Group_____ Name_____ Period_____

Concentrations and Dilutions Worksheet

A way of expressing concentration is called **molarity**. As is clear from its name, molarity involves moles. Molarity is the number of moles of solute dissolved in one liter of solution. The units, therefore are **moles per liter**, specifically it's **moles of solute** per **liter of solution**. Rather than writing out moles per liter, these units are abbreviated as M and it means **moles per liter** (not just moles).

You must be very careful to distinguish between **moles** and **molarity**. "Moles" measures the amount or quantity of material you have; "molarity" measures the concentration of that material. So when you're given a problem or some information that says the concentration of the solution is 0.1 M that means that it has 0.1 mole for every liter of solution; it does not mean that it is 0.1 moles.

Helpful Equations:

$$\text{Concentrations} = \frac{\text{Amount of solute}}{\text{Amount of solution}}$$

$$\text{Molarity} = \frac{\text{Moles of solute}}{\text{Liters of Solution}}$$

Dilution: $M_1V_1 = M_2V_2$ (M = Molarity of solution, V= volume of solution)

1. A solution is made by adding 27.5 g of calcium fluoride to enough water to make 1.00L. What is the concentration (molarity)?

2. What is the concentration of each ion in solution #1? (Hint: first write an equation)

3. How much solute is contained in 500. mL of a 2.5 M solution? (Hint: Liters)

4. A student needs 250 mL of a 0.75 M solution of sodium acetate. How many moles of sodium acetate are needed?

5. A student has 12.0 M HCl and needs to make 1.5L of 2.0 M HCl. What volume of the concentrated acid is needed?

6. Another student adds 500.mL of H_2O to the solution made in #5. What is the concentration of the new solution? (Assume the volumes are additive.)

7. A third student wants to dilute the solution in #6 to 1.0 M. How much water must be added? (Assume the volumes are additive.)

8. If 95.0 mL of rubbing alcohol are added to enough water to make 150.0 mL, what is the volume %?

Solubility and Solubility Curves Worksheet

Define the following:

Unsaturated:_____

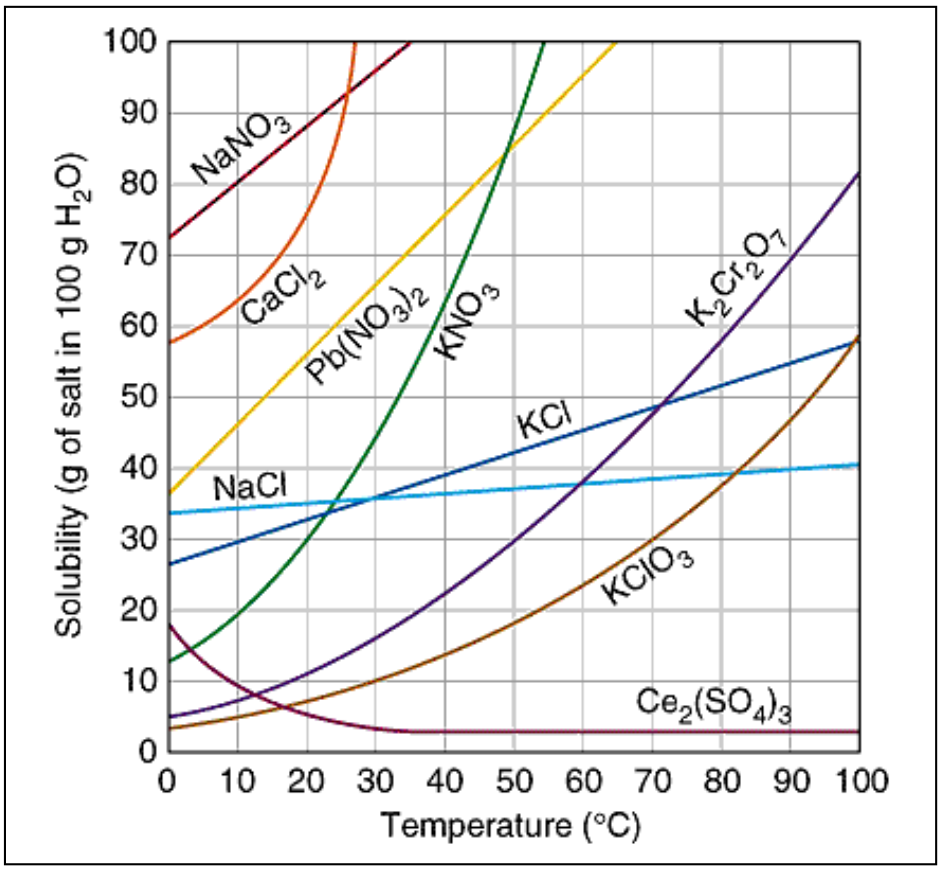
_____

Saturated:_____

_____

Supersaturated:_____

_____



Use the solubility curves to the left and on the back of this paper to answer the following questions:

1. How many grams of sodium nitrate can be dissolved in 100 grams of water at 10°C? ____ _____
2. How many grams of sodium nitrate can be dissolved in 100 grams of water at 40°C? ____ _____
3. How many grams of sodium chloride can be dissolved in 100 grams of water at 10°C? ____ _____
4. How many grams of sodium chloride can be dissolved in 100 grams of water at 90°C? ____ _____
5. How many grams of potassium chromate can be dissolved in 100 grams of water at 20°C?_____
6. What kind of solution (unsaturated, saturated, supersaturated) would be formed if 40 grams of KCl were dissolved in 100 grams of water at 60°C? _____
7. What kind of solution (unsaturated, saturated, supersaturated) would be formed if the solution in #6 were cooled to 10°C?_____
8. At what temperature would a solution that contains 80 grams of ammonium chloride dissolved in 100 g of water be saturated?_____
9. What kind of solution (unsaturated, saturated, supersaturated) would be formed if 80g of potassium chloride were dissolved in 100 grams of water at 80°C?_____
10. How much solute would precipitate out if the solution in #9 were to cool to 50°C?_____
11. How many grams of sulfur dioxide can be dissolved in 100 grams of water at 30°C?_____
12. In general, when you raise the temperature of water, can you dissolve more or less solid?_____
13. In general, when you raise the temperature of water, can you dissolve more or less gas?_____