even more creative switches you can make with leftover cardboard!

Office Supply Switch:

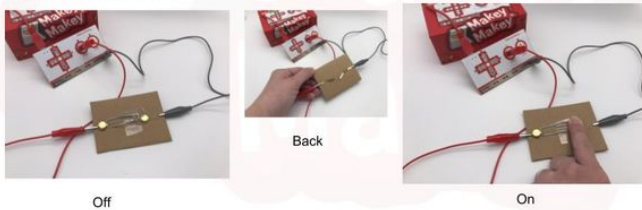
Turn everyday office supplies into a switch! This is the same science behind a light switch! You can turn things off and on with this maintained switch. (Great Idea from Scrappy Circuits)



From "Tinkering with Circuits" Labz Guide at makeymakey.com

Office Supply Switch:

Turn everyday office supplies into a momentary switch! This is the same science behind computer keys and your game controller buttons!



From "Tinkering with Circuits" Labz Guide at makeymakey.com

Step 5: Station Four: Control an LED With Makey Makey!

Supplies for this station:

- Makey Makey
- Copper Tape
- Makey Makey Simple Circuit [Template](#)

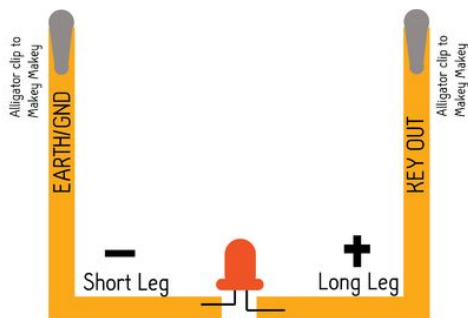
Student instructions:

Use the switch you made in station three with a simple circuit. You can power the simple circuit from station one, or you can use the [attached template](#).

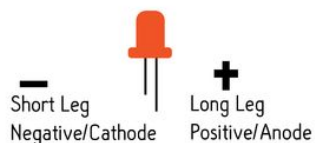
Follow the [video](#) instructions to hook Makey Makey to your circuit.

Educator Tip:

Students can use the simple circuit template from station one as well, we just found that this specific Makey Makey template helps to clear up any confusion.



Make a Simple Circuit



<https://youtu.be/vleosEM5Hm8>



<https://www.instructabl...>

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Step 6: Station Five: Collaborative LED Parallel Circuit Art

This station is inspired by the [Lighthouse Creativity Lab](#) in Oakland. They did a similar activity with their students.

Supplies for this station:

- Ahead of time, make four posters on foam core each with a battery, a positive trace and a negative trace.
- Various colored construction paper to make LED art
- Scissors
- Gluesticks
- LEDs
- Thumbtacks

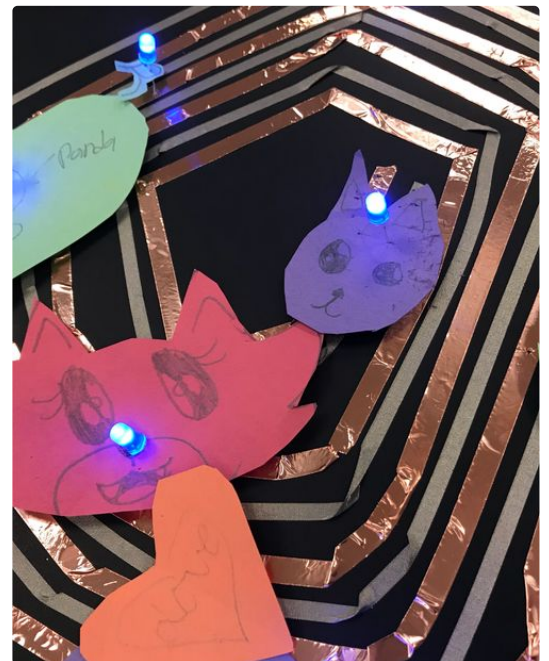
Student instructions:

Use the construction paper to make your own art and use an LED to add your work to this collaborative circuit. A thumbtack can be used to poke holes in the foam core, and then you can place your LED into the circuit! Check polarity and make sure your LED shines before heading to the next station.

After all the art work is done, you can take off the battery pack and power this whole circuit with Makey Makey. (The same way you did with the Makey Makey Circuit templates from station four!)

Educator Tip:

To make the posters, use foam core and two different colors of conductive tape. This will help your students visually understand one tape trace is negative and one tape trace is positive.





My students loved testing for conductivity and trying out the paper circuits. I thought it was a great introduction before we begin Colleen's Doll-E 1.0 project next week!



I love the progression from paper to Makey Makey and how you have scaffolded the learning stations. Thanks for sharing this awesome project!!!

Happy you like it! Let us know how it goes with your students. We've tried this in multiple classrooms and it is super fun!