

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

## SOLUTIONS NOTES HONORS CHEMISTRY

*Directions: This packet will serve as your notes for this chapter. Follow along with the PowerPoint presentation and fill in the missing information. Important terms / ideas are in all capitals and bolded!*

- **SOLUTION:**

- SOLUTE:**

- SOLVENT:**

- INSOLUBLE:**

- SOLUBLE:**

- What factors influence solubility?:

- **AQUEOUS SOLUTION:**

- \_\_\_\_\_ and \_\_\_\_\_ molecules dissolved best... WHY?

- MISCIBLE:**

- IMMISCIBLE:**

- Two Types:

- **ELECTROLYTES:**

- **NONELECTROLYTES:**

- DISSOCIATION:**

- SOLVATION:**

- Classification of Solutions

- 1) **SATURATED:** contains \_\_\_\_\_ quantity of \_\_\_\_\_ that dissolves at that temperature

- 2) **UNSATURATED:** contains \_\_\_\_\_ than the maximum amount of \_\_\_\_\_ that can be dissolved

- 3) **SUPERSATURATED:** contain \_\_\_\_\_ than is possible to be dissolved by warming or evaporating ( \_\_\_\_\_ and \_\_\_\_\_ )

- **COLLIGATIVE PROPERTIES:**

-When \_\_\_\_\_ solute to a solvent the following physical properties change:

1) **FREEZING-POINT DEPRESSION:** temperature at which the solution \_\_\_\_\_ will be \_\_\_\_\_ than that of just the pure \_\_\_\_\_ because the \_\_\_\_\_ gets in the way!

○ Examples:

2) **BOILING-POINT ELEVATION:** temperature at which the solution \_\_\_\_\_ will be \_\_\_\_\_ than that of just the pure \_\_\_\_\_ because the \_\_\_\_\_ gets in the way!

○ Examples:

3) **VAPOR PRESSURE LOWERING:** VP of the solution will be \_\_\_\_\_ than that of just the pure **VOLATILE** (\_\_\_\_\_) solvent because the **NONVOLATILE** (\_\_\_\_\_) solute gets in the way!

○ Examples:

- **Solubility Rules**

-Knowing whether substances are soluble or insoluble tells us if a precipitate forms...

1) Salts of ammonium and alkali metals are always \_\_\_\_\_

2) All chlorides, bromides, and iodides are \_\_\_\_\_ except when combined with Ag, Hg<sup>2+</sup>, and Pb which are \_\_\_\_\_

3) Chlorates, acetates, and nitrates are \_\_\_\_\_

4) Sulfates are \_\_\_\_\_ except with Ca, Sr, Ba, Hg, Pb, and Ag which are \_\_\_\_\_

5) Phosphates, carbonates, and sulfides are \_\_\_\_\_ except ammonium and alkali metal compounds are \_\_\_\_\_

6) All metallic oxides are \_\_\_\_\_ except ammonium and alkali metal compounds are \_\_\_\_\_

7) All hydroxides are \_\_\_\_\_ except ammonium, alkali metal compounds, and group 2A from Ca down are \_\_\_\_\_

○ Ex:  $Mg(NO_3)_2$  (\_\_\_\_) + 2 NaOH (\_\_\_\_) →  $Mg(OH)_2$  (\_\_\_\_) + 2 NaNO<sub>3</sub> (\_\_\_\_)

-Practice: Classify each of the following as soluble or insoluble.

- **NET IONIC EQUATIONS:**

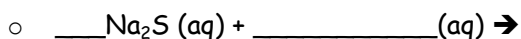
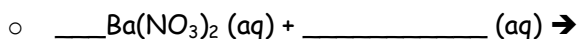
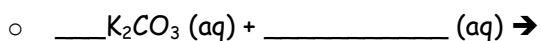
- SPECTATOR IONS:**

- Steps for Writing Net Ionic Equations:

- 1) Write the \_\_\_\_\_ equation
- 2) Rewrite the equation showing the \_\_\_\_\_ that form in solution for each \_\_\_\_\_ compound
- 3) Cancel \_\_\_\_\_ ions (ALL cancel = \_\_\_\_\_!)
- 4) Rewrite the final equation

- Example:

- Practice: Predict the products (with solubility indicated), balance, and write the net ionic equation for each.



