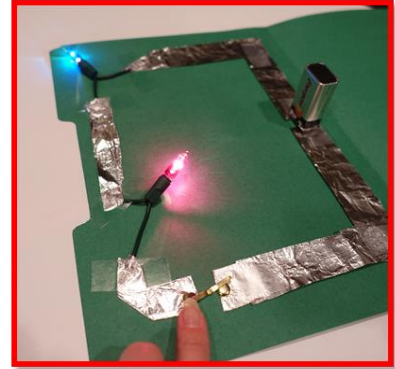
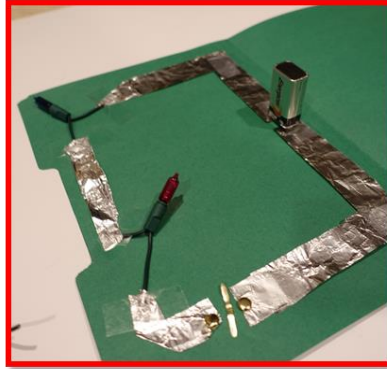
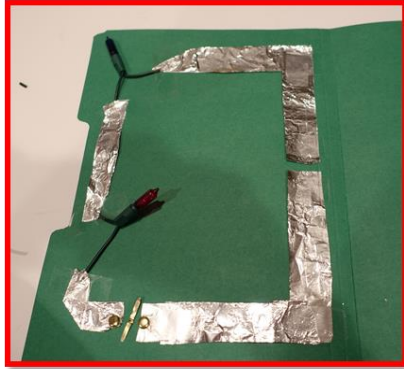


# Holiday Lights Circuitry

## Introduction:

*What will the learner be doing? What will they get to make, see, or experiment with?*

Students will be introduced to basic circuitry concepts.

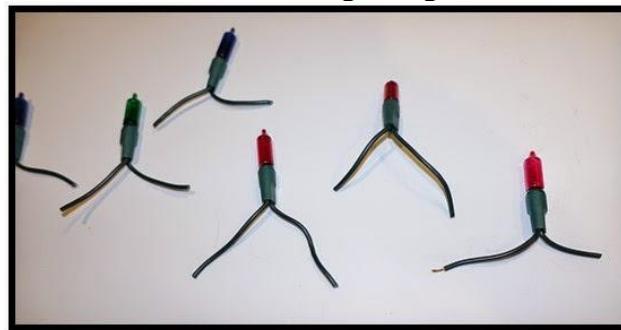


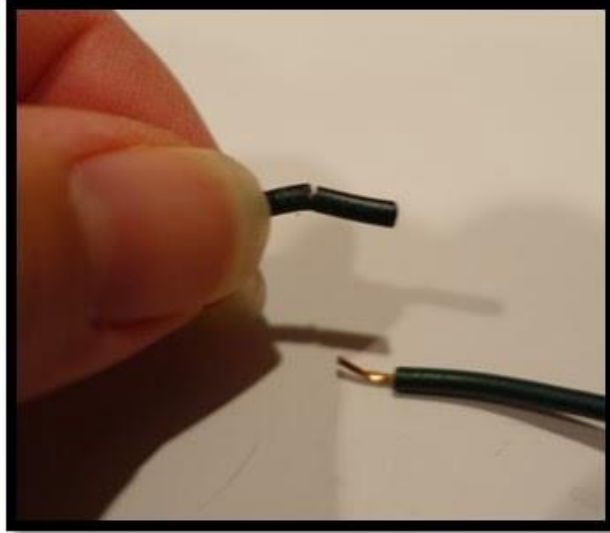
## Materials:

- File folder/cardstock/cardboard – something to build your circuit on
- Aluminum foil
- Tape
- Christmas lights that are cut apart, with the ends stripped to expose the wire
- 9v battery
- Scissors

