



Do Now ...

Date: March 14, 2016

Obj: Describe concentration of solutions.

Copy and Solve: **Molarity = moles/liters**

If I have 9 moles of NaCl dissolved in 3 L, what is the molarity? $M = \underline{\hspace{2cm}}$ mol/L

If molarity = 3 mol/L and I have 6 L, how many moles do I have? $\underline{\hspace{2cm}}$ mol

Monday, March 14, 2016

Today:

W-Up, Notes & Practice: Solutions & Molarity

Homework: Finish Molarity Worksheet

Molarity

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

Molarity allows scientists to communicate the amount of substance dissolved in a liquid.

If given grams ...

In lab we measure mass in grams.

In our calculations we work with moles.

Practice converting g \rightarrow mol

Convert:

24.0 g NaCl to moles _____

32.5 g LiBr to moles _____

Hint: g \rightarrow mol ; divide by GFM

Molarity

Find the molarity:

0.41 moles NaCl in 7.2 L _____

0.32 mol LiBr in 2.3 L _____

— — —

Do Now ...



Tuesday, March 15, 2016

Today:

W-Up, Video: Cosmos

Homework:

— — —



Do Now ...

Date: March 16, 2016

Obj: Observe unsaturated, saturated, and supersaturated solutions.

Copy and Solve:

Calculate the molarity for 39.3 g NaCl in 1.2 L.

Note: Na=22.99 g/mol Cl=35.45 g/mol

Wednesday, March 16, 2016

Today:

W-Up, Lab: Crystal Formation

Homework: HW: Complete Lab

On the back of your lab ...

1. Calculate the molarity of a solution with 3.8 moles NaCl in 22.2 L of water.
2. Calculate the number of liters needed to make a 3.0 M solution using 25.2 g NaCl.



Do Now ...

Date: March 17, 2016

Obj: Using a solubility curve (graph) predict the solubility of different solids.

Copy and Solve:

How many moles are in 2 L of a 3.7M solution of LiBr? _____

How many grams would there LiBr be?

Thursday, March 17, 2016

Today:

W-Up, Activity: Solubility Curves

Homework: p484, #40, 41- Show Work

Some practice.

How much water would you need to make 3.4 L of a 2.0 molar solution of KCl?

Hint: *Molar* is short for *Molarity*.

Some more practice.

A synonym for Molarity is

_____.

When you add salt to water, the:

