

Objective:

- Investigate the electrophorous
- Investigate electrical properties of circuits
- Understand series and parallel configurations of circuits
- Organize your findings in a clear fashion.

Warm up ideas.

- Investigate the Electrophorous. Show how it works.
- Use this as a device to shock your neighbor repeatedly and reliably

Lab Activities: For the following activities your group wants to create a lab report. The lab report should document your ideas and experiments. Include drawings, schematics, and organized data. Also, include summary statements for each part.

1.) **Simple wire, bulb, and battery**

- Supplies: D battery and bulb and a single wire
- How many unique ways can you make the bulb light up?
- Draw an electrical schematic of the light bulb construction.
- Draw all schemes to light a bulb that work and don't work.

2.) **Current Indicator:** Build a simple circuit with a light bulb

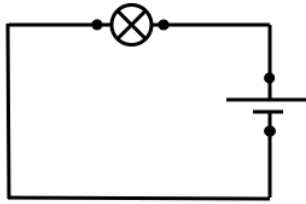
- Draw a schematic of the circuit and indicate the path of current flow.
- Use the circuit for determining the conductivity of the following materials.
Report your finding in your lab report.
 - Metal
 - Plastic
 - Wood
 - Glass
 - Parts of the broken light bulb

3.) **Series and Parallel Circuits:** In this part, build 3 circuits (see figures of Circuits 1, 2 and 3). For each circuit, map out the currents and voltage at various places in the circuit. For each:

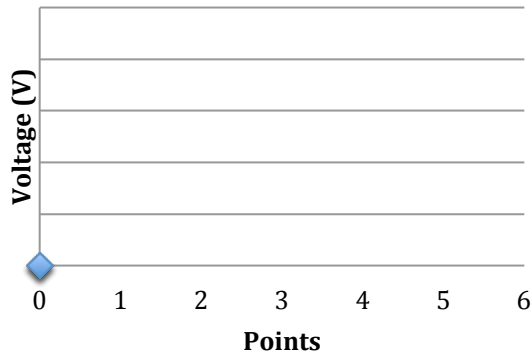
1. Construct the circuits one at a time.
2. Label various points (as indicated in the figure) in each circuit and choose a reference point (for voltage measurements).
3. Measure the voltage and current at each point.
4. Organize and present your data. Fill in the graphs for voltage vs. point and current vs. point on the circuits.

NOTE: For the parallel circuit look at the three loops individually as indicated in the figure.

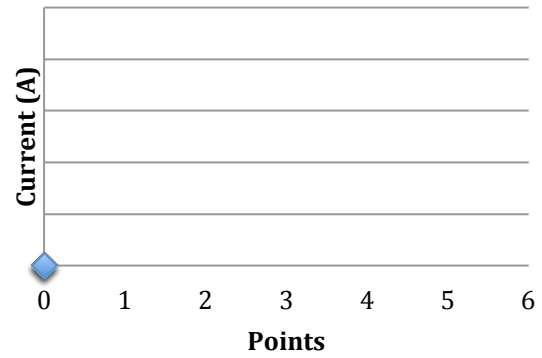
Circuit 1 (Label points 1-4)



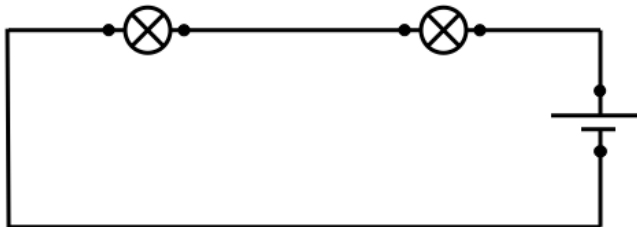
Voltage versus location



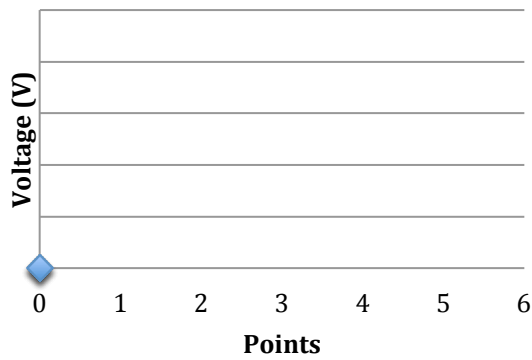
Current versus location



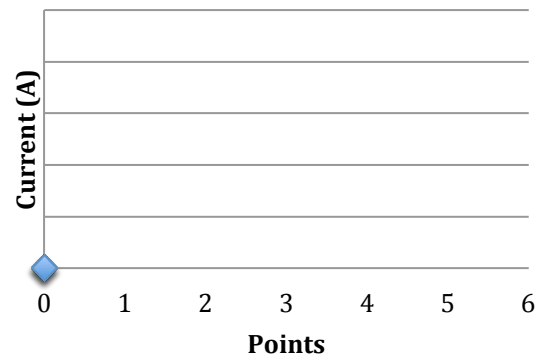
Circuit 2 (Bulbs in Series, Label points 1-6)



