



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 available at www.projectexploration.org/stemathome.

In this activity, you will:

learn about electrical circuits and make one of your own!



Supplies Required:

Graphic organizer
Metal Tape
3v Lithium Battery
White Print Paper
Diode Light bulb
Scissors

Video

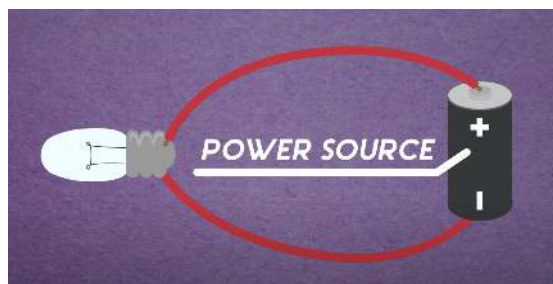
Learn about electrical circuits: <https://tinyurl.com/yc9jb857>

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. In today's activity, we are going to build a simple, series circuit where the electricity from one source (our battery) flows along one continuous loop circuit to illuminate a light bulb. Follow the instructions provided to make a circuit yourself!



Instructions

- 1. Problem** - What do we want to solve?
How do we make our art light up with the materials given?
- 2. Hypothesis** - Make a prediction!
How do we make the circuit work? Draw their prediction on your graphic organizer and share what you think using, "I predict that..."
- 3. Experiment** - Test it out and make observations!
 - Place your battery under your sheet of paper and trace the battery
 - Add the positive "+" and negative "-" symbol to your drawing based on the positive and negative terminals you see on the battery
 - Mark an "X" on your paper where you want your lightbulb to go
 - Draw a path where you want the electricity to follow, called the circuit - start at the positive terminal and draw a line towards the "X," leaving a gap where your lightbulb will go - continue your line on the opposite side of the "X" and draw your line back to the negative terminal of your drawing
 - Cut the metal tape into strips and stick them down along your drawn path, leaving a gap only where your light bulb will be placed! Any other gaps will create a break in your circuit and not allow it to work.
 - Place the negative terminal of the battery to the negative path of your circuit and the positive terminal to the positive path.
 - Looking at the clean side of your paper (without the metal strips), poke your light bulb wires through the paper and use the metal tape to connect them wire ends into your circuit. WATCH YOUR DRAWING LIGHT UP!
 - Draw whatever else your imagination comes up with on the clean side of your paper! Does the lightbulb represent the headlight on a motorcycle? Does it represent the sun? Make it part of your own drawing and scene!
- 4. Analysis** - Based on your observations what do we now know? What happens when our electrical path isn't fully connected? Why do you think that happens?
- 5. Conclusion** - Was your hypothesis correct or incorrect?
Use the sentence starter, "my hypothesis was (in)correct because..."

Additional Resources

Think about it! What other types of circuits are there? Why does the rest of a string of holiday lights go out when one light bulb burn out? Can you make a light up card with your newfound skills? Check out these videos to learn more and answer these questions!

1. Apply what you know to make a light up greeting card: <https://tinyurl.com/y2tex5qs>
2. Learn more about parallel and series circuits: <https://tinyurl.com/y5hkqrho>
3. How do holiday lights work? Are they parallel or series? <https://tinyurl.com/y4lrot9m>

Share It Out

Share your drawing with the world! How does your circuit work? What type of circuit did you create? What did you learn today?

Share on social media: Take a photo of your project/experiment and share it on social media using the hastags:

#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!



Call or text us for help: 312-772-6634



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