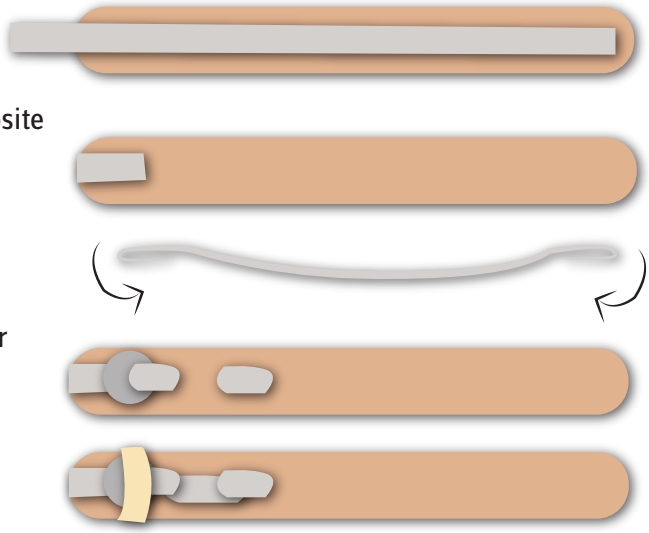
LED Lightsaber

Celebrate Star Wars Day by creating your own lightsaber.
May the force be with you!

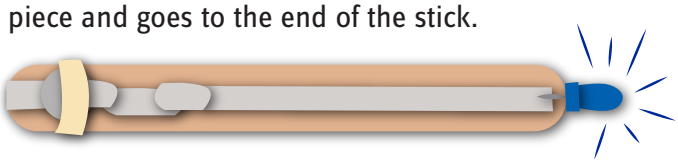
Collect

- Large popsicle stick
- 3-volt coin battery (found in electronic stores)
- A lightsaber crystal (also known as an LED bulb, found in electronic stores)
- Aluminum foil tape (found in hardware stores)
- Masking tape
- Scissors
- Empty paper towel tube
- 12'' length of wax paper or parchment paper

Make the circuit



1. Cut the aluminum foil tape into long strips about 1/4 of an inch wide.
2. Start at one end of the stick and run a strip of foil tape to the opposite end, leaving one inch hanging off of the end.
3. Wrap this extra inch over to the other side.
4. Put the negative side of the button battery on top of the extra inch of tape on side 2 of the stick.
5. Take a shorter piece of foil tape (about 4 inches long) and fold over an inch on each end, leaving the strip sticky in the middle. This will be your switch.
6. Place the switch on the stick so that one of the folded ends lies overtop of the positive side of the battery.
7. Use masking tape to sandwich the battery between the two pieces of foil tape.
8. Add a third piece of foil tape that runs from underneath the folded piece and goes to the end of the stick.
9. Clip the LED bulb to the end of the stick, with the longer leg touching the foil on side 2, and the shorter leg touching the foil on side 1.



10. Wrap tape around the legs to secure the bulb in place.

Assemble your lightsaber

11. Tape the popsicle stick to the outside of the paper towel tube, making sure the LED is sticking out over the end of the tube.
12. Lay out the sheet of parchment or wax paper. Place the LED end of the tube at the edge of the paper, overlapping about 1''.
13. Roll the paper around the tube to make the main body of the lightsaber. Secure with tape.
14. Turn on your lightsaber by pressing the folded tape to the 3rd strip of foil tape leading to the light bulb!

Troubleshooting

- The sticky side of the foil tape is not conductive. Make sure to make connections only with the shiny side of the tape.
- If the light still doesn't turn on, check to make sure that the positive side (long leg) of the LED is touching the strip of foil that leads to the positive side of the battery.

The science behind the 'saber

The lightsaber's circuit allows electrical current to flow from the power source of the battery, through the conductive foil tape, through the LED to turn it on, and then back to the power source to complete the circuit. The switch works by creating a gap in the circuit so that the current does not reach the LED. When the switch is up the circuit is open and won't work, and when the switch is down the circuit is closed and the electrical current can get through to power the LED.