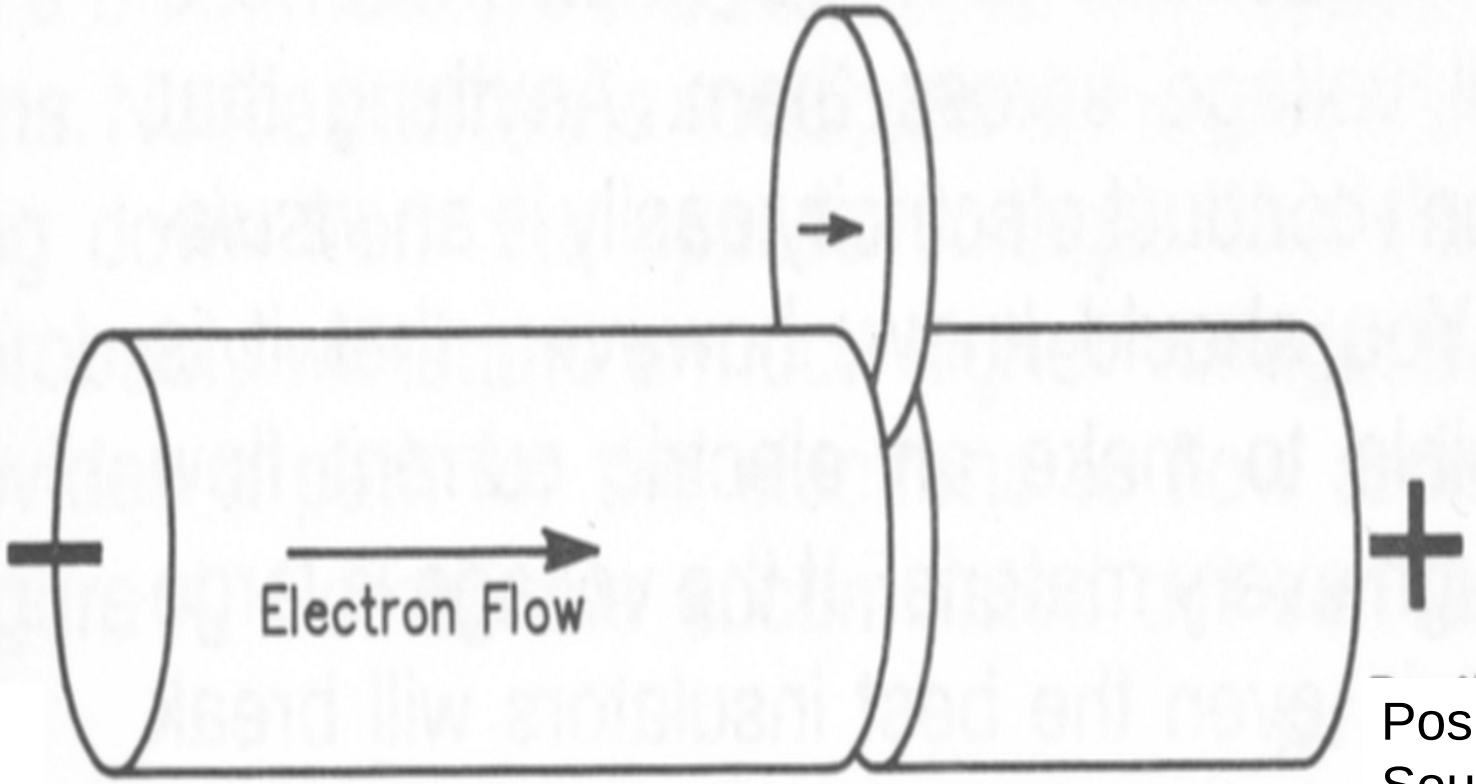
Measuring Current

A current of 1 Ampere is the same as counting 6,240,000,000,000,000,000 electrons in one second.



Negative Source

Positive Source

Measuring Current

- There is a greater potential for meter damage when measuring current than with any other function.
- Just as in voltage, there are two kinds of current associated with the voltage, AC and DC.
- This meter will only measure DC current, more expensive meters will measure both currents.
- To measure current, the **VOM must be inserted *into* the circuit** so that the current flows ***through*** the meter.

