

Solubility Curves Worksheet

→ page 3

1. Using a solubility curve, determine the amount of each solute that can dissolve in 100g of water at the given temperature

- (a) KNO_3 at 70°C
- (b) NH_4Cl at 90°C
- (c) NaCl at 100°C
- (d) NaNO_3 at 35°C
- (e) NH_3 at 20°C
- (f) KClO_3 at 65°C
- (g) NH_4Cl at 65°C
- (h) NaNO_3 at 70°C
- (i) KNO_3 at 10°C
- (j) $\text{Ce}_2(\text{SO}_4)_3$ at 15°C

2. Solubility data for four different salts in water at 60°C are shown in the table below.

Salt	Solubility in Water at 60°C
A	10 g/50 g H_2O
B	20 g/60 g H_2O
C	30 /120 g H_2O
D	40 g/80 g H_2O

Which salt is most soluble at 60°C ?

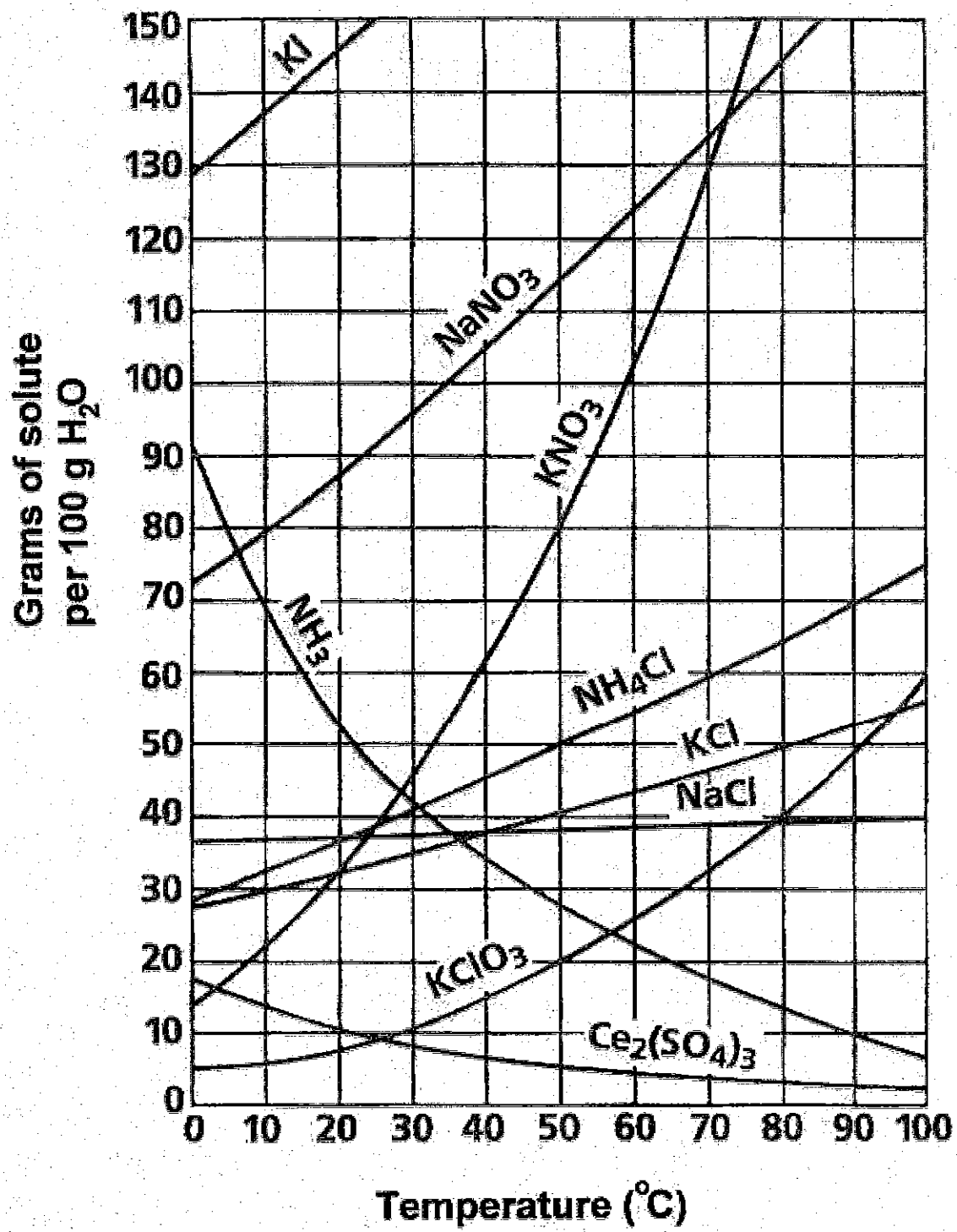
3. When cola, a type of soda pop, is manufactured, $\text{CO}_2(\text{g})$ is dissolved in it.
- (a) A capped bottle of cola contains $\text{CO}_2(\text{g})$ under high pressure. When the cap is removed, how does pressure affect the solubility of the dissolved $\text{CO}_2(\text{g})$?
 - (b) A glass of cold cola is left to stand 5 minutes at room temperature. How does temperature affect the solubility of the $\text{CO}_2(\text{g})$?
4. A student uses 200 grams of water at a temperature of 60°C to prepare a saturated solution of potassium chloride, KCl .
- (a) Identify the solute in this solution.
 - (b) How many grams of KCl must be used to create this saturated solution?
 - (c) This solution is cooled to 10°C and the excess KCl precipitates (settles out). The resulting solution is saturated at 10°C . How many grams of KCl precipitated out of the original solution?

