

Series and Parallel Circuits Lab

I. Objective: To analyze characteristics of series and parallel circuits.

II. Procedure:

A. Series Circuit

1. Connect one light bulb to a battery.
2. Measure the current out of the battery and the voltage across the bulb and the battery.
3. Connect two light bulbs in series. Measure the total current out of the battery and the voltage across each bulb. Measure the voltage across the battery.
4. Connect three light bulbs in series. Measure the total current out of the battery and the voltage across each bulb. Measure the voltage across the battery.

Note – during each trial, record your observations for how the brightness of each bulb changes as you add new bulbs or remove them.

B. Parallel Circuit

1. Connect one bulb to a battery. Measure the current out of the battery and the voltage across the bulb.
2. Connect two light bulbs in parallel. Measure the current out of the battery. Measure the current into each branch of the circuit. Measure the voltage across the battery and each bulb.
3. Connect three light bulbs in parallel. Measure the current out of the battery. Measure the current into each branch of the circuit. Measure the voltage across the battery and each bulb.

Note – during each trial, record your observations for how the brightness of each bulb changes as you add new bulbs or remove them.

IV. Observations - Record any observations regarding the brightness of the bulbs in each circuit as bulbs were added, or record observations regarding the brightness of bulbs in the series circuit compared to the parallel circuit.

V. Questions

1. Look at your data for the series circuit. What happened to the current out of the battery as each new bulb was added in series. Explain your answer.
2. Look at your data for the series circuit.
 - a) Look at the voltage for the single bulb and the battery. Are they the same or different? Why?
 - b) Add the voltages of for the two bulbs connected in series. Is it the same as the voltage of the battery? Why/why not?
 - c) Add the voltages of the three bulbs connected in series. Is your answer the same as the voltage of the battery? Why/why not?
3. Look at your data for the parallel circuit. Compare the voltage of the battery to the voltages of the bulbs connected in parallel for each trial. Is there a pattern? Explain.
4. Look at the total current out of the battery for each trial for the parallel circuit. Then look at the total current for (a) one bulb, (b) two bulbs, and (c) three bulbs. Is there any relationship to the total current? Explain.
5. Write a question of your own that you could ask to your own students if they performed this activity. The question should be based on the data that was collected to force students to analyze patterns in circuits.