Measuring Current

- There are two current ranges, high – up to 10 amps, and low – 200 milliamps (0.2 amps) and below.
- Internal fuses provide some meter protection for over current situations.
  - Because there is such a wide range between the current scales, there are two physical probe jacks for the two ranges
  - This allows for better protection, a hardy fuse to handle up to 10 amps of current and a more fragile fuse to protect the sensitive circuits needed to measure small currents.
  - Don’t count on the fuses to protect the meter!

Measuring Current

- **CAUTION!!!!!!!** There must be some resistance in the circuit or the current flow through the circuit will be the maximum the source will produce, **AND THIS CURRENT LEVEL COULD DAMAGE THE VOM!**

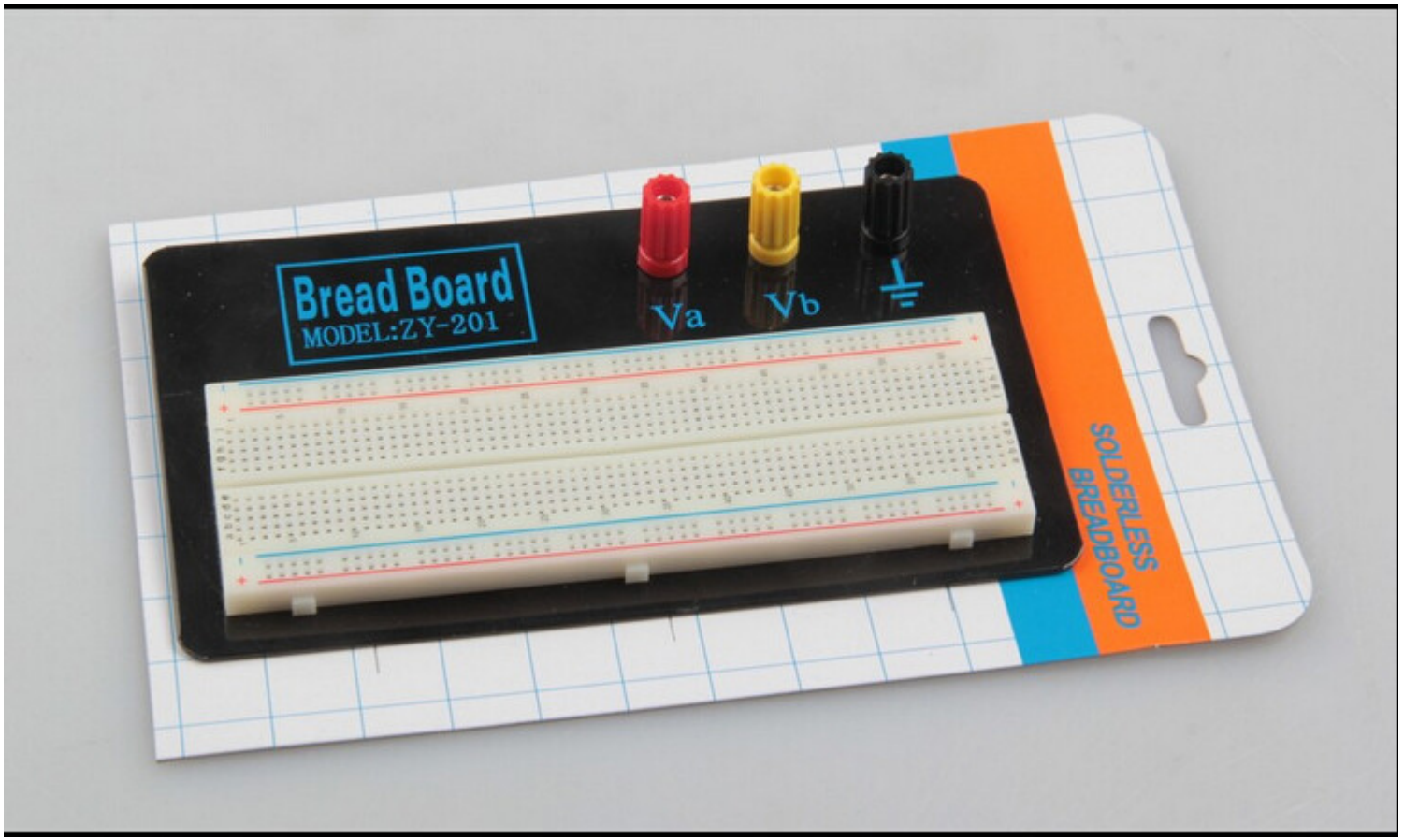
- In other words, **DO NOT CONNECT THE VOM PROBES DIRECTLY ACROSS THE BATTERY POLES IN THE CURRENT MEASURMENT FUNCTION!**

