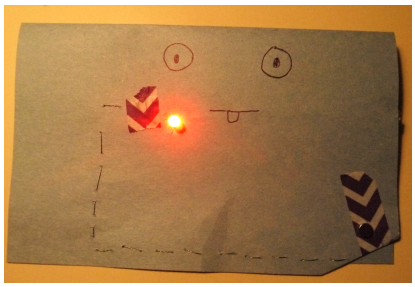
Assignment 1: Light up Cards

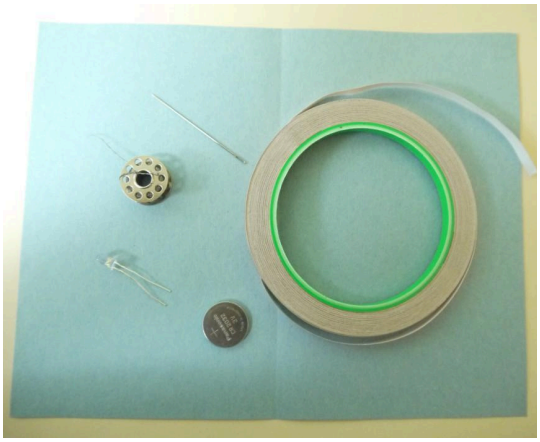
Practice with LEDs, conductive thread and circuit basics



Goals

- Make light up cards by completing a circuit

Materials list	Notes
LED	1 LED in any color
Copper Tape	1 foot
Needle	
Conductive thread	1 foot
3V coin battery	
Regular tape	
A sheet of cardstock	



Reminder

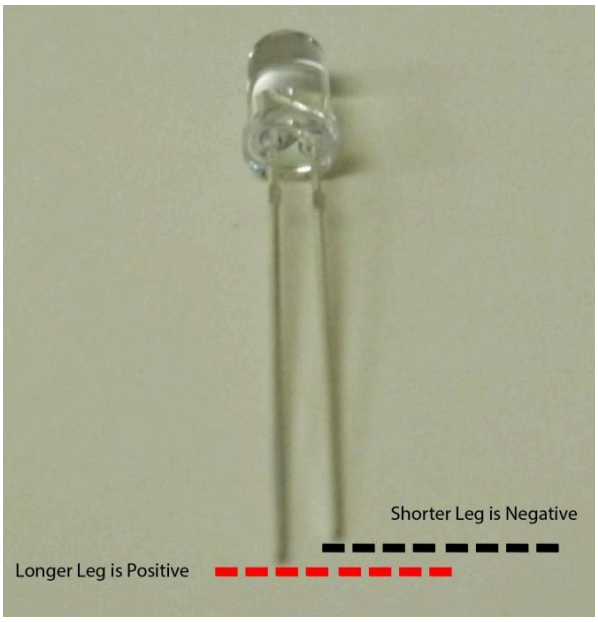
<u>Caution:</u> It's pretty hard to break a breadboard or LED, but… you could easily drain your battery!

DO NOT CONNECT YOUR POSITIVE AND NEGATIVE SIDES!

Doing so (with wires or the breadboard conductors) will cause all the charge to travel from the positive to negative sides. And you'll be left with a dead battery ☹

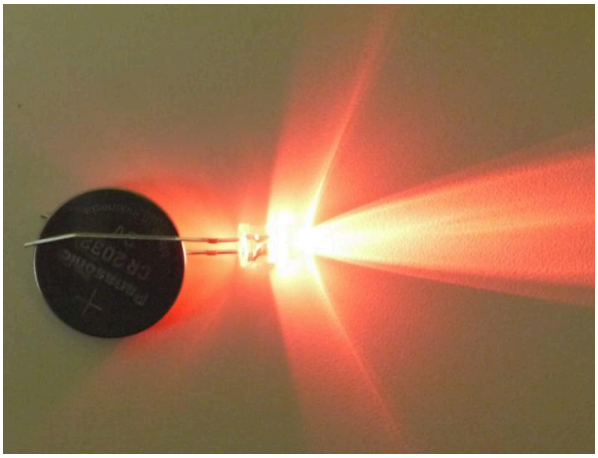
Part 1: Reminder: Background

An LED or light emitting diode, lights up when electricity passes through it. However, current can only pass through an LED in one direction. Thus it is important the right lead be connected to the positive or negative side of a battery.