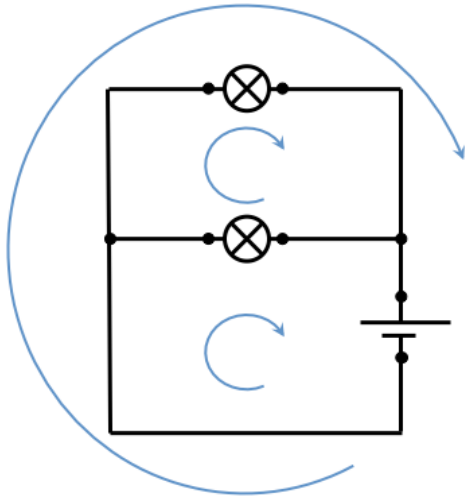
Voltage versus location



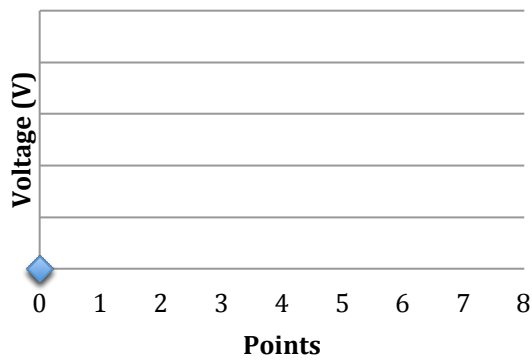
Current versus location



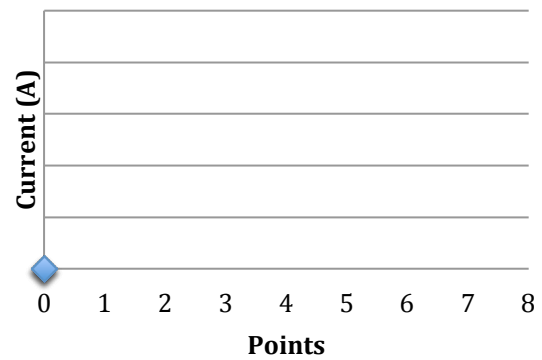
Circuit 3 (Bulbs in Parallel, Label Points 1-8)



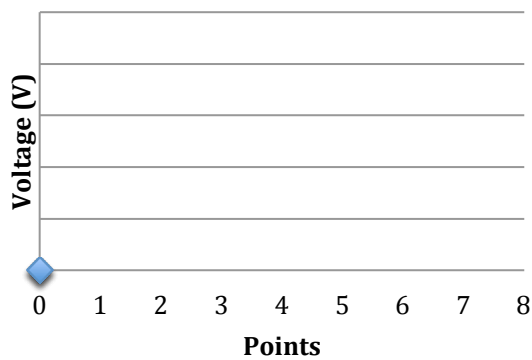
Voltage versus location



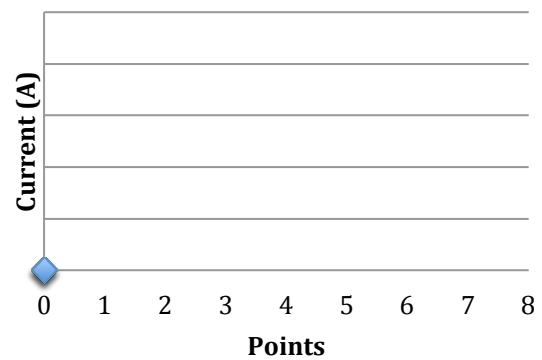
Current versus location

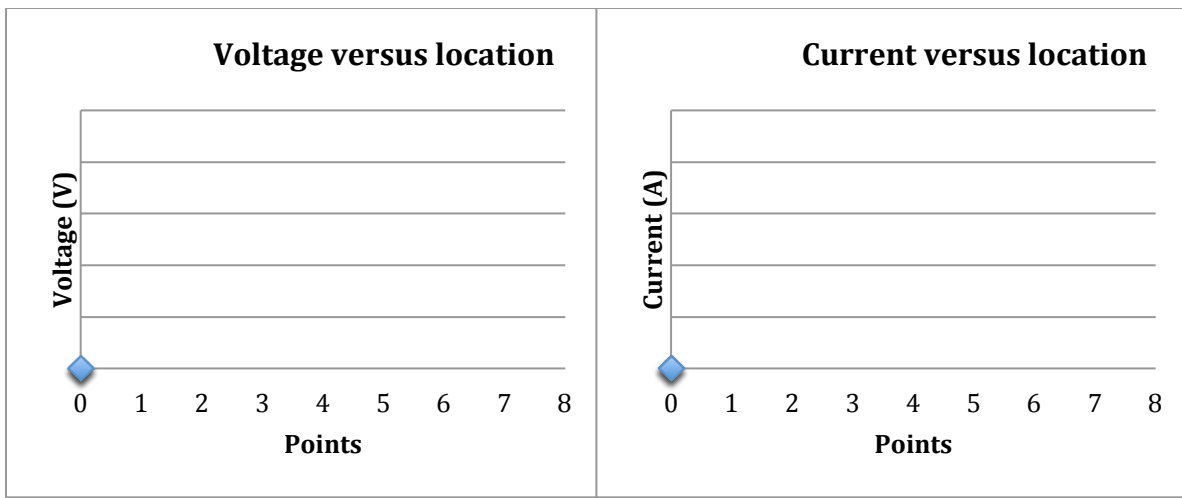


Voltage versus location



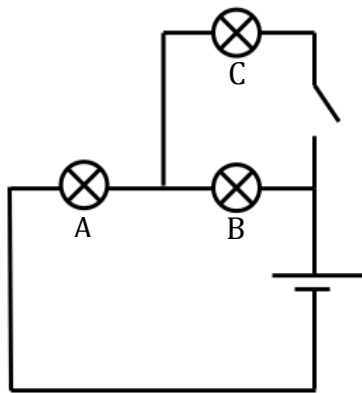
Current versus location





4.) Series and Parallel Combinations:

Here is a circuit that is a series and parallel combination. Include a switch this time. Before building the circuit make the following predictions.



1. When the switch is open compare the brightness of bulbs A, B, and C.
2. What happens to the brightness of each bulb when you close the switch?
Explain your reasoning.

- 5.) **Challenge:** Using the lab materials on the bench design a circuit so that you can turn a hallway light on and off from two different switches. Document your ideas with schematics. Include your final answer with a schematic and then create a working model.