Name: _____Date: _____Class_____

Solubility Curve Practice Problems Worksheet 1

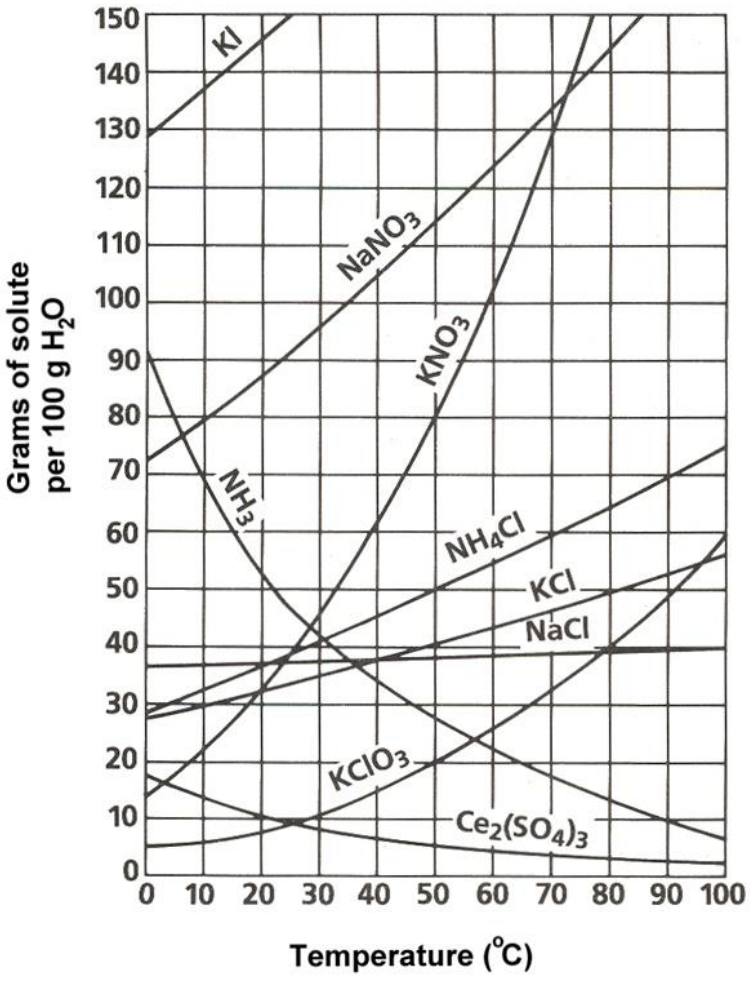
You'll notice that for most substances, solubility increases as temperature increases. As discussed earlier in solutions involving liquids and solids typically more solute can be dissolved at higher temperatures. Can you find any exceptions on the graph?_____

Here's an example of how to read the graph. Find the curve for $KClO_3$.

At 30°C approximately 10g of $KClO_3$ will dissolve in 100g of water. If the temperature is increased to 80°C, approximately _____ of the substance will dissolve in 100g (or 100mL) of water.

Directions: Use the graph to answer the following questions. REMEMBER UNITS!

1) What mass of solute will dissolve in 100mL of water at the following temperatures?
   a. KNO_3 at 70°C = _____
   b. NaCl at 100°C= _____
   c. NH_4Cl at 90°C= _____
   d. Which of the **above** three substances is most soluble in water at 15°C. = _____



Types of Solutions

On a solubility curve, the lines indicate the concentration of a _____ **solution** - the maximum amount of solute that will dissolve at that specific temperature.

Values on the graph _____ a curve represent **unsaturated solutions** - more solute could be dissolved at that temperature.

Label the following solutions as saturated or unsaturated. If unsaturated, write how much more solute can be dissolved in the solution.

Solution	Saturated or Unsaturated?	If unsaturated: How much more solute can dissolve in the solution?
a solution that contains 70g of $NaNO_3$ at 30°C (in 100 mL H_2O)		
a solution that contains 50g of NH_4Cl at 50°C (in 100 mL H_2O)		
a solution that contains 20g of $KClO_3$ at 50°C (in 100 mL H_2O)		
a solution that contains 70g of KI at 0°C (in 100 mL H_2O)		

Use the Solubility Graphs on Page 1

1. a. What is the solubility of KCl at 5°C? _____
   b. What is the solubility of KCl at 25°C? _____
   c. What is the solubility of $Ce_2(SO_4)_3$ at 10°C? _____
   d. What is the solubility of $Ce_2(SO_4)_3$ at 50°C? _____

2. a. At 90°C, you dissolved 10 g of KCl in 100. g of water. Is this solution saturated or unsaturated?
   b. How do you know?

3. A mass of 100 g of $NaNO_3$ is dissolved in 100 g of water at 80°C.

   a) Is the solution saturated or unsaturated?_____

   b) As the solution is cooled, at what temperature should solid first appear in the solution? Explain.

4. Use the graph to answer the following two questions:

Which compound is most soluble at 20 °C? _____

Which is the least soluble at 40 °C? _____

5. Which substance on the graph is **least** soluble at 10°C? _____

6. A mass of 80 g of KNO_3 is dissolved in 100 g of water at 50 °C. The solution is heated to 70°C. How many more grams of potassium nitrate must be added to make the solution saturated? Explain your reasoning (*See question #2 on the other side for a hint)*

Elements review: Fill in the chart below for some of the compounds on the graph:

Formula	**# of atoms in formula**	**If the following amounts of solute are dissolved in 100 mL of water: Is the solution SATURATED OR UNSATURATED**
Example: NaCl	*Na =* *Cl =*	*3 grams dissolved at 0°C*
Formula	**# of atoms in formula**	**If the following amounts of solute are dissolved in 100 mL of water: Is the solution SATURATED OR UNSATURATED**
KI		*120 grams dissolved at 0°C*
$Ce_2(SO_4)_3$		*7.2 grams dissolved at 70°C*
NH_4Cl		*11 grams dissolved at 46.7°C*

1. How many grams of potassium chlorate will dissolve in 300 grams of water at 65°C?

2. If a solution is made using 400 grams of water at 20°C and 40 grams of potassium chlorate, would the solution be saturated?

3. To what temperature Celsius must you raise the 100 grams of water in order for all 80 grams of the potassium nitrate to dissolve?