MiSP Solubility Assessment L3

Name _____ Date _____

Below is a data table that shows the maximum mass of potassium chloride and ammonium chloride that can be dissolved in 100 grams of water at various temperatures. Plot the data (graphing grid is provided on the last page) and draw best-fit lines. Remember to set up your axes and label them appropriately.

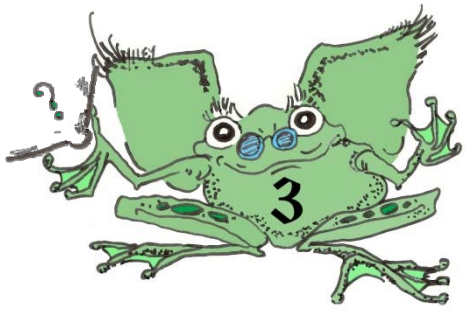
Water Temperature (°C)	Solubility of Potassium Chloride (g)	Solubility of Ammonium Chloride (g)
0	28	30
20	34	37
40	40	46
60	46	55
80	51	65
100	56	76

1. How many grams of potassium chloride will dissolve at a temperature of 83°C?
   _____grams

2. What temperature would be necessary to dissolve 35 grams of potassium chloride?
   _____ °C

3. Describe the relationship between water temperature and the maximum amount of potassium chloride that will dissolve in 100 grams of water.
   _____
   _____

4. Compare the solubility of potassium chloride to the solubility of ammonium chloride.
   _____
   _____



5. Can you tell, just by looking at your graph, whether potassium chloride or ammonium chloride had greater solubility? How can you tell?

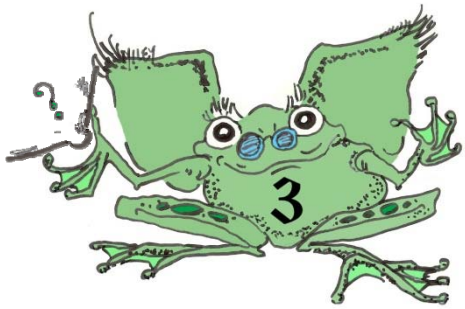
_____

_____

6. List three ways to increase the amount of solute that will dissolve in a solvent.
   - _____
   - _____
   - _____

7. a. In the diagram below label the soluble and insoluble materials.
   b. What is the solvent in the diagram below? _____
   c. What is the solute in the diagram below? _____

8. Use the information from the data table to calculate the rate of change in solubility of potassium chloride between 30°C and 50°C. Show the formula, substitutions, and answer.



9. Based on your graph on the previous page, what is the *y*-intercept for the potassium chloride solubility curve? _____

   What is the *y*-intercept for the ammonium chloride solubility curve? _____

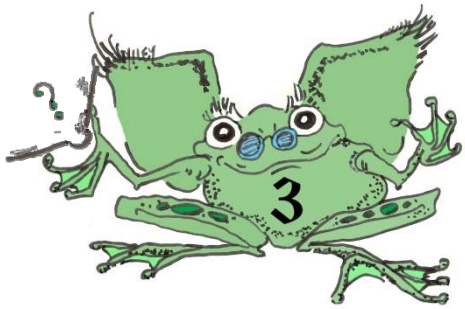
10. Based on your answers from questions 8 and 9, write an equation for the solubility curve for potassium chloride.

11. Based on the equation above, fill in the chart below to predict the amount of potassium chloride that will dissolve at various temperatures. Show formula, substitutions, and answer.

    a. 11°C

    b. 27°C

    c. 78°C



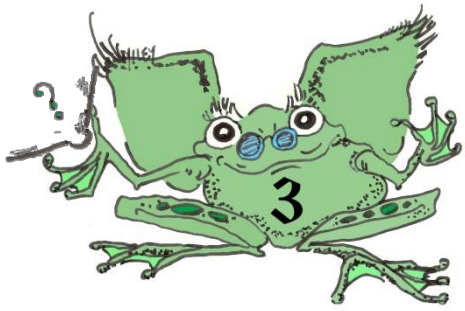
12. Bonus:
    a. What temperature would be necessary to dissolve 1,200 grams of potassium chloride in 100 grams of water?

    b. Is this realistic? Explain your answer.

_____

_____

_____



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