**LAB: Resistance and Ohm’s Law**

**Purpose:** To determine the relationship between the current through a resistor and the potential drop across it.

**Theory:** Define:

Potential Difference:

Current:

Resistance:



**Materials:**

* + - Variable power supply (we can alter the battery voltage in the simulator)
		- Voltmeter
		- Ammeter
		- Resistor (the resistance of a resistor can be changed in the simulator)
		- Connecting wires

**Procedure:**

1. Using the PhET simulator (I used the Lab option), construct the circuit as shown.
2. Click on the resistor and set it to 10Ω.
3. Click on the battery and adjust its voltage so you get a current of 0.10 A running through the circuit. Record the potential difference across the resistor from the voltmeter.
4. Click the battery and adjust the voltage so that the current increases to 0.20 A. Record the potential difference across the resistor.
5. Repeat increasing the battery voltage so that the current becomes 0.30A, then 0.40A, then 0.50A. Record the potential difference across the resistor each time.
6. Click on the resistor and change it to whatever you want. Repeat steps 3-5 for the new resistor.

**Observations:**

## Resistor #1 Resistor #2

|  |  |  |  |
| --- | --- | --- | --- |
| **Resistance****R (10Ω)** | **Current****I (A)** | **Potential Difference V (V)** | **V/I** |
|  | 0 | 0 |  |
|  | 0.10 |  |  |
|  | 0.20 |  |  |
|  | 0.30 |  |  |
|  | 0.40 |  |  |
|  | 0.50 |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Resistance****R ( )** | **Current****I (A)** | **Potential Difference V (V)** | **V/I** |
| Record the | 0 | 0 |  |
| resistance of | 0.10 |  |  |
| your new | 0.20 |  |  |
| resistor | 0.30 |  |  |
|  | 0.40 |  |  |
|  | 0.50 |  |  |

**Calculations:**

1. Calculate the ratio **V/I** for each pair of values. Record them in your table.
2. **Create a GRAPH, either by hand on paper or using a spreadsheet.** Plot the potential difference V (y-axis) against the current I (x-axis), for both resistors.
3. Draw a ***line of best fit*** for each resistor.

***BONUS:*** Calculate the slope for each line. What do you notice about the slope of the graph and resistance of the resistor?

**Discussion:**

1. Describe the **shape** of the V-I graph. What type of mathematical relationship exists between potential difference-V and current-I for a resistor?
2. Compare the values for **R**, **V/I**, and the **slope** of each line. What do you notice?

**Conclusion:**

State Ohm’s Law

Did you verify Ohm’s Law in your lab? Explain.

**Complete the lab and questions then share with me through Google Drive or send as an email attachment**