Equipment list

Per Table,
-One Extech power supply with current limit dial set 1/3 of max (about 350mA) and limit dial removed, voltage turned all the way down
-One red and one black patch cord connected to the power supply
-One 150 ohm resistor with alligator or Fahrenstock clips on both ends
-One bayonet base bulb in holder
-three clear rulers
-one multimeter
- 2-foot piece of nichrome wire, can just use 3 or 4 for the room.

Setup: power supply connected to multimeter, used as an Ammeter with 20A fuse, and in seires to 150ohm resistor.

Ohm's Law

1. Connect the commercial resistor (not the light bulb) to the power supply in a closed single loop circuit as shown above ..(as you would connect a lightbulb if you wanted to make the bulb light). Take 5 readings of voltage (across the range 1 to 9 volts) by adjusting the **VOLTAGE** output of the power supply. Read the voltage from the display on the power supply and read the current from the multimeter as your instructor shows you. Record them in the table below. Either take the readings fairly quickly or turn off the power supply between measurements. Try not to let the resistor get warm.

Voltage (V)	Current (Amps)	Resistance (R)

2. The resistance of any electrical element including a light bulb or resistor is defined to be the voltage across the resistor divided by the current through the resistor. Calculate and record the resistance R=V/i for each data point in your table above. Calculate the average of your calculated resistances. Show your work and record the average here.

3. Does the resistance of the resistor seem to be constant or does it change in some consistent way?

4. Graph voltage versus current for the resistor. Be sure to label the axes. Draw a best-fit line through your data. Calculate the slope of the best fit line. Show your calculation below. (Voltage vs. Current means that voltage goes on the vertical axis and current goes on the horizontal axis).

5. Based on the best-fit line, what is the value of your resistor? How did you find it?

6. Substitute the light bulb for the resistor in the circuit. Take 5 readings of voltage (across the range 1 to 6.75 volts) and record the associated current at each voltage.

Voltage (V)	Current (Amps)	Resistance (R)

7. Calculate and record the resistance R=V/i for each data point in your table.

8. Does the resistance of the light bulb seem to be constant or does it change in some consistent way? Explain.

9. Graph voltage versus current for the light bulb. Be sure to label the axes.

10. You should have found that the resistance of a light bulb increases as the current through it increases. That is, the resistance of the light bulb is not constant. Recall that the resistance of the commercial resistor was constant. Compare the graphs for the light bulb and resistor. What characteristic of the graph for the bulb tells you that the resistance is not constant?

11. Finally, obtain a piece of wire, roughly 2 feet long, from the front of the class . Always before, we have treated wire as having zero resistance. We're going to test that now. Connect the wire in your circuit in place of the lightbulb, and take 3 readings of voltage and current, **going no higher than 1.0 Volts on the power supply.** Record the data below.

Voltage (V)	Current (Amps)	Resistance (R)

12. How does the resistance of this piece of wire compare with the resistance of the lightbulb used earlier?