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| **Activity 6.2.4 Ohm’s Law** |

Introduction

Ohm’s Law has made Georg Ohm well respected and has provided engineers with the key to understanding and manipulating circuits. Although he had convinced himself of this mathematical relationship, he must have wondered at the time if it was all worth it. When he published a book in 1826 explaining his findings, he was forced to resign from his teaching job because his colleagues looked down on him and did not accept his findings. Georg Ohm persevered and returned to his teaching job 23 years later. Through perseverance Ohm earned a spot in history and paved the path for many others’ developments with electricity.

Equipment

* Ohm’s Law presentation
* Schematic Symbols Chart
* Gateway To Technology notebook
* Multimeter
* Snap Circuits® components
* Board, voltage source, and power supply
* Various fixed resistors
* 2 – Universal snap component
* Various sizes of snap wires

Procedure

1. In teams of two, you will create circuits and then measure and calculate resistance, current, and voltage. Complete the circuits and engineering journal entries as outlined in the Ohm’s Law presentation using the data table below.
2. Complete the Schematic Symbols Chart as you learn about different electronic components and functions.

Use 6 volts

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| **Measuring Resistance** | |
| Measured Voltage 1 100Ω resistor: 0.555V | Total Measured Voltage  6.095V |
| Measured Voltage 2 1KΩ resistor: 5.54V |
|  | Measured Current  5.75mA |
|  | Calculated Resistance – Ohm’s Law  1.06KΩ |
| Color Band Resistance 1 100Ω | Total Color Band Resistance  1.1KΩ |
| Color Band Resistance 2 1KΩ |

How close were the calculated and color band resistance values?

0.04Ω

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| **Measuring Voltage** | |
| Measured Resistance 1 99.7Ω | Total Measured Resistance  1.088KΩ |
| Measured Resistance 2 988Ω |
|  | Measured Current  5.75mA |
|  | Calculated Voltage – Ohm’s Law  6.256V |
| Measured Voltage 1 100Ω resistor: 0.555V | Total Measured Voltage  6.095V |
| Measured Voltage 2 1KΩ resistor: 5.54V |

How close were the calculated and measured voltage values?

0.161V

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| **Measuring Current** | |
| Measured Resistance 1 989Ω | Total Measured Resistance  1.0084KΩ |
| Measured Resistance 2 99.4Ω |
| Measured Voltage 1 0.555V | Total Measured Voltage  6.095V |
| Measured Voltage 2 5.54V |
|  | Calculated Current – Ohm’s Law  6.04mA |
|  | Measured Current  5.47mA |

How close were the calculated and measured current values?

0.57mA

Conclusion

1. How do you calculate the total resistance in a series circuit with more than one resistor?

You find the sum of the amount of resistance from both resistors.

1. How do you calculate the total voltage in a series circuit with more than one component?

You find the sum of the voltage drop between the resistors.

1. Give and explain two good reasons why the answers you calculated might be a little different than the values that were measured.

One reason could be that the multimeters round the decimals, giving you a number a little off. Another reason could be that more voltage is lost through the wires, not just the resistors.