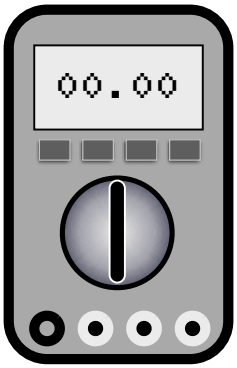
PhyzLab Springboard: The Lemon Battery



digital multimeter

C- or D-cell

ignitor cell

N-cell

• Prelab Demo •

COMMERCIAL BATTERIES: SIZE AND VOLTAGE

1. a. What is the voltage measurement for the "normal" (C- or D-cell) battery?

b. What is the voltage measurement for the "giant" (ignitor cell) battery?

c. What is the voltage measurement for the "tiny" (N-cell) battery?

d. What relationship—if any—is there between the size of a battery and its voltage?

2. LEAD SWITCH

Does switching the leads of the multimeter have any effect on the voltage reading? If so, what?

• Research •

1. Read the PhyzGuide on batteries and current.

2. What were the **critical ingredient(s)** of Galvani's and Volta's batteries?

• Apparatus •
___lemon half or wedge
___2 galvanized (zinc-coated) nails
___plate or bowl
___**your ingenuity and resourcefulness**

For clean-up:
___access to water
___access to paper towel
Rinse and return plates and nails when done. Discard used fruit.

• Task •
3. Use the apparatus to design a battery that will register 0.5 V or more. When you think you have the correct design, ask the instructor to make a voltage measurement. When you achieve success, describe your successful design.

V = _____

• Diagrams •
4. Draw a non-working and a working design. Label each diagram.

• Challenge •
5. What is the highest voltage you can attain? Hint: How did Volta achieve high voltages?

V = _____

(Previous records — 1993: 6.3V, 1999: 7.29V)