

Materials:

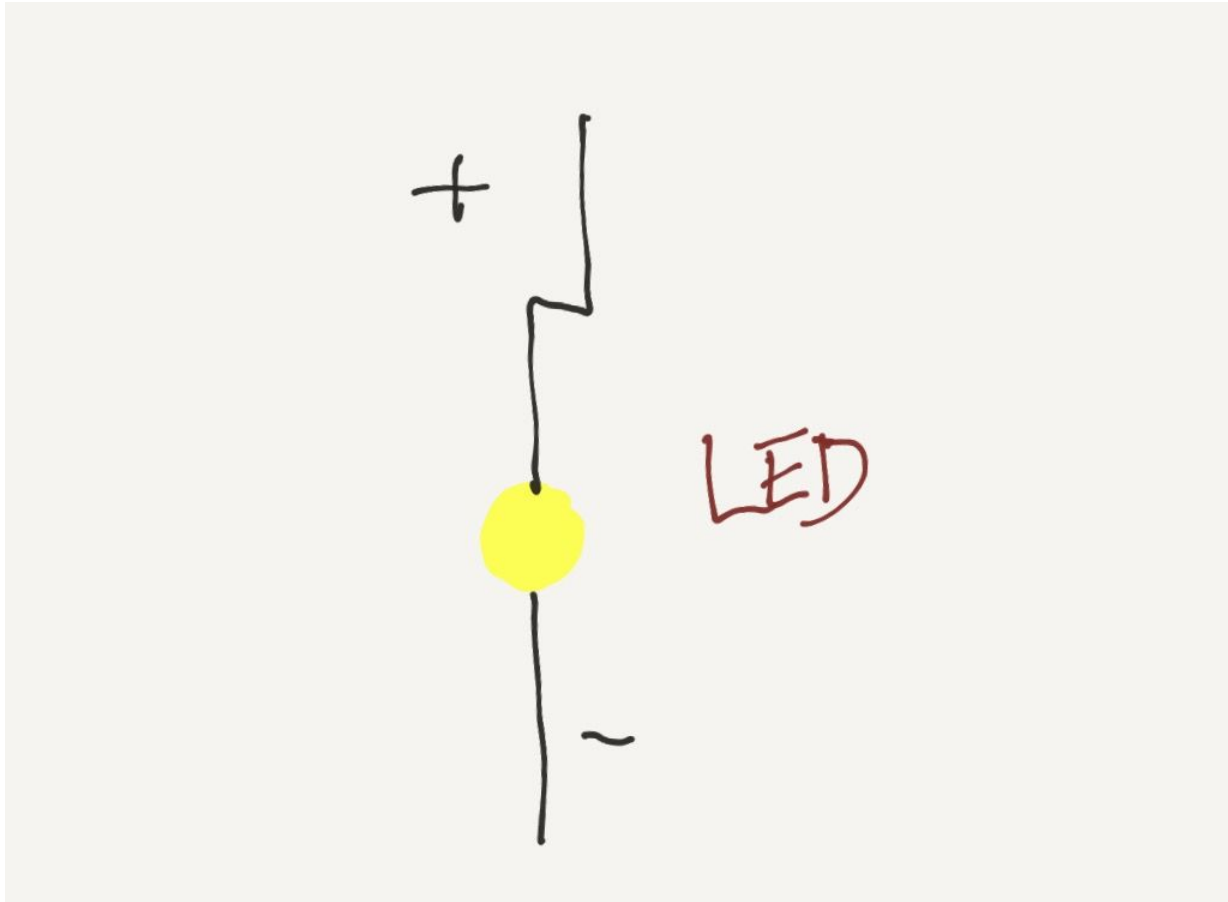
- 3mm LEDs (<https://www.sparkfun.com/categories/171>) (We're using 3)
- Conductive tape (<https://www.sparkfun.com/products/10561>)
- Coin cell battery (CR 2032) (<https://www.sparkfun.com/products/338>)
- (QTY 27)
- Lily pad slide switch board
(https://www.sparkfun.com/products/9350?_ga=1.137068726.702159231.1402446529)
- Electrical tape
- Scissors
- Long-nosed pliers are helpful
- Template

Parameters:

