Chapter 19 concept map (Electron Transfer Reactions)

1. Know that oxidation is loss of electrons and reduction is gain of electrons.
2. Balance redox reactions in acidic or basic solutions using the half-reaction method.
3. Understand how a voltaic cell works. Be able to draw a diagram of a voltaic cell, identify the oxidation and reduction half-reactions happening in the cell and label all the parts of the cell(anode, cathode, site of oxidation reaction, site of reduction reaction, direction of flow of electrons in the circuit and ions through the salt bridge)
4. Use the electrochemical cell notation to describe a voltaic cell.
5. Understand how standard reduction potentials are determined. Use standard reduction potentials to identify the oxidized and the reduced species in a redox reaction occurring in a voltaic cell, to determine the ability of a species to serve as an oxidizing or reducing agent and to rank strengths of oxidizing and reducing agents.
6. Calculate cell potentials (voltages) of voltaic cells under standard conditions from standard reduction potentials.
7. Use the Nernst equation to calculate cell potentials under nonstandard conditions.
8. Calculate ΔG° and K using the equation $\Delta G^\circ = -nFE^\circ$.
9. Understand how nonspontaneous processes of electrolysis and electroplating work. Predict which species will be oxidized and which – reduced in electrolysis and electroplating experiments. Determine the voltage that needs to be applied for these nonspontaneous processes to occur.
10. Perform stoichiometric calculations to determine moles of product formed through electrolysis and electroplating.