SUMMARY #2/AQ CHEM/SOLUBILITY RULES/AP CHEMISTRY

There are many differing opinions regarding solubility. While some chemicals are always soluble and others virtually never soluble – many, many chemicals are *somewhat* soluble. To make the lines a bit easier to draw, most chemists agree that an "insoluble" chemical will dissolve less than 0.01 g in a liter of water. Anything over 0.01 g is considered to be soluble enough to display some chemical effect in a solution.

We will identify which ions are considered soluble and insoluble. Here we go:

ALWAYS SOLUBLE (with no exceptions)

Ammonium Ions (NH_4^+)
Acetate Ions (CH_3COO^-)
Bicarbonate Ions (HCO_3^-)
Chlorate/Perchlorate Ions (ClO_3^-/ClO_4^-)
Nitrate Ions (NO_3^-)
Alkali metal cations (Li^+, Na^+, K^+, Rb^+, Cs^+)

A note should be made that all "always soluble" ions will make any other ions in a compound become soluble. ∵

USUALLY SOLUBLE (with exceptions)

Chlorides*** (Cl^-)
Bromides*** (Br^-)
Iodides*** (I^-)
Fluorides** (F^-)
Sulfates* (SO_4^{2-})

***Ions of Lead, Mercury, and Silver (PMS) will make these ions INSOLUBLE.
*Ions of Calcium, Barium, Strontium, Lead, Mercury, and Silver (CaBaSr-PMS) will make these ions INSOLUBLE.
**Ions of Calcium, Barium, Strontium, Lead, Mercury, Silver, and Magnesium will make Fluorides INSOLUBLE.

USUALLY INSOLUBLE (with exceptions)

All always ions (∵) will make any insoluble ions become soluble.

Metal Oxides and Hydroxides (except strong bases)
Metal carbonates
Metal phosphates
Metal chromates/dichromates
Metal sulfides (in additions to always (∵) Ca, Ba, and Sr ions will also make sulfides soluble).