On Writing Net Ionic Equations...

1. Start by listing the chemical formulas of the reagents that are to be reacted.
2. Look at each reagent and decide whether it will dissociate in water. It will break completely into ions if:
   a. it is a strong acid. (there are 6 of these: HCl, HBr, HI, H₂SO₄, HNO₃, and HClO₄)
   b. it is a strong base. (there are 8: LiOH, NaOH, KOH, RbOH, CsOH, Ca(OH)₂, Sr(OH)₂, and Br(OH)₂. Most of the rest of the metal hydroxides are insoluble and do not ionize.)
   c. It is a soluble compound (Solubility Rules) but recall that any ionic compound with a group I metal cation or NH₄⁺ is soluble.
3. Write an arrow to indicate a reaction occurs.
4. Predict what the possible products will be. Write them as neutral salts, and then decide if they will be dissociated (dissolved) or not.
5. If the compound is soluble, write it as it will exist as separate ions. Stop here and balance the equation if you are asked for the overall Ionic equation.
6. Cancel out any spectator ions, and the stuff that is left is the net ionic equation. Make sure it is balanced in the simplest whole numbers.

Examples:
A. Write the net ionic equation for the reaction between Hydrochloric acid and Barium Hydroxide:
   1. HCl + Ba(OH)₂
   2. H⁺ + Cl⁻ + Ba²⁺ + 2OH⁻
   3. →
   4. Products will be BaCl₂ and H₂O. H₂O will not dissociate noticeably in solution so that is the formula for the product that is formed. BaCl₂, however, is soluble. (you may need to review that section of Chapter 4). So the overall reaction becomes:
   5. H⁺ + 2OH⁻ → 2H₂O + Ba²⁺ + 2Cl⁻
   6. the net ionic Ba²⁺ and Cl⁻ are unchanged by the reaction, so eliminate them, and rewrite the simplest balanced net ionic equation: H⁺ + OH⁻ → H₂O

B. Write the net ionic equation for the reaction between Ammonia and Hydrochloric acid.
   1. NH₃ + HCl
   2. NH₃ + H⁺ + Cl⁻
   3. →
   4. NH₄⁺ + Cl⁻
   5. NH₃ + H⁺ + Cl⁻ → NH₄⁺ + Cl⁻
   6. NH₄⁺ + H⁺ → NH₄⁺

C. Write the net ionic equation for the reaction between Ammonia and Water.
   1. NH₃ + H₂O
   2. NH₃ + H₂O (water is a weak acid/base so know that it does dissociate a teensy bit into H⁺ + OH⁻)
   3. →
   4. NH₄⁺ + OH⁻
   5. NH₃ + H₂O → NH₄⁺ + OH⁻
   6. NH₃ + H₂O → NH₄⁺ + OH⁻

D. Write the net Ionic Equation for the reaction between hydrofluoric acid and potassium hydroxide.
   1. HF + KOH
   2. HF (weak acid, not much dissociation, but when it does it is H⁺ + F⁻) and K⁺ + OH⁻
   3. →
   4. H₂O and KF / water is not going to dissociate much, so leave that as it is, but KF is a salt of a group I metal cation, so it will dissolve, and dissociate into ions.
   5. HF + K⁺ + OH⁻ → H₂O + K⁺ + F⁻
   6. HF + OH⁻ → H₂O + F⁻