- A circuit is a loop from the negative end of a current source (like a battery) around to the positive end of the current source
- There are two types of circuits: parallel and series.
- In a parallel circuit, there are two or more paths for the electricity to flow. If the loads in this circuit were light bulbs and one blew out, there is still current flowing to the others because there is still an uninterrupted path between the terminals of the battery.
- A series circuit is a closed circuit in which the current follows one path.
(Remember the old strings of lights where when one bulb blew out all the others stopped working? Those bulbs were wired in series.)
- We're wiring our loads (LED bulbs) in parallel.
- The trace (=path of current) can never touch itself. That will cause a short.
- The LEDs have a positive leg and a negative leg. The positive leg is longer.

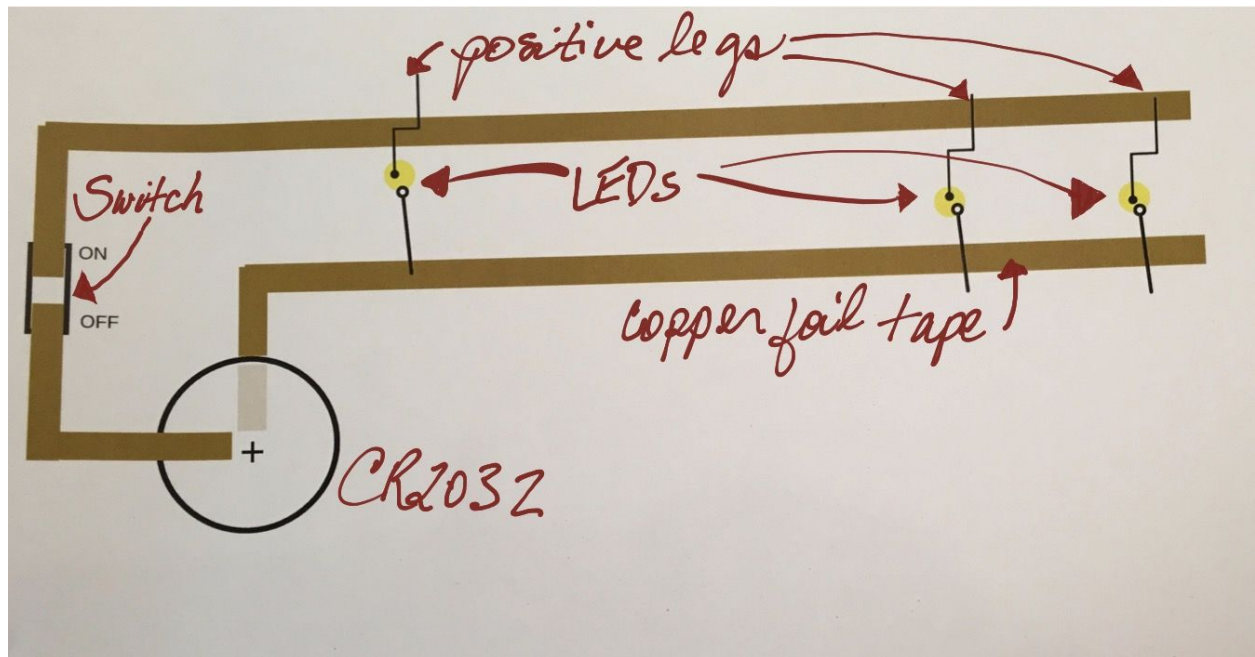
Instructions:

1. Start by ensuring you have all your materials and tools, and that they're laid out so you can find them (in cooking this is called *mise en place*, or "everything in its place.")
2. Bend the longer leg of the LED out at a 90° angle, then into a zig-zag, using your fingers or the needle-nose pliers. Bend the shorter leg out at a 90° angle (but leave it straight).

