WS 8.8 Review Worksheet

1. How much KCl can be dissolved in 100 g of water at 62.0° C? 44 g
   (read directly from graph)

2. How much KNO_3 can be dissolved in 136.0 g of water at 71.0° C? 177 g

$$\frac{130\text{ g } KNO_3}{100\text{ g } H_2O} = \frac{x\text{ } KNO_3}{136.0\text{ g } H_2O}$$

3. How many grams of water will it take to dissolve 26.0 g KCl at 56.0° C? 60. g

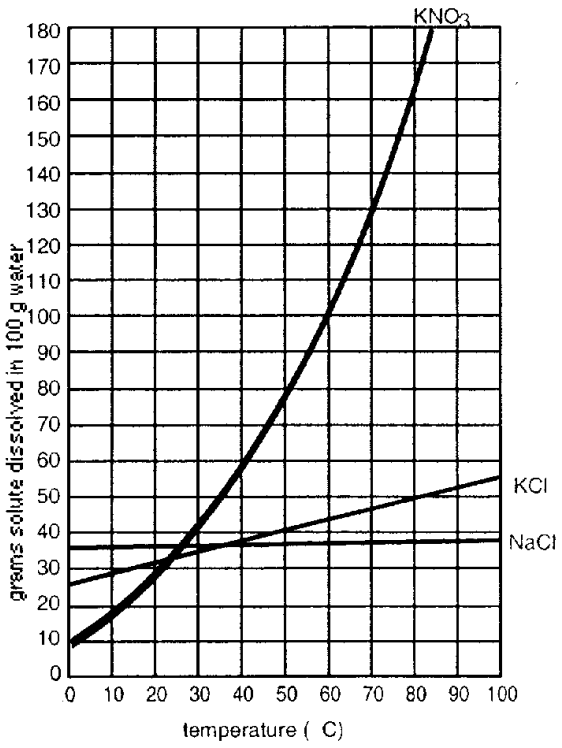
$$\frac{43\text{ g}}{100\text{ g } H_2O} = \frac{26\text{ g}}{x\text{ g } H_2O}$$

4. What temperature would be required to get 42.4 g of KCl to dissolve in 100 g of water? 53°C
   (read directly from graph)

5. What temperature would be required to get 42.4 g of KCl to disolve in 142 g of water? 13°C

$$\frac{42.4\text{ g}}{142\text{ g } H_2O} = \frac{x}{100\text{ g } H_2O} \qquad x = 29.9\text{ g}$$

see graph



6. 6490 g of solution contain 18 mg of sugar.
   → .018 g

What is the % sugar in the solution? 2.8×10^{-4} %

$$\frac{.018\text{ g}}{6490\text{ g}} \times 100 =$$

What is the ppm sugar in the solution? 2.8 ppm

$$\frac{.018\text{ g}}{6490\text{ g}} \times 10^6 =$$

7. How many grams of HF would there be in 15.6 g of 32.0% HF solution?

$$\frac{x}{15.6} = .320$$

Ans: 4.99 g

8. How much 5.30% salt solution can be made using 16.7 g of salt?

$$\frac{16.7\text{ g}}{x} = .0530$$

Ans: 315 g

9. What is the molarity of a solution containing 1.2 moles NaCl dissolved in 750 mL of NaCl solution?

$$M = \frac{\text{mol}}{\text{L}} = \frac{1.2\text{ mol}}{0.75\text{ L}} =$$

Ans: 1.6 M

10. How many moles of sugar are needed to make 1.30 mL of 1.50 M sugar solution?

$$1.30\text{ mL} \times \frac{1\text{ L}}{1000\text{ mL}} \times \frac{1.50\text{ mol}}{1\text{ L}} =$$

Ans: .00195 mol

Ans (iro+2): 0.00028 0.00195 0.025 1.6 2.8 4.99 9.6 13 44 53 60 146.0 178 315
Units (iro+1): g g g g g g % ppm moles °C °C L L mL M M

11. How many grams of $NaNO_2$ are needed to make 150 ml of 3.0 M $NaNO_2$ solution?

$150\ mL \times \frac{1\ L}{1000\ mL} \times \frac{3.0\ mol}{1\ L} \times \frac{69\ g}{1\ mol} =$ Ans: 31 g

12 . What volume of 1.3 M $CaCl_2$ solution can be made using 3.6 g $CaCl_2$?

$3.6\ g \times \frac{1\ mol}{111\ g} \times \frac{1\ L}{1.3\ mol} \times \frac{1000\ mL}{1\ L} =$ Ans: 2.5 mL (or .025 L)

13. 17.5 mL of 3.00 M HCl is place in a 100.0 mL volumetric flask and water is added up to the mark. What will be the molarity of the diluted HCl?

$M_f = \frac{(M \cdot V) + (M \cdot V)}{V_T} = \frac{(3.00)(17.5) + 0}{100.0} =$ Ans: .525 M

14. What volume of 1.3 M HBr should be added to 55 mL of 5.0 M HBr to make the total concentration 4.5 M?

$\frac{(1.3)(x) + (5.0)(55)}{x + 55} = 4.5$

$1.3x + 275 = 4.5(x + 55)$

$1.3x + 275 = 4.5x + 247.5$

$27.5 = 3.2x$

Ans: 8.6 mL

15. Use numbered steps to describe precisely how you would use a 25.0 mL volumetric flask to make up some 0.750 M NaF soln. Indicate how much NaF to use & check answer below.

$25\ mL \times \frac{1\ L}{1000\ mL} \times \frac{0.750\ mol}{1\ L} \times \frac{42\ g}{1\ mol} = .788\ g$

1) Weigh 0.788 g of NaF into flask.
2) Fill 2/3 full with water
3) Mix until dissolved
4) Fill to line (etched by hand!) with water.
5) Invert until homogeneous.

16. Some room temperature water (A) has some KBr mixed in and it all dissolves (B). Some more KBr is added and it all settles to the bottom (C). After vigorous shaking, however, about 1/2 of the KBr dissolves (D). This is then cooled down to 5°C and some of the dissolved KBr recrystallizes out (E). This is then heated to 75°C, and all the KBr quickly dissolves (F). This is then cooled back down to room temp with no KBr recrystallizing out (G). A single granule of KBr is added and a bunch of crystals form throughout the container (H). Indicate whether the solution was **uns**aturated, **sat**urated, or **sup**ersaturated at each point in time:

A uns B uns C uns D sat E sat F uns G sup H sat

17. You are given what appears to be a clear, colorless liquid in a sealed flask. You are asked to determine whether it is a solution, a colloid or a suspension. What would you do, and what would it show?

test for Tyndall effect: If there's a beam of light, it's a colloid. If not, it's a solution

18. You are given two beakers each of what contains what appears to be water. One contains water; the other contains a solution of $LiNO_3$ in water. Describe at least three distinct ways you could differentiate which liquid is which.

1. Allow to evaporate (salt will be left behind). 2. Check density by weighing equal volumes.
3. Add more $LiNO_3$ until saturated (the water beaker will require more $LiNO_3$ to become saturated).

Ans (IRO): sat sat sat uns uns uns uns sup 0.525 0.788 8.6 25 31