

Activity -- Series and Parallel Circuits

Part I. Series Circuit

- A. Examine the Series circuit set up at the front of the room. Draw a picture of the circuit here.
- B. In your drawing, identify the potential of the power supply.
- C. In your drawing, identify the power that you would expect to be consumed by each of the light bulbs.
- D. Form a hypothesis: Which lamp do you think will burn the brightest? Which lamp do you think will be the most dim?
- E. Form a hypothesis: Which lamp do you think has the greatest resistance? Which lamp do you think has the least resistance?
- F. Watch as the instructor applies voltage to the circuit. Write down your observations here.
- G. Based on your observations, which bulb is using the most power (i.e., converting the most electrical energy to radiation)?
- H. The amount of current running through the circuit is the same everywhere, but the resistance in each lamp causes a different change in potential. Based on the relationship $P=IV$, which lamp causes the greatest drop in potential? Which lamp causes the least drop in potential?
- I. Based on Ohm's Law ($V=IR$) and your results from H. above, which lamp in this circuit has the greatest resistance? Which lamp has the least resistance?
- J. Why didn't the bulb with the highest power rating burn the brightest in this circuit?

Part II. Parallel Circuit

- A. Examine the Parallel circuit set up at the front of the room. Draw a picture of the circuit here.
- B. In your drawing, identify the potential of the power supply.
- C. In your drawing, identify the power consumed by each of the light bulbs.
- D. Form a hypothesis: Which lamp do you think will burn the brightest? Which lamp do you think will be the most dim?
- E. Form a hypothesis: Which lamp do you think has the greatest resistance? Which lamp do you think has the least resistance?
- F. Watch as the instructor applies voltage to the circuit. Write down your observations here.
- G. Based on your observations, which bulb is using the most power (i.e., converting the most electrical energy to radiation) in this circuit?
- H. The potential difference applied over each lamp is the same in this circuit, but the different resistance in each lamp causes a different current to flow in each lamp. Based on the relationship $P=IV$, which lamp has the greatest current running through it? Which lamp causes the least current running through it?
- I. Based on Ohm's Law ($V=IR$) and your results from H. above, which lamp has the greatest resistance? Which lamp has the least resistance?
- J. Why did the high power bulb burn brighter in this circuit?

Part III. A Combined Circuit

Based on your results above, examine the following circuit, and calculate currents and potentials for all components. Also, indicate which lamps will shine the brightest.

