**Lab – Ohm’s Law**

Open the Ohm’s Law Virtual Lab at: <https://phet.colorado.edu/en/simulation/ohms-law>

1. Looking at the animation, how can you describe the direction of the electron flow?
2. What do the black dots within the resistor represent?
3. Leave the voltage constant, and gradually change the resistance to higher and lower values,
4. How is the number of particles in the resistor related to the resistance? Explain why.
5. How is the resistance relate to the current? Explain why.
6. Now, leaving the resistance constant, gradually change the voltage
7. How is the current related to the voltage? Explain why.
8. Complete the table:

|  |  |  |
| --- | --- | --- |
| **Voltage** | **Current** | **Resistance** |
| 1.0 V |  | R1 = 800 Ohms |
| 2.0 V |  |
| 3.0 V |  |
| 4.0 V |  |
| 5.0 V |  |
| 9.0 V |  |
| 1.0 V |  | R2 = 405 Ohms |
| 2.0 V |  |
| 3.0 V |  |
| 4.0 V |  |
| 5.0 V |  |
| 9.0 V |  |
| 1.0 V |  | R3 = 40 Ohms |
| 2.0 V |  |
| 3.0 V |  |
| 4.0 V |  |
| 5.0 V |  |
| 9.0 V |  |

1. Graph your data. Plot the voltage (V) on the y-axis and the current (I) on the x-axis.
2. What kind of relationship did you find?
3. Calculate the slope of each line.

R1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

R2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

R3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What does the slope of each graph represent?
2. Using the actual resistances given in the data table, find the % error for each resistor.

R1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

R2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

R3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Describe the relationship between voltage and current and how resistance plays a role.