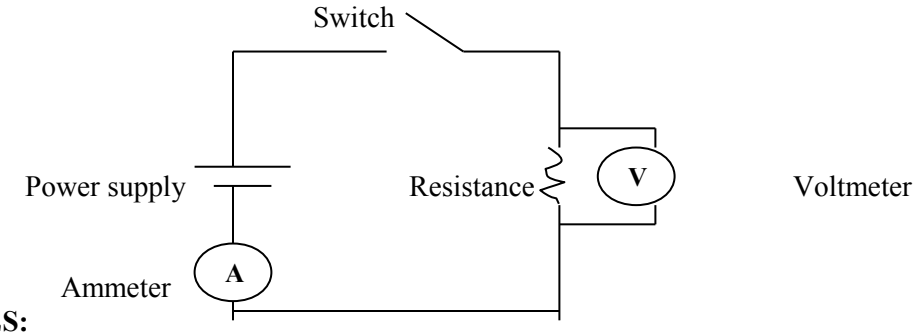
Ohm's Law

NAME_____

Ohm's Law states that if the temperature of the resistance remains constant, the electric current (I) flowing in a circuit is directly proportional to the applied voltage (V) and inversely proportional to the resistance (R) of the circuit. In other words, **I = V / R**



OBJECTIVES:

During this investigation you will determine the values of resistors by applying Ohm's law.

PROCEDURES:

1) Connect the source of current, the switch (opened), the ammeter, and the 2-Ω resistor (R_1) in series. Place the voltmeter in parallel across the resistance.

2) Make sure I have checked your circuit before you close the switch. These meters are very expensive and can easily be damaged and ruined by improper use.

3) Close the switch, and quickly read the meters. Open the switch as soon as the readings are completed.

4) Calculate the value of the resistor in ohms using Ohm's Law and enter this value in the table.

5) I will manually adjust the voltage to a higher reading so wait at this point until everyone has completed this step.

6) Once the voltage has been changed to a higher value, close the switch and once again read the meter values. Calculate the resistance, R_1 again.

7) I will once again adjust the voltage back to nearly the same voltage as before so hold on. Make two measurements of the resistance of the 3-Ω resistor (R_2). Repeat with a 5-Ω resistor. Enter all values in the table provided.

DATA & CALCULATIONS:

Resistor #	Printed Value of Resistor (with tolerance %) (Ω)	Voltage (V)	Current (A)	Experimental Resistance [= V / I] (Ω)	Experimental Error (%)
R_1					
R_1					
R_2					
R_2					
R_3					
R_3					

QUESTIONS:

1) Describe the proper placement of a voltmeter and an ammeter in a circuit.

2) Compare the printed values of your resistors with the calculated values. Be sure to mention whether or not each calculated resistance was within the tolerance range of the printed values.

3) If your values were not within the tolerance range of the printed values, suggest some reasons for the difference.

4) A 60-W light bulb has a voltage of 120 volts applied across it and current of 0.5 amperes flow through the bulb. What is the resistance of the light bulb?

EXTRA:

5) A piece of copper (resistivity = 1.72×10^{-6} ohm-m) 1.5 m long with a cross-sectional area of 15 cm^2 is placed across a potential difference causing a current of 4500 A.
What is this potential difference?