Key

Solubility Curve Worksheet

1) Define solubility.
→ amount of solute that can dissolve in a solvent @ given temp

2) Look at the graph below. In general, how does temperature affect solubility?
for solids, as ↑temp, ↑solubility

3) Which compound is LEAST soluble at 10 °C? $KClO_3$

4) How many grams of KCl can be dissolved in 100g of water at 80°C? 50g

5) How many grams of NaCl can be dissolved in 100g of water at 90°C? 40g

6) At 40°C, how much KNO_3 can be dissolved in 100g of water? ≈60g

7) Which compound shows the least amount of change in solubility from 0°C-100°C?
NaCl

8) At 30°C, 90g of $NaNO_3$ is dissolved in 100g of water. Is this solution saturated or unsaturated?

9) At 60°C, 72g of NH_4Cl is dissolved in 100g of water. Is this solution saturated or unsaturated?
super!

10) A saturated solution of $KClO_3$ 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? 50 - 20 = 30g

11) A saturated solution of NH_4Cl 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? 65 - 45 = 20g

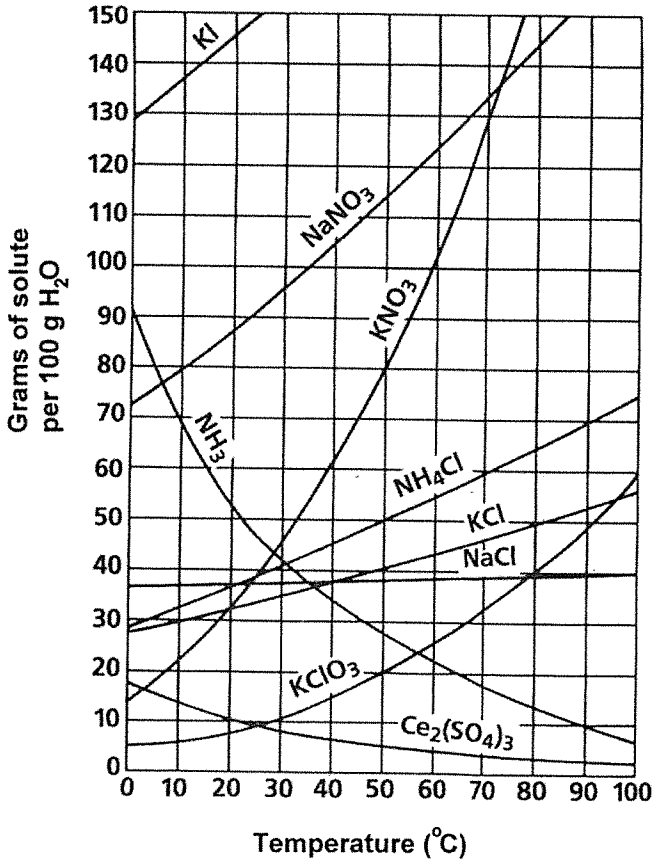
12) Which compounds show a *decrease* in solubility from 0°C-100°C?
NH_3, $Ce_2(SO_4)_3$

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

14) Which compound (besides $Ce_2(SO_4)_3$) is the least soluble at 50°C? $KClO_3$

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
   70g undissolved

   b) 130 g of $NaNO_3$ in 100 g of water at 50°C
   15g undissolved



Solutions Review Worksheet

16) What are the 3 different types of mixtures?

solution, suspension, colloid

17) What is a solution?

Homogeneous mixture - uniform in composition

18) Classify each of the following as a heterogeneous mixture or a homogeneous mixture.

a) salad Hetero

b) tap water Homo

c) muddy water Hetero

19) What is the difference between a solute and solvent?

less amount, dissolved → larger quantity does the "dissolving"

20) What is considered to be the "universal solvent? H_2O

21) Describe (in detail) the 3 steps in solution formation.

22) What is the difference between dissociation and solvation?

23) Not all solutions are solids dissolved in liquids. Provide 2 examples of other types of solutions.

metal alloys.

24) EXPLAIN the 3 factors that affect the rate of dissolving?

surface area
concentration
temperature

25) Define solubility

ability of a solute to dissolve in a solvent at a given temperature.

26) What are 3 factors that affect solubility?

a) Surface area
b) concentration
c) temperature

27) Explain the rule, "Like Dissolves Like".

polar substances dissolve polar
nonpolar " nonpolar

6) State whether each of the following will conduct an electric current. Also, explain why each does or does not conduct an electric current.

a) salt (NaCl) water

Yes - broken into charged particles

b) sugar water

No - covalent compound

c) solid NaCl

No - ionic lattice cancels charge

28) When does solution equilibrium occur?

@ saturation

29) What are the differences between a saturated solution, unsaturated solution and a supersaturated solution?

Limit of solubility - equilibrium reached

more solute can dissolve

above limit due to manipulated conditions

30) How could you tell by looking at a solution that it was saturated?

precipitate

31) What is the Tyndall Effect? Cite a common example of this effect.

Scattering of light due to heterogeneously sized particles — used to detect a colloid

32) In what type of mixture is it easiest to separate the component substance? WHY?

Heterogeneous — because they are not uniformly spread

33) Given an unknown mixture consisting of two substances, explain how a scientist could use lab techniques to determine whether the mixture is a true solution, a colloid, or a suspension.

1) Could use light / Tyndall effect
2) Could use distillation (separation by boiling pt.)
3) Could use filtration (separation by particle size)

❖ *Use the solubility cure below to answer the following questions:*

34) Which salt is LEAST soluble at 20 °C? KNO_3

35) How many grams of KBr can be dissolved in 100g of water at 60°C? ≈75 g

36) How many grams of NaCl can be dissolved in 100g of water at 100°C? ≈40g

37) At 40°C, 180g of $NaClO_3$ is dissolved in 100g of water. Is this solution saturated or unsaturated?

Super

38) At 70°C, 70g of KBr is dissolved in 100g of water. Is this solution saturated or unsaturated?

39) A saturated solution of $NaClO_3$ is formed from one hundred grams of water. If the saturated solution is cooled from 80°C to 60°C, how many grams of precipitate are formed? 40g undissolved

40) How much of the solute will dissolve and how much will remain undissolved at the bottom of the test tube?
   a) 160 g of KNO_3 in 100 g of water at 50°C

60g undissolved