Ωhm CΩmfΩrts

Ohm's Law

Ohm's law forms the basis for understanding how electrons or charge flows through circuits.

This is a very simple relationship that involves three things:

1) the voltage or the push that move electrons through the circuit,
2) the current (in amps), which is a measure of how much electric charge is flowing through that circuit as a result of that push, and
3) the resistance (in ohms), which does all it can to make it difficult for the electricity to flow.

Ohm's Law deals with the relationship between voltage and current in an ideal conductor.

This relationship states that:
The potential difference (voltage) across an ideal conductor is proportional to the current through it.

Your task is to prove that OHM'S LAW is correct.

Collect the following equipment

1. Power supply
2. 5 wires/leads
3. a multimeter set up as an ammeter
4. a multimeter set up as a voltmeter
5. one of the ceramic resistors from the tray (3.3Ω, 5.6Ω, 10Ω , 15Ω, 22Ω)

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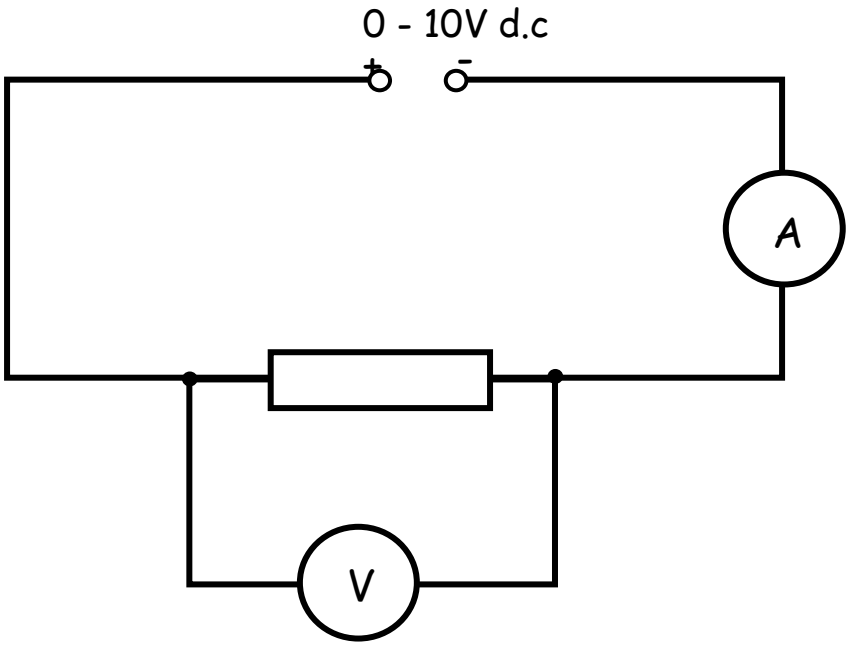
1. Measure the actual resistance of your chosen resistor using an ohmmeter and record this in your jotter. Remember that you do not need a power supply to do this step

2. Then connect up the circuit as shown in the diagram below. The power supply must be set to 0 Volts. Use the d.c supply connections (red and black).



3. Have your circuit checked by a teacher.

4. Make a table in your jotters, or preferably make a similar table in excel to record your results.

5. Take the readings from the Ammeter and Voltmeter for every turn of the power supply. Only take readings between 0 and 10V.

6. Plot a graph of voltage against current and try to find the gradient of your graph. If you use excel you can add a trendline and you can choose from the options to record the equation for the line in your graph.

7. If you have time repeat this for other resistors.

Voltage (V)	Current (A)	Resistance (ohms)
		5.4

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Voltage (V)	Current (A)	Resistance (ohms)
0.00	0.00	5.4
0.98	0.18	
1.34	0.25	
2.65	0.49	
3.77	0.70	
5.12	0.95	
6.19	1.15	
7.93	1.47	
8.97	1.66	

Here is an example of a table completed for one of the resistors with the corresponsding graph.

It is highly unlikely that all of your points will be on the straight line. Do not plot the point 0,0 on your graph

QUESTIONS/ EVALUATION

1. What do you notice about the value of the current when the voltage increases?
2. What do you notice about the gradient of your graph?
3. Why might your graph not go through (0,0)? Look at the equipment to give you a clue?
4. You should have found out one of the most important formula for electricity, and that is that the Voltage is equal to the current mulitplied by the resistance or as we would usually write it

$$V = IR$$

where V=voltage or potential difference measured in volts

I= current measured in amp

and R= resistance measured in ohms

Now try these questions

1. If there is a current of 3A through a 2.5Ω resistor, what is the voltage across the resistor?
2. A voltmeter across a power supply reads 12V, this is connected to a 6Ω resistor. What current would there be through the resistor?
3. What is the resistance of a resistor if a voltmeter across it reads 4V and the current in the resistor is 0.2A?

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OHM'S LAW EXPERIMENT

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0.00	0.00	5.4
0.98	0.18	
1.34	0.25	
2.65	0.49	
3.77	0.70	
5.12	0.95	
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