Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Electrochemistry Inquiry-Based Lab**

Your task: Build a galvanic cell with a measurable cell potential using the available materials.

*Hint: Setting up a multimeter:* Use a voltmeter to measure the potential difference between the two half-cells. Connect the negative terminal of the voltmeter to the zinc electrode. Use the most sensitive scale that is practical. Make note as to which electrode is the anode and which is the cathode. When the volt­ meter reads a positive voltage, the electrode connected to the positive terminal is the cathode and is undergoing reduction, while oxidation is occurring at the electrode connected to the negative (or common) terminal, the anode.

When you have built your cell, show your teacher, record the cell potential (Ecell), and answer the following questions:

1. Your recorded cell potential (Ecell)\_\_\_\_\_\_\_\_\_
2. Your cell potential should be a positive value. What would a negative cell potential (Ecell) indicate?
3. Sketch your cell including labels of all chemicals and the direction of ion flow and electron flow.
4. List the important chemicals and components of your galvanic cell and describe their purposes.
5. Write the balanced chemical equation for the reaction that occurs inside your cell
6. Calculate the standard cell potential (E°cell) for your cell. Show work
7. Compare your recorded cell potential (Ecell) to the standard cell potential (E°cell) for your cell. Which is larger in magnitude, and why?
8. Use your (E°cell) to calculate ∆G° for your reaction. Show work.

**Materials to be made available for students:**

250 mL Beakers

Tubing (u-shaped glass tube or rubber tube)

0.1 M Cu(NO3)2 solution\*

0.1 M Zn(NO3)2 solution\*

0.1 M KNO3 solution\*

Copper electrodes

Zinc electrodes

Cotton balls

Steel wool or sandpaper

Voltmeters with leads

alligator clips

\*note: molarities do not need to be precise. Copper(II) sulfate and copper(II) chloride solutions also work fine