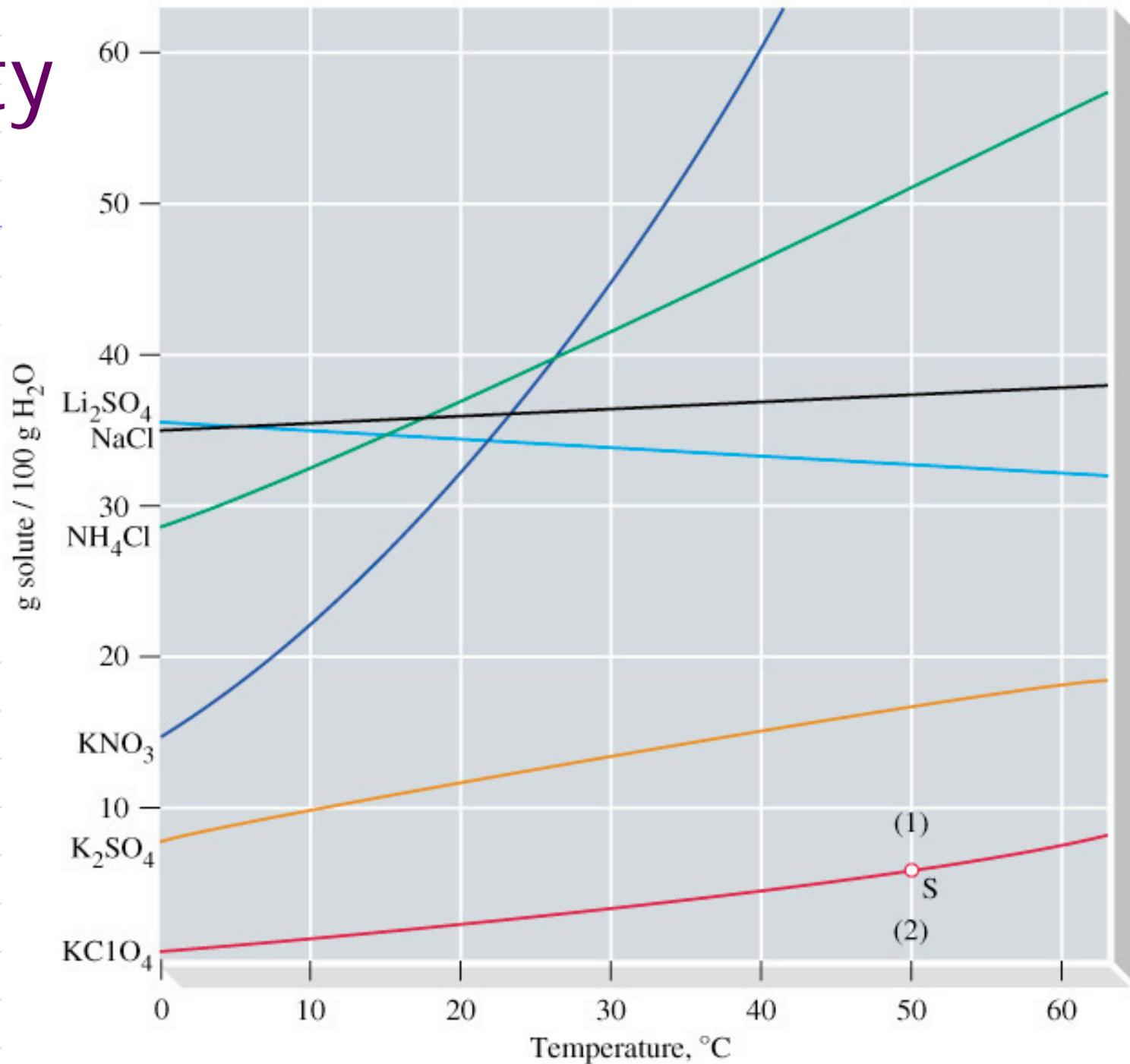
solute = _____

solvent = _____

solution = _____

Solubility Curve

Solubility of KNO_3 at 40°C ?

