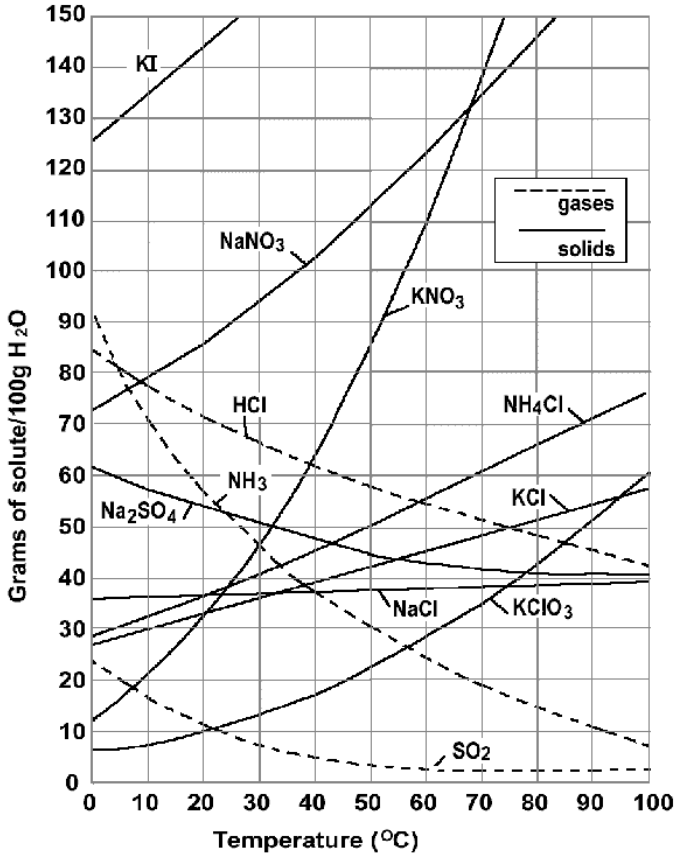
Name_____Date_____

Solubility Curve Practice Problems

Directions: Use the graph to answer the questions below. Assume you will be using 100g of water unless otherwise stated.



1. How many grams of potassium chloride (KCl) can be dissolved at 10°C? _____

2. How many grams of ammonium chloride (NH_4Cl) can be dissolved at 80°C? _____

3. How many grams of NH_3 can be dissolved at 10°C? _____.

4. At 40°C, how much potassium nitrate can be dissolved in 300 g of water? _____.

5. Ammonia (NH_3) is a gas. What happens to the solubility of gases (grams of solute) as temperature increases?_____

6. At 90°C, 60 g of KCl is dissolved in 100 g of water. Is this solution saturated, unsaturated, or supersaturated? _____

7. A saturated solution of potassium chlorate is dissolved in 100 g of water. If the solution is cooled from 90°C to 60°C, how many less grams can be dissolved? _____

8. Which substance is **least** soluble at 10°C? _____

9. Which substance shows the **least** change in solubility (grams of solute) from 0°C to 100°C? _____

10. A saturated solution of potassium chlorate is formed from 100 grams of water. If the saturated solution is cooled from 80°C to 50°C, how many grams of precipitate are formed? _____.

Name_____Date_____

Molarity Worksheet

Directions: Complete the following problems. Be sure to show your work and include units for math problems.

1) What is the equation for molarity? _____

2) Calculate the molarity of 0.060 moles $NaHCO_3$ in 1500 mL of solution.

3) If 20.0 grams of H_2SO_4 are dissolved to make a 250 mL solution, what is the molarity of the solution?

4) Calculate the number of moles of NaCl contained in 0.500L of a 1.5M solution.

5) How many grams of KNO3 should be used to prepare 2.00 L of a 0.500 M solution?

6) To what volume should 5.0 grams of KCl be diluted to create a 0.25 M solution?

7) How many moles of $CaCl_2$ are needed to create a 1500 mL solution with a concentration of 3.50 M?

8) If all the water in 410 mL of a 0.45 M NaCl solution evaporates, what mass of NaCl will remain?

Name_____Date_____

Dilution Worksheet

Directions: Complete the following problems. Be sure to show your work and include units for math problems.

1. How much concentrated 15 M sulfuric acid is needed to prepare 250 mL of a 6.0 M solution?

2. If I dilute 250 mL of 0.10 M lithium acetate solution to a volume of 750 mL, what will the concentration of this solution be?

3. To what volume should 25 mL of 10 M nitric acid be diluted to prepare a 3.0 M solution?

4. How much 6.0 M hydrochloric acid is needed to prepare 100 mL of a 2.0 M solution?

5. If 400.0 mL of 6.0 M H_2SO_4 is diluted to create a 600.0 mL solution what is the new concentration of the acid??

6. To how much water should 50 mL of 12 M concentrated hydrochloric acid be added to produce a 4.0 M solution? (hint: this is a 2 step problem).

Name_____Date_____

Solution Concepts and Colligative Properties

Directions: Answer the following questions using the vocabulary terms provided. Each word will only be used once, some terms may not be used.

saturated	unsaturated	aqueous
electrolyte	dilute	miscible
immiscible	concentrated	molarity
colligative	increases	decreases

1. A solution containing the maximum amount of solute possible at that temperature_____.
2. The solubility of a gas _____ as temperature increases.
3. These substances ionize in water and are then able to conduct an electric current _____.
4. Moles of solute per liter of solution._____
5. Two liquids which can mix are said to be_____.
6. Properties that depend on the number of particles in a solution_____.
7. A solution containing a relatively large amount of dissolved solute. _____.
8. Solution in which water is the solvent are called _____.

