

# Ohm's Law Virtual Lab

## Purpose

In this virtual lab we are going to observe how current is affected by voltage and resistance by creating a voltage versus current graph.

## Instructions

For this activity we will be using [PhET's Circuit Construction Kit](#) again. Instead of using a light bulb we will use a resistor instead. Click on the values checkbox and it will show the resistance of the resistor. In this case it is  $10.0\ \Omega$ , or 10 ohms.

The screenshot displays the PhET Circuit Construction Kit interface. On the left is a component palette with icons for Wire, Battery, Light Bulb, Resistor, and Switch. The central workspace shows a circuit with a 9.0 V battery at the top, a 10.0  $\Omega$  resistor at the bottom, and an ammeter in the right branch showing a current of 0.90 A. On the right side, there is a control panel with checkboxes for 'Show Current' (checked), 'Labels' (checked), and 'Values' (checked). Below these are buttons for 'Voltsmeter' and 'Ammeters', and two buttons labeled 'Wire Resistivity' and 'Battery Resistance'. At the bottom, there is a status bar with the text 'Tap circuit element to edit.' and the PhET logo.

You will make current measurements after changing the voltage at least 6 times. Click on the battery to change the voltage. Pick any 6 different values - try to make them at least 2 volts different each time.

### Data

Record the value for the resistor here ->	Resistor 1 = 10 $\Omega$	Resistor 2 = 21 $\Omega$	Resistor 3 = xx $\Omega$
Voltage (V)	First Resistor Current (A)	Second Resistor Current (A)	Third Resistor Current (A)
9	0.9		
12	1.2		
15	1.5		

Fill in white spaces.

### Graphs

Create 3 graphs - one for each resistor. Place voltage on the y-axis and current on the x-axis. Do a best fit line for each graph and get the equation of the line. Rewrite the equation using meaningful variables below the graph (in other words use V instead of y and I (current) instead of x!) Use Sheets to make the graphs and then insert those graphs here.

Resistor 1

Resistor 2

Resistor 3

### Analysis

Answer the following questions based upon your data and graphs.

A straight line tells you things are directly

<p>proportional. What is directly proportional in your graphs?</p>	
<p>Compare the slope of your line to the resistance in ohms of your resistor. What does this tell you about the meaning of the slope of a V vs I graph?</p>	
<p>Ohm's Law is <math>V = IR</math>. Explain how this law is seen in your graphs.</p>	