

PHYSICS  
**PhET Circuits Lab**

Name \_\_\_\_\_  
 Date \_\_\_\_\_ Hour \_\_\_\_\_

**Procedures:**

Open the Simulation titled **Circuit Construction Kit (DC only)** on the computer. If doing this from home, go to the following site to Run the simulation:

[http://phet.colorado.edu/simulations/sims.php?sim=Circuit\\_Construction\\_Kit\\_DC\\_Only](http://phet.colorado.edu/simulations/sims.php?sim=Circuit_Construction_Kit_DC_Only)

**Part 1 - Series Circuit:**

- Construct the circuit as shown in figure 1 (back page) using the Circuit Construction Kit (DC Only) simulation at the PhET site.
- Make the light bulbs have different resistance values (right click on the bulb to adjust) and record the value of each light bulb in the table below.
- Change the voltage of the battery to a value that makes sense for your circuit.
- Calculate the total resistance of your circuit using appropriate “rule.”
- Move the ammeter over wire A, to find the current going to bulb A. Repeat for bulb B and bulb C.
- Use the voltmeter to take voltage readings. To do this you will need to place the leads at opposite ends of each bulb. For total voltage, place them across the battery.
- Calculate the total current passing through your battery by using the equation:

$$I_{TOT} = \frac{V_{TOT}}{R_{TOT}}$$

- Note the comparison between that value and what the ammeter reads when placed over a wire near the battery...
- Note the comparison between that value and what the ammeter reads when placed over a wire near the battery...
- Calculate Power (**P=IV**) for each light bulb.
- Rank your light bulbs in order of brightness (1 being the least bright).

	Resistance (Ω)	Voltage (V)	Current (A)	Power (W)	Brightness Ranking (1-3)
<b>A</b>					
<b>B</b>					
<b>C</b>					
<b>Total</b>					

**Questions:**

1. What do you notice about the total current in comparison to the current to each resistor?

Why do you think this is so?

2. What do you notice about the total voltage in comparison to the voltage at each light bulb?

Why do you think this is so? (Remember that voltage is the energy each charged particle STARTS with in the circuit)

3. Which bulb is the brightest? Why do you think that is?

### Part 2 - Parallel Circuit:

- Construct the circuit as shown in figure 2.
- Make the light bulbs have different resistance values and record the value of each light bulb in the table below.
- Change the voltage of the battery to a value that makes sense for your circuit.
- Calculate the total resistance of your circuit using appropriate "rule."
- Move the ammeter over wire A, to find the current going to bulb A. Repeat for bulb B and bulb C.
- Use the voltmeter to take voltage readings. To do this you will need to place the leads at opposite ends of each bulb. For total voltage, place them across the battery.
- Calculate the total current passing through your battery by using the equation:

$$I_{TOT} = \frac{V_{TOT}}{R_{TOT}}$$

- Calculate Power (**P=IV**) for each light bulb.
- Rank your light bulbs in order of brightness (1 being the least bright).

	Resistance ( $\Omega$ )	Voltage (V)	Current (A)	Power (W)	Brightness Ranking (1-3)
A					
B					
C					
Total					

**Questions:**

4. What do you notice about the speeds of the charges through the different loops? Relate these speeds to the amount of resistance in each of these loops.
  
  
  
  
  
  
  
  
  
  
5. What do you notice about the total current in comparison to the current to each light bulb?

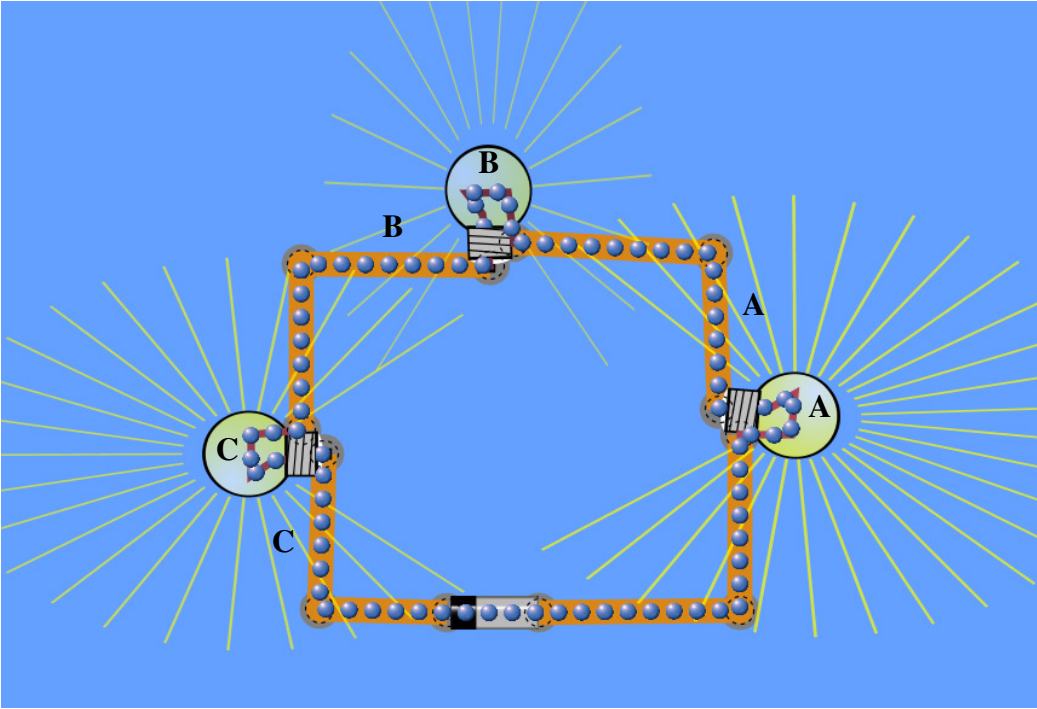
Why do you think this is so?

6. What do you notice about the total voltage in comparison to the voltage at each light bulb?

Why do you think this is so? (Remember that voltage is the energy each charged particle STARTS with in the circuit).

7. Why are the brighter bulbs those with the least resistance? Explain.

**Figure 1: Series Circuit**



**Figure 2: Parallel Circuit**

