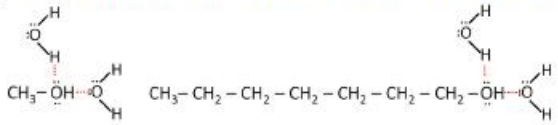
3.7 Solutions and Mixtures
3.8 Representations of Solutions
Worksheet

1) Draw one representation that shows the intermolecular interactions between NH_3 and water and another that shows the intermolecular interactions between SbH_3 and water. Use your representations to help explain why NH_3 has a higher solubility in water than SbH_3.

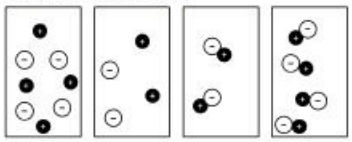
2) Explain why CH_3OH is miscible in water whereas $CH_3(CH_2)_6OH$ is not.



3) Which of the compounds below is most soluble in water? Justify your answer.
$HOCH_2CH_2OH$ or CH_3CH_2OH

4) Potassium bromide is **least** soluble in which of the two liquids from each set below. Justify your choice.
   a. H_2O or CH_4
   b. CH_3OH or CH_3CH_2OH
   c. NH_3 or Br_2

5) In the following images, a single unit represents one mole of a particle and the boxes represent one liter containers. Circle the illustration that provides the best representation a 4 *M* solution of NaCl.



6) The following questions pertain to a sample of steel.
   a. Create a representation of steel that shows the iron and carbon atoms.
   b. What type of alloy is steel?

7) A 1.34 mole sample of LiCl dissolves in water. The volume of the final solution is 0.86 L. Find the molarity of the solution.

8) A 9.98 g sample of glucose, $C_6H_{12}O_6$, is dissolved in enough water to produce a 1395 mL solution. What is the molarity of the solution?

9) How many grams of $MgSO_4 \cdot 9H_2O$ are needed to prepare 125 mL of 0.200 *M* magnesium sulfate?

10) A 251 mL sample of 0.45 *M* HCl is added to 455 mL of distilled water. What is the molarity of the final solution?
(Hint: Find the number of moles of HCl and the total volume of the final solution)

11) How many millilitres of 0.250 *M* $KMnO_4$ are needed to deliver 0.00450 moles of $KMnO_4$ in a titration?

12) How many fluorine atoms are in 750.0 mL of a 0.500*M* HF solution?

13) How many moles of NH_3 are in a 3.0 L solution of 0.23*M* NH_3?

14) Suppose you needed to prepare a 100.0 mL of 1.05 *M* NaOH using 1.50 *M* NaOH, distilled water, and a 100 mL graduated cylinder. How would you do this?

15) Find the mole fraction of glucose, $C_6H_{12}O_6$, in a solution that contains 2.1 moles of glucose and 55.49 moles of water.

16) A rigid 5.5 L sealed vessel contains 0.350 moles $N_{2(g)}$, 0.125 moles $Ar_{(g)}$, and 0.110 moles $He_{(g)}$. Find the mole fraction of each gas.

17) A gaseous solution contains 41.0% O_2 and 59.0% N_2 by mass. Find the mole fraction of each substance in the solution.