

## Ice Tray Battery



Do you know what a voltaic battery is? You probably do! Voltaic batteries come in all shapes and sizes, turning chemical energy into the electrical energy we need to power our cell phones, iPods, tablets, cars... you name it! These batteries seem pretty complicated, but you can make a real voltaic battery right at home! Grab some vinegar, nails, copper wire, and an ice tray... you're in for a lesson in circuits you'll never forget.

## Materials

- Distilled white vinegar
- 5 pieces of copper wire
- 5 galvanized nails
- Ice tray
- 1 LED light
- Adult supervision

## Experiment

1. Wrap a nail with a piece of copper wire, leaving a section of wire extending from below the head of the nail.
2. Repeat Step 1 with the remaining 4 nails and 4 pieces of copper wire.
3. Fill 6 wells of an ice tray with distilled white vinegar.
4. Create a circuit by inserting each nail into a well of vinegar while placing the extended wire into the next well.
5. Place one "leg" of an LED light into the well with only a copper wire inside it and place the other LED "leg" into the well with only a nail in it. If the bulb lights up, you nailed it! If the bulb doesn't light up, flip the legs around!

# How Does It Work?

Batteries are comprised of two different metals suspended in an acidic solution. With the Ice Tray Battery, the two metals are zinc and copper. The zinc is in the galvanization of the nail, and the copper wire. The acid comes from the vinegar inside the ice tray. More specifically, the acid comes from the 4-8% of the vinegar that is acetic acid.

The two metal components are electrodes, the parts of a battery where electrical current enters and leaves the battery. With a zinc and copper set-up, the current will flow out of the wire and into the nail. The electricity also passes through the acidic solution inside the tray wells.

Once the Ice Tray Battery is connected to the LED, you create a complete circuit. As the electrical current passes through the LED, it lights the LED, and passes back through all of the components.