

Build a Battery

Observe the flashlights

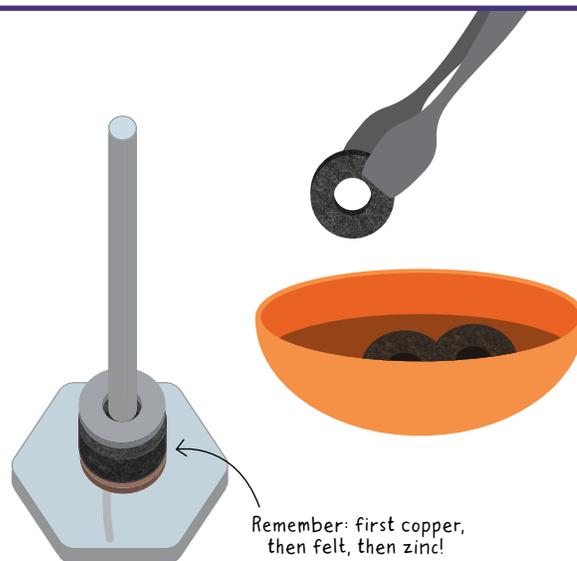
Turn both flashlights on and off. What do you observe? How are they different? Why do you think one turned on but the other didn't? *Hint: Peek inside the flashlights!*

Build a battery

First, slide a copper washer (the first copper washer should have a wire already connected to it) onto the clear acrylic rod.

Use the tongs to take a felt washer out of the bowl and give it a gentle squeeze, then slide the washer onto the rod.

Finally, add a zinc washer to the rod to make a stack. Repeat this pattern as many times as you want (or until you run out of materials).

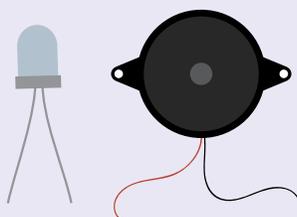
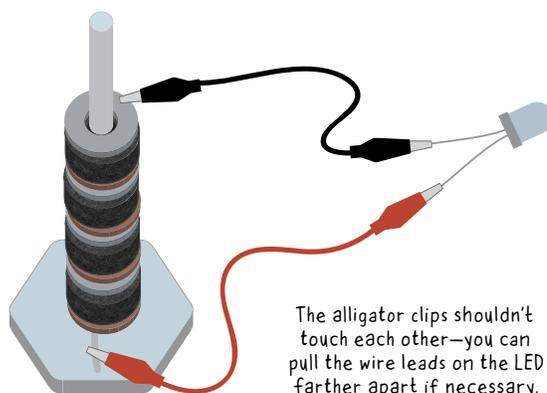


Test your battery

Choose the LED or the buzzer. Use a clip to attach the wire coming off the bottom copper disk to the longer wire lead of the LED or to the buzzer's red wire.

Attach the other wire to the shorter wire lead of the LED (or to the buzzer's black wire).

Touch the remaining end of the clip to the zinc washer at the top of the battery pile. What do you notice?

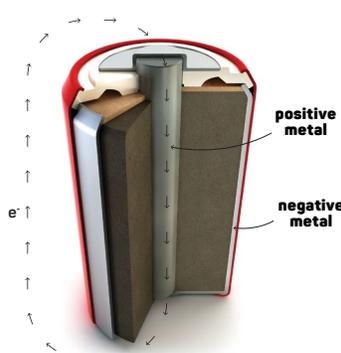
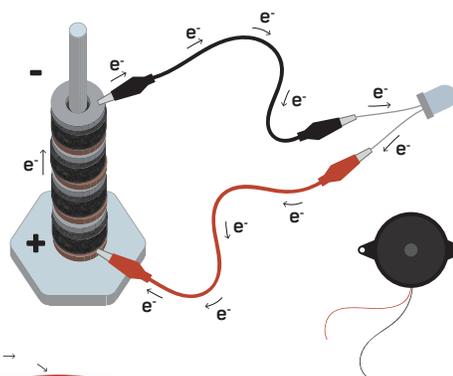


Let's keep experimenting! Try connecting the other object (buzzer or LED). Do you need to add more washers? Can you make the light brighter or dimmer? Can you make the buzzer softer or louder? What happens when you try using felt washers that are more or less soaked with vinegar? What other changes can you make to these materials?

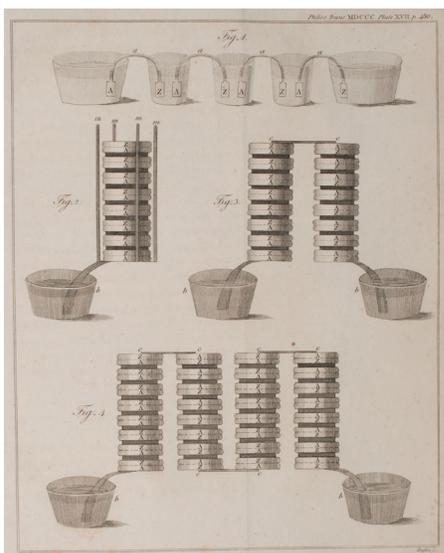
Chemists study how different materials behave and change, and how materials interact with each other.

You made a battery that converts chemical energy to electrical energy! The zinc loses tiny particles called *electrons*, which flow through the wire to the buzzer or light, and then back through the other wire to the copper washer. The copper gains the electrons, which then combine with the acid in the vinegar to create hydrogen gas. This process will continue and produce energy until all the vinegar in the felt washer dries up.

Commercial batteries work in a similar way. They use two different materials and an electrolyte solution to create an imbalance of charge and thus voltage. When the ends of the battery are connected with a wire, the voltage produces an electrical current. One AA battery produces around 1.5 volts, about the same amount as a pile made of three washers (one copper, one felt, and one zinc).



In a voltaic pile, electrons flow from zinc to copper. In a modern battery, electrons flow from the negative terminal to the positive terminal.



The voltaic pile was the first kind of battery. It was invented by Alessandro Volta around 1800. The word "volt" comes from Volta's name.

Chemists use tools to discover and make new things.

People are curious and creative. The first battery ever invented used a pile of metallic disks separated by salty cloth, similar to the one you made in this activity. This kind of battery is called a *voltaic pile*, after its inventor, Alessandro Volta. Around 1800, Volta realized that electricity could be generated through a chemical reaction. At the time, many scientists thought that only animals produced electricity, and Volta proved them wrong. He invented the battery before there were light bulbs or anything else that ran on electricity!

Most of us use chemistry for power nearly every day in things like our smartphones, computers, gaming devices, and cars. Can you imagine building a better battery?