Experiment 3.0

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Question

How does resistance affect current in parallel circuits?

Hypothesis

As more load is added, the resistance will increase.
As more load is added, the current will decrease.
As more load is added, the voltage will remain the same.

Materials

- 6 Leads (wire)
- 3 Lights (Holiday lights)
- 1 Power Source
- 1 Voltmeter/Ammeter

Experiment

1. Connect two leads to the Power Source.
2. Connect leads **a** and **b** to Light **a**.
3. Connected leads **c** and **d** to the other leads.
4. Connect the leads **c** and **d** to Light **b**.
5. Measure Voltage.
6. Measure Amperage.
7. Calculate Resistance.
8. Connect leads **e** and **f** to Light **c**.
9. Measure Voltage.
10. Measure Amperage.
11. Calculate Resistance.

Analysis

Physical Experiment

Physical Experiment	Voltage	Current (Amperage)	Resistance
Two Lights	3.26 V	0.36 A	9.05 Ω
Three Lights	3.26 V	0.52 A	6.26 Ω

PHET Simulation

PHET Simulation	Voltage	Current (Amperage)	Resistance
Two Lights	3.30 V	0.35 A	9.42 Ω
Three Lights	3.30 V	0.53 A	6.22 Ω

Percent Difference + Calculations

Percent Differences

Percent Difference	Physical Experiment	PHET Simulation	Difference %
Two Lights	0.36 A	0.35 A	3%
Three Lights	0.52 A	0.53 A	2%

Two Lights

0.36 0.35

① $0.36 - 0.35 = 0.01$

② $\frac{0.36 + 0.35}{2}$

$= \frac{71}{2}$

$= 0.355$

③ $\frac{0.01}{0.355}$

$= 0.0281 \times 100$

$= 2.816\%$

$= 3\%$

Three Lights

0.52 0.53

① $0.52 - 0.53 = 0.01$

② $\frac{0.52 + 0.53}{2}$

$= \frac{1.05}{2}$

$= 0.525$

③ $\frac{0.010}{0.525}$

$= 0.0190 \times 100$

$= 1.90\%$

$= 2\%$

Conclusion

In conclusion my hypothesis was incorrect as the data clearly shows that as more lights (loads) are added the current increases and the resistance decreases. There was a 2% difference for two light bulbs and a 3% difference for the three light bulbs between the physical experiment and the PHET simulation. Resistance in parallel circuits causes the current to increase as the resistance decreases and vice-versa.