Unit 9 Learning Objectives and Mastery Tasks

Indicator	Learning Objective	Mastery Tasks
TRA-2.C	Represent a balanced redox reaction equation using half-reactions.	☐ Use a table of half-reactions to determine a balanced redox reaction ☐ Determine the number of electrons transferred during an electrochemical reaction, given a table of half-reactions
ENE-6.A	Explain the relationship between the physical components of an electrochemical cell and the overall operational principles of the cell.	☐ Identify the components of an electrochemical cell and the role each part plays ☐ Determine the direction of electron flow in the cell ☐ Represent an electrochemical cell with an appropriate particle diagram ☐ Label anode and cathode with corresponding redox process
ENE-6.B	Explain whether an electrochemical cell is thermodynamically favored, based on its standard cell potential and the constituent half-reactions within the cell.	☐ Use signs of ΔG and/or E_{cell} to distinguish between galvanic and electrolytic cells ☐ Calculate the E_{cell} of an electrochemical cell ☐ Apply the equation $\Delta G=-nFE_{cell}$
ENE-6.C	Explain the relationship between deviations from standard cell conditions and changes in the cell potential.	☐ Explain how a concentration cell works ☐ Understand why Le Châtelier's principle cannot be used to explain electrochemical systems ☐ Use comparisons of Q values to determine how changes in the cell as it progresses impacts the E relative to E° ☐ Apply the Nernst equation qualitatively to discuss the impact of concentration on cell potential
ENE-6.D	Calculate the amount of charge flow based on changes in the amounts of reactants and products in an electrochemical cell.	☐ Apply stoichiometric calculations using Faraday's Law (I=q/t) to determine: ○ Number of electrons transferred ○ Change in mass of electrodes ○ Current ○ Time ○ Charge of ionic species