Measuring Current

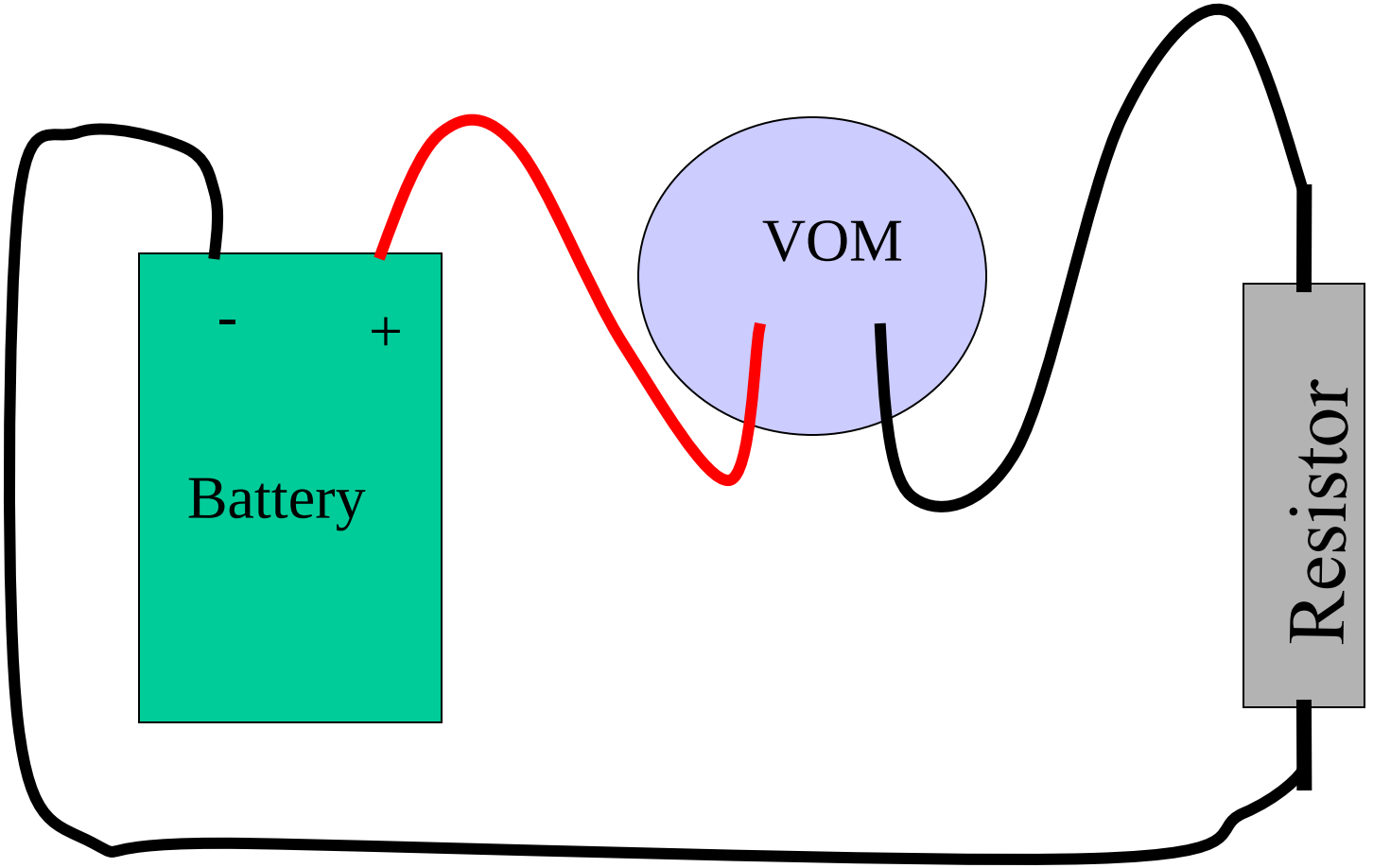
- We will be demonstrating some concepts during the current measurement exercises that will be covered in more detail later, so be patient, it will all come together in the end.

