

POPSICLE FLASHLIGHT

Students will build a flashlight and explore the flow of electricity.

MATERIALS

Included in the Kit:

- Jumbo Popsicle Stick
- Battery
- Binder Clip
- LED Light
- Copper Tape

Not Included in the Kit:

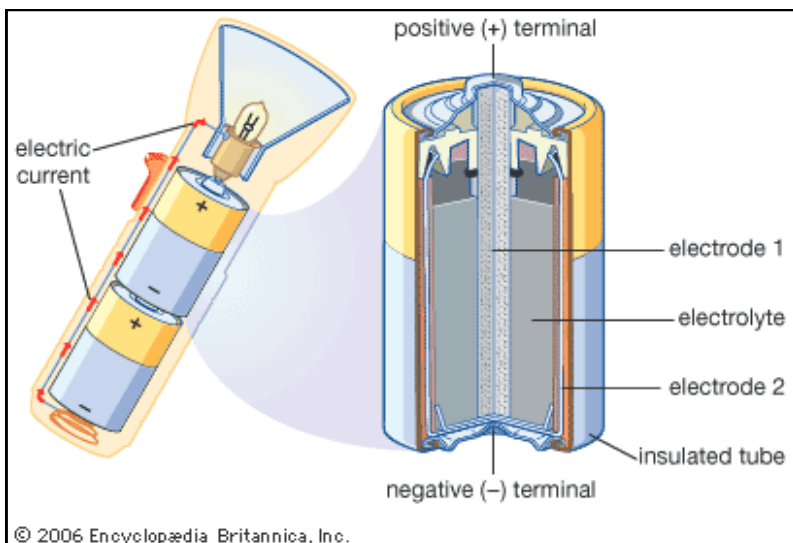
- Scissors
- Non-Conductive Tape
(clear, electrical, wash)

LESSON

Picture this: The sun has gone down and you are just getting home from an evening adventure-science club meeting, dinner at a restaurant, or even a shopping trip. The street is darker than usual, with only the moon providing light. You head inside with out a second thought but when you try to switch the light on-*nothing*. After flipping it a few more times (just to be sure) you also notice the digital oven clock is black and there is no “hum” coming from the refrigerator. This can only mean one thing-SOME ONE UNPLUGGED THE HOUSE!

Well, not exactly. The whole block is out of power (ahh, that explains the street lights being out too!) and it is not always easy to tell exactly why or when it will come back. So, what do you do? Light a candle and accept that bed time will be early tonight? If only there was a way you could have energy without being hooked up to a wall....like a battery! **Batteries are storage containers for energy. Chemicals inside the battery store the energy until it is ready for use.** Primary batteries can only be used once then have to be thrown away but, secondary batteries can be recharged and used over and over again-**can you think of an example for each battery type?**

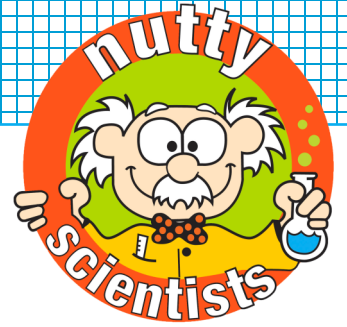
To make the battery release its energy (and actually help you out when there is no power) it has to be part of a



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circuit. A circuit is a path that allows energy to flow, think of it like a circle! Certain material allow electricity to flow through them and we call those conductors. If you have a battery and can make a circuit that hooks into a light then you can avoid that early power-outage bedtime (but maybe not that homework). The best way to understand how batteries work in a circuit is to experiment and make one yourself! In the following activities you will put together a flashlight and see firsthand how a circuit works.

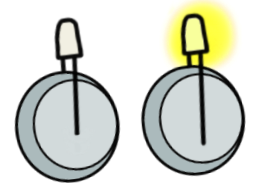
**Although low voltage batteries are used, adult supervision recommended. **



ACTIVITY 1: LIGHT AND BATTERY TEST

Before beginning, it is always a good idea to test your parts to make sure they work the way they are supposed to. For our flashlights we will be using a small LED light bulb and a coin cell battery-find these first and test them out!

- Touch the light to the battery, experimenting with different ways until the light turns on. **Observe what part of the battery is touching what part of the LED light.** Batteries have a positive and negative side, along with these lights! For the electrical circuit to work, positive needs negative and negative needs positive.



ACTIVITY 2: ASSEMBLE THE CIRCUIT

To make a circuit, we need something to carry electricity from the battery to the LED light. Copper is a metal that conducts electricity (meaning, it can hold and carry electricity).

- Tape down the LED prong on the popsicle top and down the middle of your popsicle stick. Repeat on the other side!

Now that we have a way for electricity to move from the battery to the light, we can add the electricity!

- Clip the binder clip to the flat side of the jumbo popsicle stick. Fold the metal pieces up. This is where you will place your battery! Use clear tape (or another non-conductive tape) to hold the battery in place.
- The metal pieces should touch the battery directly so be sure not to put tape over the whole battery (tape will prevent the electricity from flowing correctly.)

You may have to play around with where the battery is-remember positive on negative and negative on positive! You will know it is on the right spot when the battery turns on! The binder clip helps complete the circuit and acts as a switch, allowing you to turn the flashlight on and off.

