



Presented by



# ICE TRAY BATTERY

## Overview and objective:

Students will use basic chemical techniques to make a voltaic battery.

## Major concepts:

**Electrode** – a conductor through which electricity enters or leaves an object, substance, or region.

**Circuit** - a roughly circular line, route, or movement that starts and finishes at the same place.

## WHAT YOU WILL NEED:

- Distilled white vinegar
- 7 pieces of copper wire
- 7 galvanized nails
- Ice tray
- 1 LED light  
(We had to do a little searching before finding ours at Radio Shack)
- Adult supervision
- Safety goggles



Batteries are made of two different metals – or **electrodes** - suspended in an **acid solution**. With this experiment, our metals are the copper (wire) and the zinc (galvanization of the nail). The acid is contained in the vinegar.

The electrodes are the parts of the battery where electrical current enters and leaves the battery. With this setup, 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 your battery is connected to the LED, you complete the **circuit**. As the current passes through the LED, it lights it, then passes back through all the battery components.



### Procedure:

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 nails and pieces of copper wire.
3. Fill 8 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 prong of an LED light into the well with only a copper wire inside it and place the other LED prong into the well with only a nail in it. If the bulb lights up, you nailed it! (if not, flip the LED around)



### Exercises:

1. Vary the number of nails and wells filled to see if it has an impact on the brightness of the bulb.
2. Vary the gauge of the copper wire and/or size of the nails to see if this has an impact on the bulb lighting.

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