Lab 34-2: **Ohm's Law**

Purpose:
1. To determine the relationship between voltage and current for a resistor.
2. To determine the resistance of an unknown resistor.
3. To become familiar with connecting and reading ammeters and voltmeters.

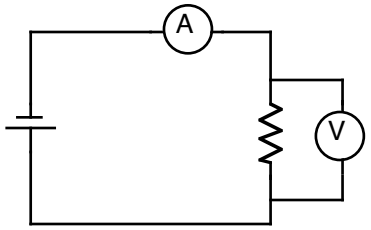
Materials:

1 power supply	2 resistors	6 connecting wires
1 ammeter	1 voltmeter	2 alligator clips

Warnings: The resistors you are using can become very hot if there are large currents passing through them for any length of time. To prevent burning your fingers, and/or destroying the resistors and meters, observe the following precautions:

1. *Always start with low voltages and currents, and work your way up. Stop if something starts to really heat up.*
2. *If you smell smoke, immediately disconnect the power supply.*

Procedure:
1. Turn on your common sense. Then set up the circuit as shown.



2. Vary the power until you are reading about .05 A in the resistor. Record the exact current and voltage. Remember to record the voltage and current as measured by the portable meters.
3. Repeat #2 for current readings of up to 0.5 A at .05 A intervals.
4. Repeat for a second resistor, recording your data in the table below.

Data:

Resistor #1				Resistor #2			
Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps

Calculations:
1. For each set of data, make a graph of voltage vs. current. (Put the graphs on one piece of paper: to type in the second set of data, under "Data" choose "New Manual Column" and call it "Voltage2".) After entering the other voltages, on the graph, click on the vertical axis and choose "More..." to turn on both voltages and turn off the current. These graphs should be straight, so put in the regression lines.

2. On each straight line graph, write the equation that describes the relationship voltage and current. Make photocopies as needed.

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Questions:

1. For the resistors you were given, how does the current in a resistor depend on the applied voltage?

2. Define resistance, both in words and mathematically.

3. Did the resistors become charged in anyway; i.e., do they become positive or negative? Explain.

4. Define each item listed below.
   a. voltage

   b. current

   c. resistance

5. Imagine you have a 20 Ω resistor with a potential difference of 10 volts across the ends.
   a. What is the current in the resistor?

   b. How much charge would pass through the resistor in one minute?

   c. How many electrons would pass through the resistor in one minute?

   d. If there was 40 V across the resistor, what would be the current?

6. How much voltage would it take to create a current of 0.75 A through a 3 Ω resistor?

7. What is the resistance of something if 5 V produces a current of 0.8 A?