

Unit 10 Review

LT1: I can explain the difference between saturated, unsaturated, supersaturated

1. Define solute and solvent.

Solute - substance being dissolved

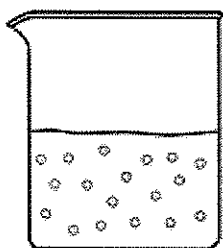
solvent - substance it's dissolved in

2. Describe what it means when a solution is supersaturated.

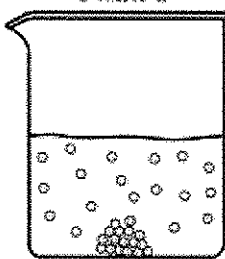
Solution that contains more dissolved solute than a saturated solution would contain

LT2: I can draw and analyze diagrams of solutions that are unsaturated and saturated.

3. Label saturated or unsaturated for the beakers below:



3.6 g of solute added



7.0 g of solute added

A. cannot tell

B. saturated

- 3b. What simple test could you perform to determine if beaker A is at its exact saturation point or if it's unsaturated?

add small amount more solute and see if it dissolves or sits on the bottom

LT3: I can read/interpret a solubility curve

Use the solubility curve to answer the following questions.

4. Based on the solubility curve for potassium nitrate, how many grams of the salt will dissolve in 100 g of water at 50°C?

80g KNO₃

5. Based on the solubility curve for ammonium chloride how many grams of the salt will dissolve in 200 g of water at 50°C?

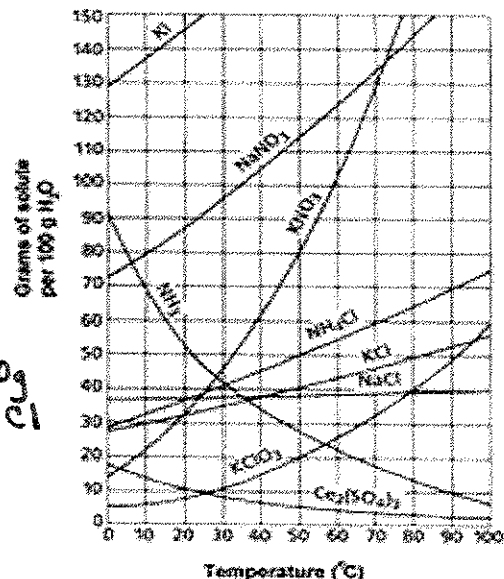
$$\frac{50g}{100g H_2O} = \frac{x}{200g} \quad x = 100g NH_4Cl$$

6. At 50°C and 70 grams of KNO₃, is the solution unsaturated, saturated or supersaturated?

unsaturated

7. Is NH₃ saturated, unsaturated or supersaturated if 60 grams is added to 100 grams of water at 30°C?

supersaturated



LT4: I can explain and understand the concept of solubility

8. As temperature of a solid increases, solubility increases ~~decreases~~ (circle one).
9. As temperature of a gas increases, solubility increases ~~decreases~~ (circle one).

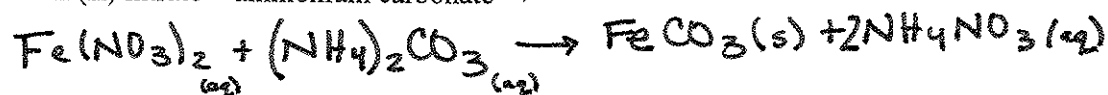
LT5: I can use solubility rules to determine if an ionic substance is soluble/insoluble

10. For the following compounds, write the corresponding name or formula and use the solubility rules to determine if it's soluble or insoluble in water.

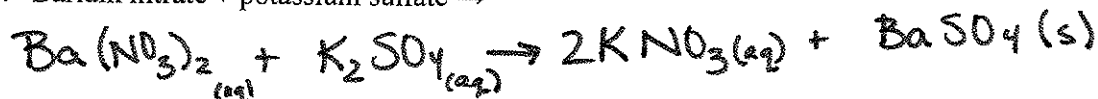
	Name/Formula	Soluble or Insoluble
X Al_2O_3	<u>aluminum oxide</u>	<u>insoluble</u>
b. $RbNO_2$	<u>rubidium nitrite</u>	<u>soluble</u>
c. $MgSO_4$	<u>magnesium sulfate</u>	<u>soluble</u>
d. $ZnCl_2$	<u>zinc chloride</u>	<u>soluble</u>
e. $Ba(OH)_2$	<u>barium hydroxide</u>	<u>soluble</u>
f. Iron (II) carbonate	<u>$FeCO_3$</u>	<u>insoluble</u>
g. Potassium nitrate	<u>KNO_3</u>	<u>soluble</u>
h. Calcium hydroxide	<u>$Ca(OH)_2$</u>	<u>soluble</u>
X Magnesium chromate	<u>$MgCrO_4$</u>	<u>insoluble</u>
j. Ammonium cyanide	<u>NH_4CN</u>	<u>soluble</u>
k. Lithium chloride	<u>$LiCl$</u>	<u>soluble</u>
l. Nickel (II) bromide	<u>$NiBr_2$</u>	<u>soluble</u>

11. Predict the products (and states of matter) for following reactions, write the balanced formula equation with the correct states of matter.

