**Redox**

Oxidation- Reduction = **Redox** Ask Ms. Cormier about this word!

**Oxidation** = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Reduction** = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**"LEO says GER"**

**Problem**

We have to know how many electrons are being lost or gained.

**Solution**

We assign **oxidation numbers**.

**Oxidation Numbers**

* indicate the number of an atom's electrons involved in bonding to an atom NOT itself
* are positive or negative numbers, but do not confuse them with positive or negative charges on ions or valences!
* the element with the greater electronegativity is assigned a negative value.

**Electronegativity**

* is a measure of the tendency of an atom to attract a bonding pair of electrons. The Pauling scale is the most commonly used. Fluorine (the most **electronegative** element) is assigned a value of 4.0, and values range down to caesium and francium which are the least **electronegative** at 0.7 www.chemguide.co.uk/atoms/bonding/electroneg.html

"Saturday Night **F**ever"

e.g. Draw the Lewis dot structure for hydrogen gas:

Draw the Lewis dot structure for water:

Draw the Lewis dot structure for hydrogen peroxide:

Draw the Lewis dot structure for H2SO4:

**Rules for Assigning Oxidation Numbers**

Oxidation numbers are assigned to elements using these rules:

* **Rule 1:** The oxidation number of an element in its free (uncombined) state is zero — for example, Al(s) or Zn(s). This is also true for elements found in nature as *diatomic* (two-atom) elements

image0.png

and for sulfur, found as:

image1.png

* **Rule 2:** The oxidation number of a *monatomic* (one-atom) ion is the same as the charge on the ion, for example:

image2.png  
image3.png

* **Rule 3:** The sum of all oxidation numbers in a neutral compound is zero. The sum of all oxidation numbers in a [***polyatomic***](http://www.dummies.com/education/science/chemistry/polyatomic-ions-names-and-symbols/) (many-atom) ion is equal to the charge on the ion. This rule often allows chemists to calculate the oxidation number of an atom that may have multiple oxidation states, if the other atoms in the ion have known oxidation numbers.
* **Rule 4:** The oxidation number of an alkali metal (IA family) in a compound is +1; the oxidation number of an alkaline earth metal (IIA family) in a compound is +2.
* **Rule 5:** The oxidation number of oxygen in a compound is usually –2. If, however, the oxygen is in a class of compounds called *peroxides* (for example, hydrogen peroxide), then the oxygen has an oxidation number of –1. If the oxygen is bonded to fluorine, the number is +1.
* **Rule 6:** The oxidation state of hydrogen in a compound is usually +1. If the hydrogen is part of a *binary metal hydride* (compound of hydrogen and some metal), then the oxidation state of hydrogen is –1.
* **Rule 7:** The oxidation number of fluorine is always –1. Chlorine, bromine, and iodine usually have an oxidation number of –1, unless they’re in combination with an oxygen or fluorine.

http://www.dummies.com/education/science/chemistry/rules-for-assigning-oxidation-numbers-to-elements/