

Objective: Derive Ohm's Law.

Materials:

- Multimeter
- Snap circuits kit (3 resistors (1 kΩ, 5.1 kΩ, 10 kΩ), 1 switch, 1 battery holder, 2 3-snap connectors, 2 4-snap connectors)
- 2 AA batteries

Procedure

1. Use the multimeter to measure the resistance of each resistor. Record these in the table.
2. Build the circuit at the right. Make sure the switch is off.
3. Use the multimeter to measure the voltage across the battery holder. $V =$ _____
4. Measure the current with the 1kΩ resistor in the circuit. Record it in the table.
5. Replace the resistor with the 5.1 kΩ resistor and measure the current. Record it in the table.
6. Replace the resistor with the 10 kΩ resistor and measure the current. Record it in the table.

Analysis

7. Are the current and resistance directly or inversely proportional? _____
 - a. Write the equation for this model. _____
8. Calculate the constant of variation of with each resistor. They should be almost the same. Record them in the table.
9. Find the average of the constant of variation. _____
 - a. Which of the measured quantities matches the value of the constant of variation? _____
10. Compare these with $\% \text{ error} = \frac{\text{theory} - \text{experimental}}{\text{theory}} \times 100\%$. $\% \text{ error} =$ _____
11. Replace the constant of variation in the model from step 7 with the variable for step 9a. _____
12. Rewrite the model so that there is no division. This should be Ohm's Law. _____

Resistor	Measured R	Current I	Constant of variation
1 kΩ			
5.1 kΩ			
10 kΩ			
		Average	