**Net Ionic Equations**

* Written for reactions that occur between two compounds that form a precipitate
* Use solubility rules to predict the state of the products
* If a solid is not formed in the products, no reaction occurs (NR)
* Ionic symbols are used and are aqueous
* **Total Ionic Equation** : aqueous compounds are split into their ions, solid products remains a compound
* **Spectator Ions**: ions that are present in a reaction but do not become part of the solid
* **Net Ionic Equations:** spectators are taken out and only the ions that produced the solid are written

**Example: Aqueous sodium carbonate and aqueous calcium nitrate**

**BCE**

Na2CO3(aq) + Ca(No3)2(aq) -> CaCO3(s) + 2NaNO3(aq)

**TIE**

**2 Na+(aq)** + CO32-(aq) + Ca2+(aq) + **2NO3-(**aq) -> CaCO3(s) + **2Na+(aq)** + **2NO3-(**aq)

**NIE**

CO32-(aq) + Ca2+(aq) -> CaCO3(s)

**Ions and The Water Supply**

* Hard Water has a high concentration of dissolved ions, leaves soap scum and makes soap difficult to lather
* Soft Water has lower concentration of dissolved ions

**Removing Ions from Water**

* Ion exchange: cation exchangers are a resin of negative ions bound to sodium ions, when hard water runs through cations bump the sodium off of the resin and get washed away
* Chemical precipitation can precipitate heavy metals. Sulfur compounds are usually used
* Electrodialysis is a technique that uses oppositely charged electrodes to attract ions in water. The water is kept in the middle compartment with an electrode on either side. When the current is applied to the water, the ions move to the opposite electrode and the clean water stays in the middle compartment.