

POPSICLE FLASHLIGHT

Learn the basics of electrical circuits by assembling an LED flashlight. An electrical circuit needs a closed loop from the power source (battery) to the LED to keep the light shining. Add a switch (binder clip) to interrupt the flow of electrons to the LED and introduce an on/off setting to the circuit.

MATERIALS FOR ONE FLASHLIGHT

- 1 jumbo popsicle stick
- 1 small binder clip
- 1 coin cell battery (CR2032 3V)
- 1 LED light (2-3V)
- Copper foil tape (approximately 10-12")
- Transparent tape
- Scissors

METHOD

1. Cut one end off of the popsicle stick.
2. Test the battery and LED by sliding the battery between the LED leads. Note: Light emitting diodes (LEDs) are polarized and only allow current to flow in one direction. The longer lead is the anode (positive) and the shorter lead is the cathode (negative). An LED must be correctly connected to the power source to observe light. Be sure to connect the anode to the positive battery terminal and the cathode to the negative terminal.
3. Cut a strip of copper foil tape slightly shorter than the length of the popsicle stick. Place the popsicle stick between the LED leads. On one side of the popsicle stick, cover the LED lead with the copper tape, continuing to guide the tape down the center of the popsicle stick. Repeat with a new strip of copper on the other side. DO NOT loop the copper tape over the end of the popsicle stick. The copper tape needs to be two separate strips on each side of the popsicle stick, not one continuous strip.
4. Add the binder clip (prongs flipped up) to the end of the popsicle stick opposite the LED, then flip prongs down, making sure they touch the copper tape. Use transparent tape (non-conductive) to secure the battery (keeping in mind LED polarity) between one metal prong and the copper tape.
Note: An electrical circuit cannot have any gaps. Make sure the transparent tape doesn't interfere with the metal prongs of the

binder clip making contact with the battery. Experiment with battery placement until the LED lights up then secure the top part of the battery with tape.

5. Turn the flashlight on and off by lifting and lowering the metal prong of the binder clip.

TAKE IT BACK TO CLASS

- Research other circuit components that are polarized. Find out how to determine which are the positive and negative terminals.
- Compare and contrast different types of light bulbs. Figure out which lightbulb is the most efficient or consumes the least power.
- Add more LED lights in series without changing the power source to see if the light becomes brighter or dimmer. Discuss why this happens.

SOURCE:

<https://www.funlovingfamilies.com/popsicle-stick-led-flashlight-summer-stem-activity/>

NOTES
