

Name: \_\_\_\_\_

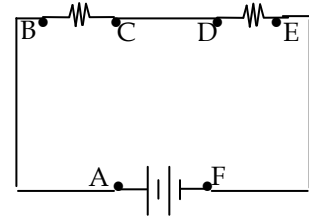
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### *Exploring a Series Circuit Makeup*

**Complete this activity online if you were absent from class when a Series Circuit was built.**

1. To access the program, go to **PhET** and click on the link to “Circuit Construction Kit (DC only).”
2. Construct a circuit that consists of a battery and **two light bulbs** as shown in the schematic to below.

3. Right-click on the battery to change its voltage to 60 V.
4. Right-click on bulb #1 to change its resistance to 10  $\Omega$ .
5. Right-click on bulb #2 to change its resistance to 20  $\Omega$ .



6. Select a “Non-contact Ammeter” and hover it over the points indicated in the diagram below to measure the current at points A, C, and E.
7. Select a Voltmeter and use the probes to determine the potential differences indicated.

Current (Amps)		Voltage (Volts)	
A		AF	
C		BC	
E		DE	

### Questions

1. How do the currents compare at the three different locations? Explain why you think that is so.
  
  
  
  
  
  
  
  
  
  
2. How do the voltage drops across the two light bulbs put together compared to the voltage gain through the battery. Explain why you think that is so.

**CONTINUED ON THE OTHER SIDE**

Now, **ADD a third light bulb** into the circuit between points C and D. **Right-click on it to make its resistance 30  $\Omega$ .** Measure the currents and voltages as indicated in the table below.

Current (Amps)		Voltage (Volts)	
A		AF	
C		BC	
D		CD	
E		DE	

3. What happens to the voltage across the first two bulbs when the third bulb is added? Explain why you think that is so.
4. What happens to the current in the circuit when the third bulb is added. Explain why you think that is so.

### Series Circuit Practice Problem

1. A 10- $\Omega$  resistor, a 15- $\Omega$  resistor, and a 5- $\Omega$  resistor are connected in series across a 90-V battery.
  - a) Draw a circuit diagram (include an ammeter).
  - b) What is the equivalent (total) resistance of the circuit?
  - c) What is the current in the circuit?