- **Concentration of Solutions**

- Reactions take place when two \_\_\_\_\_ are \_\_\_\_\_

- In order to do stoichiometric calculations, the **CONCENTRATION** ( \_\_\_\_\_ ) \_\_\_\_\_ must be known

- A few ways to expression concentration...

- **MOLARITY (M):**

$$M =$$

-Example: Calculate the molarity of a solution when \_\_\_\_\_ g of NaOH is dissolved in enough water to make 1.5 liters of solution.

-Practice:

- How many liters of \_\_\_\_\_ M solution can be made using 125 grams of LiBr?
- What mass of oxalic acid,  $H_2C_2O_4$ , is needed to make \_\_\_\_\_ mL of a 0.0500 M solution?
- What is the concentration of a solution that has a volume of \_\_\_\_\_ L and contains 660 g of  $Ca_3(PO_4)_2$ ?

- **MOLALITY (m):**

$$m =$$

-Example: In lab, \_\_\_\_\_ mole of  $C_2H_6O_2$  is dissolved in 250.0 g of water. Calculate the molality.

-Practice:

- How many grams of \_\_\_\_\_ are needed to make a 7.9 m solution?

- How many grams of  $\text{H}_2\text{O}$  are required to dissolve \_\_\_\_\_ g  $\text{KNO}_3$  to make a 2.25 m solution?

- **MASS %**

% by Mass =

-Example: What is the percent concentration of \_\_\_\_\_ g of NaCl dissolved in 350.0 g of water?

- **PARTS PER MILLION (ppm)**

ppm =

-Example: A \_\_\_\_\_ g sample of groundwater was found to contain  $5.4 \times 10^{-6}$  g of  $\text{Zn}^{2+}$ . What is the concentration of  $\text{Zn}^{2+}$  in parts per million?

- **PARTS PER BILLION (ppb)**

ppb =

-Example: A chemical analysis shows that a water sample contains \_\_\_\_\_ mg of  $\text{Cd}^{2+}$  in  $4.00 \times 10^4$  g of water. What is the concentration in parts per billion?

- **Preparing Solutions**

-To make a certain concentration of solution, the \_\_\_\_\_ should be weighed out first and then placed in a \_\_\_\_\_ flask

-Dissolve the \_\_\_\_\_ in *SOME* of the \_\_\_\_\_ then add the remaining solvent

-To save space, time, and money \_\_\_\_\_ / \_\_\_\_\_ solutions are often purchased

-Water is then added to \_\_\_\_\_ the stock solutions to the desired concentration

-Moles of solute \_\_\_\_\_ = Moles of solute \_\_\_\_\_ (no solute is added during a dilution)

-How much \_\_\_\_\_ needs to be added?...

- **DILUTIONS**

Equation:

-Example: What volume of \_\_\_\_\_ M  $\text{H}_2\text{SO}_4$  must be used to prepare 1.5 L of 0.10 M solution?

-Practice: How many mL of stock solution should be used to prepare \_\_\_\_\_ mL of 0.750 M NaBr solution using 2.00 M stock solution?

- **Solution Stoichiometry**

-Steps for Stoichiometry with Solution Reactions:

1) Write and balance the equation

2) Determine \_\_\_\_\_

3) Determine the \_\_\_\_\_ of each reactant and find the \_\_\_\_\_

4) Find amount of product

**Depending on \_\_\_\_\_ given, some steps can be \_\_\_\_\_!!**

-Examples:

- How many grams of  $\text{Ca}(\text{OH})_2$  are required to react with \_\_\_\_\_ mL of 0.40 M HCl? Show the balanced equation.

