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    REVIEW
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S T U D Y   L I S T   F r o m   P a u l   G r o v e s

General Terms

I can…

☐ Determine the oxidation number of any element.

☐ State that oxidation number is the charge an atom would have if all of the shared electrons were assigned to the more electronegative atom.

☐ Identify for any element in a reaction whether it is gaining or losing electrons (LeO GeR).

☐ Explain that when oxidation occurs, reduction must also occur (RedOx).

☐ Correctly apply the terms oxidizing agent and reducing agent to a redox reaction.

☐ State that there are two big topics in electrochemistry, (1) **Electrolysis**—in which electricity (moving electrons) causes chemical change, and (2) **Electrochemical Cells**—in which chemical changes cause a flow of electrons (electricity).

Electrolysis

Battery
Electrodes
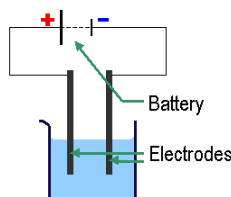
I can…

☐ State that during electrolysis, electricity applied to a solution causes ions to migrate to the electrodes.

☐ State that an electrode is the part of the conductor that touches the solution.

☐ State that reduction always occurs at the cathode (red cat).

☐ State that oxidation always occurs at the anode (an ox).

☐ Write equations for the reactions that occur at the electrodes when water undergoes electrolysis (memorize how to derive these).
(−) cathode: $2\ H_2O(l) + 2\ e^- \rightarrow H_2(g) + 2\ OH^-$
(+) anode: $2\ H_2O(l) \rightarrow O_2(g) + 4\ H^+ + 4\ e^-$

☐ Explain that during the electrolysis of an ionic solution, either the + ion can be reduced or water can be reduced. In the same way, either the – ion can be oxidized or water can be oxidized.

☐ Use a reduction potential chart to determine which of two substances is more likely to be reduced or oxidized.

☐ State that electrical current is measured in Coulombs and 1 Coulomb = 1 amp·1 sec.

☐ State that 1 Faraday (**F**) = 1 mole of electrons = 96,500 Coulombs.

☐ Use the Faraday, amps and seconds to quantify electrolysis problems.

Electrochemical Cells
(Voltaic Cells & Galvanic Cells)

I can…

☐ State that oxidization always occurs at the anode and reduction always occurs at the cathode.

☐ Draw a simple electrochemical cell:

Electron flow
V
Zn   Salt / ion   Cu
       bridge
Zn2+ SO4 2-   Cu 2+ SO4 2-
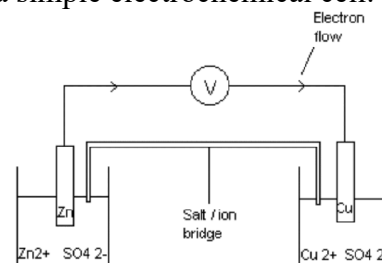
☐ Use the reduction potential chart to determine which chemical is the anode (smaller E°) and which chemical is the cathode (larger E°).

☐ State that standard conditions are 25°C, solutions are 1 M, and gases are 1 atm.

☐ Calculate the voltage of a standard cell as the difference in the two E° values. (not like Hess)

☐ State that the anode is the (−) electrode because the chemicals are being oxidized (losing e⁻'s).

☐ State that for non-standard cells, changes that drive the reaction forward increase the voltage. (The Nernst equation allows you to calculate this voltage for a non-standard cell.)