X Two alcohols that are used in our everyday lives are rubbing alcohol and ethylene glycol. Rubbing alcohol is used as an antiseptic. Ethylene glycol is the main ingredient in antifreeze, which is used in automobile cooling systems. Explain, in terms of molecular polarity, why rubbing alcohol, 2-propanol, is soluble in water.

6. The following data table shows the solubility of a solid solute.

Temperature (°C)	Solute/100 g of H ₂ O
0	18
20	20
40	24
60	29
80	39
100	49

- (a) Graph the data from the data table. Connect the points.
- (b) Based on the data table, if 15 grams of solute is dissolved in 100 grams of water at 40°C, how many more grams of solute can be dissolved in this solution to make it saturated at 40°C?
- (c) How many grams of KClO₃ must be dissolved in 100 grams of H₂O at 10°C to produce a saturated solution?
7. A saturated solution of NaNO₃ is prepared at 60.°C using 100. grams of water. As this solution is cooled to 10.°C, NaNO₃ precipitates (settles) out of the solution. The resulting solution is saturated. Approximately how many grams of NaNO₃ settled out of the original solution?
8. An unsaturated aqueous solution of NH₃ is at 90.°C in 100. grams of water. How many grams of NH₃ could this unsaturated solution contain?



Solubility Curve Worksheet

- 1) Define solubility.
- 2) Look at the graph below. In general, how does temperature affect solubility?

- 3) Which compound is LEAST soluble at 10 °C? _____
- 4) How many grams of KCl can be dissolved in 100g of water at 80°C? _____
- 5) How many grams of NaCl can be dissolved in 100g of water at 90°C? _____
- 6) At 40°C, how much KNO₃ can be dissolved in 100g of water? _____
- 7) Which compound shows the least amount of change in solubility from 0°C-100°C?

- 8) At 30°C, 90g of NaNO₃ is dissolved in 100g of water. Is this solution saturated or unsaturated?

- 9) At 60°C, 72g of NH₄Cl is dissolved in 100g of water. Is this solution saturated or unsaturated?

- 10) A saturated solution of KClO₃ is formed from one hundred grams of water. If the saturated solution is cooled from 90°C to 50°C, how many grams of precipitate are formed? _____

- 11) A saturated solution of NH₄Cl is formed from one hundred grams of water. If the saturated solution is cooled from 80°C to 40°C, how many grams of precipitate are formed? _____

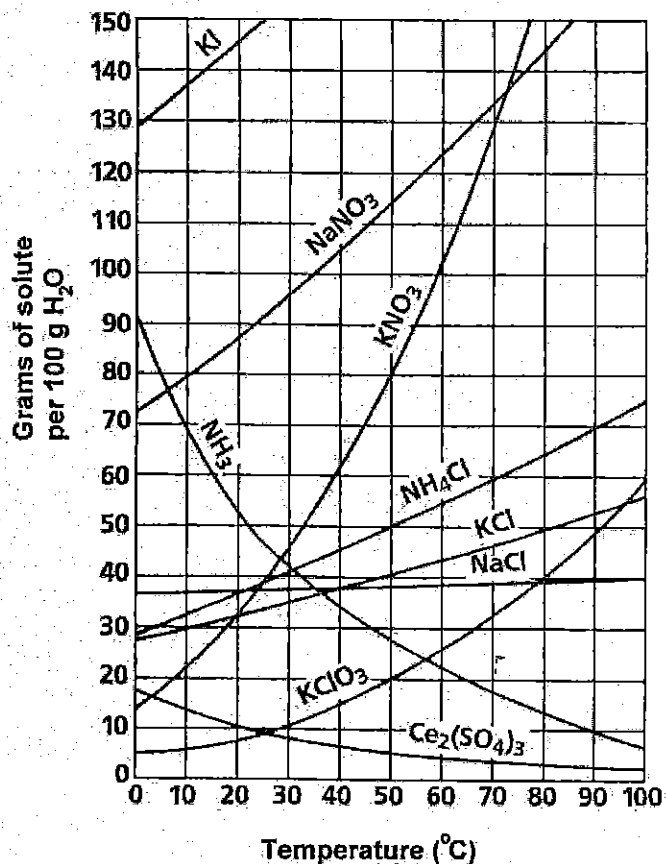
- 12) Which compounds show a decrease in solubility from 0°C-100°C?

- 13) Which compound is the most soluble at 10°C?

- 14) Which compound (besides Ce₂(SO₄)₃) is the least soluble at 50°C? _____

- 15) For each of the following solutions, explain how much of the solute will dissolve and how much will remain undissolved at the bottom of the test tube?
 - a) 120 g of KCl in 100 g of water at 80°C

- b) 130 g of NaNO₃ in 100 g of water at 50°C



Solubility Curve Worksheet Problem #6