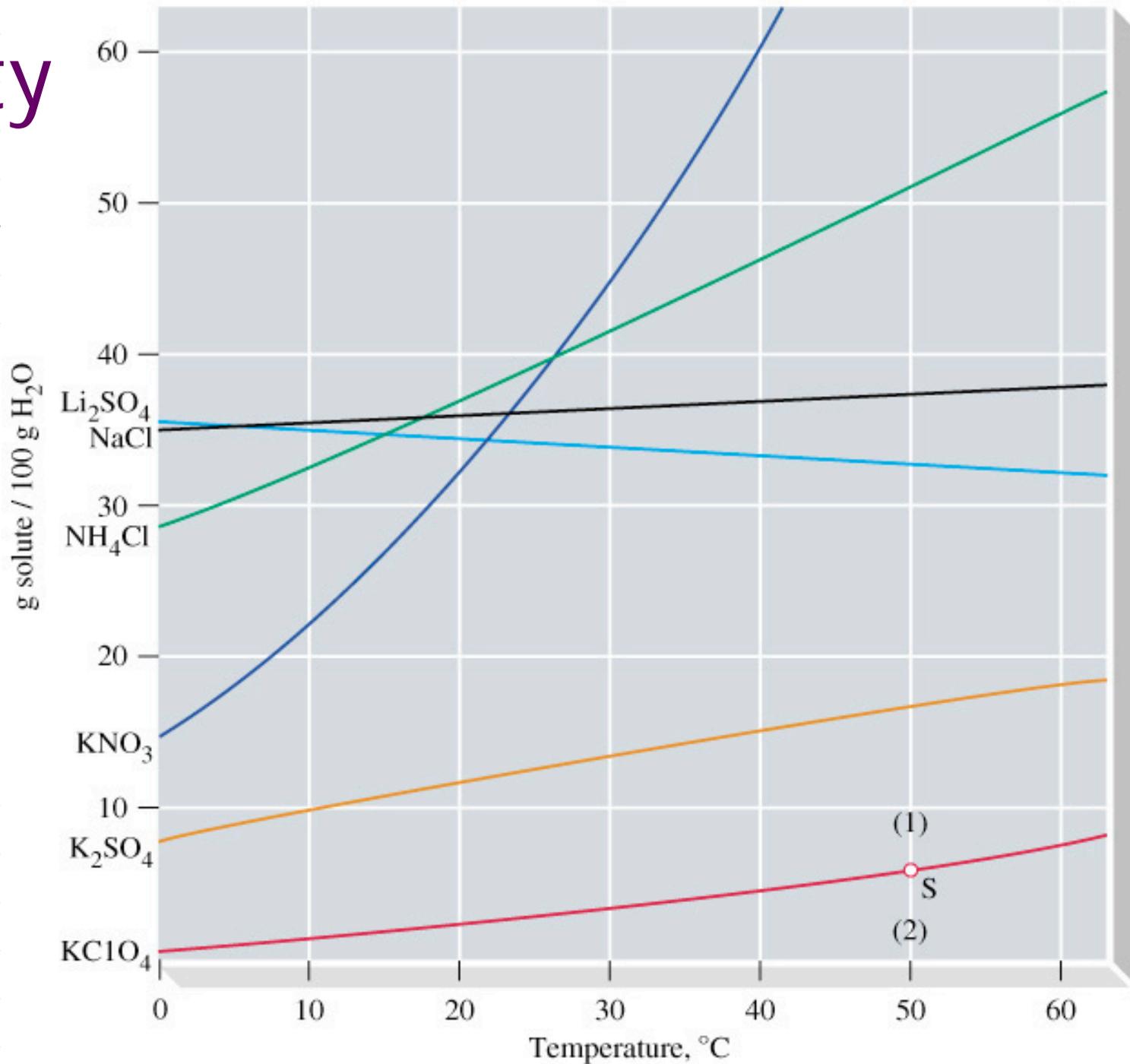


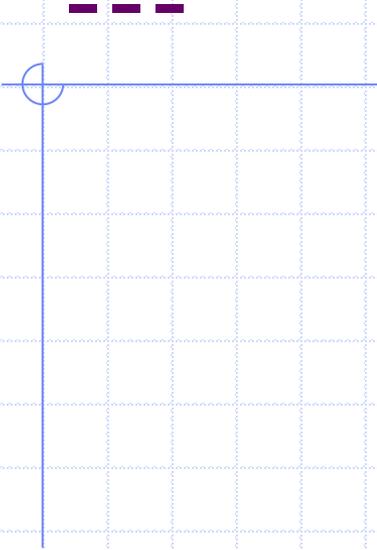
http://cwx.prenhall.com/petrucci/medialib/media_portfolio/text_images/FG14_08.JPG

Solubility Curve

Solubility of K_2SO_4 at $100^\circ C$? (approx)

http://cwx.prenhall.com/petrucci/medialib/media_portfolio/text_images/FG14_08.JPG





— — —



Do Now ...

Date: March 18, 2016

Obj: Use correct lab technique and calculations to make a solution

Copy and Solve:

IVs in the hospital must be the correct concentration. What happens to human cells if there is too much salt? Too little?

Friday, March 18, 2016

Today:

W-Up, Lab: Making Solutions

Homework: Finish Lab

Warm-Up

The Molarity (M) of a normal saline solution is 1.0M NaCl solution according to Wikipedia. Which of the following are safe to give a human?

- A. 3.7 g NaCl in 500mL
- B. 29.3 g NaCl in 500mL
- C. 500mL of a 3M NaCl solution diluted to 1500mL

Making Solutions



http://files.turbosquid.com/Preview/Content_on_2_20_2005_23_59_32/IV%20Pump.jpg
9ec1-
e98b359f2861Large.jpg

