

### **Water Solubility Rules**

(ref. table 4.1, p. 144, *Chemistry, 7<sup>th</sup> ed.*, Zumdahl & Zumdahl)

*Note that there may be a number of exceptions to these rules, and/or there are more subtle classifications ("partially soluble", "somewhat soluble", "marginally soluble", etc.), but these are the rules that we will use in CHM 101.*

1. (Required memorization)
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3. Most chloride, bromide, and iodide salts are soluble.  
EXCEPTIONS (for CHM 101): chloride, bromide, and iodide salts containing  $\text{Ag}^+$ ,  $\text{Pb}^{2+}$ , and  $\text{Hg}_2^{2+}$  are INSOLUBLE.
4. Most sulfate salts are soluble.  
EXCEPTIONS (for CHM 101):  $\text{BaSO}_4$ ,  $\text{PbSO}_4$ ,  $\text{Hg}_2\text{SO}_4$ , and  $\text{CaSO}_4$ , are INSOLUBLE.
5. Most hydroxide salts are insoluble, unless rule #2 applies to the compound.
6. Most sulfide ( $\text{S}^{2-}$ ), carbonate ( $\text{CO}_3^{2-}$ ), chromate ( $\text{CrO}_4^{2-}$ ), and phosphate ( $\text{PO}_4^{3-}$ ) salts are insoluble, unless rule #2 applies to the compound.