Solutions and Molarity

Objectives

- Understand the factors that affect solubility
- Perform calculations using molarity

Solutions

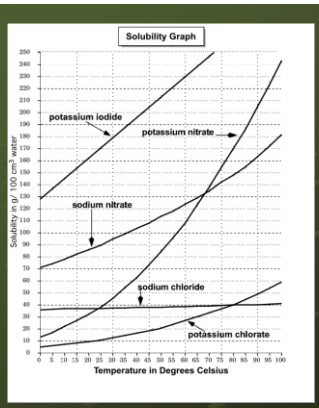
- Solute—what dissolves
- Solvent—does the dissolving

Factors affecting how quickly something dissolves:

- Temperature
- Stirring/agitation
- Particle size

Factors affecting solubility (how much dissolves):

- Temperature
- Pressure



Molarity

- Measures concentration
- M = moles solute / volume soln (L)
- 1.0 M $CaCl_2$ = 1.0 mol $CaCl_2$ / 1 L soln

7

Molarity Problems

- Calculate the concentration of sodium chloride [NaCl] when 50.0 grams of salt is dissolved to make 3.0 L of solution.
- What mass of potassium bromide [KBr] is in 0.500 L of a 0.45 M solution?

8

Molarity Problems

- Calculate the concentration of sodium chloride [NaCl] when 50.0 grams of salt is dissolved to make 3.0 L of solution.
- What mass of potassium bromide [KBr] is in 0.500 L of a 0.45 M solution?

9

Molarity Problems

- How would you prepare 250.0 mL of a 3.0 M solution of calcium chloride ($CaCl_2$) solution?

10

Molarity Problems

- How would you prepare 250.0 mL of a 3.0 M solution of calcium chloride ($CaCl_2$) solution?

11

Molarity and Dilutions

- Dilute a solution with water to make a weaker soln (like making juice from concentrate)
- $M_1V_1 = M_2V_2$
  - Units for V have to be the same on both sides

12

Dilution Problems

- How would you make 700 mL of 0.60 M calcium bicarbonate using 1.5 M calcium bicarbonate solution?
- How much 0.50 M magnesium nitrate can you make from 15 mL of 3.0 M magnesium nitrate?

13