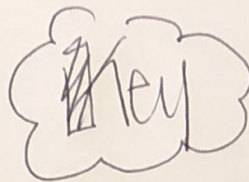


# CONCENTRATIONS OF SOLUTIONS MIXED PRACTICE



**DIRECTIONS:** Answer each of the following questions using your knowledge of chemistry and the NYS Reference Tables. **PLEASE SHOW ALL WORK!** Express final answers to the proper number of significant figures and be sure to include the proper units.

1. How many moles of KOH are contained in 200.0 mL of a 2.0 M solution? How many grams of KOH are present?

$$M = \frac{\text{mol solute}}{\text{L solution}}$$

$$2.0 \text{ M} = \frac{x}{0.200 \text{ L}}$$

$$x = 0.4 \text{ mol KOH}$$

Then convert moles  $\rightarrow$  grams for 2nd part

K	39.10
O	16.00
H	1.01
<hr/>	
	56.11 g/mol

$$0.4 \text{ mol} \left( \frac{56.11 \text{ g}}{1 \text{ mol}} \right) = 22.444 \text{ g}$$

$$22 \text{ g KOH}$$

2. A solution is made by dissolving 6.0 mL of vinegar in 294 mL of water. What is the percent by volume of vinegar in the solution?

$$\% = \frac{\text{volume solute}}{\text{volume solution}} \times 100$$

$$\frac{6.0 \text{ mL vinegar}}{300. \text{ mL solution}} \times 100$$

$$2\% \text{ vinegar}$$

Solute + solvent = solution  
300 mL solution

3. Determine the molarity of a solution made by dissolving 28 g HCl in 3.0 L of water. (Note: molar mass of HCl = 36.5 g/mol)

\* need to convert g HCl to mol HCl

$$28 \text{ g HCl} \left( \frac{1 \text{ mol}}{36.5 \text{ g}} \right) = 0.767123288 \text{ mol HCl}$$

$$M = \frac{\text{mol solute}}{\text{L solution}}$$

$$\frac{0.767123288 \text{ mol}}{3.0 \text{ L}} = 0.2557077$$

$$0.26 \text{ M HCl}$$

CONTINUED ON BACK  $\rightarrow$



4. A 350 g solution contains 0.0050 g NaCl. What is the concentration of NaCl in parts per million (ppm)?

$$\text{ppm} = \frac{\text{mass solute}}{\text{mass solution}} \times 10^6$$

$$\frac{0.0050 \text{ g NaCl}}{350 \text{ g solution}} \times 10^6 = 14.286$$

14 ppm NaCl

5. A solution is made by dissolving 80. g  $\text{KNO}_3$  in 300. g  $\text{H}_2\text{O}$ . What is the percent by mass of  $\text{KNO}_3$  in the solution?

$$\% = \frac{\text{mass solute}}{\text{mass solution}} \times 100$$

\* need to determine total solution  
 80. + 300. = 380. g solution

$$\frac{80. \text{ g } \text{KNO}_3}{380. \text{ g solution}} \times 100 =$$

21.5%  $\text{KNO}_3$

6. A solution has a concentration of 6.5 ppm. How many grams of solute are dissolved in 450 grams of the solution?

$$\text{ppm} = \frac{\text{mass solute}}{\text{mass solution}} \times 10^6$$

$$6.5 \text{ ppm} = \frac{x \text{ g solute}}{450 \text{ g solution}} \times 10^6$$

$$\frac{2925}{10^6} = \frac{(x)(10^6)}{10^6}$$

$$x = 0.002925 \text{ g solute}$$

0.0029 g  
 or  
 $2.9 \times 10^{-3} \text{ g}$

7. Determine the mass of KI dissolved in 375 g of a 16% KI solution.

$$\% = \frac{\text{mass solute}}{\text{mass solution}} \times 100$$

$$16\% = \frac{x \text{ g KI}}{375 \text{ g solution}} \times 100$$

$$\frac{16}{100} = \frac{x}{375}$$

x = 60 g KI