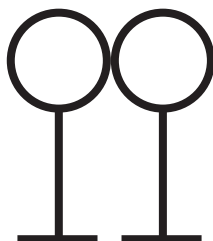
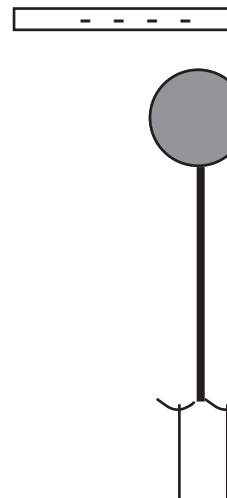


## Homework – Section 8

1. A leaf electroscope is an old device for detecting the presence of small amounts of charge. It usually consists of a conducting rod supporting a conducting knob at one end and two light-weight conducting "leaves" at the other end, as shown in the diagram. The leaves are hung from the rod so they can swing freely. The support system for the electroscope is not shown. If a charged rod is brought near the knob, the leaves will swing apart. Use the ideas of electric potential halo and repulsive or attractive forces to explain why the leaves separate when a negatively charged rod is placed near the knob. Use an electroscope to see if it behaves as described.



2. Two metal spheres mounted on insulating rods are touching each other as shown. A positively-charged rod is placed close to one of the spheres, and then someone pulls the spheres apart.

a) Describe the charges that end up on each sphere, using the electric potential halo idea to explain how these charges got to the spheres.

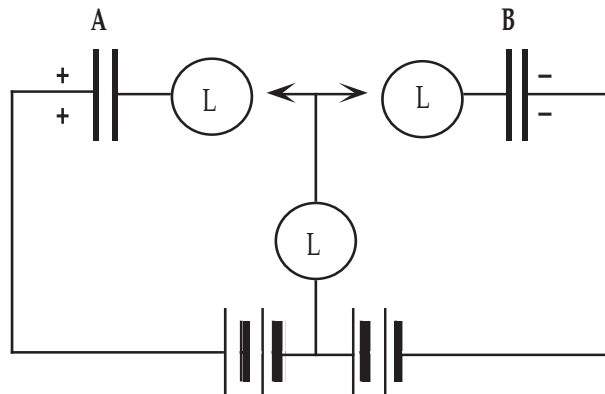
b) How could you use the electroscope in problem 1 to check your prediction?

3. An electroscope has a positive charge added to it at the knob, and the leaves then separate. You can now use the electroscope to identify the type of charge on various objects.

a. Describe what the leaves would do if a positively-charged object were brought near the knob. Explain in terms of electric halo.

b. Describe what the leaves would do if a negatively-charged object were brought near the knob. Explain in terms of electric halo.

4. A third bulb will be added to the incomplete island circuit similar to the one you investigated in Figure 8.6a, as shown. The 4-cell battery has been separated into two 2-cell batteries and the connection to the third bulb is made between them.



Predict the observed brightness of the third bulb over time after this connection is made.

**Prediction:**

Once you have made your prediction, construct the circuit. You and your partner can work together to make the simultaneous connection.

**Observations:**

**Explanation:**

5. Color code the diagram, including the plates, the wires, and objects placed between the plates (at the circles).