To tell which lead of a LED is positive or negative we look at the length of each lead.

The positive lead will be slightly longer than the negative LED. Lets test this with a 3v battery.



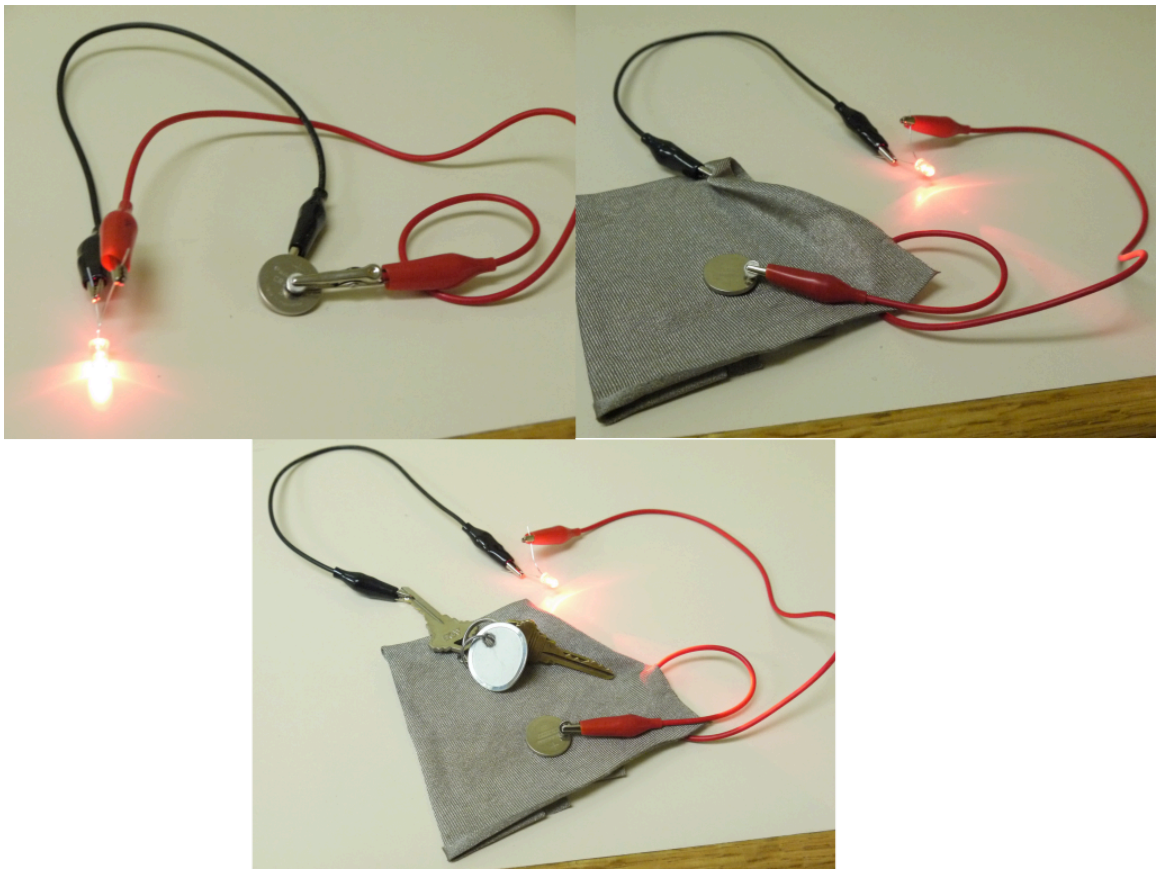
Place the battery between the LED legs so that the positive lead touches the the battery side marked with a +.

You have just created a circuit. A circuit allows a path for electricity to flow.

