Building a Battery

For this project you will need:

- Your own multimeter
- Some wire and Assorted junk

Your task is to build your own battery, from scratch (meaning that your battery may contain nothing that was commercially manufactured to be part of a battery). We will test these batteries in lab, with a little bit of a competitive twist.

A battery is a type of voltage source that converts chemical energy directly into electrical energy. A *battery* consists of two or more *voltaic cells* (or *galvanic cells*) connected together to produce a voltage that is greater than the voltage produced by the individual cells. A cell typically consists of two different metals and a moist conductor or *electrolyte*. The voltage of the cell is determined by its chemistry. The voltage of the battery depends on the cell voltage and the number of cells in the battery. Above is a picture of a three-cell battery in which each cell consists of a copper penny, a zinc-coated (galvanized) nail, and a slice of potato whose juice serves as the electrolyte.

Specific requirements:

a) Your battery must be a *battery* (that is, contain at least two cells)
b) Your battery must generate at least 3.0 Volts, and you must demonstrate this to the class using your meter.
c) Your battery must be safe. Stick to simple, non-toxic materials, please. Think potatoes, lemons, vinegar—not concentrated acid!
d) You must tell the class about (1) how you made the battery, (2) what problems you had in making it, (3) what successes you had, and (4) what interesting thing happened while making it (such as, for example, *"I used Dr. Pepper for my electrolyte, and what was interesting is that I planned on using Coke, but Coke did not produce much voltage, and Pepsi produced more, but for some reason Dr. Pepper really generated the voltage."*) Photos of things you tried, or of the parts of your battery (if they are not all visible) are helpful.

If you meet all of the above requirements, you will receive a grade of 82.5% **B** (80% **B-** if your class discussion is missing the key points). If your battery will also *do something* beyond making a reading on your meter (for example, if it will light up some kind of light that you brought, or make something run that you brought) you will receive a grade of 95% **A**. And the student whose battery is voted BEST by the class (one student one vote; the instructor also gets one vote) will receive a 5-point bonus for a maximum grade of 100% **A+**.

NOTE—your battery, and any "thing" for your battery to "do", must be entirely your own; no sharing between students of materials or equipment of any kind. This is not a team project.

If you do not meet all of the above requirements, but your "battery" will generate a voltage, you will receive a grade of 62.5% **D**.

If the thing you made will not generate any measureable voltage, or if you do something unsafe, then no credit for the project.

You will find an abundance of material in books and on the internet about homebuilt batteries and cells.

Battery Project Grade Sheet (print this out)

NAME**_____**

- ❑ Battery contains at least two cells
- ❑ Battery generates at least 3.0 Volts, demonstrated class using your meter.
- ❑ Battery is safe.
- ❑ Explained to class
    - How you made the battery
    - What problems you had in making it
    - What successes you had
    - What interesting thing happened while making it
- ❑ Battery runs a _____
- ❑ Battery voted #1!

BATTERY PROJECT GRADE_____