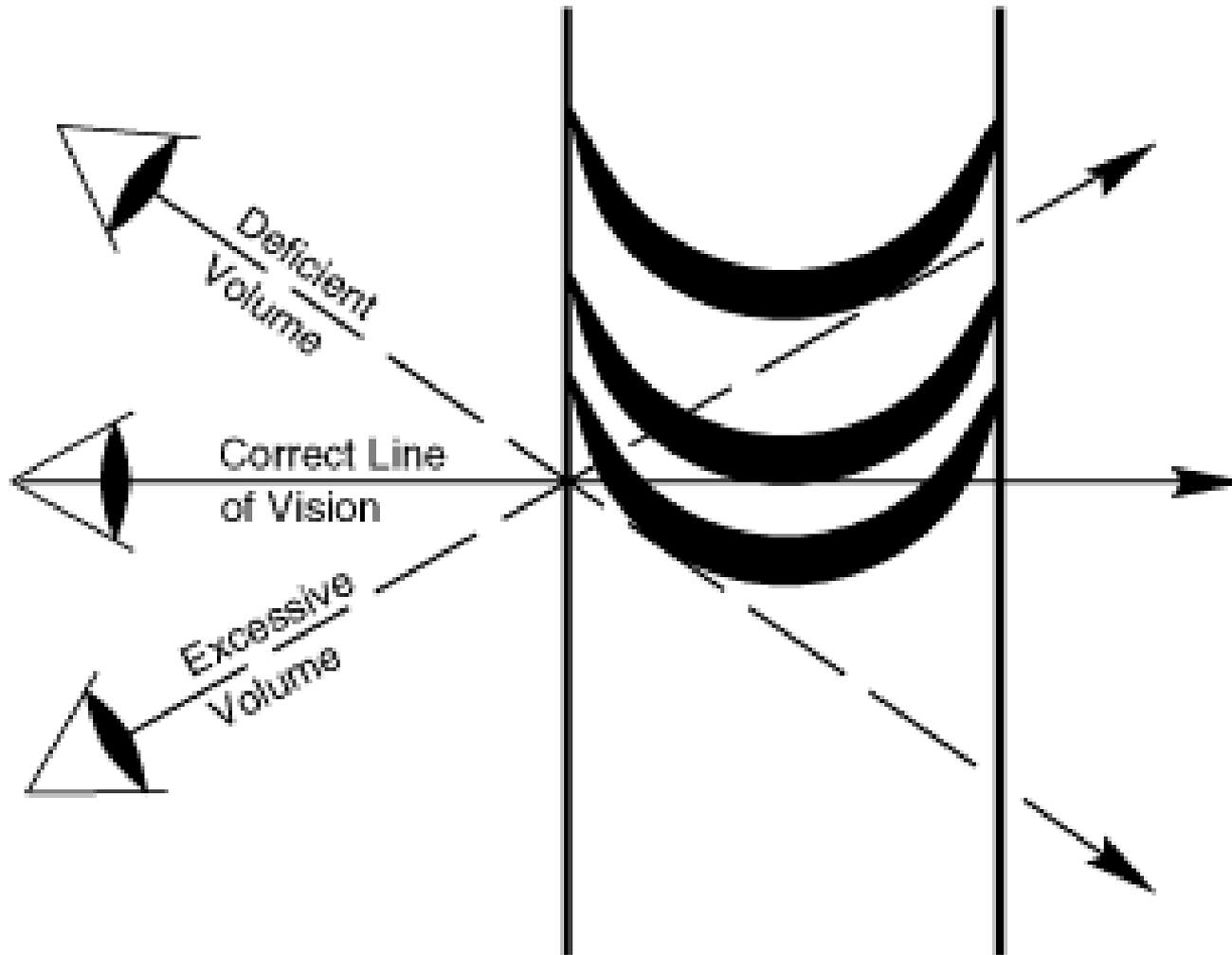
Making Solutions

Making a solution from a solute.

- Be sure all equipment is clean and dry.
- Calculate* the amount of solute for the desired volume.
- Add some solvent to a volumetric flask.
- Dissolve the solute.
- Add solvent to the mark. Read from bottom of the meniscus.

*Molarity = moles/liters

Meniscus



Volumetric Flask

From <http://sv.e-sensei.ne.jp/~ashida/school/images/volumetric-flask02copy.jpg>



Wrap-Up

1. How would you make 250mL of a 6 M NaCl solution? Describe how you would actually do this in the lab (along with your calculations)

Remember: $M = \text{moles/liters}$



Old Content Below



Do Now ...

Date: March 18, 2011

Obj: Calculate how to make dilutions from stock solutions.

Copy and Solve: $M_1V_1 = M_2V_2$

I have an initial volume of 2.0L and a molarity of 2.0 M. What will be the final molarity if I dilute (add water) to a volume of 8.0L?

Friday, March 18, 2011

Today:

W-Up, Notes & Practice: Dilutions, Quiz

Homework:

Solutions by Dilution

$$M_1V_1 = M_2V_2$$

100.0 mL of 2.500 M KBr solution is on hand. You need 0.5500 M. What is the final volume of solution which results?

$$(2.500 \text{ mol/L}) (100.0 \text{ mL}) = (0.5500 \text{ mol/L}) (x)$$

$$x = 454.5 \text{ mL}$$

Solutions by Dilution

To dilute a solution means to add more solvent without the addition of more solute.

The amount of solute stays constant.

