

Candidate 2 evidence

Title

How changing the Resistance effects current in a series circuit.

Aim

To determine how increasing the resistance in a series circuit effects the current.

Data collection and Handling

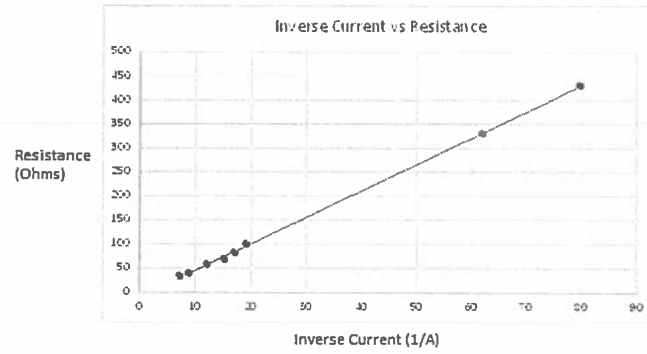
Brief description

A battery pack, Resistor and ammeter were set up in series with a multimeter across the resistor. The resistor was changed and every time it did, a new current reading was recorded. The experiment was repeated 3 times for accuracy.

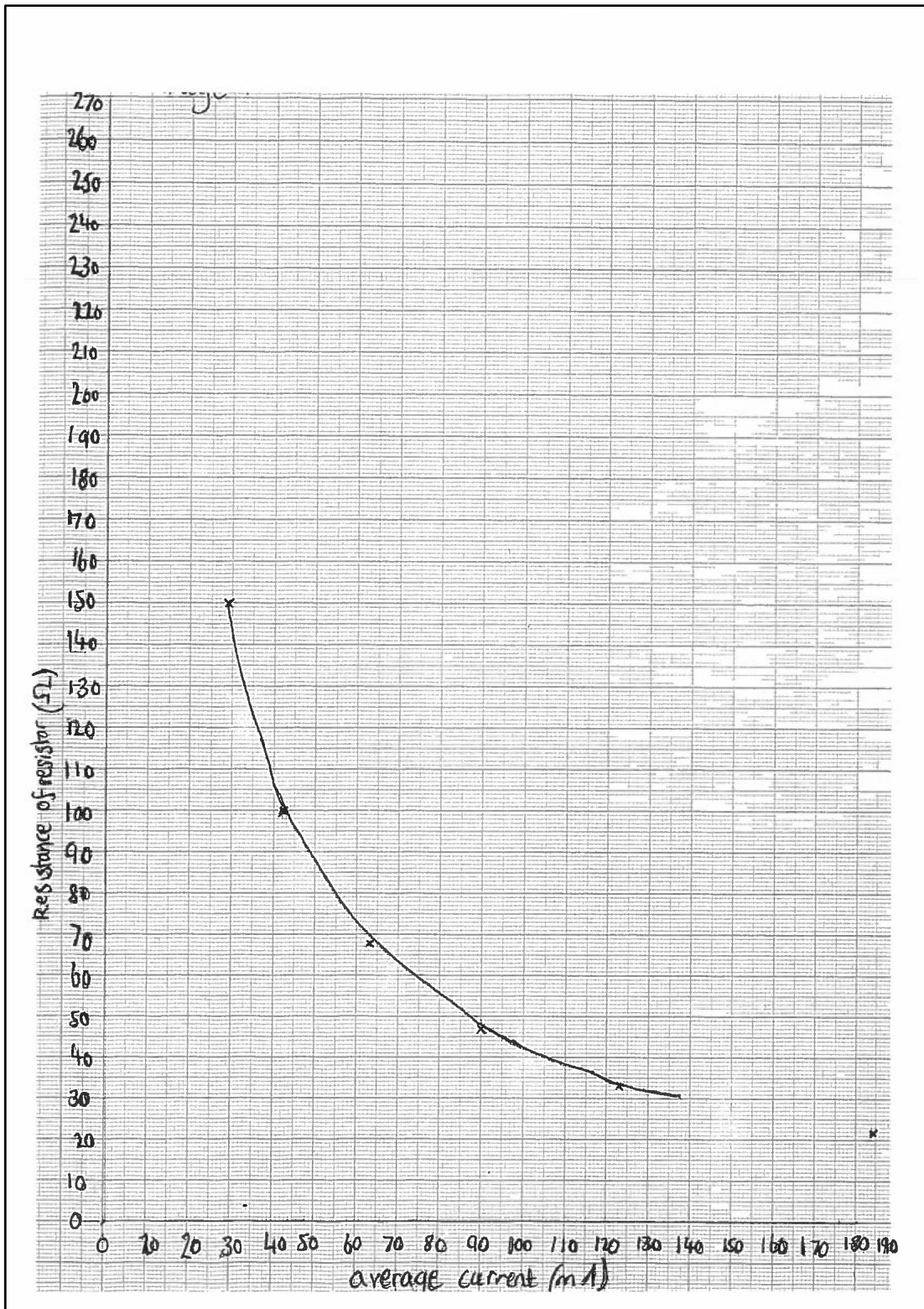
Data

on separate sheet

Resistance of Resistor (Ω)	Current reading 1 (mA)	Current reading 2 (mA)	Current reading 3 (mA)	average current (mA)
22	187.9	182.0	182.1	184.0
33	122.4	123.3	122.9	123.0
47	90.1	90.2	90.2	90.2
68	63.0	63.0	62.9	63.0
100	42.3	42.4	42.4	42.4
150	29.1	29.2	29.2	29.2



<https://sites.google.com/site/laurasapphysicslabportfolio/emlabs/ohm-s-law-lab>



Analysis

The graph from the internet has a straight line going through the origin whereas my graph is a smooth curve. This is because the person has plotted resistance against inverse current and I plotted resistance against current. The smooth curve shows that the values are ohmic and if I had plotted resistance against inverse current, I too would've had a straight line through the origin.

Conclusion