Directions: Answer the following questions by choosing the best answer.

9. Adding sodium chloride to water will cause the_____.
a) boiling point to rise and the freezing point to lower.
b) boiling point to lower and the freezing point to rise.
c) both boiling point and freezing point to rise.
d) both boiling point and freezing point to lower.

10. Which chemical listed will have the greatest effect on lowering vapor pressure?
a) $C_{12}H_{22}O_{11}$ b) Na_3N c) NaCl d) Ca_3P_2

Unit 9 Solutions, Acids and Bases HW Packet

Name_____Date_____

1) Identify if the compounds below are electrolytes or non electrolytes by placing a check in the correct column.

Compound	Electrolyte	Non Electrolyte
NaBr		
Methanol		
HCl		
KOH		
$C_6H_{12}O_6$ (sugar)		
Hexane		
Carbon Dioxide		

2) Circle the compounds below that would be soluble in water. Hint: Determine the bond type first.

AgCl KBr CH_4 NH_3 $Ca(NO_3)_2$ CO_2

3) Fill in the table below by classifying if the substance describes a solution, suspension or colloid. Some characteristics may described more than one substance. Place a check mark on the column that is being described.

Characteristic	Colloid	Suspension	Solution
Settles out if undisturbed			
Passes through filter paper			
Homogeneous mixture			
Heterogeneous mixture			
Scatters light			
Smallest particle size			

Unit 9 Solutions, Acids and Bases HW Packet

Name_____Date_____

Acid Base Concepts

Part I Directions: Use the characteristics given to identify if a substance is an acid, base or both. Place a check in the appropriate column.

Characteristic	Acid	Base
Bitter taste		
Litmus paper turns blue		
Bromothymol blue turns yellow		
$Ca(OH)_2$		
$HC_2H_3O_2$		
Phenolphthalein turns cloudy		
Corrosive to metals		
Sour taste		

Part II: Directions: Choose the best answer for each of the questions below.

1) Which substance can be classified as an Arrhenius acid?
a. HCl b. NaCl c. LiOH d. KOH

2) Which metal will react with hydrochloric acid and produce $H_2(g)$?
a. Au b. Cu c. Mg d. Hg

3) According to the Arrhenius theory, a substance that is classified as an acid will yield
a. OH^- b. NH_4^+ c. H^+ d. CO_3^{2-}

4) Which substance is classified as an Arrhenius base?
a. HCl b. NaOH c. $LiNO_3$ d. $KHCO_3$

5) In aqueous solution of an ionic compound turns red litmus blue. Conducts electricity, and reacts with an acid to form a salt and water. This could be
a. HCl b. NaI c. KNO_3 d. LiOH

Part III: Directions: Write the balanced chemical reactions for each of the Arrhenius Acid Base Neutralization reactions below.

1) ___$Mg(OH)_2$ + ___ H_3N →

2) ___HBr + ___ $Al(OH)_3$ →

3) The reaction between calcium hydroxide and sulfuric acid .

Name_____Date_____

pH and pOH Calculations

Directions: Fill in the table below. You do not need to show your work.

pH	[H^+]	pOH	[OH^-]	ACID or BASE?
3.78				
	3.89×10^{-4} M			
		5.19		
			4.88×10^{-6} M	
8.46				
	8.45×10^{-13} M			
		2.00		
			2.31×10^{-11} M	
10.91				
	7.49×10^{-6} M			

Directions: Calculate the following problems.

Calculate the pH for the following solutions:

1) $[H^+] = 0.000010M$

2) $[H^+] = 1.0 \times 10^{-11}$

3) $[OH^-] = 1.0 \times 10^{-4}$

4) pOH = 5.75

Calculate the $[H^+]$ for the following solutions:

1) pH = 4

2) pOH = 8

3) pH = 3.75

4) $[OH^-] = 6.53 \times 10^{-4}$

Name_____Date_____

Titration Worksheet

Directions: Answer the following questions. For any math problems be sure to show your work and include units.

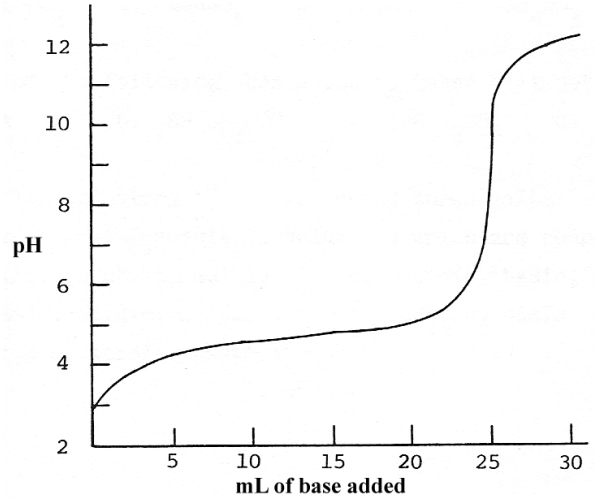
1. If 20.0 mL of a 0.01 M HCl solution is required to neutralize 30.0 mL of NaOH solution, what is the molarity of the base?

2. What volume of 2.5×10^{-2} M HBr is required to neutralize 125 mL of 0.03 M KOH?

3. A 10.0 mL sample of H_2SO_4 was neutralized by 13.5 mL of 1.0 M $Ca(OH)_2$. What is the molarity of the acid?

4. Suppose that 20.0 mL of 0.10 M LiOH is required to neutralize a 0.50 M HCl solution. What is the volume of the acid used?

5.



a) This is a _____ (strong/weak) acid titrated with a strong base

b) Place a dot (•) on the curve at the equivalence point. The pH at the equivalence point is ____.