

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, Hg²⁺, 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 NaNO₃ (____)

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

- **NET IONIC EQUATIONS:**

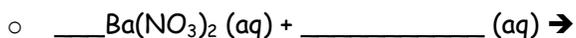
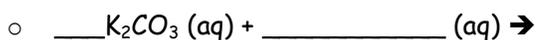
- SPECTATOR IONS:**

- 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 H_2O are required to dissolve _____ g 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 5.4×10^{-6} g of Zn^{2+} . What is the concentration of Zn^{2+} in parts per million?

- **PARTS PER BILLION (ppb)**

ppb =

-Example: A chemical analysis shows that a water sample contains _____ mg of Cd^{2+} in 4.00×10^4 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 H_2SO_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.

