Objective:
The objective is to have students create models of an electrochemical cell.

Target student audience:
All levels

ChemSense User Level:
Intermediate or Advanced

ChemSense Tools used:
Animation, Feedback-Peer

Specialized Tools needed:
None

Classroom Implementation

Time: Including pre-laboratory discussion and computer work is 2.0 hours.
Student Grouping: Students are paired-up on the computers.
Activity Type:

Chemistry Concepts in Activity:
California State Standards in Chemistry 3. g Knows how to identify reactions that involve oxidation and reduction and how to balance oxidation-reduction reactions.

ChemSense Connectivity The connectivity of atoms to make molecule structures sits at the core of contemporary chemistry. Chemical reactions, that is, the transformation of one set of compounds into another, are changes in chemical identity and re expressed in terms of connectivity changes.

Prerequisite Chemistry Concepts:
The students must understand the concept of oxidation and reduction reactions as being two parts of the whole system.

Inquiry Skills (linked to NSES):

ACTIVITY Summary:
The lesson begins with a review oxidation and reduction reactions and the parts of an electrochemical cell, anode, cathode, salt bridge, substance being oxidized, and the substance being reduced. Using a Standard Half Cell Potential Chart, students select metals to represent the anode and cathode in an electrochemical cell of their design. The students write the half-reactions and sketch the electrochemical cell in their laboratory

notebook, and then sketch a five-frame storyboard showing the direction the electrons would flow in their cell, and the resulting change. Students use the storyboard to animate the process.

Sources:
None

Application:
The gain and loss of electrons are the cause of many chemical reactions observed in everyday life such as the corrosion of metals and the function of batteries.

ACTIVITY:

ELECTROCHEMICAL CELL CHEMSENSE EXPERIMENT

Purpose:

To create an animation sequence that shows the oxidation and reduction of metals in an electrochemical cell, which result in one metal plating and the other metal corroding.

Goal:

The student will be able to visualize the oxidation and reduction process.

California State Standard:

3. g Knows how to identify reactions that involve oxidation and reduction and how to balance oxidation-reduction reactions.

Pre-laboratory Directions:

1. Use the Standard Half Cell Potential Chart to select two metals to act as electrodes in an electrochemical cell.
2. Use the cell potentials to determine which metal will be the anode, and which will be the cathode. Write the half-reactions and the net cell reaction. Determine the solutions to be in each of the half-cells.
3. Sketch the electrochemical cell into your laboratory notebook, and label the following parts: anode, cathode, salt bridge, metal to be oxidized, metal to be reduced, metal to be corroded, metal to be plated, connecting wire and position of the voltmeter.
4. Sketch out four additional frames that show the flow of electrons, the change in the metals (electrodes), and any change in concentration of the solutions. Be sure to include charges on the ions.

Procedure:

1. Use pre-lab directions as a guide for a 20-40-frame animation sequence depicting the oxidation and reduction processes in the electrochemical cell.
2. Send at least one message to a classmate regarding the content of their animation sequence.
3. Show your work to the instructor.

4. Save your work to your account folder.

Rubric for scoring:

Rubric Score	Level of Competence	Expectation Level
4	Mastery	Animation has smooth transitions between frames. Oxidation and reductions half reactions are accurately labeled, and the electron flow and ions show charges. Text accurately describes the animation process. Message sent is specific to the recipient work.
3	Skilled	Animation may not be smooth and oxidation and reductions half reactions or electron flow and ions may have minor errors. Text accurately describes the animation process. Message sent may be off topic.
2	Proficient	Animation is not smooth, but oxidation and reductions half reactions or electron flow and ions are accurate. Text accurately describes the animation process. Message sent may be off topic or inaccurate.
1	Introductory	Animation may not be smooth. Oxidation and reductions half reactions, electron flow and ions are not accurate. Text may contain errors relating to the electrochemical cell. Message sent may be off topic, inaccurate, or missing.
0	Incomplete	Animation may have smooth transitions between frames, but the oxidation and reductions half reactions, electron flow and ions are wrong and/or inaccurate. Text is incomplete. Message sent is off topic or missing.