

Iona Prep Physics Lab

Light Bulbs Wired In Series

In this experiment you will set up a series circuit with three small light bulbs. You will use a voltmeter and an ammeter to explore the relationships in this type of circuit.

Materials:

Power Supply

Ammeter

Digital Multimeter (used as voltmeter)

2 bulbs in sockets

Knife Switch (optional)

Hook-up wires

Procedure

1. Begin by drawing a neat schematic circuit using the power supply, knife switch, and two light bulbs in a series circuit. Indicate the voltmeter wired to measure the voltage across the **entire** circuit and the ammeter measuring the current through the circuit. Label the polarity on the ammeter.
2. Have the instructor check your diagram.
3. Obtain the necessary materials and construct the circuit according to your schematic.
4. Before installing the bulbs, use the Digital Multimeter as an ohmmeter to check that each bulb has a fairly low resistance. Very high resistance indicates that the bulb is burned out and will not function.
5. Have the instructor check your circuit before applying power.
6. Set the variable voltage to its minimum setting.
7. Close the knife switch and adjust the voltage so that the bulbs are fairly bright. The voltage across the circuit should be < 10 Volts DC.
8. Record the voltage across the circuit and the current through the circuit.
9. Draw another schematic diagram with the voltmeter reading the voltage across bulb 1.
10. Before changing any of the wiring, open the knife switch.
11. Now change the location of the voltmeter to read the voltage across bulb #1. Record this value. (If possible, read this voltage using two different voltage scales. Do the readings agree? If not, which one do you suppose is more accurate? Why?)
12. Repeat steps 9,10,11 to measure the voltage across bulb #2. Record this value.

Data:

Voltage across the entire circuit:

Voltage across bulb # 1

Voltage across bulb # 2

Conclusion: State the expected relationship among the voltage readings for this kind of circuit and whether or not your measurements confirm that relationship.