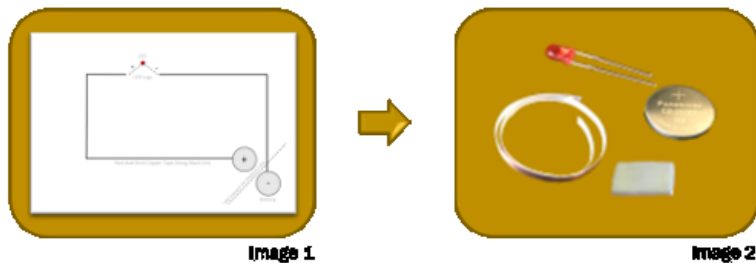


SIMPLE CIRCUIT INSTRUCTION SHEET

A simple circuit consists of just three components – the source of the electricity, the conductive pathway, and the component that needs the electricity to work.

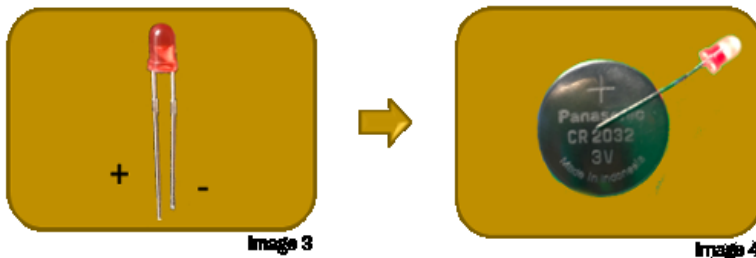
In this simple circuit the battery is the source of the electricity, the copper foil tape creates the conductive pathway, and the LED is the component that needs the electricity to work. The battery will act as a switch when you fold the bottom right corner of the circuit along the dotted line. When the battery makes contact with the other side the circuit will close and turn on the LED.

Step 1 – Supplies:



1.1 Print out the simple circuit template if you haven't already done so. You will also need an LED, a coin cell battery, a 3/4" piece of foam tape, and 20" of copper foil tape with conductive adhesive (**Image 1 & 2**).

Step 2 – Testing:



2.1 Test your battery and LED. The longer leg of the LED is positive, and the shorter leg is negative (**Image 3**). You can also use the flat side of your LED to determine which leg is negative as it's the leg closest to that side. We had a hard time finding the flat side during our investigation though, so we always looked at the leg length when testing.

2.2 Polarity is important with LEDs so be sure to place the positive leg on the positive side of the battery and the negative leg on the negative side. If both the battery and LED are working you should see the LED light up (**Image 4**).

If the LED doesn't light up, try switching the direction of the LED legs. If it still doesn't work you either need a new battery or a new LED. It's a lot easier to replace a bad battery or LED now before you start the project, so these tests are very useful.

Step 3 – Build:

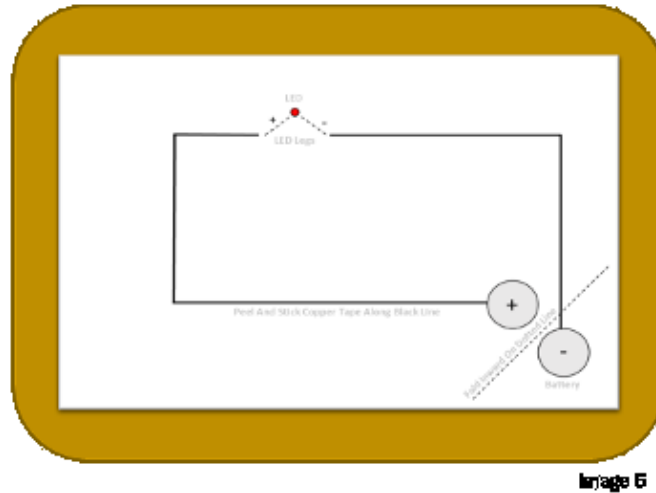
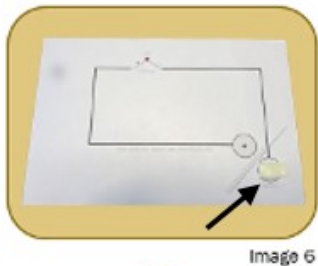
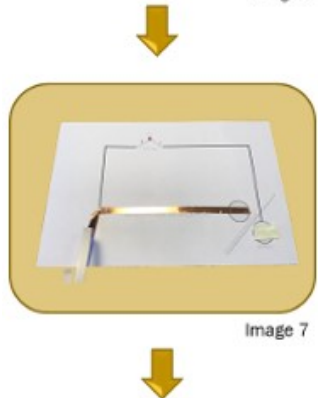


Image 5

Let's look at the simple circuit template. The solid black line marks the path for the copper foil tape. The small red circle represents the placement of the LED with the attached dotted lines showing the position of the positive and negative LED legs. The gray circles located in the bottom right corner represent the battery position and the dotted line between them is where the template is folded to complete the circuit (**Image 5**).