- In the following exercises you will use various resistors to limit the current flow in a simple circuit.

The Proto Board

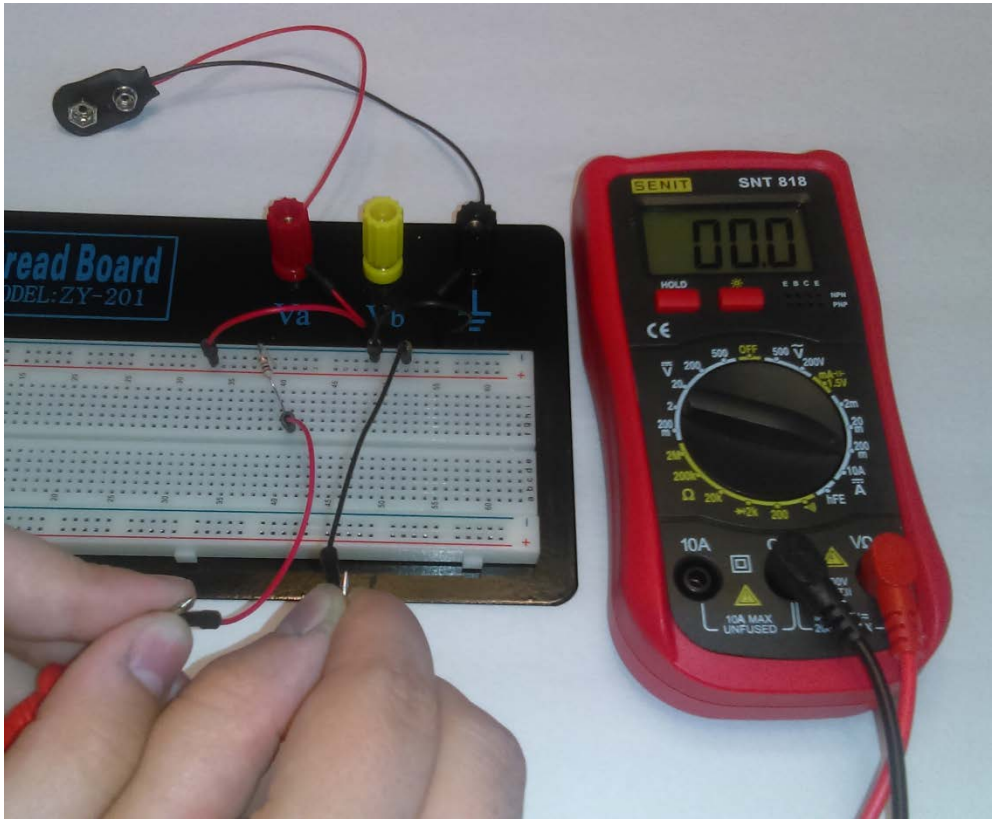


Measuring Current
Basic Circuit



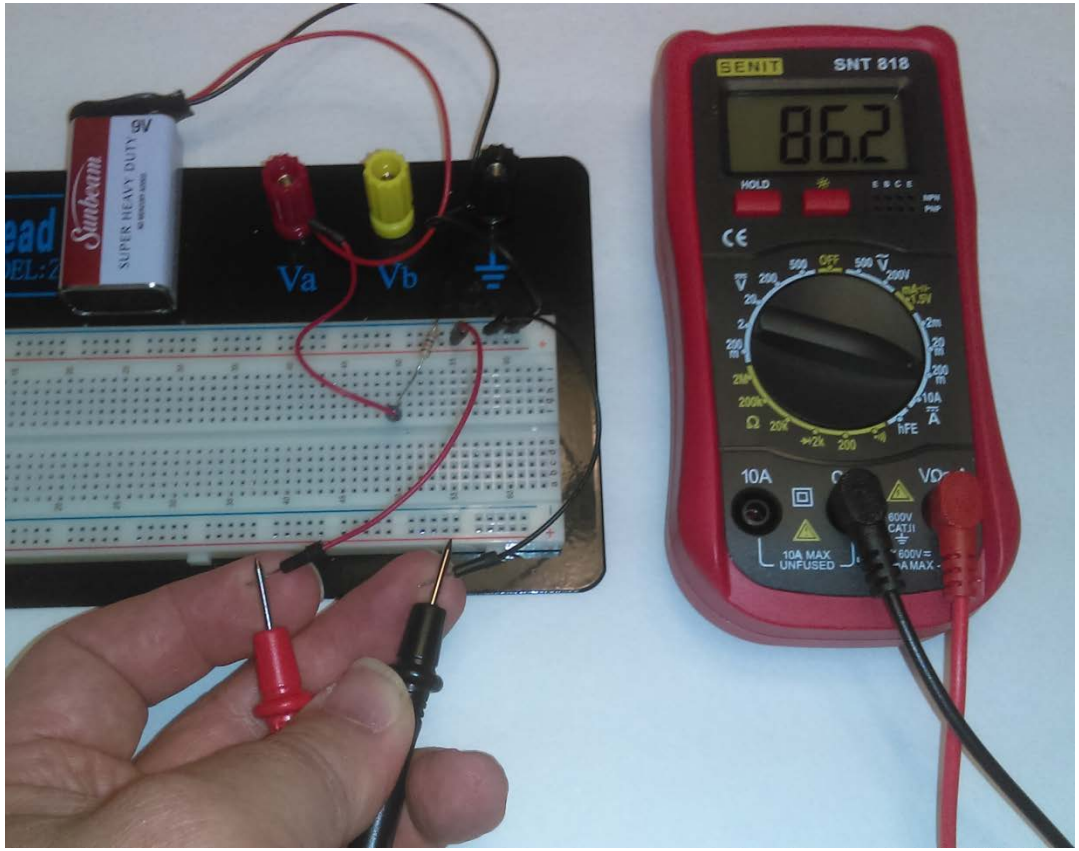
First Current Measurement

- Set up the circuit using a 100 ohm resistor (brown, black, brown).
- Connect a wire to the + power source, connect another wire to the top end of the resistor (the non grounded end).
- Set VOM current scale to 200 m. (m here is short for mA)
- Without connecting the battery, practice touching the VOM probes to the exposed wire ends.

