



LED Magical Wand Activity



Ready to get started with this activity? To keep track of your progress, check off the instructions for each step below as they are completed.

Instead of conjuring up some magic, let's use circuits to cast Lumos and Nox! A circuit needs a conductor, an energy source, and an insulator.

Consider this: A light emitting diode, or LED, lights up when powered by a direct current circuit by converting electricity directly into light. LEDs are the most efficient way to make light - more efficient than an incandescent bulb or even fluorescent light, which give off heat and that is unused energy! Inside an LED is a super small semiconductor crystal, which has both positive and negative materials that allow current to flow and the LED to light up. You can put an LED and circuit into any form: a traditional flashlight case, a cup with aluminum foil to reflect the light and make it brighter, or — like this example – using craft sticks to make a LED magic wand.

1. Gather Your Materials

No phoenix feathers needed, just the following items:

- Copper foil or paper circuit tape
- (3) Popsicle/Craft sticks
- (1) LED bulb Choose your color
- (1) Lithium 3-volt Battery (CR2032) - keep this away from young children

2. Color Code Your Craft Sticks

- Check to make sure the LED bulb works by straddling the silver prongs on each side of the battery. The blub should light up.
- In this example two craft sticks are pink and one is plain. This will help prevent confusion on where the circuit tape will go.
- Make a switch by wrapping circuit tape around the lower end of one of the pink sticks.





- Electrical tape any color
- Scissors
- Markers (if you'd like to color the popsicle/craft sticks)

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3. Add Circuit Tape

- Repeat the same wrap about a centimeter above the circuit tape, this makes a break in the circuit
- Add a strip, from end to end, of circuit tape on the other craft stick (matching color)

4. Attach the LED

• Attach the LED to each of the colored sticks with circuit tape. It does not matter which leg of the LED is on which stick, but it does have to touch the circuit tape on the stick and the circuit tape being used to attach the legs.

5. Add an Insulator

- The third stick is the insulator. Cut a piece off of this center insulator stick to become a switch. The piece should be about the size of the battery (about an inch).
- Attach circuit tape to one side of the small piece of the popsicle stick.

6. Attach Electrical Tape

 Use electrical tape to attach the small piece so it will cover the gap between the two circuit tape rings.





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7. Install the Battery

- Slide the battery inside the two colored sticks as a test. Does the LED light up? If not, turn the battery over and try again.
- If the LED lights up, put the insulator between the two colored sticks near the top (by the LED bulb).
- Use electrical tape to secure all three sticks in place.



8. Things to Think About

- Is an insulator needed for the wand to work?
- Can you identify the three fundamental parts of an electrical circuit? (Power source, conductor, the load)
- Can you link more LEDs to the wand with this battery?