So,

moles before dilution = moles after dilution

Solutions by Dilution

We use:

$$M_1V_1 = M_2V_2$$

$$(\text{Molarity}_1)(\text{Volume}_1) = (\text{Molarity}_2)(\text{Volume}_2)$$

Solutions by Dilution

$$M_1V_1 = M_2V_2$$

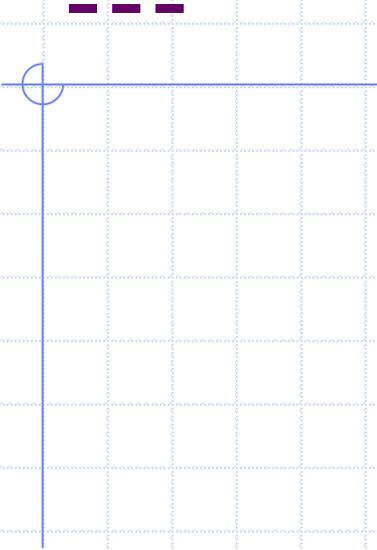
53.4 mL of a 1.50 M solution of NaCl is on hand, but you need some 0.800 M solution. How many mL of 0.800 M can you make?

$$(1.50 \text{ mol/L}) (53.4 \text{ mL}) = (0.800 \text{ mol/L}) (x)$$

$$x = 100.0 \text{ mL}$$

Solutions by Dilution

1. How would you prepare 100 mL of 0.40 M MgSO_4 from a stock solution of 2.0M MgSO_4 ?
2. You have a 2.0 M solution of NaCl. Calculate the volume you must dilute to make 2.0 L of 0.50 M NaCl solution.
3. You have a 4.0 M solution of KNO_3 . Calculate the volume you must dilute to make 50 mL of 0.2 M KNO_3 solution.



---Old Content---



Monday, March 23, 2009

Today:

W-Up, Demo: Boiling Gatorade, Notes &
Practice: Solvation (dissolving), Dilutions

Homework: Study for Quiz Wednesday

Warm-Up

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

$$\text{Mol} = \text{grams/GFM}$$

Find the molarity for:

1. 3.0 moles of NaCl in 1.5 L
2. 3.0 grams of NaCl in 1.5 L
3. Find the number of grams of NaCl in 1.8 L of a 2.0 M solution of NaCl.
4. Find the number of grams of NaCl in 1800 mL of a 2.0M solution of NaCl

Electrolytes (Video)

When dissolved in water do electrolytes conduct electricity?

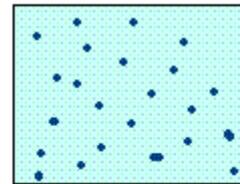
Electrolytes are substances that produce positive and negative ions when dissolved.

E.g. Na^+ is a cation
 Cl^- is an anion

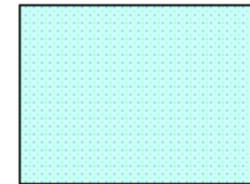


Warm-Up

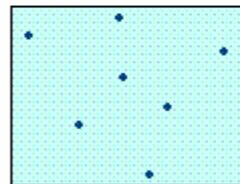
1. Which has the most particles?
2. Place in order of boiling point.
3. Place in order of freezing point.
4. How and why are #2 and #3 related?



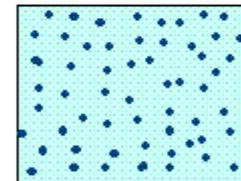
Gatorade



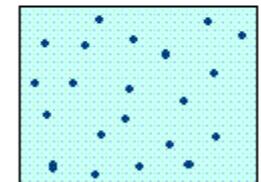
Pure Water



A



B



C

• = Particle (ion, atom, or molecule)

Warm-Up

Mr. B. is thirsty after teaching about solutions. Describe how he would make Kool-Aid using the terms (at least 5) from your notes.

Image from
www.animationarchive.org/labels/commercial.html



Lab Discussion

What are the main points we learned from the lab yesterday?

1. The more particles (ions, atoms, ...) the _____
- 2.
- 3.
- 4.
- 5.

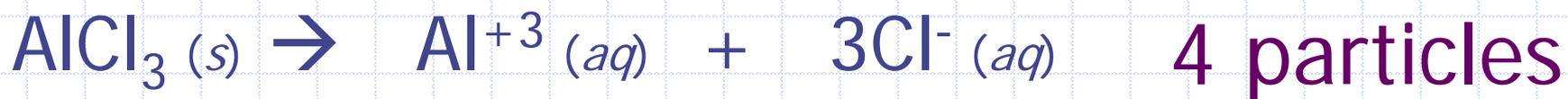
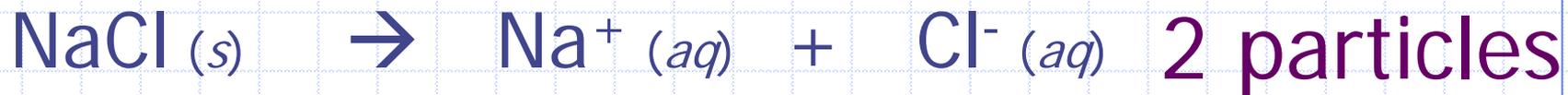
Colligative Properties

Properties that depend only on the number of particles in solution.