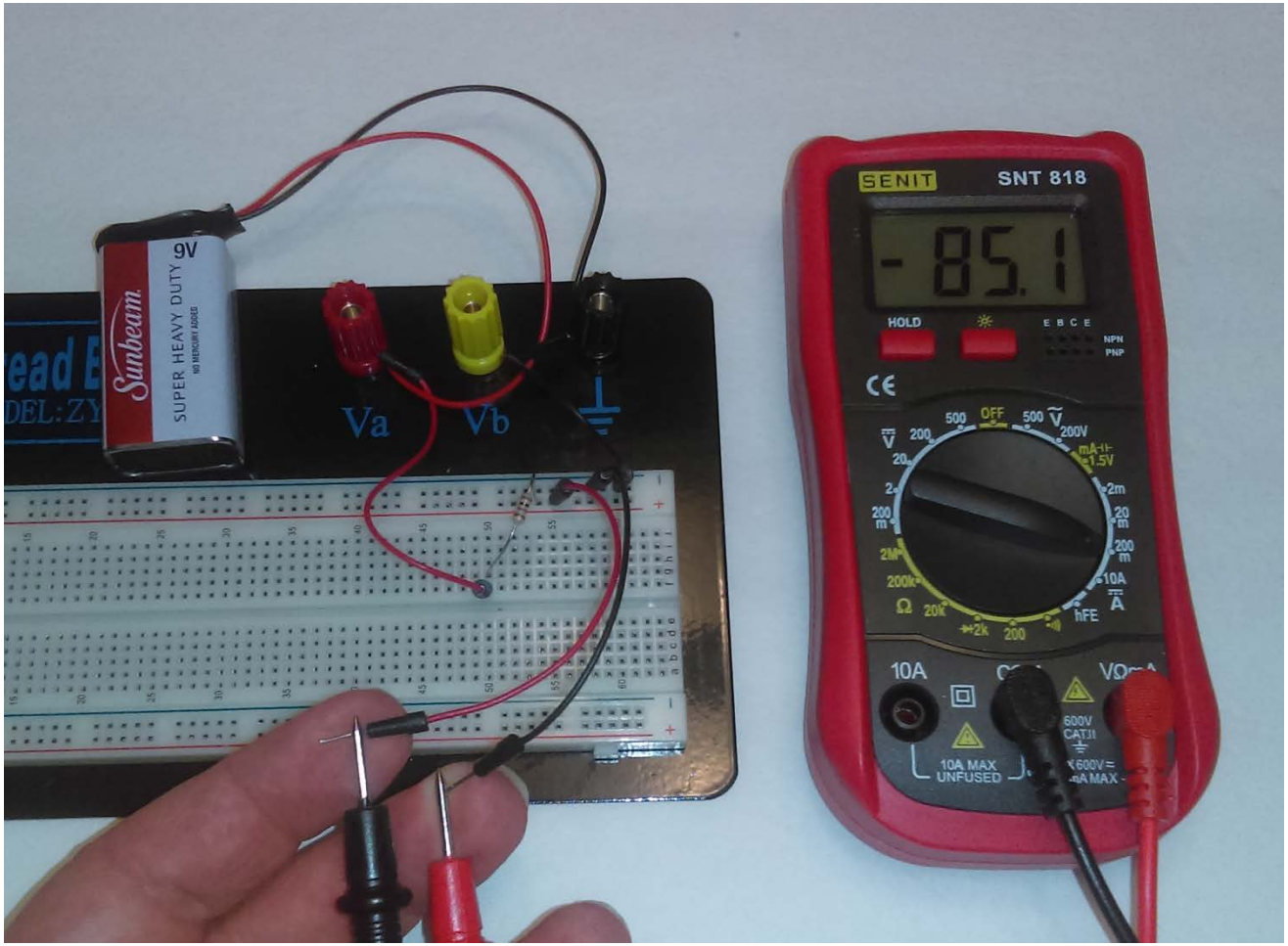


First Current Measurement

- Connect the battery.
- With the VOM set to the 200 m current scale, touch the black lead to the wire hooked to the top side of the resistor.
- Touch the red lead to the lead coming from the + side of the battery.
- Note the VOM reading.



