Series Circuits Lab

**Directions:** Complete the simple circuits described below and measure the current flowing through the circuit and voltage drop across the resistors and lamps.

**Measuring Voltage:** Set the multimeter to volts and record in volts

**Measuring current:** Set the multimeter to Amps, plug jack into 10A and record in Amps

1. A circuit with a 1.5 V battery and (1) light bulb. Make the circuit using the materials provided and draw the circuit below.
   
   Voltage Drop ________________
   
   Current ________________

2. A circuit with a 1.5 V battery and (2) short light bulbs. Make the circuit using the materials provided and draw the circuit below.

   Voltage Drop Light 1 ________________
   
   Voltage Drop Light 2 ________________
   
   Current in circuit ________________

3. A circuit with (2) 1.5 V batteries and (1) short light bulb and (1) switch. Make the circuit using the materials provided and draw the circuit below.

   Voltage Drop ________________
   
   Current in circuit ________________

4. A circuit with (2) 1.5 V batteries and (2) short light bulbs. Make the circuit using the materials provided and draw the circuit below.

   Voltage Drop Light 1 ________________
   
   Voltage Drop Light 2 ________________
   
   Current in circuit ________________
5. A circuit with (2) 1.5 V batteries, (1) long bulb and (1) 10Ω resistor. Make the circuit using the materials provided and draw the circuit below.

Voltage Drop across lamp __________
Voltage Drop across 10Ω resistor ______
Current in circuit ________________

6. A circuit with (2) 1.5 V batteries, (1) short light bulb and (1) long light bulb. Make the circuit using the materials provided and draw the circuit below.

Voltage Drop across short lamp __________
Voltage Drop across long lamp _______
Current in circuit ________________

Postlab Questions:

1. Compare the brightness of the short light bulb in experiment #1 versus the brightness of the light bulbs in experiment #2.

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2. Were the light bulbs in Experiment #2 the same brightness or different in brightness from each other? Explain a reason for your observation.

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3. State the current readings for experiments #3 AND #4. Would you expect there to be a difference in the amount of current? State a reason to support your answer.

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4. Compare the voltage drops between the light bulb and the resistor in experiment #5. Which of the two offered more resistance to the flow of current? How can you tell?

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5. Compare the brightness of the two difference bulbs in experiment #6. How does brightness relate to the resistance of the light bulbs? Include the voltage drops in your answer.

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6. A 50.-ohm resistor, an unknown resistor $R$, a 120-volt source, and an ammeter are connected in a complete circuit. The ammeter reads 0.50 amperes.

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0.50 Ω

A
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120-volt SOURCE
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50. Ω

R
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a. Calculate the equivalent resistance of the circuit shown. [Show all work, including the equation and substitution with units.]

b. Determine the resistance of resistor $R$ shown in the diagram.