Student's Name

Professor

Course

Date

Ohms' Law

Introduction

Ohms law states that current flowing through the circuit is directly proportional to voltage, given that resistance will be controlled (Britannica). The law can be summarised using the following formula;

$$V = IR$$

Where;

V= the potential difference/voltage across the circuit

I= current flow

R= resistance

According to Ohms' law, the voltage and the current flowing through the circuit also increases. On the other hand, as the resistance increases, the current reduces, and thus current and resistance have an inverse relationship (Britannica).

A graph of voltage (V) against the current (I) will have a positive trend line where the gradient of the graph will represent resistance (R).

Materials

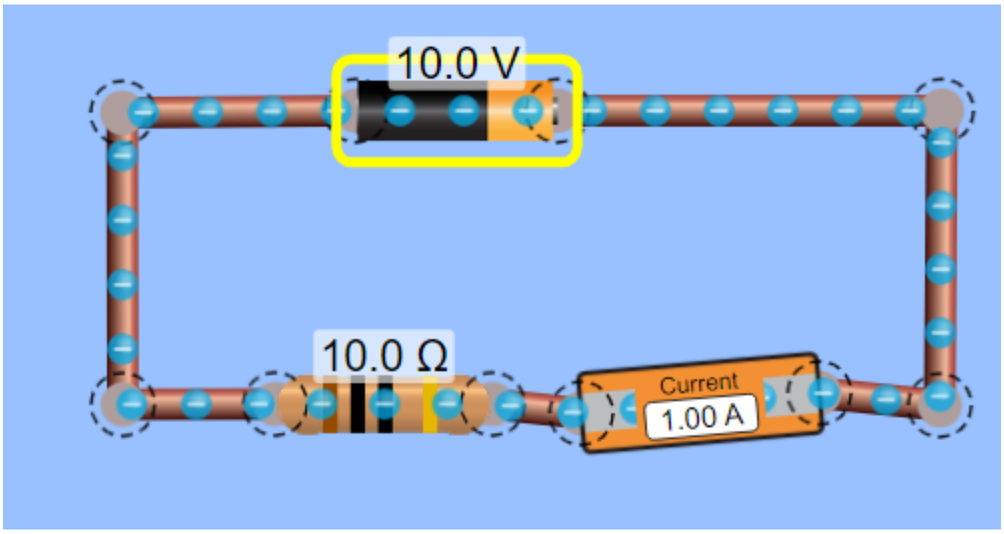
The experiment will be virtual, and thus, the following materials will be required;

-Web browser

PHET simulator (https://phet.colorado.edu/en/simulation/circuit-construction-kit-dc-virtual-lab)

Procedure

1. Launch the PHET simulator using the link given below; https://phet.colorado.edu/en/simulation/circuit-construction-kit-dc-virtual-lab
2. Arrange the simulation as shown by the image below; (note that resistance will be kept constant at 10 ohms in the entire experiment)



3. Set the voltage to 9 volts using the slider at the bottom of the window. Record the current readings (Ampere) as shown by the ammeter.
4. Repeat steps 3-4 two more times, recording the ammeter readings.
5. Adjust the voltage to 12V, record the ammeter readings, and repeat the process twice.

6. Set the voltage to 14V, 20 V, 23 V, 34V, and 41 V while recording the ammeter readings
7. Repeat step 6 two more times to ensure data accuracy.
8. Find the average current (A) based on the recorded data.
9. Plot a graph of voltage (V) against the current (I)

Data

Voltage (V)	**Current (A)**		
	Trial 1	**Trial 2**	**Trial 3**
9.0	0.9	0.9	0.9
12.0	1.2	1.2	1.2
14.0	1.4	1.4	1.4
20.0	2.0	2.0	2.0
23.0	2.3	2.3	2.3
34.0	3.4	3.4	3.4
41.0	4.1	4.1	4.1

Sample Calculations

Average current (I)

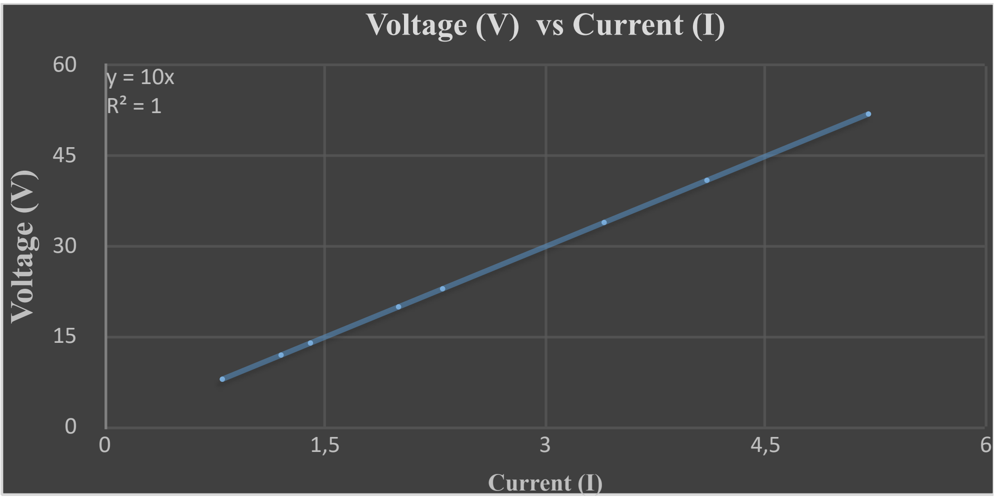
$$Average\ current\ (I) = \frac{Trial\ 1 + Trial\ 1 + Trial\ 1}{3}$$

$$Average\ current\ (I)(9V) = \frac{0.9 + 0.9 + 0.9}{3} = 0.9A$$

I used the same method to compute the average current for other trials, as shown by the processed data in table 2 below;

Voltage (V)	**Current (I)**
9.0	0.9
12.0	1.2
14.0	1.4
20.0	2.0
23.0	2.3
34.0	3.4
41.0	4.1
52.0	5.2

From table 1 above, it can be noted that as the voltage rises, current also increases. The data in table 2 can be plotted as shown below;



As the voltage increases, the current flowing through the circuit also increases. When the voltage is 9 volts, the ammeter reading is 0.9 A. When the voltage is 52.0 volts, the ammeter reading is 5.2 A. The slope of the above graph is 10, equivalent to the resistance (10 ohms).

Mathematically the slope of the graph can be written as;

$$Slope = \frac{V}{I} = R$$

Based on the equation above, the slope of the graph is equivalent to resistance (R); thus, the resistance of the above circuit is 10 ohms. The hypothetical resistance is equivalent to the real value and thus confirms Ohm's law.

Conclusion

Ohms law states that voltage (V) is directly proportional to current (I), given that resistance is kept constant. From this experiment, as the voltage increases, the current flow also increases and thus confirming the Ohms law. The slope of the graph ($\frac{V}{I}$) is equivalent to the resistance used in this exploration.

Works Cited

Britannica. "Ohm's Law | Physics." *Encyclopædia Britannica*, 14 Dec. 2018, www.britannica.com/science/Ohms-law.