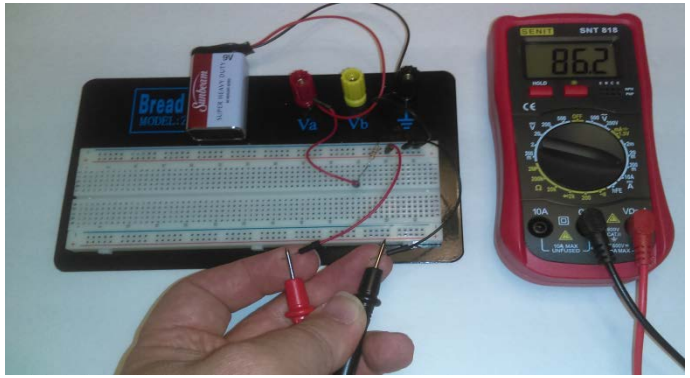
First Current Measurement



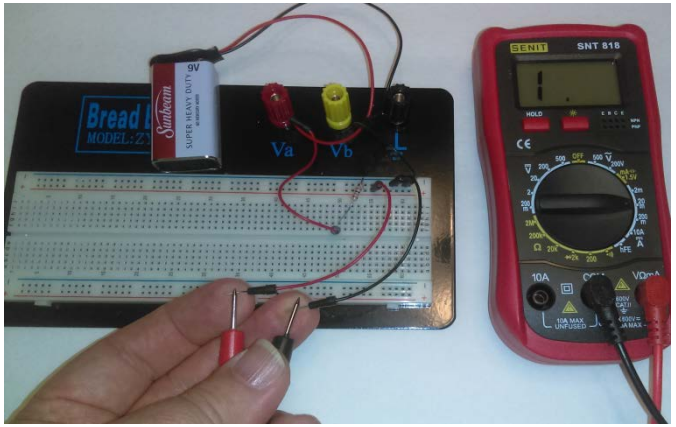
- Now reverse the VOM leads and note the reading.

First Current Measurement

- Return the VOM leads so that the **red** is connected to the battery.
- Change the VOM current ranges down and note the display readings
- What is the best range for measuring the current from a 9 volt source through a 100 ohm resistor?



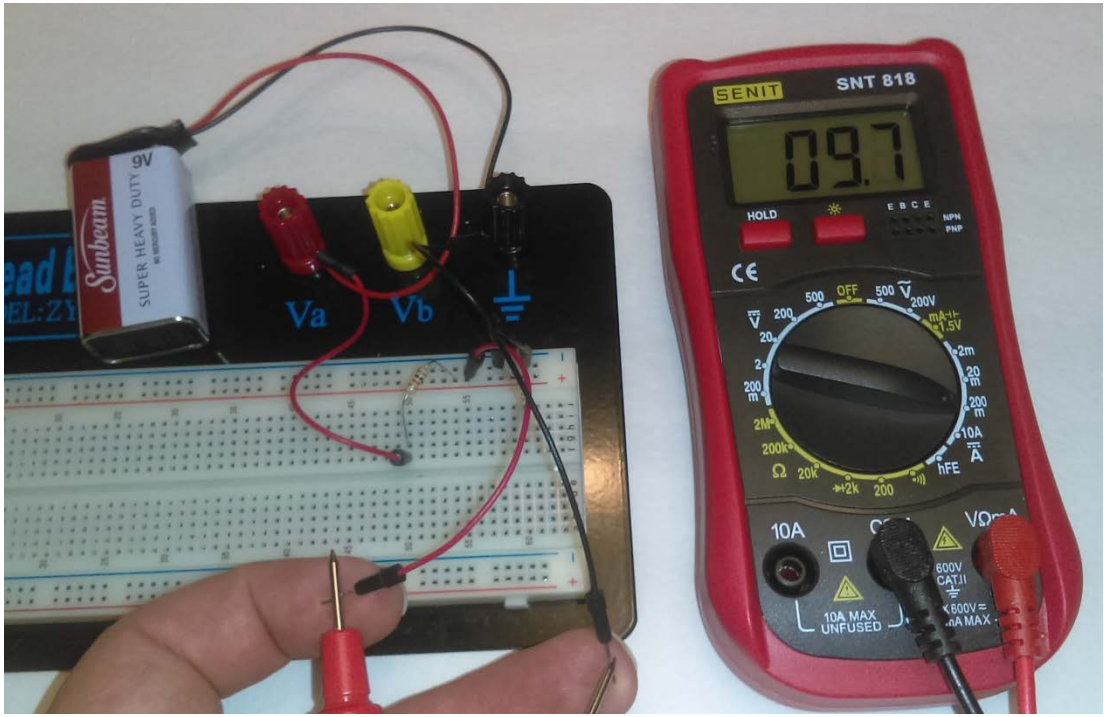
200 m Range



20 m Range

Measuring Current

- Wire the circuit with a 1k ohm resistor (brown, black, red).
- Measure current using the 200 m range.



Measuring Current

- What is the best range to measure the current through a 1 k-ohm resistor?

