

PHY 202/182 Lab Instructor notes
Lab 2: Direct Current and Resistors
Spring 2004

- Students have not had any circuits in lecture. Introduce voltage, current, and resistance using water in a pipe as an analog. Discuss units for each.
- I might skip equivalent resistances in lecture. In that case, you will have to introduce the idea.
- In the lab manual, there are several places where students must compare two numbers (currents, for instance). Discuss what one might expect, based on the tolerance ratings for the resistors.
- Tell the students that they should not connect the meter in “Ohms mode” to a powered circuit.
- If the LED is connected directly to the power supply (without the current-limiting resistor), or the voltage is too large, then it will die. Check circuits (and turn down power supply voltage). I had to replace seven LED’s last time; this made me very upset.
- The resistance of LED as measured by the DMM is infinite. This is intended to be a “head scratcher” problem: try to let the students figure this out without giving them the answer.
- In the LED part of the lab, I define zero volts and V_1 and V_2 are defined with respect to this. This would be a good time to talk about potential energy only being defined to within a constant. For circuits, the definition of $V = 0$ is arbitrary.
- Before the students leave, check their calculation of the resistance of the light bulb. It should be about 250 to 300 ohms.
- In LED and light bulb section, students often don’t see that they should use $V_2 - V_1$ as the voltage across the resistor. Check this.
- The wires on the alligator clips are a bit thin and they break too often. If you have a circuit that “doesn’t work” check that the alligator clips have continuity.
- Before you leave, make sure that the multimeters are turned off.