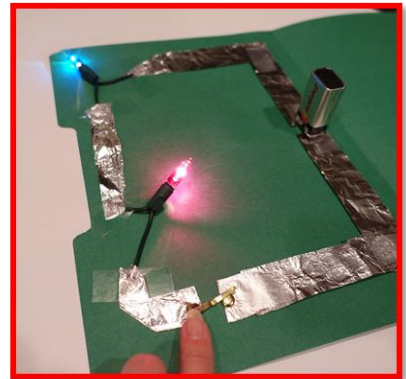
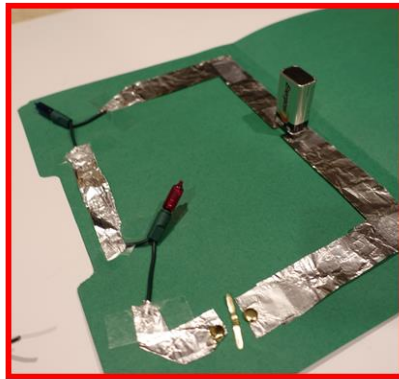
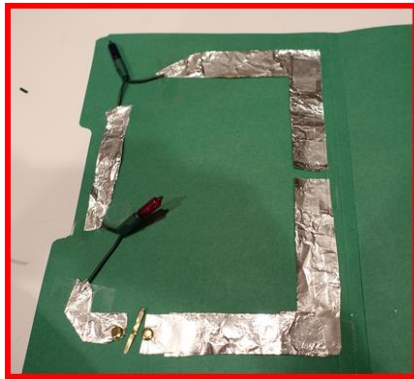
## Activity Procedure:

To prepare the lights, you will need to cut the string apart and score the bottom of each light with scissors - just enough to remove the plastic coating. At first this will be time consuming, but you will be able to reuse the lights again in the future.

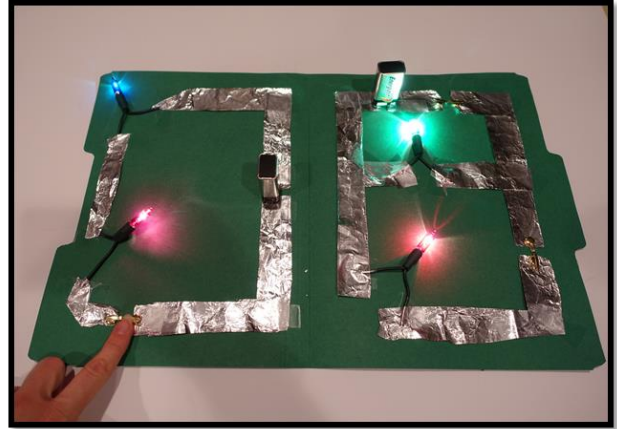




Next, you will want to cut the aluminum foil into strips to serve as the students "wires." You will use three brass fasteners to create a "switch" and of course the 9-volt battery will be the power source. A very simple series circuit is shown below. Notice the space left in the aluminum foil for both the switches and the battery:



Depending on the grade level of the students, you can have them build a very simple circuit or a very complex circuit with both series and parallel circuits combined.



## Background

### What is an Electric Circuit?

You flip a switch and a light goes on. Do you know why the light goes on? To understand, you need to know a little about electric circuits.



*A circuit is what allows you to turn on the lights in your bedroom.*

A circuit is a path for electricity to move through. It's sort of like a big loop. As electricity moves, or flows, the electricity might light a bulb, turn a fan, or make your toaster get hot. Let's take a look at the parts of a circuit to better understand how this works.

# Parts of a Circuit

All circuits have some basic parts, called components. One component is the **power source**, also called a voltage source. The power source is what pushes the electricity through the circuit.

Next, circuits need **connectors**. Connectors connect all the parts of the circuit and create the path or loop that the electricity travels through. Connectors are often made of wire or other metal.

A third component is the **load**. This is the thing being powered by the electricity in a circuit. It could be a light bulb, a TV, a fan, or any of the many electronic gadgets we use every day.

Finally, most circuits will have a switch that turns the power on and off.

## Terms to Consider:

- Circuit, electricity, electric current, switch, closed circuit, open circuit

## Enrichment Ideas:

- Create another circuit with more lights
- Try to create a cool pattern with your foil

## Troubleshooting your circuit:

- Check that foil is touching foil everywhere that different pieces have been connected. Tape will stop the current from flowing if it between pieces of foil. This is usually the problem.
- Check that the lightbulb isn't blown out. They will also easily blow out when dropped, or used for a few seconds with the battery.
- Check that the wires on the lightbulb are taped down tightly, as well. These are the most common issues when it doesn't work.

## Resources:

<https://nittygrittyscience.blogspot.com/2014/12/stem-activity-holiday-light-circuits.html>

<https://eschooltoday.com/science/electricity/what-is-an-electrical-circuit.html>