

Activity 2.3 Light Up Your World

Introduction

In the last activity, you observed several types of **energy conversions**. Converting energy into different types helps in heating and cooling our homes, providing light, and powering all of our devices. What are the sources of energy? How does energy get to our homes?

In this activity you will construct an electrical circuit to convert chemical energy into other forms of energy. You will use what you learn from the electrical circuit to predict energy conversions in another device. Then you will consider how energy is available to use in your home.

Equipment

- Launch Log
- 3V Battery, 1 per pair
- Light Emitting Diodes (LEDs), 5 mm, red/green MV5491A, 1 per pair
- Flashlight, 1 per pair
- iPad® tablet
- Apps
 - Popplet Lite
 - Educreations™
 - Safari® browser

Procedure

Part 1 – Light Energy

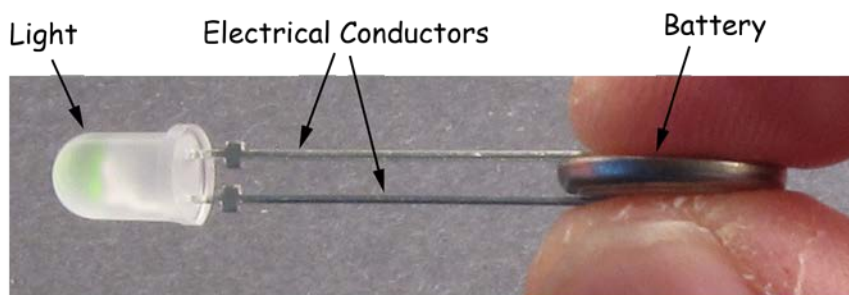
1. Lay a coin battery and an LED beside each other. In your Launch Log, describe any differences between the two legs on the LED.



2. Place the long leg of the LED on the positive side of the coin battery with a plus sign (+) stamped on it. The shorter leg will be on the opposite side of the coin battery. Pinch the legs together with your thumb and forefinger. Describe how the LED responds and write your observation in your Launch Log.



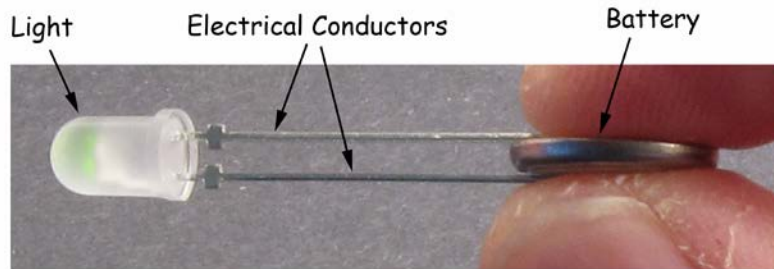
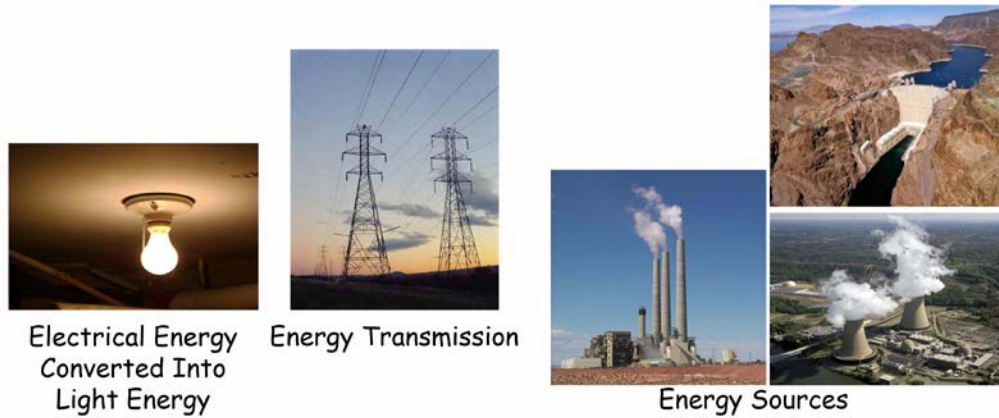
3. Reverse the LED legs so the short leg is on the positive side (+) of the coin battery. Describe how the LED responds and write your observation in your Launch Log.
4. This process demonstrates several **energy conversions**. The battery contains **chemical energy** which it converts into **electrical energy**. The **electrical energy** flows through the electrical conductors to the LED where it is converted into **light energy**. Refer to the labeled image below.



