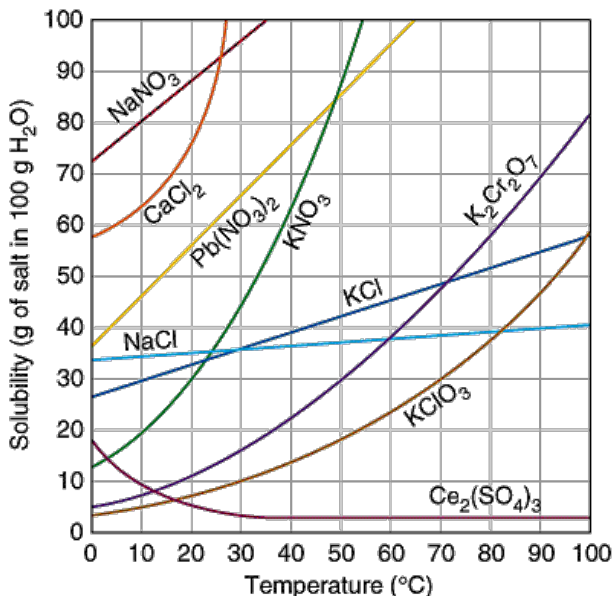


## Unit 9

Understand and be able to analyze the solubility curve.



- What is the solubility of potassium chlorate at 80°C?  
About 38 grams
- If you have a solution of sodium chloride containing 30 grams at 50°C. Is the solution saturated, **unsaturated**, or supersaturated?
- If you cool a saturated potassium dichromate solution from 80°C to 50°C, how much solute will crystallize?  
About 30 grams will crystallize
- If you dissolve 50 grams lead (II) nitrate in water, at what temperature will the solution become saturated?  
About 15°C
- What mass of potassium chloride would be needed to form a saturated solution if the potassium chloride was dissolved in 200 grams of water at 70°C?  
About 96 grams

Be able to identify and solve for molarity, molality, Henry's law, and dilution calculations.

- How many grams of AlCl<sub>3</sub> are required to make a 2.25 m solution in 30.0 grams of water?  

$$m = \frac{\text{moles solute}}{\text{Kg solvent}} \quad 2.24 \text{ m} = \frac{x}{0.03 \text{ Kg}} = 0.0672 \text{ moles} \cdot \frac{130.33 \text{ grams}}{1 \text{ mol}} = 8.76 \text{ grams}$$
- What volume of 12M HCl is needed to prepare 250 mL of 0.20 M HCl?  

$$M_1V_1 = M_2V_2 \quad (12\text{M})(V_1) = (0.2\text{M})(250 \text{ mL}) \quad V_1 = 4.2 \text{ mL}$$
- What is the molality of 18 g NaCl in 200 g of H<sub>2</sub>O?  

$$m = \frac{\text{moles solute}}{\text{Kg solvent}} \quad m = \frac{0.302 \text{ moles}}{0.20 \text{ Kg}} = 1.51 \text{ m}$$
- Calculate the solubility of carbon dioxide in water at 0°C and a pressure of 3 atm. The solubility of carbon dioxide is 0.348 g/100 mL at 0°C and 1.00 atm.  

$$\frac{S_1}{P_1} = \frac{S_2}{P_2} \quad \frac{x}{3 \text{ atm}} = \frac{0.348 \text{ g}}{1 \text{ atm}} \quad S_1 = 1.044\text{g}/100\text{mL}$$

e) Calculate the molarity of a 15 g NaCl in 250 ml solution.

$$M = \frac{\text{moles solute}}{\text{Liters solvent}} \quad M = \frac{0.257 \text{ moles}}{0.250 \text{ Liters}} = 1.028 \text{ M}$$

**Know the fundamentals of acids and bases.**

a) List properties of acids.

Tastes sour, react with metals to make H<sub>2</sub> gas, pH less than 7, reacts with bases to form salt and water, turn blue litmus paper red, electrolyte, formulas start with H (typically)

b) List properties of bases.

Tastes bitter, pH more than 7, reacts with acids to form salt and water, turned red litmus paper blue, electrolyte, formulas ends with OH (typically)

c) What ions do acids produce? What ions do bases produce?

Acids produce H<sup>+</sup> ions, Bases produce OH<sup>-</sup> ions

d) What is the pH scale measuring?

pH scale measures the H<sup>+</sup> ion concentrations

(low pH means high H<sup>+</sup> concentration, high pH means low H<sup>+</sup> concentration)

e) What happens when an acid and base combine? What's produced?

Acid + Base → Salt (ionic) + water (H<sub>2</sub>O)

This is called a neutralization reaction, producing two neutral compounds.