

**SOLUBILITY & SATURATION WEBQUEST**

**The Dissolving Process**

Go to: <http://www.mhhe.com/physsci/chemistry/essentialchemistry/flash/molvie1.swf>

1. Look at the above animation. Explain how an ionic compound such as NaCl will dissolve in water.

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2. Does the sodium ion and chloride ion remain intact when dissolved? Draw a particle visualization of what NaCl looks like once it is dissolved in water (You don't need to show the water, just the NaCl). Be sure to use two different colors for the sodium ion and chloride ion.



Go to:

<http://www.chem.iastate.edu/group/Greenbowe/sections/projectfolder/flashfiles/thermochem/solutionSalt.html>

3. Look at the above animation. Explain why you do not see the salt particles after it is added to the water. Are the salt particles still present in the solution? Explain.

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4. Why do you think that you cannot dissolve an unlimited amount of sodium chloride in water?

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Partner #1: \_\_\_\_\_ Partner #2: \_\_\_\_\_ #: \_\_\_\_\_

### Factors Affecting Solubility

Source(s): \_\_\_\_\_

**\*\*Remember to use evidence from your source(s) to help support your explanation\*\***

5. What factors affect the solubility of a solid? How is it affected?

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6. What factors affect the solubility of a gas? How is it affected?

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### Factors Affecting Rate of Solution

Source(s): \_\_\_\_\_

**\*\*Remember to use evidence from your source(s) to help support your explanation\*\***

7. Why does sugar dissolve faster in hot tea than in iced tea?

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8. Why would granulated sugar dissolve faster in water than a sugar cube?

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9. Why do we stir ice tea after we put sugar in it? Explain using the terms solvent, solute, and solution.

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Partner #1: \_\_\_\_\_ Partner #2: \_\_\_\_\_ #: \_\_\_\_\_

## Saturation

Source(s): \_\_\_\_\_

**\*\*Remember to use evidence from your source(s) to help support your explanation\*\***

10. Describe the difference between a saturated solution, an unsaturated solution, and a supersaturated solution.

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11. What happens when you add more solute to an unsaturated solution?

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12. What happens when you add more solute to a saturated solution?

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13. What happens when you add more solute to a supersaturated solution?

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14. How do you make a supersaturated solution?

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## Solubility Curves:

[https://www.spiritsd.ca/curr\\_content/chem30\\_05/graphics/4\\_graphics/sol\\_curve.jpg](https://www.spiritsd.ca/curr_content/chem30_05/graphics/4_graphics/sol_curve.jpg)

15. What does a solubility curve tell you?

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What mass of the following solutes will dissolve in 100 mL of water?

16.  $\text{KNO}_3$  at  $50^\circ\text{C}$ ? \_\_\_\_\_

17.  $\text{NH}_3$  at  $50^\circ\text{C}$ ? \_\_\_\_\_

18.  $\text{NaNO}_3$  at  $50^\circ\text{C}$ ? \_\_\_\_\_

19. Which of the above is the most soluble? \_\_\_\_\_

20. Which salt on the entire graph is most soluble at  $80^\circ\text{C}$ ? \_\_\_\_\_

21. Which salt is least soluble at  $10^\circ\text{C}$ ? \_\_\_\_\_

22. Which salt shows the least solubility change when the temperature is increased from  $0$  to  $100^\circ\text{C}$ ? \_\_\_\_\_

23. For each of the following solutions, state whether the solution is saturated, unsaturated or supersaturated in the following conditions:

A) at  $30^\circ\text{C}$ , 70 g of  $\text{KNO}_3$  is dissolved in 100 g of water \_\_\_\_\_

B) at  $20^\circ\text{C}$ , 0 g of  $\text{KClO}_3$  is dissolved in 100 g water \_\_\_\_\_

