


All About Circuits

Circuits are all around us; they can be as simple as a battery connected to a lightbulb, and as complex as those found within computers. Circuits are like highways for electrons, which are particles that makeup electricity. Electrons will always travel between positive and negative terminals of a power source, like a battery. Like people, electrons will never leave “home” unless they can get back; therefore, electrons will only flow through a circuit that has a complete path between positive and negative terminals. If the electrons don't flow, then power won't flow, and anything connected to the circuit will not turn on. In addition, electrons are lazy: they will always take the path of least resistance or the easiest route between terminals. For example, if given the choice between a path with a lightbulb or a path without, they will take the path without the lightbulb.

Symbols used to represent circuit parts:

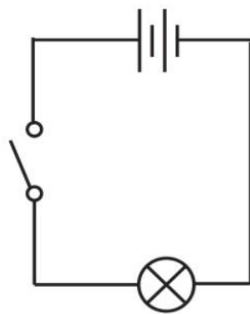
BATTERY: 

WIRE: 

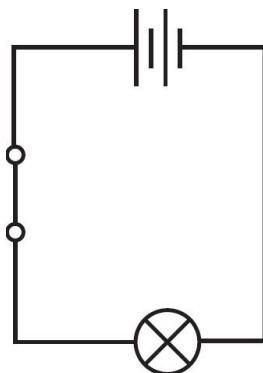
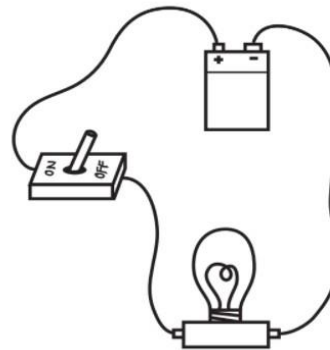
LIGHTBULB: 

SWITCH:  (OPEN)
(CLOSED)

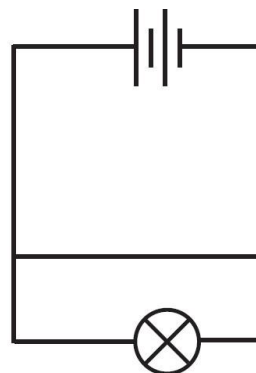
Circuit Diagram:



Drawing of Circuit:



The lightbulb in this circuit will be on because the switch is closed, allowing electricity to flow through it to the lightbulb.



The lightbulb in this circuit will not be on because there is another wire bypassing the lightbulb, and since electricity takes the path of least resistance, it will not pass through the bulb and turn it on.

Popsicle Stick LED Flashlight



This activity/flashlight is **not** for children under 4 years of age. The flashlight uses a button/coin battery, which if swallowed or placed in the nose or ears, can cause serious injury or death. Please be mindful when building, using, and disposing of this flashlight.

Step 1: Materials



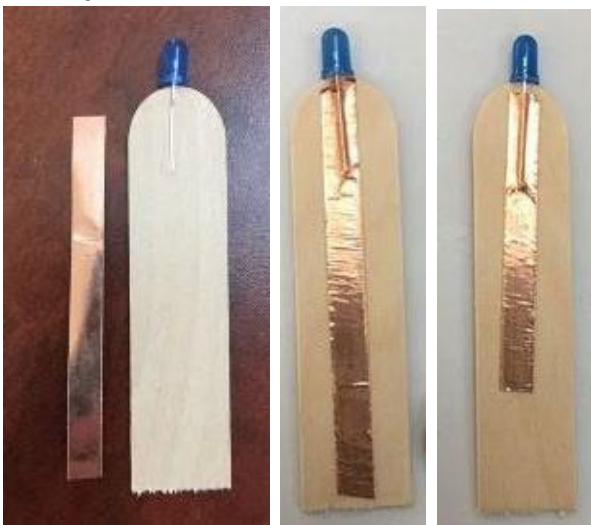
Popsicle stick (1/2)	3V Coin battery
LED light	Binder clip
Copper tape (5")	

Step 2: Test Battery & LED light



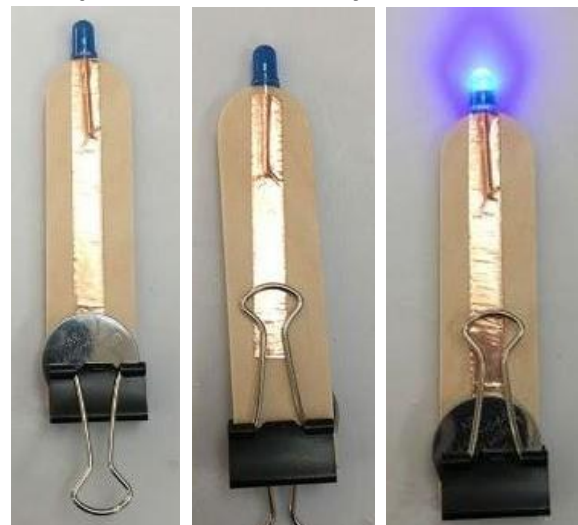
Position the battery between the wire of the LED with the longer wire (+) on the positive side and the shorter wire (-) on the negative side. If it lights up, you are good to go!

Step 3: Attach the LED



Set the LED on the curved end of the popsicle stick. Set the stick down flat with the short wire (-) of the LED facing up. Take a 3" piece of copper tape and place it firmly over the wire and stick. Flip over so the longer wire (+) is facing up. Take a 2" piece of copper tape and place firmly over the wire and stick.

Step 4: Add the battery and switch



Place the negative side of the battery on the side with the longer piece of tape. Use the binder clip to clamp the battery and popsicle stick together. To turn on your flashlight, flip up the handles of the binder clip making sure that they connect with the copper tape.

Troubleshooting:

If it doesn't work, be sure the copper tape is firmly pressed over the LED wires. Also make sure your battery makes a strong connection with the tape.