Name:_____ Period:_____

Exploring a Parallel Circuit Makeup
Complete this activity online if you were absent from class when a Parallel 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 the right. A-F is the battery and D-E & B-C are light bulbs (resistors).

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 Ω.

5. Right-click on bulb #2 to change its resistance to 20 Ω.

6. Select a "Non-contact Ammeter" and hover it over the points indicated in the diagram below to measure the
   current at points A, B, D, and F.

7. Select a Voltmeter and use the probes to determine the potential differences indicated.
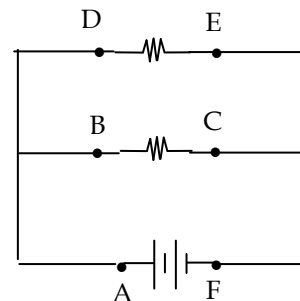
Current (Amps)		Voltage (Volts)	
A		AF	
B		BC	
D		DE	

<u>**Questions**</u>

1. How do the voltages compare at the three different locations? Explain why you think that is so.

2. How do the currents passing through each bulb (at points B and D) added together compare to the current
   coming out of the battery (at point A). Explain why you think that is so.

CONTINUED ON THE NEXT PAGE

Now add a third light bulb in parallel with the other two. Right-click on it to make its resistance 30 Ω. Measure the currents and voltages as indicated in the table below.

Current (Amps)		Voltage (Volts)	
A		AF	
B		BC	
D		CD	
the point just before the new bulb		right before and right after the new bulb	

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 through each of the original bulbs (at points B and D) when the third bulb is added? Explain why you think that is so.

5. What happens to the current coming out of the battery (at point A) when the third bulb is added? Explain why you think that is so.

Parallel Circuit Practice Problem

1. A 10-Ω resistor, a 15-Ω resistor, and a 5-Ω resistor are connected in parallel across a 9-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 each branch of the circuit?