Ohm's Law

Ohm's Law describes the proportional relationship between the current flowing through a circuit and the potential difference between two points. The formula, V = IR, where I = current in amps, V = potential difference in volts, and R = resistance in ohms, details the ratio between a constant resistance and the effect of current on the voltage output. This relationship forms the basis for many electrical circuits and helps to describe the interaction between components.

Requirements (Check when complete)**:**

This section focuses on developing an understanding of the base principles governing Ohm's Law

Do EACH of the following and submit to your instructor:

- ☐ Identify and describe the effect of current(I) on Ohm's Law, calculate for I
- ☐ Identify and describe the effect of resistance(R) on Ohm's Law, calculate for R
- ☐ Identify and describe the effect of voltage(V) on Ohm's Law, calculate for V

This section focuses on measurements that help to explain Ohm's Law's principles

Do EACH of the following and submit to your instructor:

- ☐ Using a pencil and blank sheet of paper, produce three lines of varying lengths
    - ☐ Make sure that a good amount of graphite is deposited onto the paper
- ☐ Configure your power supply to output 5V DC
- ☐ Connect your power supply leads to the corresponding leads of your multimeter
- ☐ Carefully touch the negative lead to one side of your graphite line and the positive lead to the other. Record the resistance
- ☐ Calculate the current flowing through the circuit
- ☐ Adjust the position of the postitive lead closer to the negative lead. Record the resistance
- ☐ Calculate the new current flowing through the circuit
- ☐ Identify and describe the effect of resistance on current in your pencil lead experiment. Repeat for the other two lines.

Do EACH of the following and submit to your instructor:

- ☐ Configure and use your multimeter to measure DC voltage
- ☐ Configure your power supply to output 5V DC
- ☐ Construct a simple breadboard circuit that connects the power supplied anode and cathode through a 1KOhm resistor.
- ☐ Use your multimeter to measure the voltage across the resistor and record the result
- ☐ Calculate the current flowing through the resistor
- ☐ Configure your multimeter to measure current
- ☐ Attach your multimeter in series with your resistor and record the current flowing through the circuit
- ☐ Calculate the value of the resistor based on your current measurement
- ☐ Calculate the voltage of your power supply using your calculated current and resistance

Ohm's Law

This section focuses on demonstrating Ohm's Law through a physical application

Do ONE of the following and submit to your instructor:

☐ Design a simple circuit that uses a 10KOhm potentiometer instead of a fixed resistor. Connect your potentiometer as before, and limit your power supply current to 100mA. Record the effect of resistance on the circuit.

☐ Determine the voltage drop over a copper conductor. Describe the relationship between conductor thickness, temperature and resistance.

☐ Construct a simple LED dropping resistor circuit. Use Ohm's Law to determine the current draw and internal resistance of your LED.

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