

Name \_\_\_\_\_

Period \_\_\_\_\_

## SOLUBILITY CURVES

Use the attached graph to answer the following questions. Please note that the density of water is 1.0 g/mL.

1. What relationship exists between solubility and temperature for most of the substances below? What is the exception?
2. How many grams of  $\text{NaNO}_3$  will dissolve in 100 g of water at  $20^\circ\text{C}$ ? \_\_\_\_\_
3. How many grams will dissolve at  $60^\circ\text{C}$ ? \_\_\_\_\_
4. How many grams of  $\text{NH}_4\text{Cl}$  will dissolve in 1 liter of  $\text{H}_2\text{O}$  at  $50^\circ\text{C}$ ?
5. 90 grams of  $\text{NaNO}_3$  is added to 100 g of  $\text{H}_2\text{O}$  at  $0^\circ\text{C}$ . With constant stirring, to what temperature must the solution be raised to produce a saturated solution with no  $\text{NaNO}_3$  remaining?
6. A saturated solution of  $\text{KClO}_3$  was made with 300 g of  $\text{H}_2\text{O}$  at  $40^\circ\text{C}$ . How much  $\text{KClO}_3$  could be recovered by evaporating the solution to dryness?
7. 500 grams of water are used to make a saturated solution of  $\text{KCl}$  at  $10^\circ\text{C}$ . How many more grams of  $\text{KCl}$  could be dissolved if the temperature were raised to  $100^\circ\text{C}$ ?
8. A saturated solution of  $\text{KNO}_3$  in 200 g of  $\text{H}_2\text{O}$  at  $50^\circ\text{C}$  is cooled to  $20^\circ\text{C}$ . How much  $\text{KNO}_3$  will precipitate out of solution?

9. If you dissolve 120 grams of  $\text{NH}_4\text{Cl}$  in 300 grams of water at  $70^\circ\text{C}$ , would the solution be unsaturated, saturated, or supersaturated?
10. Given a saturated solution of  $\text{KNO}_3$  in 200 grams of water at  $30^\circ\text{C}$ , determine how much more solute can be dissolved in the solution when it is heated to  $70^\circ\text{C}$ .
11. 150 grams of  $\text{KClO}_3$  are added to half liter of water at  $20^\circ\text{C}$  and stirred thoroughly.
- How much  $\text{KClO}_3$  will remain undissolved?
  - To what temperature must the solution be heated in order to dissolve the solute on the bottom of the solution?
12. 400 grams of water is saturated with  $\text{NaNO}_3$  at  $60^\circ\text{C}$ . If the solution is cooled to  $10^\circ\text{C}$ , how much  $\text{NaNO}_3$  will settle out of the solution?
13. a. How much ammonia gas can be dissolved in 200 grams of water at  $10^\circ\text{C}$ ?
- If the solution is heated to  $50^\circ\text{C}$ , how much ammonia gas will leave the solution?
14. Considering how carbon dioxide gas dissolves in soda, should an open can of Coke be kept warm or cold if you want the dissolved  $\text{CO}_2$  gas to stay in the soda?

**ANSWERS:**

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4) 500 g  $\text{NH}_4\text{Cl}$   
5)  $22^\circ\text{C}$   
6) 45 g  $\text{KClO}_3$

7) 140 g  $\text{KCl}$   
8) 96 g  $\text{KNO}_3$   
9) unsaturated

10) 170 g  $\text{KNO}_3$   
11a) 120 g  $\text{KClO}_3$   
11b)  $65^\circ\text{C}$

12) 180 g  $\text{NaNO}_3$   
13a) 136 g  $\text{NH}_3$   
13b) 82 g  $\text{NH}_3$

# Solubilities of Common Chemicals

