

Lab: Dissolve This!!



Safety: Goggles on eyes, test tube holders and beaker tongs when handling hot glassware!

Part 1: Solubility Curves

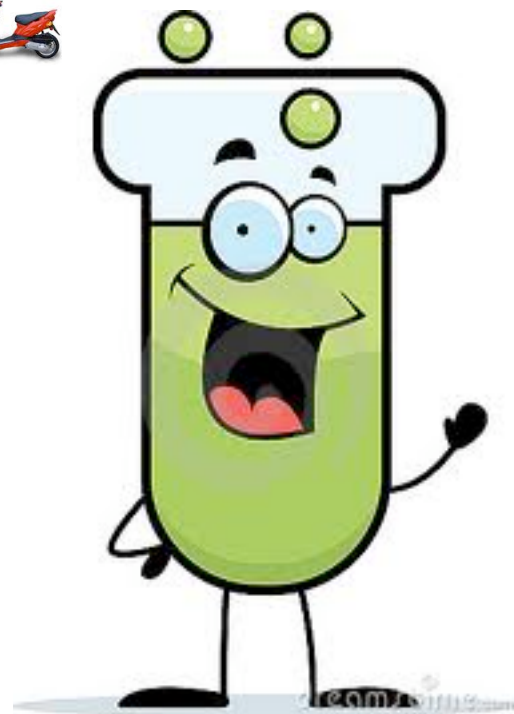
Pre-lab Questions:

1. Define these terms:

Solvent:

Solute:

Solution:



2. What 3 factors affect how fast something dissolves? _____,
_____, _____

3. Is a solution an element, compound, or mixture? _____ How do you know?

4. Is a solution homogeneous or heterogeneous? _____ How do you know?

5. Draw a particle diagram of a solution:

6. Use Table G to answer the following questions:

a. At 60°C, how many grams of NaNO_3 can dissolve in 100g water? _____

b. If I made a solution at 60°C with 80g of NaNO_3 and 100g water, is the solution unsaturated, saturated, or supersaturated? _____

c. What 2 things could I do to make this solution saturated?

1. _____

2. _____

7. For most substances, solubility _____ (increases or decreases) with increasing temperature.

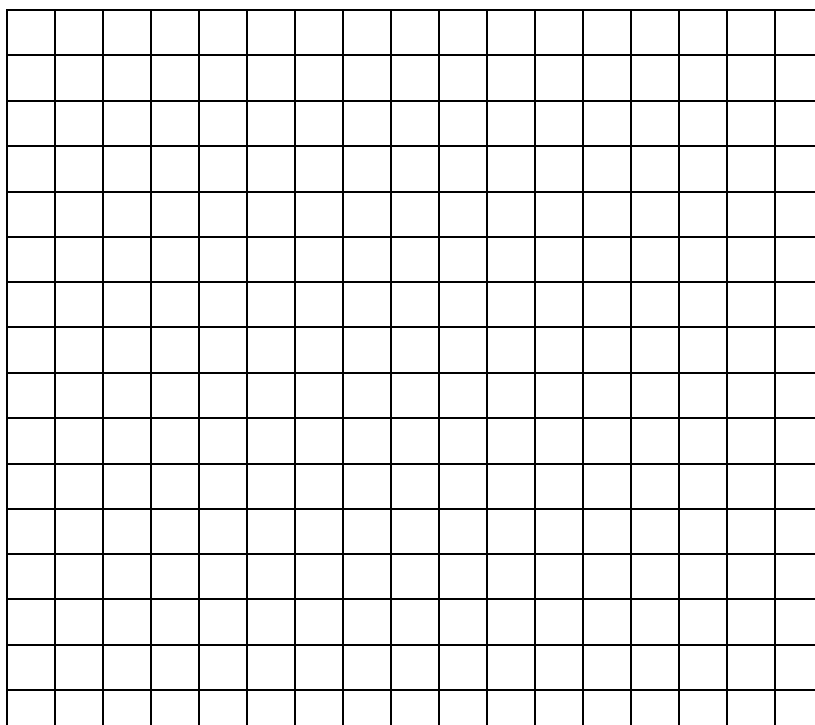
8. List the 3 substances on Table G that decrease solubility as the temperature increases: _____, _____, and _____. These substances are all _____.

Part 1 Procedure:

1. Add 10mL of distilled water to each of 4 test tubes labeled A, B, C, and D.
2. Add 2 g of KNO_3 to test tube A, 4 g of KNO_3 to test tube B, 6 g of KNO_3 to test tube C, and 8 g of KNO_3 to test tube D
3. Put all 4 test tubes into a hot water bath (beaker with water on a hot plate) to dissolve the KNO_3 .
4. As the substance in each test tube dissolves, use a test tube holder to remove it from the hot water bath. Watch carefully and at the FIRST SIGN OF CRYSTALS FORMING, record the temperature of the solution in the test tube. Record your data.

	g of solute/ 10 g H_2O	Temp. at which solute precipitates ($^{\circ}\text{C}$)	Convert values in 1 st column to equivalent amount/100 g H_2O .
A	1 g		
B	2 g		
C	3 g		
D	4 g		

5. clean and dry all of your glassware and return all materials exactly as you found them.
6. Make a solubility curve for KNO_3 . LABEL the x-axis "Temperature ($^{\circ}\text{C}$)" and the y-axis "solute per 100g H_2O ". Use your 4 data points to construct the solubility curve, and use a best-fit curve.



7. On your graph, find a point where the solution would be saturated. LABEL that **point A**. Find a point where it would be unsaturated and label that **point B**. Find a point where it would be supersaturated and label it **point C**.
 8. Find the point you labeled A on your graph above. If that solution was cooled by 20°C , how many g of KNO_3 would settle out as a solid? _____ g
 9. State the relationship shown on your graph between the amount of KNO_3 added and temperature at which the solution crystallized:
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Part 2: Like Dissolves Like

Pre-lab Questions:

1. Explain in your own words what “like dissolves like” means:

2. Based on your knowledge of molecular polarity, complete the following table:

	Polar or Nonpolar Molecule?	Predict solubility in Water	Predict solubility in Oil
NH ₃			
I ₂			
HCl			

3. Explain, in terms of molecular polarity, how soap works:

Procedure:

1. In 4 clean, dry test tubes, add ½ inch of water. In 4 other test tubes, add ½ inch of baby oil.
2. Add one microspoonful of NaCl to a test tube of water, and add one microspoonful of NaCl to a test tube of baby oil. Seal the top with a cork and shake. Record observations in data table.
3. Repeat step 2 with microspoonfuls of sugar, 3 drops of vegetable oil, and 3 drops of vinegar.

	Dissolves in Water?	Dissolves in Baby Oil?	Polar or Nonpolar Molecule?
NaCl			
sugar			
vegetable oil			
vinegar			

4. clean and dry all of your glassware and return all materials exactly as you found them.