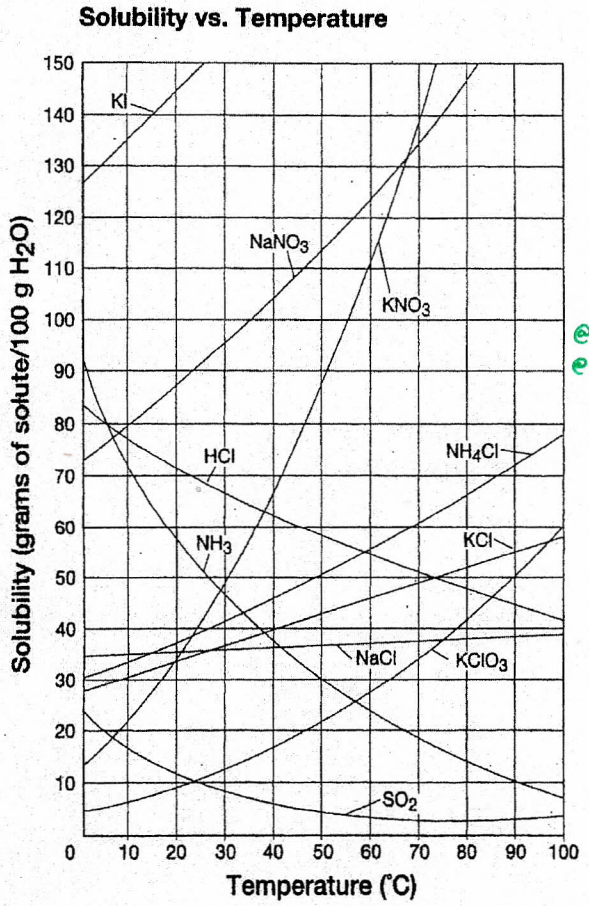
ANSWER KEY

EXTRA PRACTICE: Interpreting Solubility Curves Practice #3

Name: _____ Date: _____

Name: _____ Date: _____ Block: ___

Solubility Curves



@45°C = 41g, @80°C = 52g → 52-41=11g to saturate from 45-80°C

Henry's Law: $\frac{S_1}{T_1} = \frac{S_2}{T_2}$

1. Most substances on this graph show an increase in solubility with an increase in temperature. What are the exceptions? Gases show a decrease in solubility as temperature increases

2. Each curve shows how solubility for that substance changes as Temperature changes. Solubilities of substances whose curves show greater slopes are more (more/less) affected by temperature changes than those that have more gradual slopes.

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Using Solubility Curves

3. If 50g of water saturated with potassium chlorate at 23°C is slowly evaporated to dryness, how many grams of the dry salt will be recovered?
@ 23°C → 10g/100g H_2O ∴ $\frac{10g}{100g} = \frac{x}{50g}$ → X = 5g/50g H_2O
3. 5grams

4. What is the smallest mass of water required to dissolve completely 23g of ammonium chloride at 40°C?
@ 40°C → 46g/100g H_2O → $\frac{46g}{100g H_2O} = \frac{23g}{x}$ →
4. 50g H_2O

5. A saturated solution of sodium nitrate in 100g water at 40°C is heated to 50°C. What is the rate of increase in solubility in grams per degree?
@ 40°C → 104g/100g H_2O ; @ 50°C → 113g/100g H_2O →
5. 9g $NaNO_3$/10°C

6. Which salt has solubility values that are least affect by changes in temperature? *NaCl has a rather straight, level line →
6. NaCl

7. If 30g of potassium chloride is dissolved in 100g water at 45°C, how may additional grams of KCl would be needed to make the solution saturated at 80°C? @ 45°C → 41g/100g H_2O → 41-30=11g to saturate @ 45°C
7. 22g KCl additional

8. At what temperature do potassium chlorate and potassium chloride have the same solubility in water? @ 97°C → $KClO_3$ = KCl
8. 97°C

9. At 50°C, 100g water is saturated with sulfur dioxide. How many grams of sulfur dioxide must be added to saturate the solution at 0°C?
@ 50°C → 4g/100g H_2O ; @ 0°C → 23g/100g H_2O → 23g - 4g →
9. 19g SO_2

10. At 50°C, 100g water is saturated with potassium nitrate. How many grams of potassium nitrate will precipitate when the solution is cooled to 40°C?
@ 50°C → 89g/100g H_2O ; @ 40°C → 67g/100g H_2O → 89g - 67g →
10. 22g KNO_3

11. How many grams of sodium chloride are required to saturate 500g water at 100°C?
@ 100°C → $\frac{39g}{100g H_2O} = \frac{x}{500g H_2O}$ →
11. 195g NaCl

12. Which compound is least soluble in water at 12°C?
12. $KClO_3$

13. At 80°C, 100g water is saturated with potassium chloride. How many grams of KCL will precipitate when the solution is cooled to 45°C?
@ 80°C → 52g/100g H_2O ; @ 45°C → 41g/100g H_2O → 52g - 41g →
13. 11g KCl

14. A saturated solution of a compound contains 130g of solute in 100g water. What is the compound? KI / KNO_3 / $NaNO_3$
14. KI/KNO_3/$NaNO_3$

15. How many grams of sodium nitrate are required to saturate 200g water at 10°C?
@ 10°C → $\frac{80g}{100g H_2O} = \frac{x}{200g H_2O}$ →
15. 160g $NaNO_3$

16. Which saturated solution of a chloride has the greatest percentage by mass of solute at 60°C? % by mass = $\frac{g\ solute}{g\ soln} \times 100$ → $\frac{55g}{100g} \times 100$ → 55%
16. NH_4Cl

17. An aqueous solution of potassium nitrate at 50°C is 60 percent by mass KNO_3. Is this solution unsaturated, saturated, or supersaturated?
@ 50°C → $\frac{110g}{100g H_2O} > \frac{60g}{100g H_2O}$ ∴ Unsaturated
17. Unsaturated