

# FRANKLIN-SIMPSON HIGH SCHOOL

Course Name: Pre – AP Chemistry

Unit Name: Oxidation-Reduction Reactions and Electrochemistry

Days: 7

## Quality Core Objectives:

Unit 19 Oxidation-Reduction Reactions and Electrochemistry	
I.A.1. Scientific Inquiry	c. Collect, organize, and analyze data accurately and use techniques and equipment appropriately
	d. Interpret results and draw conclusions, revising hypotheses as necessary and/or formulating additional questions or explanations
	e. Write and speak effectively to present and explain scientific results, using appropriate terminology and graphics
	f. Safely use laboratory equipment and techniques when conducting scientific investigations
	g. Routinely make predictions and estimations
I.A.2. Mathematics and Measurement in Science	b. Use appropriate SI units for length, mass, time, temperature, quantity of matter, area, volume, and density; describe the relationships among SI unit prefixes (e.g., centi-, milli-, kilo-); recognize commonly used non-SI units
	c. Use the correct number of significant figures in reporting measurements and the results of calculations
I.A.3. Science in Practice	e. Use a variety of appropriate sources (e.g., Internet, scientific journals) to retrieve relevant information; cite references properly
	f. Identify and analyze the advantages and disadvantages of widespread use of and reliance on technology
III.A.3 Chemical Equations and Stoichiometry	g. Predict products of single replacement reactions, using the activity series, and write balanced equations for these reactions
V.D. REDOX Reactions and Electrochemistry	a. Define REDOX reaction, oxidation, reduction, oxidizing agent, and reducing agent
	b. Assign oxidation numbers (states) to reaction species; identify the species oxidized and reduced, and the oxidizing agent and reducing agent, in a REDOX reaction
	c. Balance REDOX equations by the ion-electron and half-reaction methods
	d. Diagram and explain the operation of a voltaic cell
	e. Determine the net voltage obtained when standard half-cells are paired to form a voltaic cell, and use this voltage to predict reaction spontaneity

**Purpose of the Unit:** Students will be able to identify REDOX reactions, identify the different parts of the reaction, and balance the reaction by various methods. Students will also be able to apply their working knowledge of REDOX reactions to construct voltaic cells, both graphically and experimentally. Students will then be able to predict the available voltage from a cell, as well as its spontaneity.

**Prerequisites:** Students should be able to:

- Balance equations
- Predict products of reactions
- Determine the charge on an ion

**Daily Lesson Guide**

Day	Lesson Content and Objectives	Focus Questions	Critical Thinking (High Yield / Literacy /LTF/etc.)	Engagement	Assessment and/or Accommodations
1	<ul style="list-style-type: none"> <li>* Predict products of single replacement rxns</li> <li>* Activity series</li> <li>* Balancing equations</li> </ul> III.A.3.g	<ul style="list-style-type: none"> <li>* How do you predict the products of a single replacement reaction?</li> <li>* How do I know if the reaction will occur?</li> </ul>	<ul style="list-style-type: none"> <li>* Summarizing and note taking</li> <li>* Evaluation/ Analysis/ Application</li> <li>* Non-linguistic representation</li> <li>* I Do – We Do – You Do</li> </ul>	<ul style="list-style-type: none"> <li>* Pre-test</li> <li>* ACT bell ringer</li> <li>* Modeled notes</li> <li>* Work sample problems together, alone (formative)</li> </ul>	<ul style="list-style-type: none"> <li>* Evaluate pre-test</li> <li>* Evaluate sample problems for understanding</li> </ul> Enrichment: Less guidance in note taking, more independence in practice, more challenging examples in formative