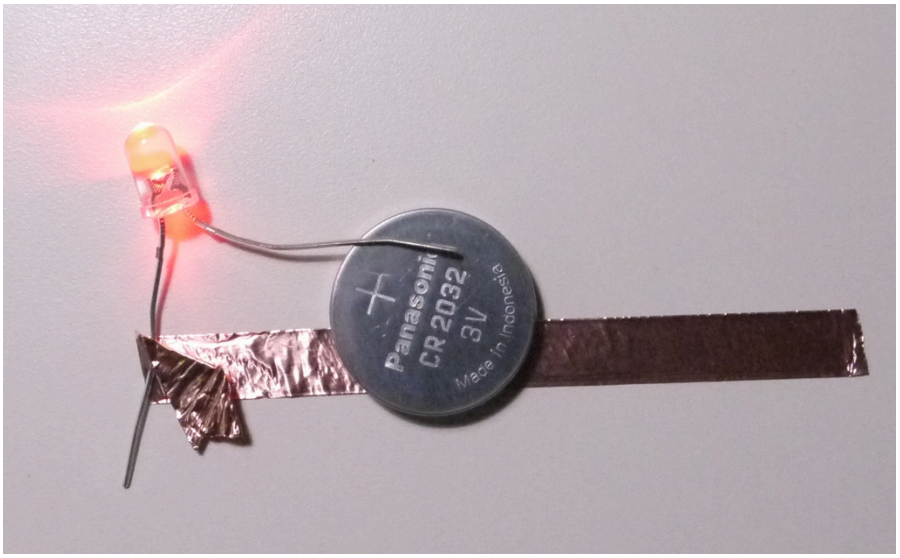
electricity can only flow between power and ground.

If a circuit is open, electricity won't flow and the LED won't light.

There are many ways to complete the same circuit. We can add other conductive objects like alligator clips, magnets or other household items to achieve this circuit.



We will practice creating these circuits with other conductive material like copper tape and conductive thread



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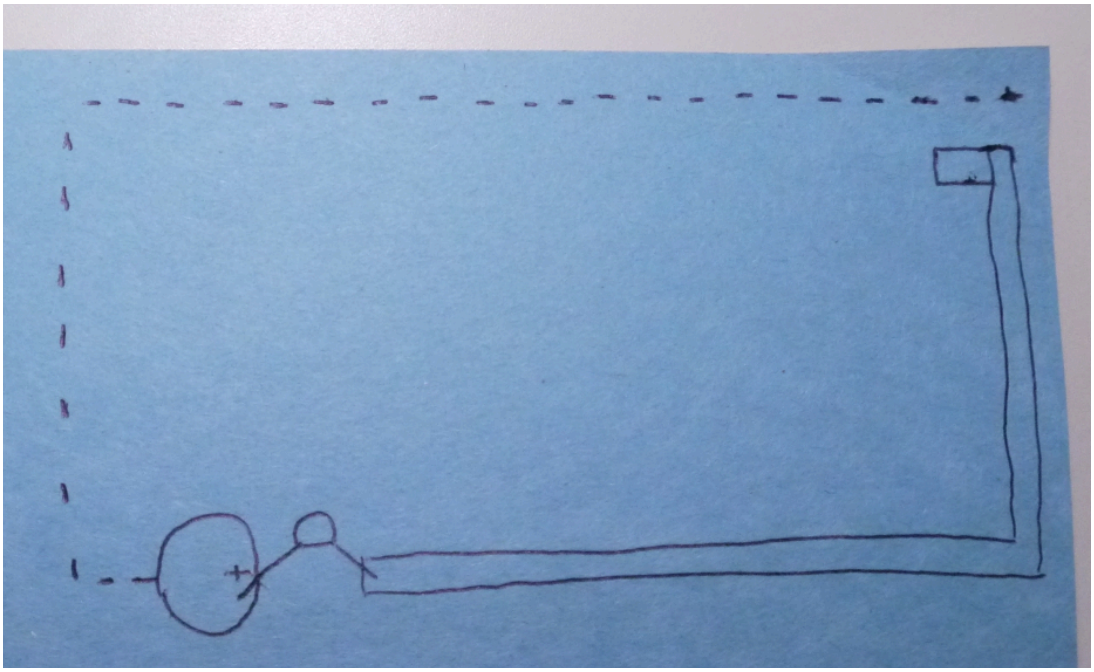
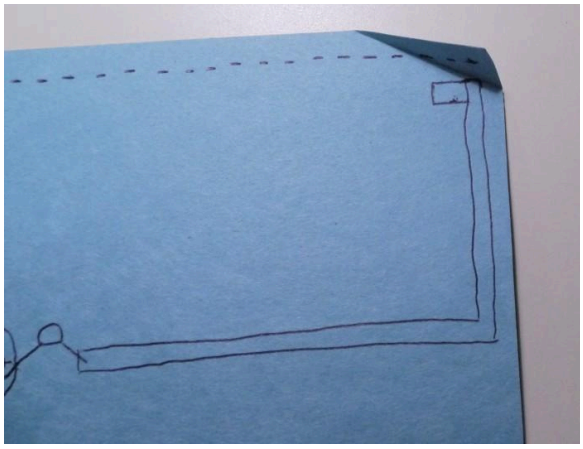
Part 2: Plan

