

Also see page 49 in your equations book

TABLE 3-4

Solubility of Some Ionic Compounds in Water

| Negative Ion                                                                                                                       | Plus | Positive Ion                                                                                                       | Form a Compound Which Is  |
|------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------------------------------------------------------------------------------------------------|---------------------------|
| Any negative ion                                                                                                                   | +    | Alkali metal ions (Li <sup>+</sup> , Na <sup>+</sup> , K <sup>+</sup> , Rb <sup>+</sup> , or Cs <sup>+</sup> )     | Soluble, i.e., >0.1 mol/L |
| Any negative ion                                                                                                                   | +    | Ammonium ion, NH <sub>4</sub> <sup>+</sup>                                                                         | Soluble                   |
| Nitrate, NO <sub>3</sub> <sup>-</sup>                                                                                              | +    | Any positive ion                                                                                                   | Soluble                   |
| Acetate, CH <sub>3</sub> COO <sup>-</sup>                                                                                          | +    | Any positive ion except Ag <sup>+</sup> or Hg <sup>2+</sup>                                                        | Soluble                   |
| Chloride, Cl <sup>-</sup> , or Bromide, Br <sup>-</sup> , or Iodide, I <sup>-</sup>                                                | +    | Ag <sup>+</sup> , Pb <sup>2+</sup> , Hg <sub>2</sub> <sup>2+</sup> , or Cu <sup>+</sup>                            | Not soluble               |
|                                                                                                                                    | +    | Any other positive ion                                                                                             | Soluble                   |
| Sulfate, SO <sub>4</sub> <sup>2-</sup>                                                                                             | +    | Ca <sup>2+</sup> , Sr <sup>2+</sup> , Ba <sup>2+</sup> , Ra <sup>2+</sup> , Ag <sup>+</sup> , or Pb <sup>2+</sup>  | Not soluble               |
|                                                                                                                                    | +    | Any other positive ion                                                                                             | Soluble                   |
| Sulfide, S <sup>2-</sup>                                                                                                           | +    | Alkali ions or NH <sub>4</sub> <sup>+</sup>                                                                        | Soluble                   |
|                                                                                                                                    | +    | Be <sup>2+</sup> , Mg <sup>2+</sup> , Ca <sup>2+</sup> , Sr <sup>2+</sup> , Ba <sup>2+</sup> , or Ra <sup>2+</sup> | Soluble                   |
|                                                                                                                                    | +    | Any other positive ion                                                                                             | Not soluble               |
| Hydroxide, OH <sup>-</sup>                                                                                                         | +    | Alkali ions or NH <sub>4</sub> <sup>+</sup>                                                                        | Soluble                   |
|                                                                                                                                    | +    | Any other positive ion                                                                                             | Not soluble               |
| Phosphate, PO <sub>4</sub> <sup>3-</sup> , or Carbonate, CO <sub>3</sub> <sup>2-</sup> , or Sulfite, SO <sub>3</sub> <sup>2-</sup> | +    | Alkali ions or NH <sub>4</sub> <sup>+</sup>                                                                        | Soluble                   |
|                                                                                                                                    | +    | Any other positive ion                                                                                             | Not soluble               |

| Two Activity Series |                     |          |
|---------------------|---------------------|----------|
| Metals              | Decreasing Activity | Halogens |
| lithium             | ↓                   | fluorine |
| potassium           |                     | chlorine |
| calcium             |                     | bromine  |
| sodium              |                     | iodine   |
| magnesium           |                     |          |
| aluminum            |                     |          |
| zinc                |                     |          |
| chromium            |                     |          |
| iron                |                     |          |
| nickel              |                     |          |
| tin                 |                     |          |
| lead                |                     |          |
| HYDROGEN*           |                     |          |
| copper              |                     |          |
| mercury             |                     |          |
| silver              |                     |          |
| platinum            |                     |          |
| gold                |                     |          |

\* Hydrogen is in capital letters because the activities of the metals are often determined in relation to the activity of hydrogen.