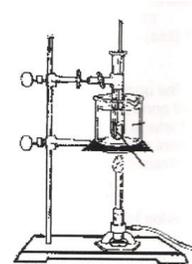


**Worksheet: Solubility of Salt**

**Pre-Lab Questions:** (answer after reading Background Info, purpose, procedure on lab)



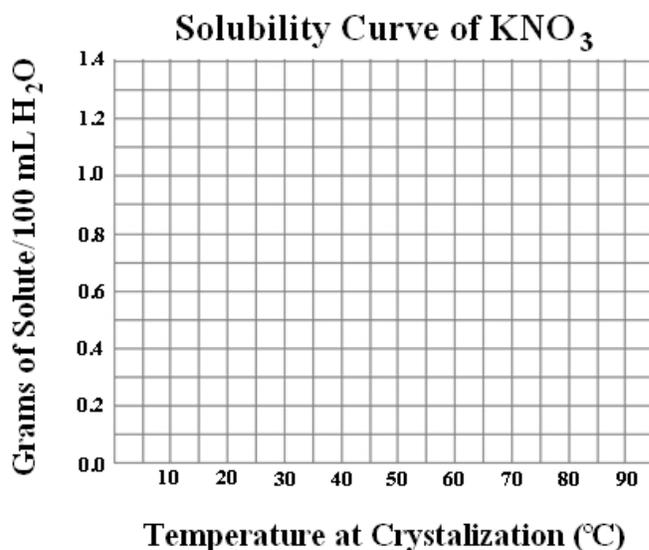
1. When making hot chocolate, how does stirring affect the rate of dissolving? Why?
2. How is the solubility of sugar in water affected by increasing the temperature?
3. What is the difference between a saturated and an unsaturated solution?
4. You dissolved enough sugar in water to reach its saturation point @ 80°C. What will you see begin to happen as the solution cools down? Why?
5. a. In the lab why are we heating up KNO<sub>3</sub> in a hot water bath? b. When do we stop heating it?
6. a. After heating the KNO<sub>3</sub> solution, why do we cool it off- what are we looking for?  
b. Why do we need a thermometer in the KNO<sub>3</sub> solution- What are we measuring?

**Data/ Observations:** (gather data from other groups as needed)

Test Tube #	Grams of KNO <sub>3</sub> / mL of H <sub>2</sub> O	Crystallization Temperature (°C)
1	0.40 g/ 1.00 mL	
2	0.60 g/ 1.00	
3	0.80 g/ 1.00	
4	1.00 g/ 1.00	

**Calculations/ Analysis:**

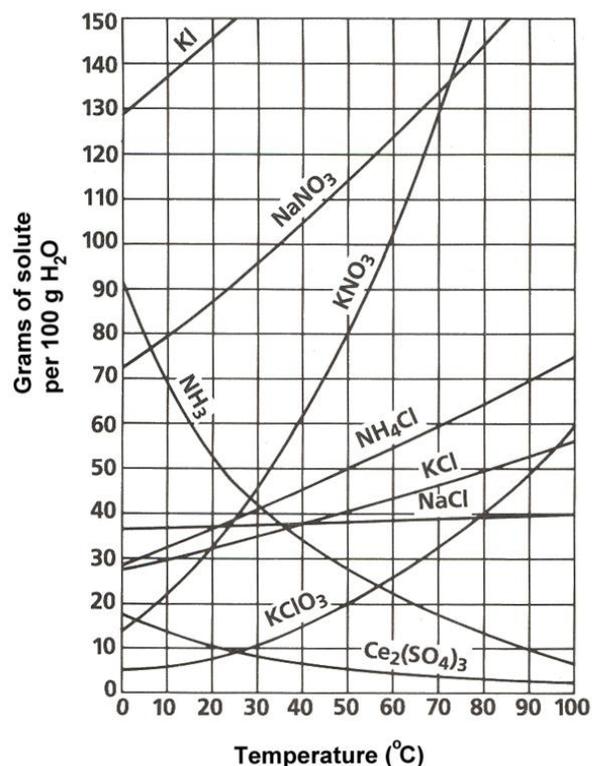
1. Plot your experimental data on the graph paper that you have been provided. Draw your best fitting curve through your data points.
2. Using your graph, how many grams of KNO<sub>3</sub> can be dissolved in 1.00 mL of water at the following temperatures?
  - a. 30 °C                      b. 40 °C
  - c. 60 °C                      d. 70 °C
3. According to your graph, how does the solubility of KNO<sub>3</sub> change as the temperature rises?
4. Using your graph, how much KNO<sub>3</sub> must be added to make a saturated solution at 55 °C?



### Questions for Discussion

Use the solubility curve provided on the right to determine the answers to the following questions:

1. Why do you think the temperatures on the graph only go from  $0^{\circ}\text{C}$  to  $100^{\circ}\text{C}$ ?
2. How many grams of solute are required to saturate 100 g of water in each of the following solutions?  
(FYI: 100 g  $\text{H}_2\text{O}$  = 100 mL)
  - a.  $\text{KClO}_3$  at  $90^{\circ}\text{C}$
  - b.  $\text{NaNO}_3$  at  $10^{\circ}\text{C}$
3. Which substance is most soluble at  $20^{\circ}\text{C}$ ?
4. Which substance's solubility changes the most from  $0^{\circ}\text{C}$  to  $100^{\circ}\text{C}$ ?
5. At what temperature does KI have a solubility of 150 g/100 mL water?



6. How does the solubility of all "gases" ( $\text{NH}_3$ , and  $\text{Ce}_2(\text{SO}_4)_3$ ) change with increased temperatures? Can you think of a reason why this might be so?
7. NOT related to the graph: The solubility of sucrose (table sugar) in water is 200 g sucrose/ 100 mL  $\text{H}_2\text{O}$  @  $25^{\circ}\text{C}$ . How many grams of sugar would you be able to dissolve if you halved  $\text{H}_2\text{O}$  to 50 mL of  $\text{H}_2\text{O}$  @  $25^{\circ}\text{C}$ ?