First we need to plan out the path of our circuit. This is important because remember that we can't cross over the positive and negative path. If you need to cross over one path you can cover on path in non-conductive material, like regular tape and then place your other path over it, however it better to avoid this when possible.



The way this design is laid out the positive lead of my LED goes straight to my battery, while my negative path starts with copper tape goes around the edge stops at the corner. Then I have my conductive thread continuing to the battery.

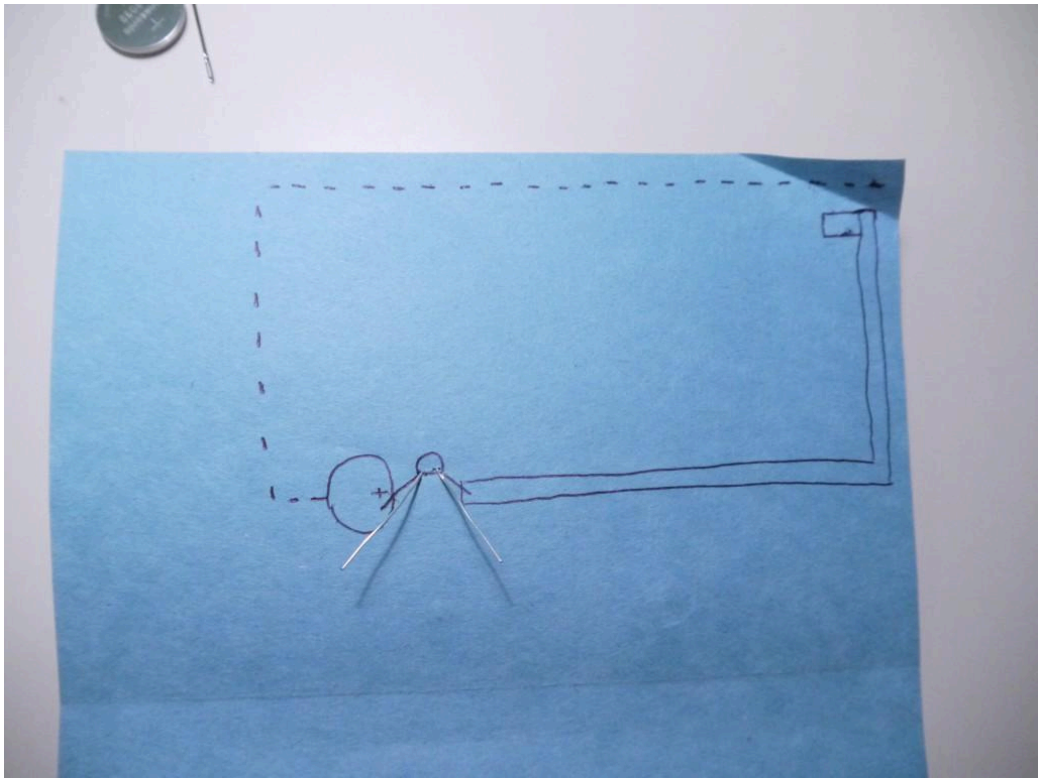
Notice on the top right side that the design shows that the copper tape and conductive thread aren't touching. This would cause an open circuit and the LED won't light.



