

## Lemon Battery

Lesson Title: *The Transfer of Energy 2: Electrochemistry*  
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Name: \_\_\_\_\_

Conduct the Lemon Battery experiment and then answer the questions that follow. If you need assistance answering the last three questions, go to the Lemon Battery experiment on the Hila Science Camp website at:

[http://www.hilaroad.com/camp/projects/lemon/lemon\\_battery.html](http://www.hilaroad.com/camp/projects/lemon/lemon_battery.html)

### Lemon Battery Experiment

- Insert a copper penny into one of the precut slits in your lemon.
- Insert a galvanized nail near the other end of the lemon. Make sure the nail and the penny do not touch.
- Attach an alligator clip to the penny, and insert the other end into the positive terminal of the voltmeter.
- Attach an alligator clip to the nail, and insert the other end into the negative terminal of the voltmeter.
- Record the voltage observed using a voltmeter. Your teacher should have one or more of these that you can use.
- Join with one or two other students to combine your lemon meters. Hook up two or more lemon batteries in series to the same voltmeter. That is, rather than attaching the negative (nail) end into the voltmeter, attach it to the positive end (penny) of another lemon, and connect the negative end of this second lemon into the voltmeter. Record what is observed.

Now answer these questions and be prepared to discuss your answers with the class:

1. What voltage did you record?
2. What voltage did you record for a second lemon battery hooked up in series?
3. What characteristics of the lemon, nail, and penny could be made to increase the voltage?
4. What characteristics of the lemon, nail, and penny could be made to decrease the voltage?
5. Could a lemon battery power a light bulb?