**In-Class Activity**

Acids, bases, and solubility rules

Example compounds are given below for each of the common solubility rules. Label the cations as acidic or non-acidic and the anions as basic, feebly basic, or non-basic.

Give a reason for each acid/base strength classification.

1. **AgNO3, Pb(NO3)2**  (All nitrates are soluble.)
2. **AuCl3, CaCl2**  (All chlorides are soluble, except AgCl, Hg2Cl2, and PbCl2.)

1. **CaCO3, Ag3PO4, Na3PO4**  (All carbonates and phosphates are insoluble, except those of Na+, K+, and NH4+.)
2. **Al(OH)3, Fe(OH)2, NaOH** (All hydroxides are insoluble, except NaOH, KOH, and Ba(OH)2.)
3. **PbS, Cu2S, Na2S** (All sulfides are insoluble, except those of Na+, K+, NH4+, Mg2+, Ca2+, Sr2+, and Ba2+.)
4. **PdSO4, Na2SO4** (All sulfates are soluble, except BaSO4 and PbSO4.)
5. Compounds labeled in red above are part of the exceptions to the rules. Ignoring these compounds, do you notice any trends between the acid/base strength of the cations and anions and their solubility or insolubility when paired? [Hint: If you’re having a hard time seeing trends, ignore #6.]
6. Based on your answer to question 7, can you explain why the red compounds in 3, 4, and 5 don’t follow the listed solubility rule?