This is because I don't want my LED to stay on all the time. Although when I have my circuit finished I can bend the corner so that the thread and conductive tap touch. This will close the circuit and cause the LED to light.

Part 3: Getting Started

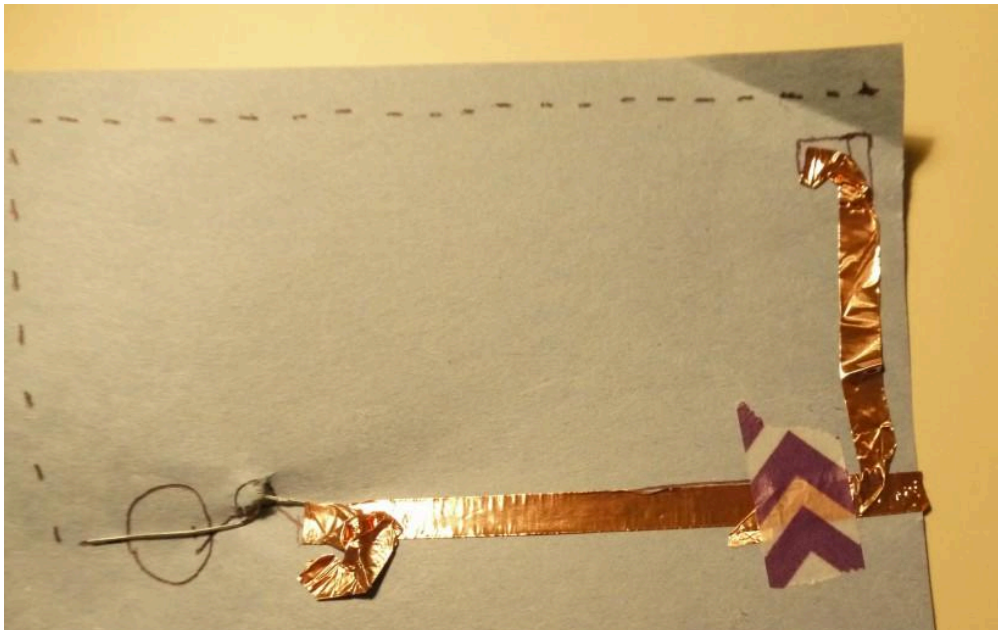
Next we take our LED and place it through the paper. If the paper is too thick you can use a needle to make your desired holes.



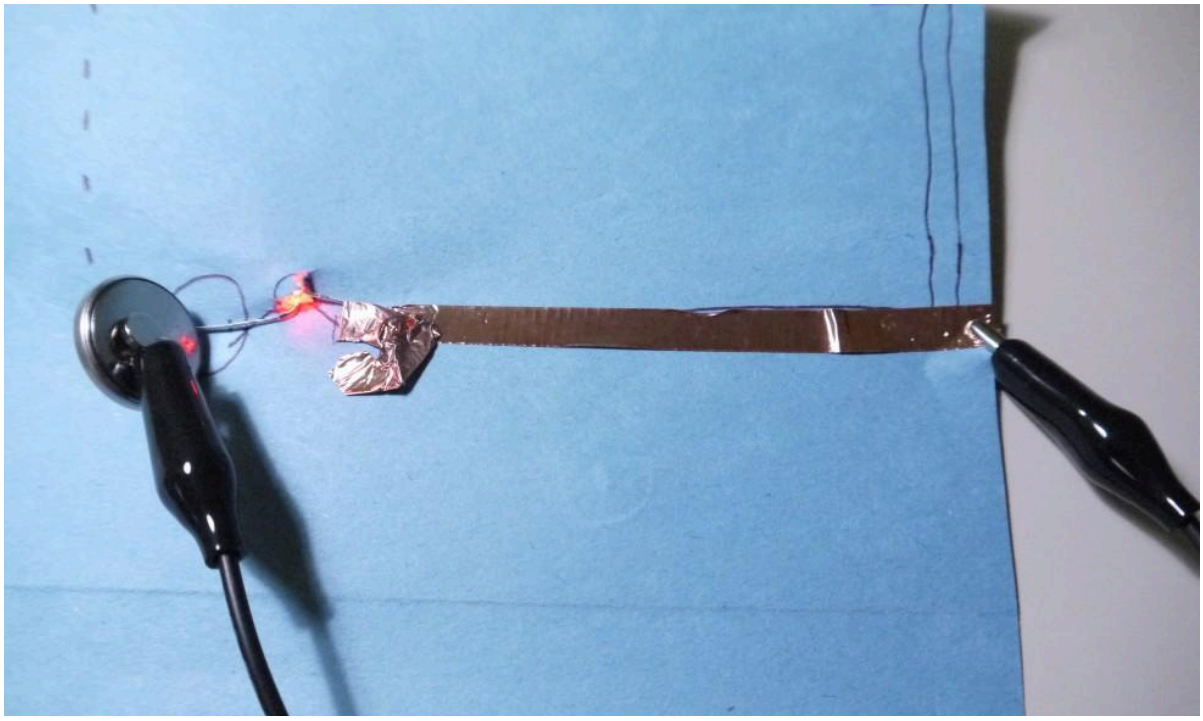
Make sure that your LED legs are facing the correct direction.

