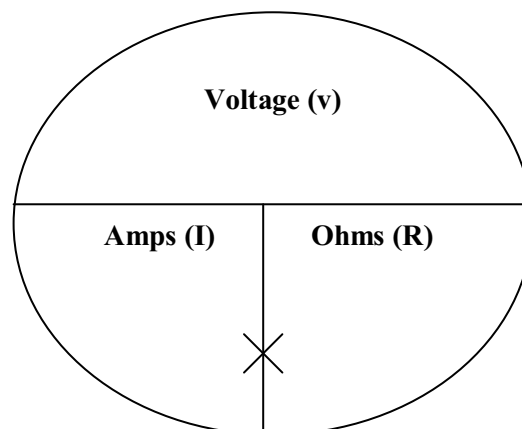


Is ohms law obeyed in a circuit with a cell and a resistor?

Knowledge and Understanding

Ohms law is a group of formulas used to calculate Voltage (V), Current (I) and Resistance (R) in a circuit. It is used to calculate a missing value in a circuit. It was named after the German physicist Georg Simon Ohm, who was born in 1787 and died in 1854. The voltage is measured in volts, the current is measured in amperes and the resistance is measured in ohms.

An easy way to remember the formulas is by using the following diagram:



To find a missing value, cover it with your finger. The horizontal line in the middle means to divide the two remaining values. The "X" in the bottom section of the circle means to multiply the remaining values.

The formula for ohms law is:

$$V = I \times R$$

This means: The voltage is equal to the current multiplied to the resistance. Altogether there are three formulas. The other two formulas are:

$$I = V/R$$

This means that the current is equal to the voltage divided by the resistance.

$$R = V/I$$

The above means that the resistance is equal to the voltage divided by the current.

Here is a quote that I have found which describes ohms law:

“The amount of current flowing in a circuit made up of pure resistances is directly proportional to the electromotive forces impressed on the circuit and inversely proportional to the total resistance of the circuit.”

Simply, ohms law means:

1. A steady increase in voltage, in a circuit with constant resistance, produces a constant linear rise in current – For example, a straight-line graph.
2. A steady increase in resistance, in a circuit with constant voltage, produces a progressively (not a straight-line if graphed) weaker current – For example – A curved line graph.

Metals conduct electricity in their solid state or when they are melted but they are not decomposed in the process. (I.e. - a chemical reaction does not occur) Metals can conduct electricity because in their structure, each metal atom gives up its outer shell electrons to form a sea of unlinked electrons. This means that the electrons are free to move through the metal's structure and therefore conduct electricity.

Prediction

I predict that the results, which will appear on my graph, will be straight. This will show that ohms law has been obeyed.

Apparatus

Power pack

Voltmeter

Ammeter

Resistor

Wires

Crocodile Clips

Plan

The following experiment took place to see if ohms law was obeyed
First we set up the equipment as follows:

For the experiment we would turn the power pack on and touch the metal part of the resistor with the crocodile clips, which were attached to the voltmeter. After each reading was taken, the power would be switched off. Each time we would do this, a reading would be taken from the ammeter. We took down nine readings each time. Nine was taken because using the information on the power pack, the experiment started at two volts and went

up to ten volts. We used the voltmeter to clarify the amount of voltage that was being passed through the circuit. The ammeter was used
We recorded the results on a table. This experiment was done three times so that by looking at our results we could take an average reading.
To keep the test fair, the same power pack and resistor was used. The resistor that was used was 3-amp resistor.

Results

1st set

Voltage (volts)	Current	Ohms (Ω)
1.23	0.28	5
2.23	0.5	5
3.60	0.81	5
4.60	1.04	5
6.00	1.35	5
7.00	1.58	5
8.40	1.89	5
9.40	2.12	5
10.40	2.36	5

2nd set

Voltage (volts)	Current	Ohms (Ω)
1.30	0.27	5
2.23	0.50	5
3.60	0.81	5
4.60	1.05	5
6.00	1.35	5
7.01	1.58	5
8.40	1.89	5
9.40	2.12	5
10.40	2.36	5

3rd set

Voltage (volts)	Current	Ohms (Ω)
1.30	0.27	5
2.60	0.50	5
3.60	0.81	5
4.60	1.04	5
6.00	1.35	5
7.00	1.59	5
8.20	1.90	5
9.40	2.12	5
10.40	2.35	5

Average

Voltage (volts)	Current	Ohms (Ω)
1.28	0.27	5
2.25	0.50	5
3.60	0.81	5
4.60	1.04	5
6.00	1.35	5
7.00	1.58	5
8.33	1.89	5
9.40	2.12	5
10.40	2.36	5

Analysis

Looking at my results from the graphs (plotted from the results from the tables, shows that my results are correct and that ohms law has been obeyed. I know this because the gradient is a straight line that shows a pattern on the graph (the straight line).