

Ohm, Ohm on the Range [Experiment]

Students typically have no experience connecting electric meters to circuits. So before collecting data to determine Ohm's Law, they will be instructed to make correct and incorrect meter connections. Direct experience will be their guide to which connections are correct and which are incorrect. The current and voltage data typically yield excellent graphs and resistance values.

Equipment note: Power resistors are relatively large, rectangular or cylindrical objects. They are not the common, small, color-coded resistors. Power resistors can typically handle 10 W. They allow students to collect "normal" values of current and voltage. The small resistors typically blow out past 0.25 W. Power resistors can be found at electronics supply companies and scientific supply companies.

Answers to Procedure Questions

PART A

1. As the power supply is turned up, the ammeter reading increases and the bulb gets brighter.
2. As the power supply is turned up, the ammeter reading increases but the bulb does not light.
3. As the power supply is turned up, the voltmeter reading increases but the bulb does not light.
4. As the power supply is turned up, the voltmeter reading increases and the bulb gets brighter.
5. Series.
6. Parallel.

PART B

1. The best-fit slope should match the value of each power resistor. So a 5- Ω resistor would have a best-fit slope of 5 V/A.

Answers to Summing Up Questions

1. $R = V/I$
2. A yielded a line with a greater slope so it is the device with the greater resistance.
3. The resistance increases as the current (or voltage) increases.
4. The resistance decreases as the current (or voltage) increases.