

Warm Up (use whiteboards)

A) Determine the molar concentration of a solution that contains 47.0 g of CaCl_2 dissolved in 550 mL of water.

B) How many moles of KF are found in 460. mL of a 0.980M solution?

Check Homework

Dilutions

Dilution - process of decreasing the concentration of a solution by adding more solvent (normally water).

Calculating new concentration after a dilution...

Start with 250. mL of a 0.15 mol/L solution.

100. mL of water is added to dilute the solution.

Which quantity is the same before and after the dilution?

- moles of solute (n) ? Same
- volume of solution (V) ? ↑
- concentration of solution (C) ? ↓

$$n_i = n_f$$

$$v_i C_i = v_f C_f \quad *$$

$$v_i = 250. \text{ mL}$$

$$C_i = 0.15 \text{ mol/L}$$

$$v_f = 350. \text{ mL}$$

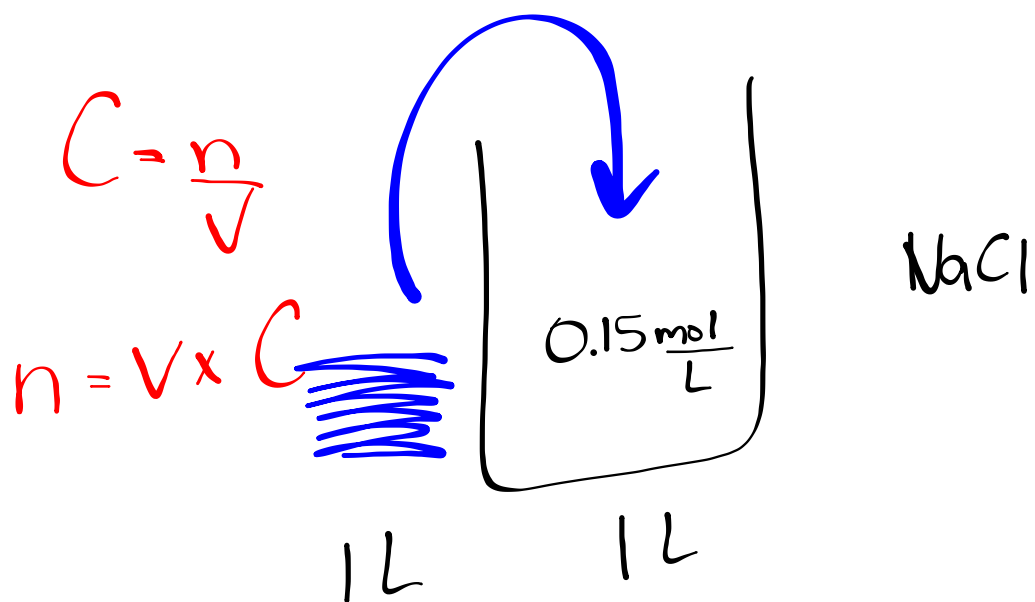
$$C_f = ?$$

$$v_i C_i = v_f C_f$$

$$(250. \text{ mL})(0.15 \text{ mol/L}) = (350. \text{ mL})C_f$$

$$C_f = \frac{(250. \text{ mL})(0.15 \text{ mol/L})}{(350. \text{ mL})}$$

$$C_f = 0.11 \text{ mol/L}$$



Sample Problems

How much 0.20 mol/L glucose solution can be made from 50. mL of 0.50 mol/L glucose solution?

$$\begin{aligned}
 V_i &= 50. \text{ mL} & V_i C_i &= V_f C_f \\
 C_i &= 0.50 \text{ mol/L} & (50. \text{ mL})(0.50 \text{ mol/L}) &= V_f (0.20 \text{ mol/L}) \\
 V_f &= ? & V_f &= \frac{(50. \text{ mL})(0.50 \text{ mol/L})}{(0.20 \text{ mol/L})} \\
 C_f &= 0.20 \text{ mol/L}
 \end{aligned}$$

$$V_f = 130 \text{ mL}$$

What would be the concentration of a solution made by adding 250 mL of water to 45.0 mL of 4.2 mol/L KOH?

$$\begin{aligned}
 V_i &= 45.0 \text{ mL} & V_i C_i &= V_f C_f \\
 C_i &= 4.2 \text{ mol/L} & (45.0 \text{ mL})(4.2 \text{ mol/L}) &= (295 \text{ mL}) C_f \\
 V_f &= 295 \text{ mL} & C_f &= \frac{(45.0 \text{ mL})(4.2 \text{ mol/L})}{(295 \text{ mL})} \\
 C_f &= ?
 \end{aligned}$$

$$C_f = 0.64 \text{ mol/L}$$

*Today's
Assignment*

p. 484 #12,13

p. 486 #21

p. 499 #52