

The Solubility Quiz is Friday, November 7, 2014

Review the following:

- \* this assignment
- \* Factors that Affect Solubility Notes
- \* Calculating Concentration Notes

1) a) Calculate the concentration in g/L of a 1.5 L solution containing 60 g of solute in water. (temperature = 20 °C.)

$$\frac{\text{grams}}{\text{litres}} \quad \frac{60\text{g}}{1.5\text{L}} = 40\text{g/L}$$

The concentration is 40g/L.

b) If the saturation point for the above solute in water at 20 °C is 52 g/L, is the above solution unsaturated, saturated, or supersaturated?

The solution is unsaturated. The solution can hold 52g/L but only has 40g/L.

2) How many grams of solute are present in a 3 L solution whose concentration is 22 g/L?

$$\begin{array}{|c|} \hline 22\text{g} \\ \hline 1\text{L} \\ \hline \end{array} \quad \begin{array}{|c|} \hline 22\text{g} \\ \hline 1\text{L} \\ \hline \end{array} \quad \begin{array}{|c|} \hline 22\text{g} \\ \hline 1\text{L} \\ \hline \end{array}$$

66 grams

There are 66 grams of solute present.

3) Emilia pours 18 g of table salt, NaCl, into a graduated cylinder and adds water up to the 600 mL mark.

What is the concentration of the salt solution in g/mL?

$$\frac{\text{grams}}{\text{mL}} \quad \frac{18\text{g}}{600\text{mL}} = 0.03\text{g/mL}$$

The concentration is 0.03g/mL.

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4) You wish to make a solution of the salt KCl. How many grams of KCl are required to make 6 L of a 3.5 g/L solution?

$$\frac{3.5\text{g}}{\text{L}} \times 6\text{L} = 21\text{ grams}$$

21 grams of KCl are needed.

5) How many grams of solute are present in 3 L of solution with a concentration of 20 g/L?

$$\frac{20\text{g}}{\text{L}} \times 3\text{L} = 60\text{g}$$

There are 60 grams of solute present.

6) To prepare 2 L of Kool-Aid, you used 98g of Kool-Aid powder. What is the concentration of the solution in g/L

$$\frac{\text{grams}}{\text{litres}} = \frac{98\text{g}}{2\text{L}} = 49\text{g/L}$$

The concentration is 49g/L.

7) How does the solubility of a solid dissolved in a liquid change as the temperature of the solvent increases?

The solubility of the solid increases as the temperature increases.

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8) Why does a can of pop fizz when it is opened?

The pop fizzes because there is a decrease in pressure. The carbon dioxide gas is less soluble at a lower pressure and therefore starts to leave the solution (pop).

9) What is an unsaturated solution?

An unsaturated solution still has some unfilled spaces left between the solvent particles. More solute can be dissolved.

10) Explain why a supersaturated solution is considered to be unstable?

A supersaturated solution is holding more solute than the molecule spacing wants to hold. The solution spaces are 'overstuffed' and thus unstable.