Solubility Worksheet

Name:

- Name three factors that influence the rate at which a solute dissolves in a solvent 1.
- Define the following words 2.
 - Solubility a.
 - Saturated b.
 - Unsaturated c.

d. Supersaturated

The graph below (on the next page) is known as a solubility curve and can be used to determine if a particular solution is saturated at a given set of conditions and how much of the solute is dissolved under those conditions.

Whenever you are given a graph to analyze the first thing you should do is look at each axis to determine what information the graph is showing.

X- axis –

Y-axis –

Each line represents the maximum amount of solute that can be dissolved in 100 g of H₂O at a particular temperature.

Below the line \rightarrow the solution is

On or above the line \rightarrow the solution is

Above the line and all the solute is dissolved \rightarrow the solution (it must say that the is solute is completely dissolved)

For most substances, solubility increases as temperature increases. What are the exceptions on the graph below?

Part One: Reading Solubility Curves

Use the graph to answer the following questions. **REMEMBER UNITS!**

- Grams of solute What mass of solute will dissolve in 100mL of water at 1. the following temperatures?
 - a. KNO₃ at 70°C _____
 - b. NaCl at 100°C _____
 - c. NH₄Cl at 90°C
 - d. Which of the **above** three substances is most soluble in water at 15°C.



Part Two: Types of Solutions (saturated, unsaturated, supersaturated)

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 ______ (below, above, on) a curve represent <u>unsaturated solutions</u> - more solute could be dissolved at that temperature.

Use the solubility curve on the second page to label the following solutions as saturated or unsaturated. If unsaturated, write how much more solute can be dissolved in the solution.

Solution	Saturated (S) or Unsaturated (U)?	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 ₂ O)		
a solution that contains 50g of NH ₄ Cl at 50°C (in 100 mL H ₂ O)		
a solution that contains 20g of KClO ₃ at 50°C (in 100 mL H ₂ O)		
a solution that contains 70g of KI at 0°C (in 100 mL H_2O)		

Additional Practice:



1. a. At 90°C, you dissolved 10 g of KCl in 100. g of water. Is this solution

saturated or unsaturated?



^{2.} 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.
- 3. 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?

- 4. Which substance on the graph is **least** soluble at 10°C?
- 5. A mass of 80 g of KNO₃ 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