Galvanic Cells: Electricity from Redox Reactions

SCH4C | Student laboratory assignment | 1 of 4

Prepare for your investigation

Name: _____ Date: _____ Class: _____

Research question

How does the choice of electrode metals affect the voltage and direction of electron flow in a galvanic cell?

Learning goal: use the virtual model to gather evidence, explain galvanic cells: electricity from redox reactions and communicate a supported conclusion.

Materials: WorksheetGalaxy virtual laboratory, this assignment, calculator or spreadsheet if needed. Virtual observations only; do not recreate hazardous procedures or perform physical fitness tests without teacher approval.

1. Define two relevant scientific terms from the Background Information tab. (K/U)

2. Write a prediction or hypothesis with a scientific reason. (K/U, T/I)

3. Identify the variable or feature compared, the measured outcome and constants or consistent observation criteria. (T/I)

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Perform the virtual laboratory

Open the corresponding virtual lab and read Background Information. Follow the investigation instructions below. Record authentic simulated results; do not invent data.

• Review the standard reduction potentials in Background Information.

• Construct a Zn–Cu cell. Predict the anode, cathode, and voltage before running the model.

• Run and record at least five different metal pairs , including Zn–Cu, Fe–Cu, and Cu–Ag.

• For each pair, record the anode, cathode, predicted voltage, and observed model voltage.

• Compare at least two cell potentials and explain how reduction potentials determine the difference.

• Remove the salt bridge in one trial and explain why a complete circuit is necessary.

• Complete the lab report with a hypothesis, data, balanced half-reactions, analysis, and conclusion.

Record each completed observation using the simulator’s record control when available. Use Data & Graphs to review results. Export CSV if available; attach additional rows or screenshots when needed.

Record the exact settings and any changes to the method.

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Observations & results

Enter the actual results. Keep trial IDs consistent between continued tables. Attach the full exported data or extra sheets when the procedure requires more rows. Include units as displayed.

Data table 1

Trial / item	Metal pair	Anode	Cathode	Predicted E° (V)	Bridge

Data table 1 — continued (2)

Trial / item	Model reading (V)

Qualitative observations / sample calculation (show units where applicable)

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Analysis, conclusion & assessment

4. Present a labelled graph of a measured relationship, or an annotated diagram / comparison chart for qualitative investigations. Attach it separately. Explain the pattern using recorded evidence. (C, T/I)

5. Variables and controls: Identify the independent variable, dependent variable, and controlled conditions. (K/U, A)

6. Use your trial data to explain why different electrode pairs produce different voltages. (K/U, A)

7. Explain the role of the salt bridge and describe the effect of removing it. (K/U, A)

8. Identify two limitations of this simulation compared with a physical galvanic cell. (K/U, A)

Conclusion and evaluation: answer the research question, revisit the prediction using evidence, identify a model limitation and propose an improvement. (T/I, A)

Submit this assignment plus your completed Lab Report (printed or saved as PDF from the lab) and any supporting data/figures.

K/U: accurate concepts /10	T/I: method, data, reasoning /12	C: clear tables, units, report /8	A: explanation, conclusion, transfer /10

Total: /40