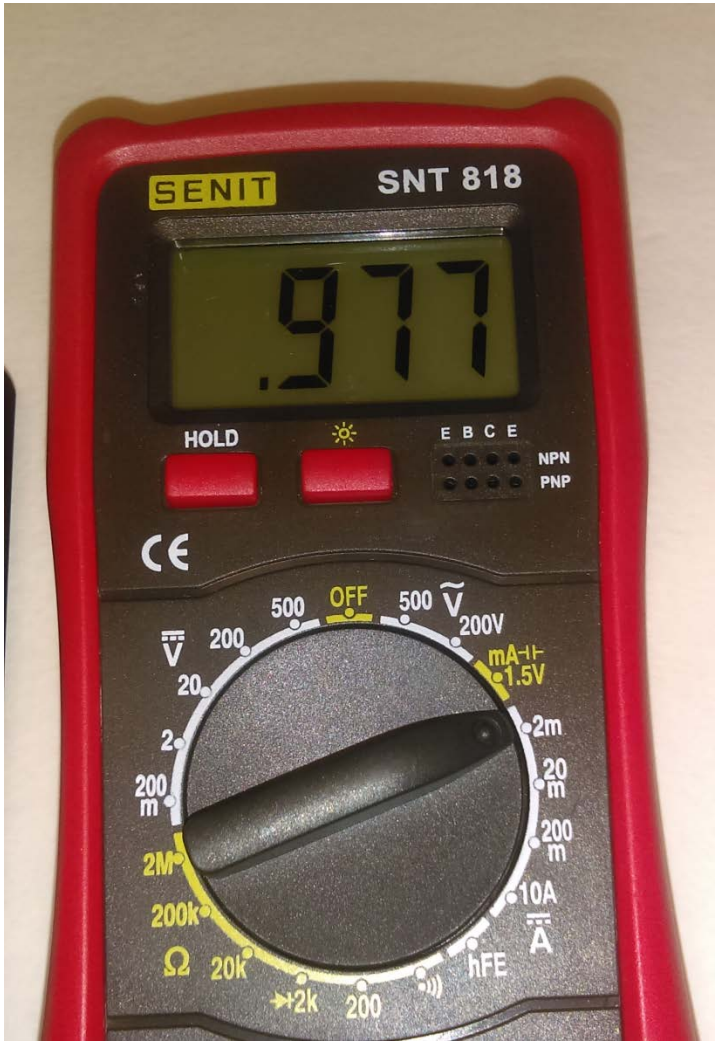
200 m

20 m

2m

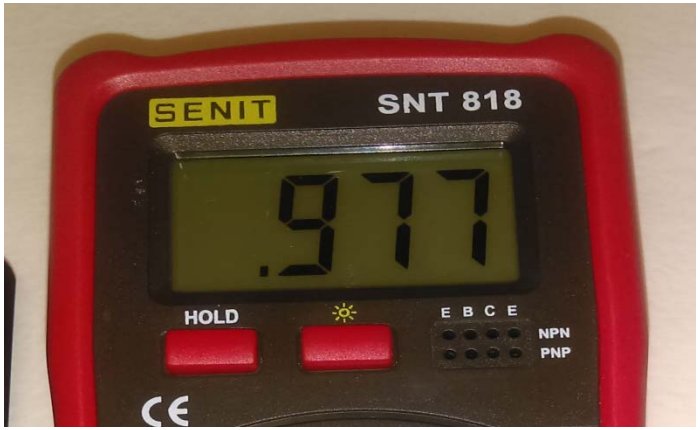
Measuring Current

- Wire the circuit with a 10 k-ohm resistor (brown, black, orange).
- Measure current with the 2m range.



Measuring Current

- What is the best range to use to measure the current through a 10 k-ohm resistor at 9 volts?



2m

200 u

Measuring Current

- Wire the circuit with a 100 k-ohm resistor (brown, black, yellow).
- Begin with the 200 m range, and measure the current at each range.
- What is the best range to use to measure the current trough a 100 k-ohm resistor at 9-volts?

200m

20m

2m