LAB : OHM'S LAW

Objective

The objective of this lab experiment is to learn to build a simple circuit with one resistor and one DC source.

Theory

Ohm's Law states that the electric current I passing through a resistor with resistance R is proportional to the voltage (electric potential difference) V across the resistor and inversely proportional to the resistance.

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

PROCEDURE

1. A simple circuit was built using the PhET Simulation tool.
2. The DC power source was set to 12.0 V.
3. Three resistors $R1$=10.0 Ω, $R2$=20.0 Ω, and $R3$=30.0 Ω were created and each resistor put into the circuit one at a time, voltage measured using the voltmeter and the values recorded on Table 1.
4. With the power source still set at 12.0 V, the current of each resistor was measured and the values recorded on Table 1.

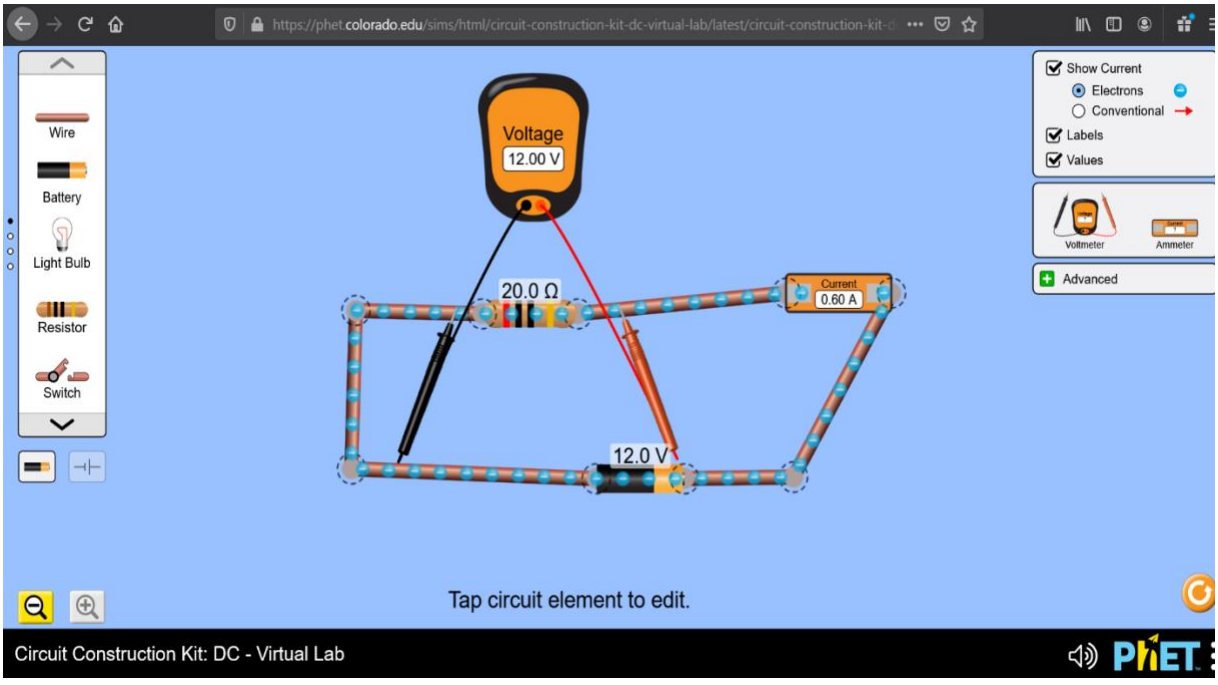


Figure 1: Experimental setup 1

5. The 10.0 Ω resistor was put in the circuit and the voltage of the power supply increased from 1 V to 5 V using 1 V increments.