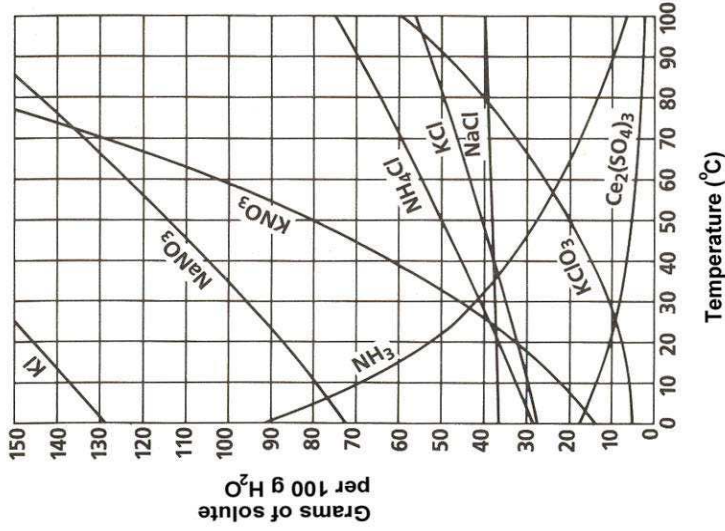
C) at  $100^\circ\text{C}$ , 30 g of  $\text{NaNO}_3$  is dissolved in 100 g of water \_\_\_\_\_

D) 50 g of  $\text{NH}_4\text{Cl}$  at  $70^\circ\text{C}$  is dissolved in 100 g water \_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_ #: \_\_\_\_\_

SOLUBILITY CURVES

- 1) What salt is least soluble in water at 20°C?
- 2) What compound shows a decrease in solubility from 0° to 100°C?
- 3) Which salt is most soluble at 10°C?
- 4) Which salt is least soluble at 50°C?
- 5) Which salt is least soluble at 90°C?
- 6) Which salt shows the least change in solubility from 0° to 100°C?
- 7) How many grams of potassium chloride can be dissolved in 200 g of water at 80°C?
- 8) At 40°C, how much potassium nitrate can be dissolved in 300 g of water?
- 9) At 30°C, 90 g of sodium nitrate is dissolved in 100 g of water. Is this solution saturated, unsaturated, or supersaturated?

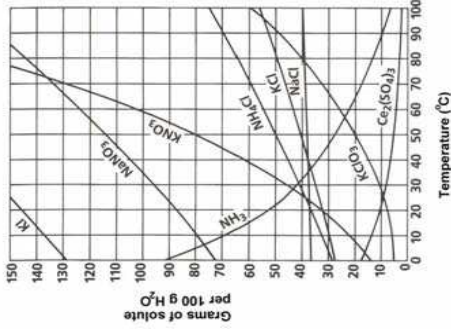


- 10) A saturated solution of potassium chlorate is formed from one hundred grams of water. If the saturated solution is cooled from 80°C to 50°C, how many grams of precipitate are formed?

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_ #: \_\_\_\_\_

SATURATION WS

- 11) How many grams of NH<sub>4</sub>Cl are needed to make a saturated solution in 100 g of water at 90°C?
  - 12) How many grams of KNO<sub>3</sub> are needed to make a saturated solution in 100 g of water at 50°C?
- For #13-15, use the answers: saturated, unsaturated, or supersaturated**
- 13) Ten grams of KClO<sub>3</sub> in 100 g of water at 40°C would produce a \_\_\_\_\_ solution.
  - 14) Eighty grams of NH<sub>4</sub>Cl in 100 g of water at 60°C would produce a \_\_\_\_\_ solution.
  - 15) Twenty grams of KClO<sub>3</sub> in 100 g of water at 50°C would produce a \_\_\_\_\_ solution.



**For #16-18, a crystal is dropped into a solution of the same substance in water. Use the answers saturated, unsaturated, or supersaturated**

- 16) The crystal does NOT dissolve. It simply rests on the bottom of the container. The original solution was \_\_\_\_\_.
  - 17) The crystal dissolves completely. The original solution was \_\_\_\_\_.
  - 18) When the crystal touches the solution, most of the solution rapidly recrystallizes. The original solution was \_\_\_\_\_.
- Review**
- 19) Which type of compound is always an electrolyte? ionic    polar covalent    nonpolar covalent
  - 20) Which type of compound is never an electrolyte?
  - 21) What does the term "miscible" mean?
  - 22) Give an example of two liquids that are immiscible.

- 23) Circle the ones that are insoluble in water.    NH<sub>4</sub>Cl    KNO<sub>3</sub>    CCl<sub>4</sub>    NaCl    C<sub>6</sub>H<sub>6</sub>