a. Iron (II) nitrate + ammonium carbonate \rightarrow



b. Barium nitrate + potassium sulfate \rightarrow



c. Sodium phosphate + strontium hydroxide \rightarrow



d. Ammonium sulfide + aluminum nitrate \rightarrow



LT6: I can write a solvation equation to represent the dissociation of a soluble ionic compound

12. Write the solvation equation for NaCl.

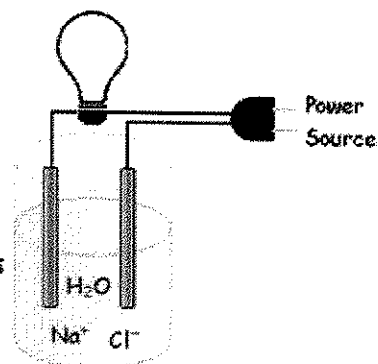


13. What is the difference between a strong and weak electrolyte?

Strong dissociates completely
weak dissociates only partially

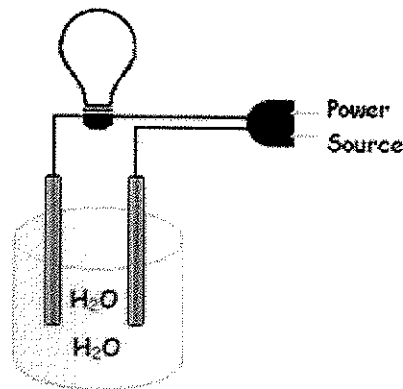
14. What would cause the lightbulb to light in a saltwater solution?

Electricity flows when charged particles move. When NaCl dissociates it produces individual ions. They are free to move and conduct electricity.

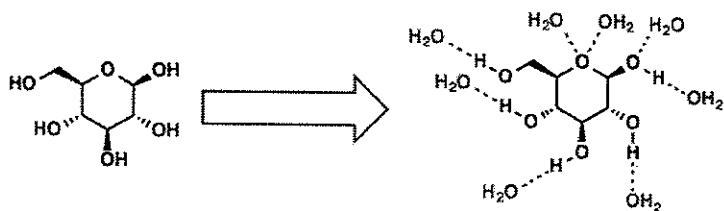


15. What type of compound would cause the light bulb below to remain unlit? Explain your answer..

If the substance cannot dissociate, it cannot be a soluble ionic compound. This must be a molecular compound (non electrolyte)



15. Explain the picture below using the words, dissociate, solvent, solute, ionic and molecular compound.



when the molecular solute is placed in the solvent water it does not dissociate into individual ions like an ionic compound does. It just dissolves through the attractions with the water molecules

LT7: I can solve concentration calculations for molarity, dilution, and percent by mass

Molarity and dilutions

$$M = \text{mol/L}$$

$$M_1V_1 = M_2V_2$$

$$1300\text{mL} = 1.3\text{L}$$

16. Calculate the molarity of a 1,300 mL solution containing 1.65 g of dissolved potassium bromide. (KBr, MM = 119.00 g/mol)
- $$1.65\text{g KBr} \times \frac{1\text{mol}}{119.00\text{g}} = .0139\text{mol}$$

$$M = \frac{.0139\text{mol}}{1.3\text{L}} = .011\text{M}$$

17. What mass of glucose ($\text{C}_6\text{H}_{12}\text{O}_6$, MM = 180.18 g/mol) was used to make 1.50 L of a 0.155 M solution?

$$.155\text{M} = \frac{\text{mol}}{1.50\text{L}} \quad \text{mol} = .233\text{mol C}_6\text{H}_{12}\text{O}_6 \times \frac{180.18\text{g}}{1\text{mol}} = 41.9\text{g}$$

18. How much water should be added to 100.0 mL of 18.0 M sulfuric acid to prepare a 1.50 M solution?

$$18.0\text{M} \times 100.0\text{mL} = 1.50\text{M} \times X$$

$$X = 1200\text{mL final} \quad 1200 - 100 = 1100\text{mL H}_2\text{O}$$

19. A stock solution is prepared by dissolving 0.630 g oxalic acid ($\text{H}_2\text{C}_2\text{O}_4$ MM = 90.04 g/mol) in enough water to make 150.0 mL of solution. To prepare a dilution, 20.0 mL of the stock solution is diluted to a final volume of 300.0 mL.

$$150.0\text{mL} = .150\text{L}$$

- a. What is the molarity of the initial solution?
- $$.630\text{g H}_2\text{C}_2\text{O}_4 \times \frac{1\text{mol}}{90.04\text{g}} = .006997\text{mol}$$

$$M = \frac{.006997\text{mol}}{.150\text{L}} = .0466\text{M}$$

- b. What is the molarity of the dilute solution?

$$.0466\text{M} \times 20.0\text{mL} = X \times 300.0\text{mL}$$

$$X = .00311\text{M}$$

20. An aqueous solution contains 5 grams of sodium chloride and 95 grams of water in solution. What is the percent mass of sodium chloride in the solution?

$$\% = \frac{5\text{g NaCl}}{(95+5)\text{g}} \times 100$$
$$= 5\%$$

21. What is the percent of ethanol in a solution that contains 30 mL of ethanol dissolved in 180 mL of water?

$$\% = \frac{30\text{mL}}{(180+30)\text{mL}} \times 100$$
$$= 14.3\%$$