

Ohm's Law LAB

Question:

Can we **PROVE** that a **linear relationship** exists between voltage (V), current (I) and Resistance (R)?

Background information:

Normally an hypothesis is required when conducting a lab. In this case, we will focus on obtaining data using an Advanced Circuits GIZMO on www.explorellearning.com. Ohm theorized that given a series circuit (a circuit where the resistors are connected such that the electric current can only pass along one unique path), the more you increase the resistance along the circuit; the more you decrease the current and therefore increase the voltage. Georg Ohm theorized this in 1827. When collecting data, you will use an ammeter, which measures current (I) in amperes (or Amps) and you will use a voltmeter which measures voltage (V) in volts.

GIZMO instructions:

Using the username and password provided, log onto www.explorellearning.com. Find the Advanced Circuits GIZMO and launch it. Create a **series circuit** such that it includes a **100Ω resistor**, a **switch**, a **battery (9V)** and is connected by the **wires** provided.

Table:

Create a table of values such that the top resembles (you will need about eight spaces below):

Current (I)	Voltage (V)	

- **You will notice a blank third mystery column which you will need to complete.**

Explain how this **PROVES** that the relationship between Voltage and Current is linear.

Instructions for Collecting Data:

Using the ammeter, place it anywhere along the circuit. Note the measurement and place it in the table adjacent to the appropriate voltage measurement.

Using the voltmeter, place the two portions at each end of the resistor. If you get a negative reading, switch the two portions. Note the measurement and place it in the table.

Now insert another battery into your circuit. Repeat these instructions until your table is full of data.

Graphing:

Using the provided graph paper, make a title (**Voltage Against Current**). Place the **current (I)** measurements along the independent (or x-axis). Place the **voltage (V)**, measurements along the dependent (or y-axis). Be sure to use up as much space as possible.

Include a line of best fit or a curve of best fit (whichever is appropriate).

Show the appropriate triangle slope calculations on the graph.

Explain how this **PROVES** that the relationship between Voltage and Current is linear.

Conclusion:

Make a statement about whether Ohm's Law is or is not a linear relationship. Use **as much** evidence to demonstrate that your statement is accurate (i.e. table, graph, calculations, etc.)

Presentation:

Copy your table, your graph and your slope calculations onto the poster sheet provided. Don't forget to include your title, your question and your conclusion.

Task	Level 1	Level 2	Level 3	Level 4
Table	Table is partially complete with some collected data but does not include first difference calculations.	Table is somewhat complete with some collected data, including some first difference calculations.	Table is complete with most collected data, including most first difference calculations.	Table is completed with all collected data, including accurate first difference calculations.
Graph	Graph lacks most of these components: title, labelled axis, properly plotted points with a line of best fit and slope calculations	Graph contains some of these components: title, labelled axis, properly plotted points with a line of best fit and slope calculations	Graph contains most of these components: title, labelled axis, properly plotted points with a line of best fit and slope calculations	Graph is complete with title, labelled axis, properly plotted points with a line of best fit and slope calculations
Conclusion	Conclusion is lacking and/or contains only one of the following: the table or the graph or the slope calculations.	Conclusion is lacking but includes two of the following: the table or the graph or the slope calculations.	Conclusion is solidly founded and two of the following: the table or the graph or the slope calculations.	Conclusion is solidly founded and links the table, the graph and the slope calculations.