Then grab a piece of copper tape. Try to avoid ripping the copper tap, instead fold the tap on the corners so that it bends where you want the path to continue.

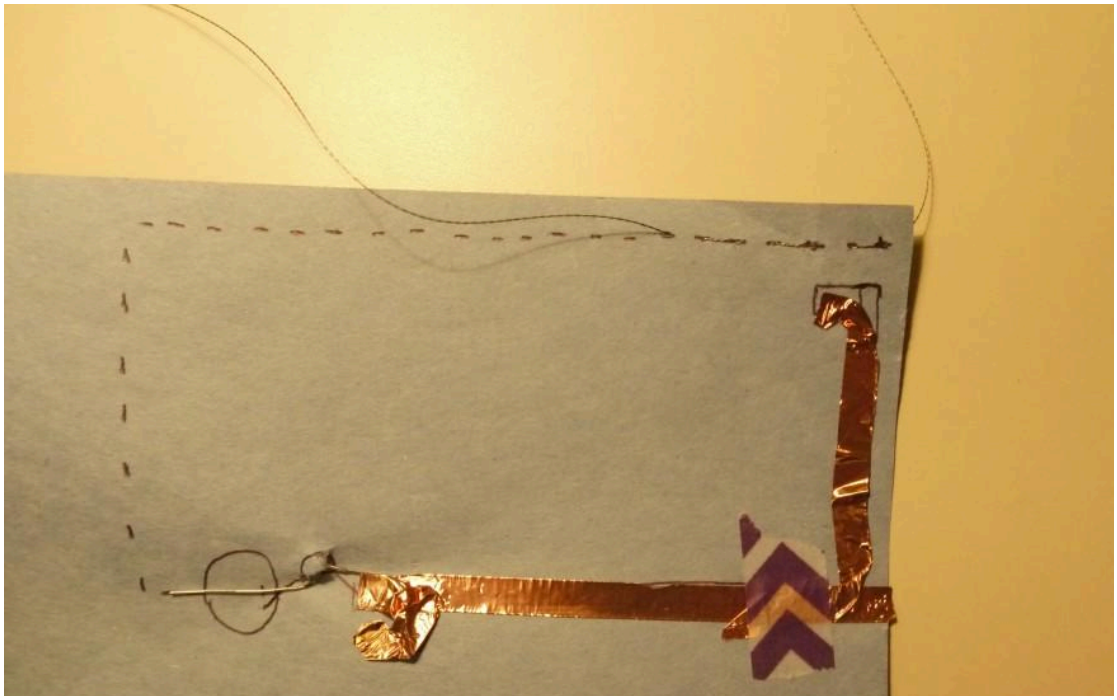
If you rip your copper tap you can continue the circuit as I did by flipping the copper tap so that both of the conductive sides are touching. Then tape them down with regular tape.



