What is often helpful when solving Ksp problems?	A chart with the Molar ratios, [Initial], [Change], and [Equilibrium] of all products (as a mnemonic remember RICE, MICE, or ICE box). Since the reactant is a solid, it is ignored.
You are told that the molar solubility of $PbF_2(s)$ is 2.15×10^{-3} mol/L. Write the equilibrium chart that will assist you in calculating Ksp.	$PbF_2(s)$ | $Pb^{2+}(aq)$ | $F^-(aq)$ Mole ratio: — | 1 | 2 [Initial] (M): — | 0 | 0 [Change] (M): — | + x | + 2x [Equilibrium] (M): — | x (= 2.15×10^{-3}) | 2x (= 4.30×10^{-3})
> solve for Ksp.	$Ksp = [Pb^{2+}][F^-]^2 = [2.15\times10^{-3}][4.30\times10^{-3}]^2 = 3.98 \times 10^{-8}$
What is the common ion effect?	When dissolving a solid in water, if one of the ions that the solid dissociates into is already present, less of the solid will dissolve.
Explain the common ion effect using $CaCl_2(s) \leftrightarrow Ca^{2+}(aq) + 2Cl^-(aq)$ as an example.	By adding NaCl to this equilibrium, some $CaCl_2$ will come out of solution. (Or if the solution initially contains NaCl, less $CaCl_2$ will dissociate). Additional NaCl increases the concentration of Cl^-, shifting the equilibrium to the left (Le Chatelier's principle). Note that other compounds that produce either Ca^{2+} or Cl^- (such as $Ca(OH)_2$, $CuCl_2$, etc.) would have the same effect.
Write the equilibrium chart for determining the molar solubility of $Fe(OH)_3$ in a 0.050 M NaOH solution.	$Fe(OH)_3(s)$ | $Fe^{3+}(aq)$ | $OH^-(aq)$ Mole ratio: — | 1 | 3 [Initial] (M): — | 0 | 0.050 [Change] (M): — | + x | + 3x [Equilibrium] (M): — | x | 0.050 + 3x
How can Ksp help us predict when a precipitate will form?	Ksp can be compared to the ion product. When ion product > Ksp then a precipitate will form.
Can 10^{-5} mol of AgCl dissolve in 1L of water? (Ksp of AgCl = 1.8×10^{-10})	$Ksp = [Ag^+][Cl^-]$, ion product = $[Ag^+][Cl^-] = [10^{-5}][10^{-5}]=10^{-10}$ $Ksp = 1.8 \times 10^{-10}$, thus Ksp > ion product, thus some precipitate will remain.

Review examples 14.13, 14.14, 14.15, 14.17, 14.18 (pg. 576 - 582)

15.1

Write the reaction for the self-ionization of water.	$H_2O + H_2O \leftrightarrow H_3O^+(aq) + OH^-(aq)$
What name and symbol is given to Kc for the self-ionization of water?	The ion-product constant of water, also known as Kw.
Write the equilibrium law for Kw. Give the numeric value of Kw.	$Kw = [H^+][OH^-] = 1.0 \times 10^{-14}$
How are acids and bases defined with respect to ion concentrations?	Acid $[H^+] > [OH^-]$ Base $[H^+] < [OH^-]$ Neutral $[H^+] = [OH^-]$

15.2

Give the equation for pH. How can this equation be rearranged?	$pH = -\log[H^+]$ or $[H^+] = 10^{-pH}$
Give the equation for pOH. How can this equation be rearranged?	$pOH = -\log[OH^-]$ or $[OH^-] = 10^{-pOH}$
What equation is used to convert between pH and pOH?	$pH + pOH = 14$
How does pH define acidity?	pH = 7 is neutral. Greater than 7 is basic, lower than 7 is acidic.
Why is pH useful?	It is a type of shorthand. For example it is easier to speak of a pH of 4 rather than a $[H^+]$ of 1.0×10^{-4}.