

# CHEMISTRY CONTENT FACTS

The following is a list of facts related to the course of Chemistry. A deep foundation of factual knowledge is important; however, students need to understand facts and ideas in the context of the conceptual framework. This list is not intended to provide a comprehensive review for State and National Assessments. Its purpose is to provide a highlight of the factual material covered in Chemistry. This list is not all inclusive, be sure to check Nevada State Standards and your district syllabi.

## Redox and Electrochemistry

- Know the rules for determining the oxidation states
- Sum of the oxidation states in a neutral molecule must always equal **ZERO**
- **Oxidation** - loss of electrons causes the oxidation # to increase (LEO)
- **Reduction** - gaining of electrons causes the oxidation # to decrease (GER)
- To have a Redox reaction there must be a change in oxidation # and you **CANNOT** have oxidation without having reduction
- **Standard Reduction potentials show ONLY** reduction reactions, in order to change them into oxidation reactions you must reverse them and change to sign of the  $E^{\circ}$  value. The strongest reducers are on the TOP of the chart and the strongest oxidizers are on the BOTTOM of the chart.
- Only metals above hydrogen will react with acids to produce Hydrogen gas
- Hydrogen is used as the standard on which the entire table is based -  $E^{\circ} = 0$  volts
- To calculate the  $E^{\circ}$  of a cell first determines which one of your elements is the substance being reduced and which one is being oxidized. Use the opposite of the sign on the element being oxidized and add them up
- If  $E^{\circ}$  is + then the reaction is spontaneous
- If the  $E^{\circ}$  is - then the reaction is non-spontaneous
- If the  $E^{\circ} = 0$  then the system is at equilibrium
- **Electrolytic cell** - need a battery to get going, Anode is (+) electrode & the cathode is the (-) electrode.
- **Electroplating** - plating occurs at the cathode or negative electrode. Car bumpers can be coated with protective metal in this manner. Mass increases at the site of plating.
- **Balancing Redox equations** - balance with respect to charge and mass
- The substance being reduced is the oxidizing agent
- The substance being oxidized is the reducing agent
- To figure out the  $E^{\circ}$  value for a redox reaction you should use the following reaction  $E^{\circ}_{\text{total}} = E^{\circ}_{\text{reduced}} + E^{\circ}_{\text{oxidized}}$