Circuits Experiment #1: Ohm's Law

Purpose
The purpose of this lab will be to investigate the three variables involved in the mathematical relationship known as Ohm's Law.

Equipment Needed
- Resistor pack w/ required resistors
- (2) D-cell batteries
- Battery holder
- (3) wire leads
- Digital multimeter

Part I: Measuring Resistance (battery not needed)

1. Determine the resistance of each resistor using the coding chart included with this lab and organize them according to the table
2. Set up the multimeter and resistor to measure the resistance. Set the red jack into the voltage/resistance port and the black jack into the black com. You may have to adjust the resistance using the dial to measure the resistances.
3. Measure the resistance of the resistors in ohms and place your values in the table. If they are not close, you coded the resistor incorrectly.

Part II: Measuring Current (battery required)

1. Set up the multimeter and resistor in series with the battery pack to measure current. Set the dial to the mA DC setting and plug the red jack into the mA port.
2. Record the current flowing through the resistors in your table in milliamps (mA).

Part III: Measuring Voltage (battery required)

1. Setup the multimeter and resistor in parallel with the battery back. Set the dial to the 2V DC setting and make sure the black jack is in the black com and the red jack is in the voltage/resistance port.
2. Measure the potential difference (voltage) across each of the resistors and record these values in the table

Clean-up

Disassemble the apparatus, turn off the multimeter and place the resistors back in the bag.
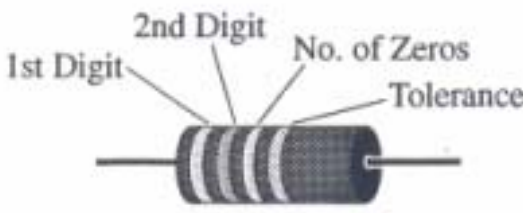
Postlab:

1. Calculate the V/R by dividing the voltage by the resistance of each resistor.
   - Use the voltage stated by the multimeter (in Volts)
   - Use the resistance stated by resistor, not from the multimeter (in Ohms, not kΩ)

Resistance	Resistance Check	Voltage (V)	Current (mA)	V/R
4.7 Ω				
10 Ω				
22 Ω				
47 Ω				
68 Ω				
100 Ω				
470 Ω				
1 kΩ				
2.2 kΩ				
10 kΩ				

2. Graph current (y-axis) in milliamps (mA) vs. resistance (x-axis) in ohms on the graph paper included with this lab. Use a pencil and label your graph appropriately. Connect the dots to complete the curve.

3. Ohm's law states the current is given by the ratio of voltage/resistance. Does your data concur with this?

   3. What is the relationship between current and resistance?

Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Gray	8
White	9

2nd Digit

1st Digit

No. of Zeros

Tolerance

Fourth Band	
None	±20%
Silver	±10%
Gold	±5%
Red	±2%

Resistor Chart