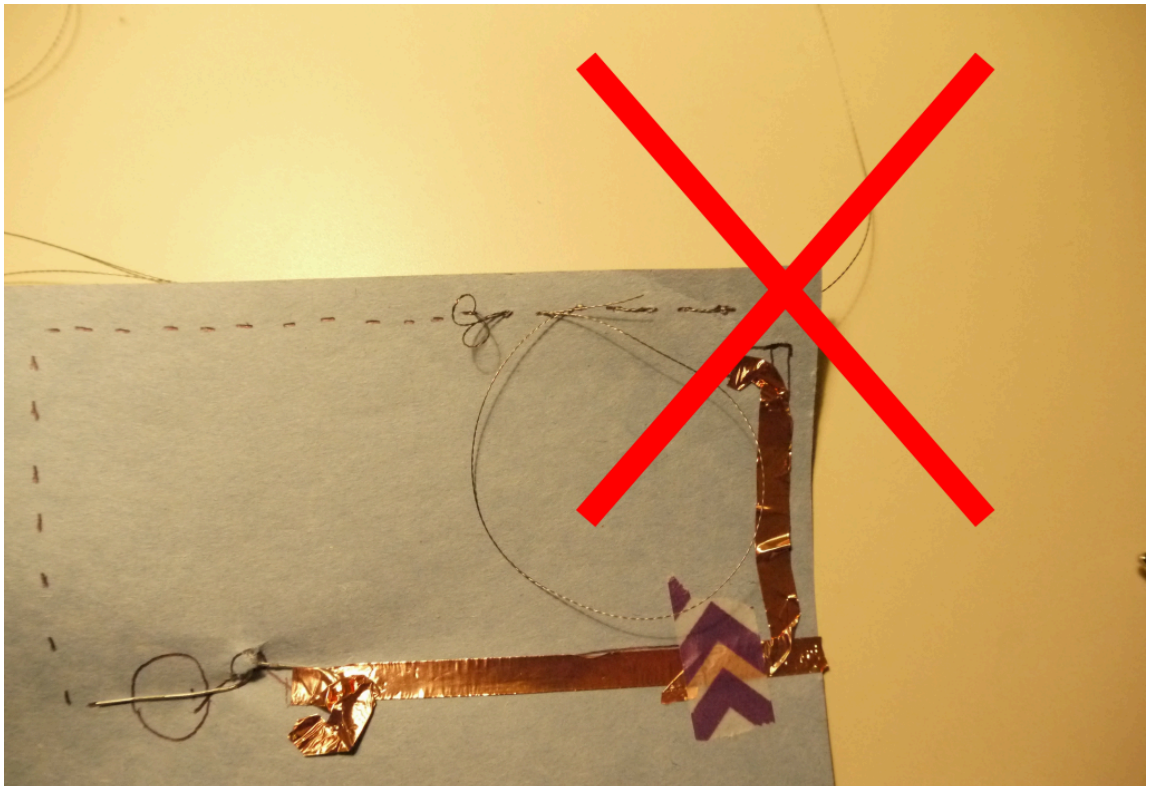
Make sure you are testing your circuit as you go along.



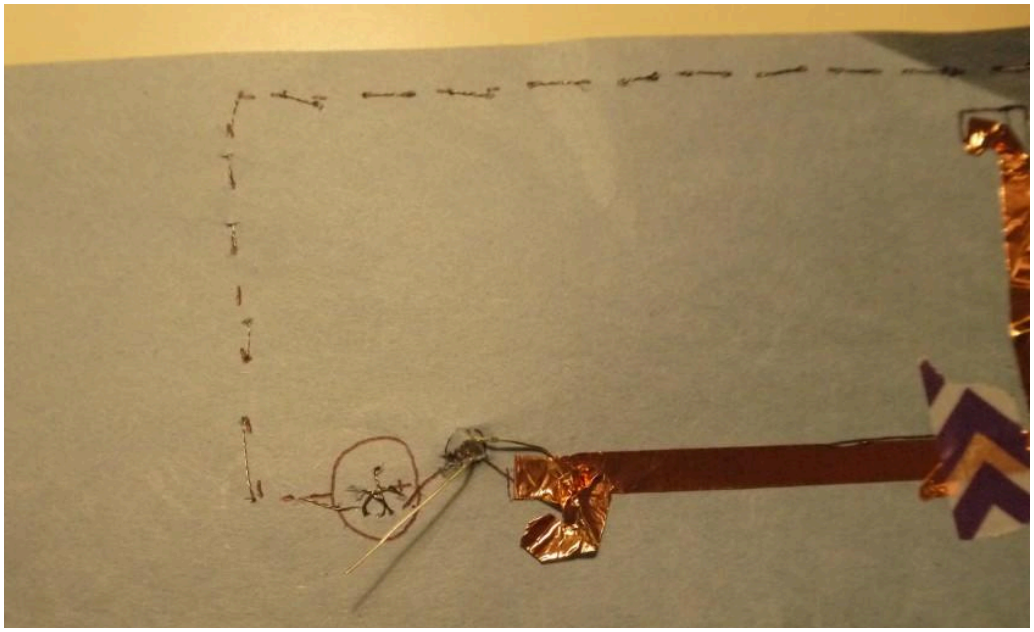
When you have finished the copper tape path continue along the dotted path with conductive thread.