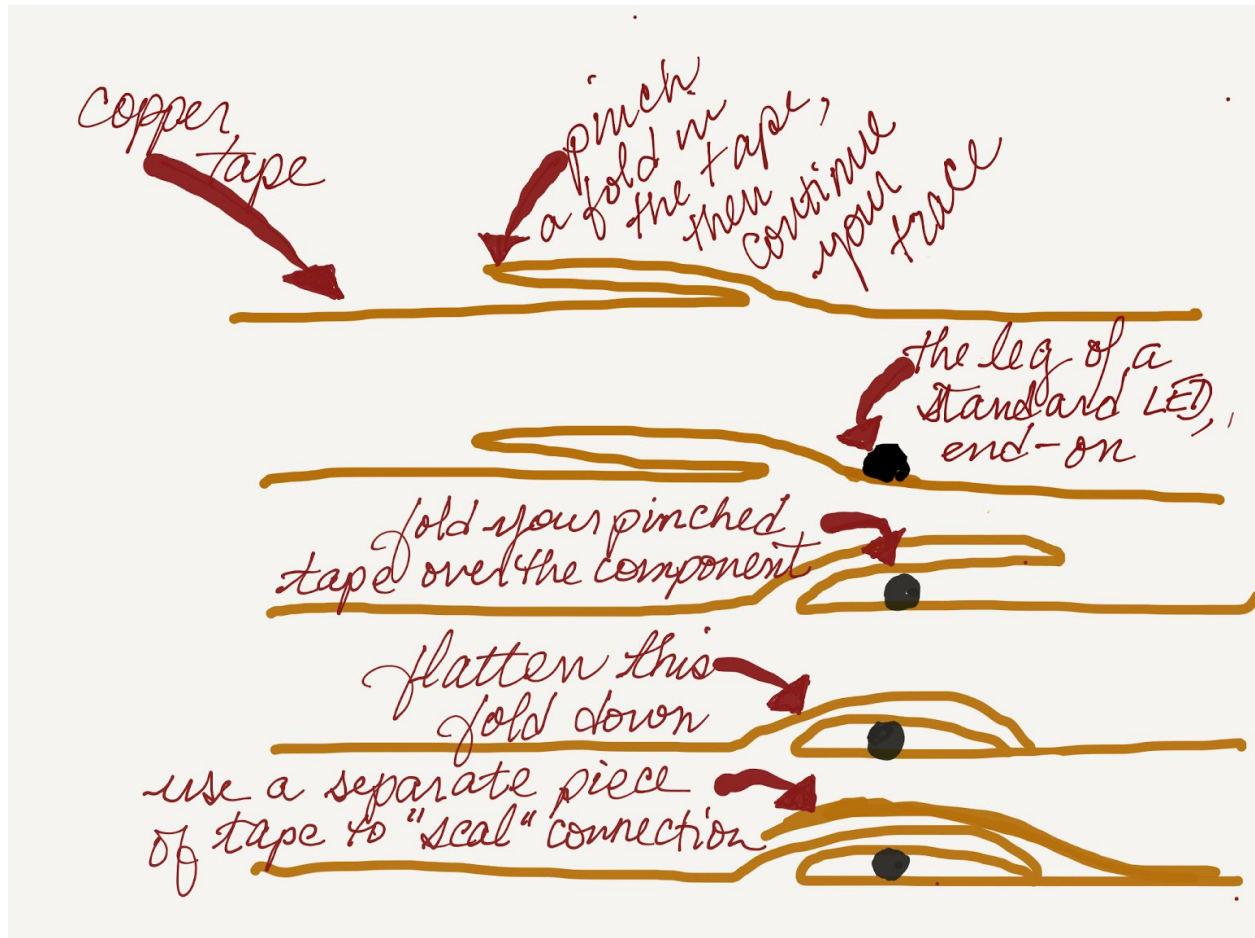


Example Pictured Above

3. Use three separate pieces of copper tape to attach the LEDs, Battery, and Switch as shown below. Add electrical tape over top the battery and switch.



4. Here is the best way that I have seen to make the connection between a component and your "trace" -- steps are shown from top to bottom and this is viewing the copper tape from the side.



Adding components using copper tape (a fancy illustration)

5. Test!

Questions for further investigation:

- Does it matter which way the legs of the LEDs are pointing?
- Does it matter which direction the switch is pointing? How can you test that?
- Does it matter whether the switch is between the battery and the positive ends of the LED or between the battery and the negative ends of the LED

- Can you think of a better way to ensure a connection between the leg of the LED and the copper trace? (Seriously, can you?)
- How could you switch on one bulb and off the other two (it might mean changing the wiring layout and/or using additional materials)?