3.1 Bend the bottom right corner of the template inward along the dotted line so the gray circles touch. Unfold the corner forming a crease on the dotted line.



3.2 Attach the 3/4" piece of foam tape to the gray circle marked negative ('-') in a horizontal direction. Be sure to place the foam tape horizontally or the copper tape in step 3.8 will cover too much of the adhesive surface needed for the battery to stay attached (**Image 6**).

3.3 Attach the copper tape to the solid black line, peeling the backing off as you go. Don't remove the backing all at once or the copper tape will twist and stick to itself. Start at the gray circle marked with the '+' sign and follow the black line counter clockwise until you reach the corner (**Image 7**).

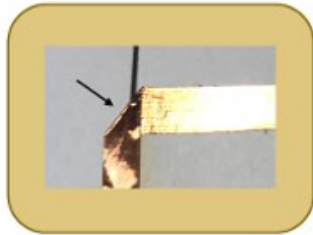


Image 8

3.4 Corners can be tricky but we're using copper tape that's conductive on both sides, so it should be okay if things get a little twisted.

3.5 When you reach a corner the trick is to bend the copper tape in the opposite direction from where you want to go first, creating a diagonal fold (**Image 8**).

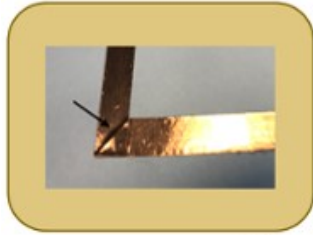


Image 9

3.6 Hold this folded section in place with your finger as you bend the copper tape back over to continue going in the right direction. You should see a nice corner formed but don't worry if it's messy. It gets easier with practice (**Image 9**).

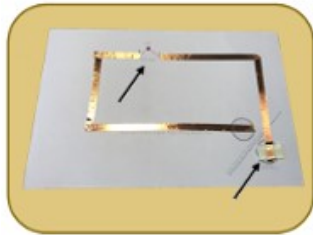


Image 10

3.7 Finish placing the copper tape along the solid black line. When you reach the gap use your fingers to cut the tape and then continue placing the tape along the black line on the other side of the gap (**Image 10**).

3.8 When you reach the end of the black line run the copper tape up and over the piece of foam tape (**Image 10**).



Image 11

3.9 It's time to connect the LED. Bend the LED legs wide enough to connect to the copper tape on both sides of the gap, line the legs up with the dotted lines and the LED to the red circle (**Image 11**).

Note: Remember that polarity matters. The positive leg needs to connect to the side marked positive and the negative leg needs to connect to the side marked negative.



Image 12

3.10 Tear off two small pieces of copper tape and use them to cover the LED legs and stick them to the existing copper tape (**Image 12**).



Image 13

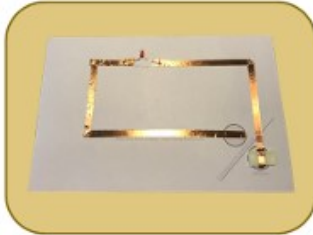


Image 14

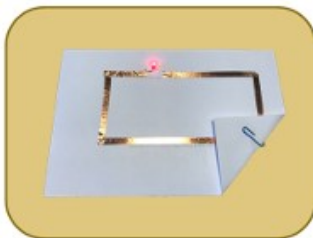


Image 15

3.11 Attach the coin battery to the piece of foam tape from step 3.2. Be sure to have the positive side of the battery facing up so it connects to the positive side of the circuit when the corner is folded (**Image 13**).

3.12 You have just finished building your simple circuit (**Image 14**). It's time to fold the template along the crease created at the start in step 3.1 so the battery can complete the circuit. You should now see the LED light up (**Image 15**).

Note: If your LED doesn't light up, you should check out our trouble shooting tips at the beginning of this post, next to the investigation tab.

You just finished building the simple circuit but what if you need a circuit that uses multiple LEDs? Look at our parallel and series circuits next, two ways to work with multiple LEDs.