Make sure that your thread is sewn so that there are no loose threads. If you have loose threads you risk the chance of the thread crossing over the opposite path, which would create a short circuit.

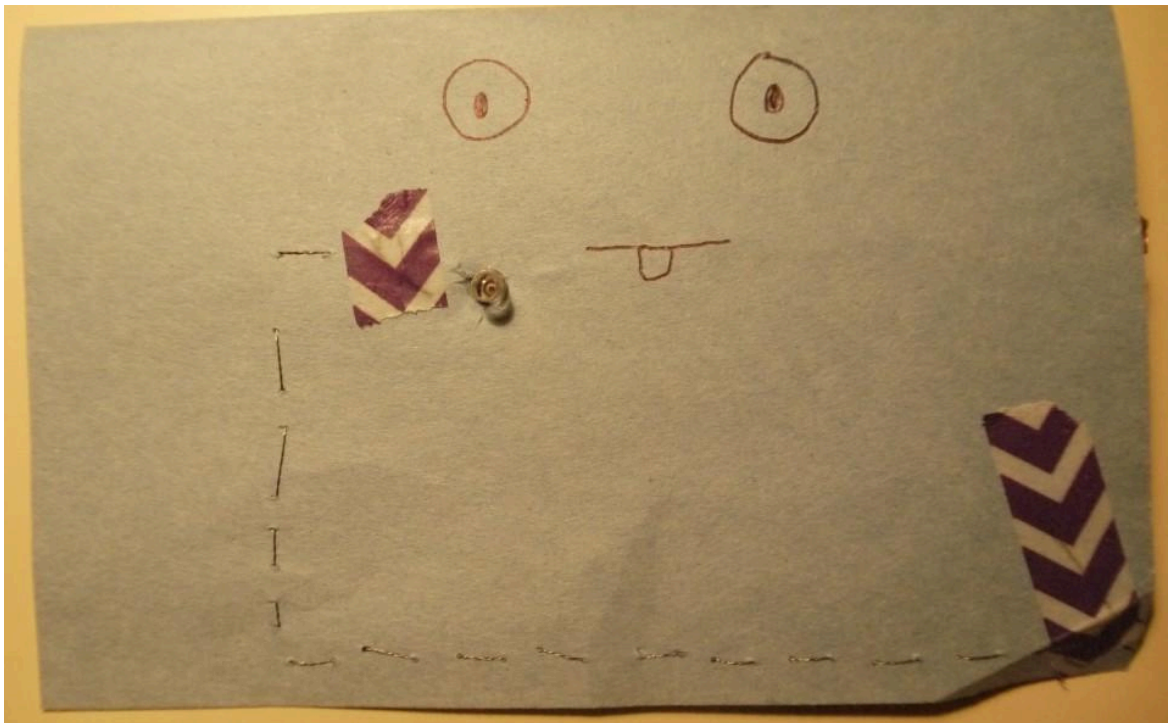


Continue your path down to the battery and sew the shape of a star on the spot where the battery will be. Take note and be careful not to rip a hole.



Now place your battery on top of the patch of conductive thread. Place one LED lead onto the battery and tape it.

Finally your circuit will be completed and the card will be fully operational.



Now when you fold the corner the LED lights up!