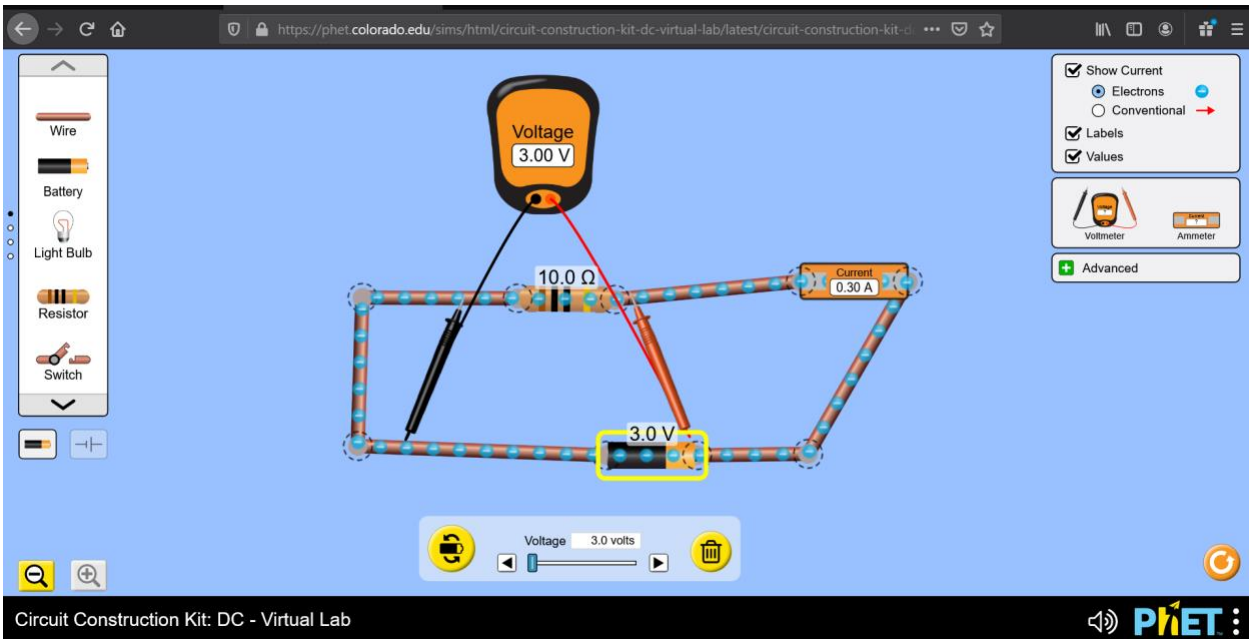


Figure 2: Experimental setup 2

DATA TABLE 1

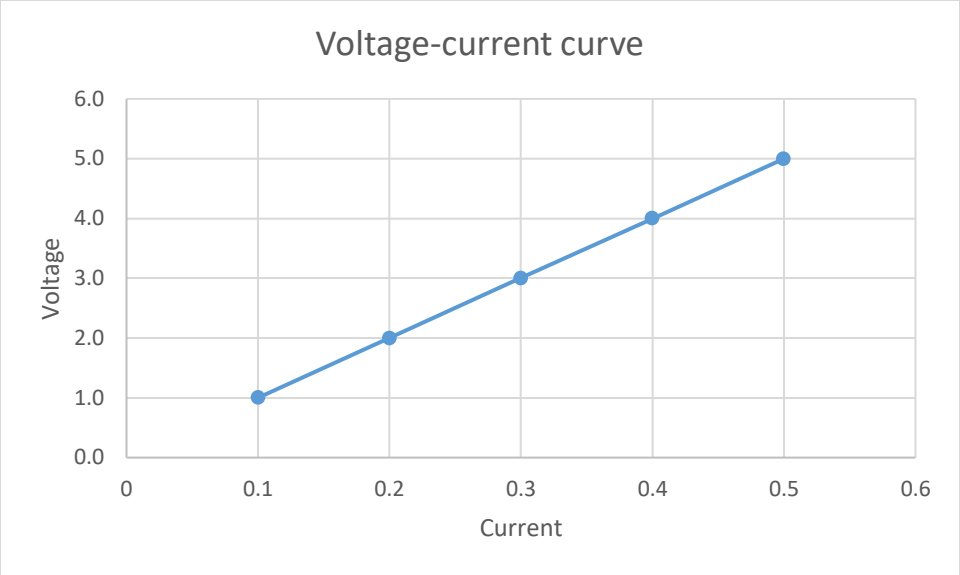
DC Power Source: 12.0 V

Resistance	Measured voltage	Calculated current	Measured current	% difference in the current
10.0 Ω	12.0 V	1.2 A	1.2 A	0.0
20.0 Ω	12.0 V	0.6 A	0.6 A	0.0
30.0 Ω	12.0 V	0.4A	0.2 A	0.0

DATA TABLE 2

Resistance: 10.0 Ω

Voltage(volt)	Measured current(ampere)	Slope	%error in resistance
1.0	0.1	10.0	0.0
2.0	0.2		
3.0	0.3		
4.0	0.4		
5.0	0.5		



From the graph $slope = \frac{3.0-2.0}{0.3-0.2} = 10.0$

This is equal to the resistance offered by the 10.0 Ω resistor.

Conclusion

In the above setups, Ohm's law was obeyed; the current passing through a resistor was found to be directly proportional to the voltage across the resistor and inversely proportional to the resistance offered by the resistor.