My experiment shows that as the resistance is increased in a series circuit, current decreases. We know this is true because when the resistance was $150\ \Omega$ the current was $29.2\ \text{mA}$ and when the resistance was $22\ \Omega$ the current was $184\ \text{mA}$.

Evaluation

The values on the resistors may not have been entirely accurate as over time and the more they are used, they can vary. I should've measured the resistance of the resistors using an ohmmeter and used those values to get more accurate readings and a more accurate graph.

Underlying Physics

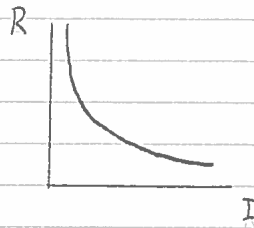
Ohms law

$$\text{voltage (V)} = I R$$

Resistance (Ω)

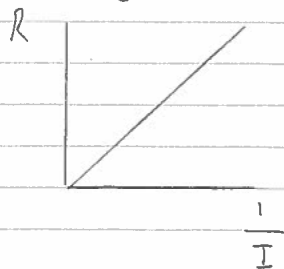
Current (A)

When current is plotted against resistance there will be a smooth curve as shown in the diagram below.



This shows that as the resistance increases, the current decreases.

When inverse current is plotted against resistance there will be a straight line traveling through the origin as shown in the diagram below.



The term to describe this is 'Ohmic' showing these are ohmic values meaning resistance is constant

As resistors heat up, their resistance can vary. This is a result of too many electrons being forced through at once. This can vary factors and results.

$$I = \frac{V}{R}$$

Current (A) voltage (V) resistance (Ω)

$$R = \frac{V}{I}$$

voltage (V) Resistance (Ω) current (A)

Current is the same at all points in a series circuit

1 amp is 1 coulomb of charge per second. 1 coulomb of charge is -6.241×10^{18} electrons.