2	<ul style="list-style-type: none"> <li>* REDOX rxns</li> <li>* Oxidation</li> <li>* Reduction</li> <li>* Oxidizing agent</li> <li>* Reducing agent</li> <li>* Oxidation numbers</li> <li>* Balancing REDOX rxns by ion-electron and half-rxn method</li> </ul> <p>V.D.a, b, c</p>	<ul style="list-style-type: none"> <li>* What is a REDOX reaction?</li> <li>* What are the parts of a REDOX reaction?</li> <li>* How do I balance a REDOX reaction?</li> </ul>	<ul style="list-style-type: none"> <li>* Summarizing</li> <li>* Evaluation/ Analysis</li> <li>* Non-linguistic representation</li> <li>* I Do – We Do – You Do</li> <li>* Identifying similarities and differences</li> </ul>	<ul style="list-style-type: none"> <li>* ACT bell ringer</li> <li>* Modeled notes</li> <li>* Work sample problems together, alone (formative)</li> </ul>	<ul style="list-style-type: none"> <li>* Evaluate sample problems for understanding</li> </ul> <p>Enrichment: Less guidance in note taking, more independence in practice, more challenging examples in formative</p>
3-4	<ul style="list-style-type: none"> <li>* Balancing REDOX rxns (cont'd.)</li> <li>* Voltaic cell diagram</li> <li>* Determining net voltage from voltaic cells</li> <li>* Predicting spontaneity</li> </ul> <p>V.D.c, d, e</p>	<ul style="list-style-type: none"> <li>* How do I balance a REDOX reaction?</li> <li>* How do I represent a voltaic cell and determine the voltage potential?</li> <li>* How do I know if a battery is spontaneous?</li> </ul>	<ul style="list-style-type: none"> <li>* Summarizing and note taking</li> <li>* Analysis/ Application</li> <li>* Non-linguistic representation</li> <li>* Identifying similarities and differences</li> <li>* I Do – We Do – You Do</li> <li>* Advanced organizers</li> </ul>	<ul style="list-style-type: none"> <li>* ACT bell ringer</li> <li>* Modeled notes</li> <li>* Work sample problems together, alone (formative)</li> <li>* Article about manufacturing batteries</li> </ul>	<ul style="list-style-type: none"> <li>* Evaluate sample problems for understanding</li> <li>* Evaluate comprehension of article</li> </ul> <p>Enrichment: Less guidance in note taking, more independence in practice, more challenging examples in formative</p>
5	<ul style="list-style-type: none"> <li>* Laboratory: Building a voltaic cell to power a motor</li> </ul> <p>I.A.1.c, d, e, f, g I.A.2.b, c I.A.3.e, f III.A.3.g V.D.a, b, c, d, e</p>	<ul style="list-style-type: none"> <li>* How can I apply what I know from this unit build a voltaic cell (battery) and power a motor?</li> </ul>	<ul style="list-style-type: none"> <li>* Synthesis/ Application/ Analysis</li> <li>* Identifying similarities and differences</li> <li>* Learning with others</li> <li>* Authenticity</li> <li>* Novelty and Variety</li> <li>* Generating and testing hypotheses</li> </ul>	<ul style="list-style-type: none"> <li>* ACT bell ringer</li> <li>* Conduct lab according to procedures provided (summative)</li> </ul>	<ul style="list-style-type: none"> <li>* Evaluate lab report</li> </ul> <p>Enrichment: Student development of lab procedures with less guidance</p>

6	<ul style="list-style-type: none"> <li>* Review</li> <li>I.A.1.c, d, e, f, g</li> <li>I.A.2.b, c</li> <li>I.A.3.e, f</li> <li>III.A.3.g</li> <li>V.D.a, b, c, d, e</li> </ul>	<ul style="list-style-type: none"> <li>* What can I do to be better prepared for the exam?</li> </ul>	<ul style="list-style-type: none"> <li>* Use clickers to test students' knowledge and clarify and misconceptions before the exam with immediate feedback.</li> </ul>	<ul style="list-style-type: none"> <li>* ACT bell ringer</li> <li>* Use clickers to review with exam like questions (summative)</li> </ul>	<ul style="list-style-type: none"> <li>* Students participate in review</li> <li>Enrichment: Less time to solve problems and limited use of aides</li> </ul>
7	<ul style="list-style-type: none"> <li>* Exam</li> <li>I.A.1.c, d, e, f, g</li> <li>I.A.2.b, c</li> <li>I.A.3.e, f</li> <li>III.A.3.g</li> <li>V.D.a, b, c, d, e</li> </ul>	<ul style="list-style-type: none"> <li>* Can I demonstrate my knowledge on the exam?</li> </ul>	<ul style="list-style-type: none"> <li>* Evaluation</li> <li>* Analysis</li> <li>* Application</li> <li>* Synthesis</li> </ul>	<ul style="list-style-type: none"> <li>* ACT bell ringer</li> <li>* Students take exam (summative)</li> </ul>	<ul style="list-style-type: none"> <li>* Evaluate exam</li> <li>Enrichment: No use of supports with exemption of periodic table, periodic table only has element symbols, not names</li> </ul>