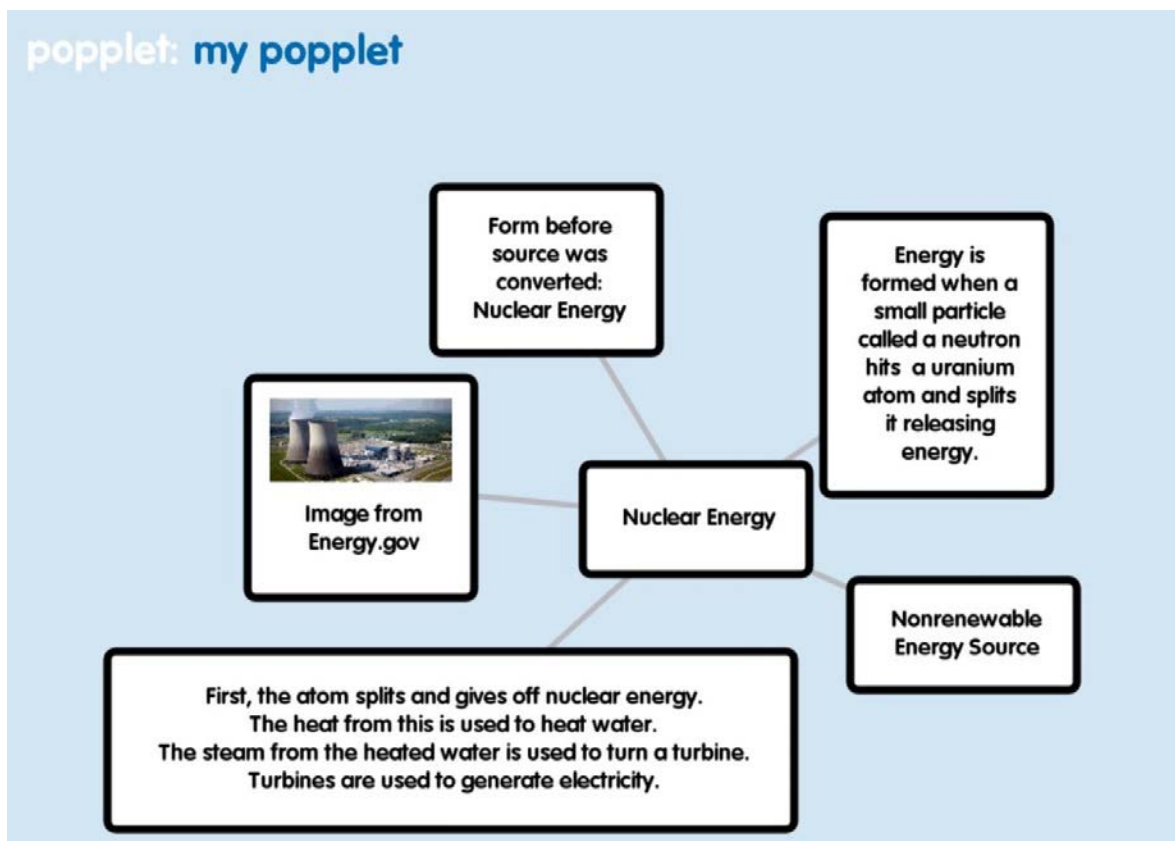
5. Refer to the coin battery and LED electrical circuit as an example while you complete the next steps. As a group examine the flashlight given to you by your teacher. Use the Educreations app to document how you predict that energy is converted between forms. Each group member should record this prediction in their Launch Log.
6. Create a plan that your group will use to carefully dismantle the flashlight to identify its parts. Agree on the roles of each team member.
7. Follow the plan that your group created. As you dismantle the flashlight, check to see if your prediction about energy conversions seems accurate. Update any changes to the prediction as you observe the parts of the flashlight.
8. Share the Educreations project as a group as your teacher directs.

Part 2 – Energy Sources

1. In Part 1 the electrical energy required to light the LED and light bulb was stored as **chemical energy** in the batteries. The energy conversions that you observed in the two light energy examples illustrate how energy is converted from sources close to your home and transmitted to where you live. Refer to the images below.



- In Part 2 you will learn about energy sources that generate large amounts of electricity for homes and businesses. These energy sources can be **renewable** or **nonrenewable**. Renewable energy sources can be easily replenished while nonrenewable energy sources cannot.
- The following example shows information about nuclear energy:



4. In pairs or a small group, follow your teacher's directions to research one of the following energy sources:
 - Oil (petroleum)
 - Natural gas
 - Coal
 - Biomass
 - Geothermal
 - Hydropower
 - Wind
5. See the sample popplet above for an idea of how to organize your research. Include the following information:
 - Name of energy source
 - How the energy source was formed
 - How the energy source generates electricity
 - What form the energy is before it is converted to electrical energy (mechanical, chemical, light, thermal, electrical, nuclear)
 - Is the energy source renewable or nonrenewable?
 - Image of the energy source (illustration or photograph)
6. Share and discuss your findings with your class as directed by your teacher.

Going Further

If directed by your teacher, research the main energy source in your community. Then summarize this information either as a digital presentation using an app such as Educreations or Popplet Lite. You may also create a resource to teach younger students about energy production in your area.

Conclusion Questions

1. How are the energy sources you learned about alike? Explain.
2. How are the energy sources you learned about different? Explain.
3. How well did your group predict the energy conversions in a flashlight? What changes did you make after you observed the dismantled flashlight?