Project Exploration creates transformative learning opportunities for youth underrepresented in the sciences --particularly students of color and girls -- by equipping them with the skills, practices, and mindset needed for a lifelong pursuit of learning. STEM@Home makes activities around science, technology, engineering, and math accessible and fun to do at home. This STEMbook activity, resources, and more are availble at www.projectexploration.org/stemathome.

In this activity, you will:

learn to use the engeering design process to make a light up wand!

independent activity

Supplies Required:

3 Craft Sticks
Copper Tape
LED Light Bulb
CR2032 Battery
Electrical Tape (or any nice tape that works for your design)
Scissors

Video

Learn about the engeering behind ciruts: https://tinyurl.com/ock3w2s
Watch the tutorial video to make your magic wand: https://tinyurl.com/y3kvykch

Overview

How many light switches do you have at home that you turn on and off everyday? Have you ever wondered how they work? For example, how they can so quickly be turned off then right back on, bringing electricity to your lights and appliances?

What about a flashlight? We all know that flashlights work because of electricity, provided by the batteries we install inside the flashlight. But how does the electricity get from inside the batteries to the lightbulb? The electricity flows along a circuit!

There are two basic types of electrical circuits; series and parallel circuits. Today, we will use the engeering design process to make a simple, closed ciruit to light up a magic wand!

Instructions

1. Wrap two strips of copper tape around the middle of the craft stick, leaving about one finger width (1 centimeter) in between the two rings
2. Line up a copper strip from one of the rings to the end of the popsicle stick, and again from the second ring to the other end of the craft stick. You should have copper covering almost one entire side of your stick with just a little space in the middle.
3. On a second craft stick, place a copper strip down the entire length of one side of the stick.
4. Test your LED light by putting one wire on each side of the battery. Make sure it lights up!
5. Use copper tape to secure the two wire legs of the LED light to the craft sticks - one to each craft stick. Make sure the copper tape is continuous, leaving no space between the wires and the copper tape, all the way to the ends.
6. Cut one inch off the 3rd popsicle stick using scissors. Slide the long part of the middle stick between the two outer sticks.
7. Add a piece of copper tape to one side of the small piece of craft stick you just cut off the middle piece. Using your electrical tape create a hinge and attach the piece so it will cover the gap between the rings on the outside of your stick.
8. Slide your battery in. Test to make sure it is the correct way and your wand works. Now tape your wand together! Add a piece of tape to the top to secure the three craft sticks together. Then add more tape at the bottom starting at the bottom of the on/off switch all the way to the end securing the battery
9. To turn on your wand simply close the flap securely with your thumb. LUMOS!

Additional Resources

Think about it! What other ways could you use simple circuits to light up projects?

1. What is electricity? https://tinyurl.com/hksfbez
2. How do Simple Circuits work? https://tinyurl.com/y9lg33vs
3. Make a light up card: https://tinyurl.com/y3hp9x4e

Share It Out

Share on social media: Share a video of you activating your wand on social media and explain how your simple circuit works! Tag @jk_rowling and share your favorite Harry Potter spell or what spell you would cast if you had a real magic wand!

#MagicWand
#Circuits
#ProjectExploration
#STEMatHome

For more activities like this one, go to www.projectexploration.org/stemhome. If you're interested in learning more about Project Exploration and our free events, programs, and activities, please find us on social media and be sure to follow!

project exploration
changing the face of science