For example:

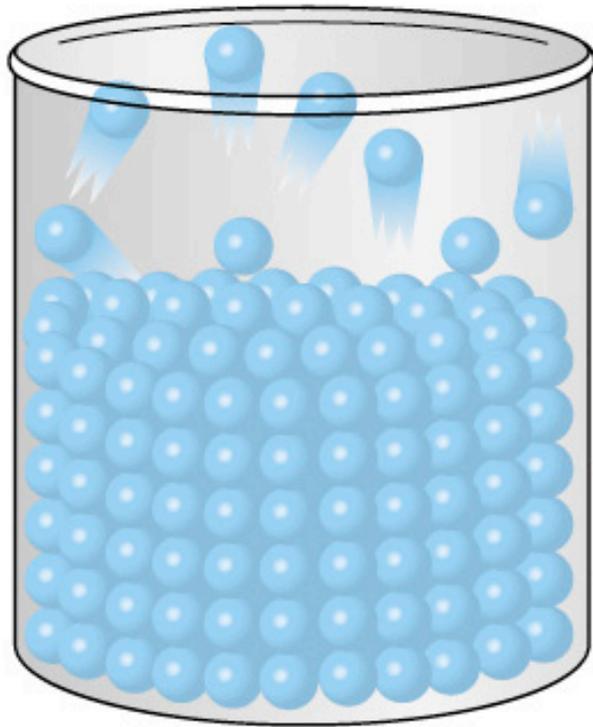
- Freezing Point
- Boiling Point

Colligative Properties & Ions

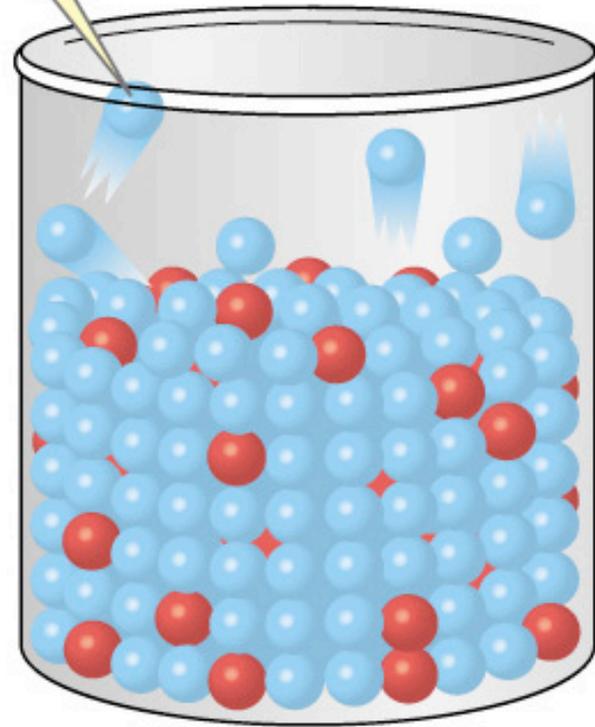


More particles \rightarrow higher boiling point,
lower freezing point

Fewer solvent molecules
leave surface, lowering
vapor pressure



● Pure solvent

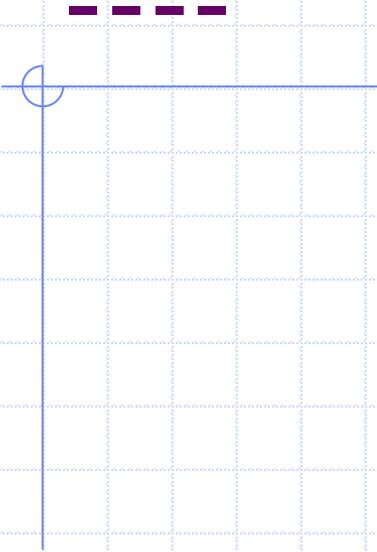


● Solvent with
nonvolatile solute

Colligative Properties

Why does the number of particles dissolved in the solution elevate (raise) the boiling point and depress (lower) the freezing point?





Warm-Up: Solvation (dissolving)

Describe all of the ways you could make salt dissolve faster in water.

How and why does each of these ways help salt dissolve faster?

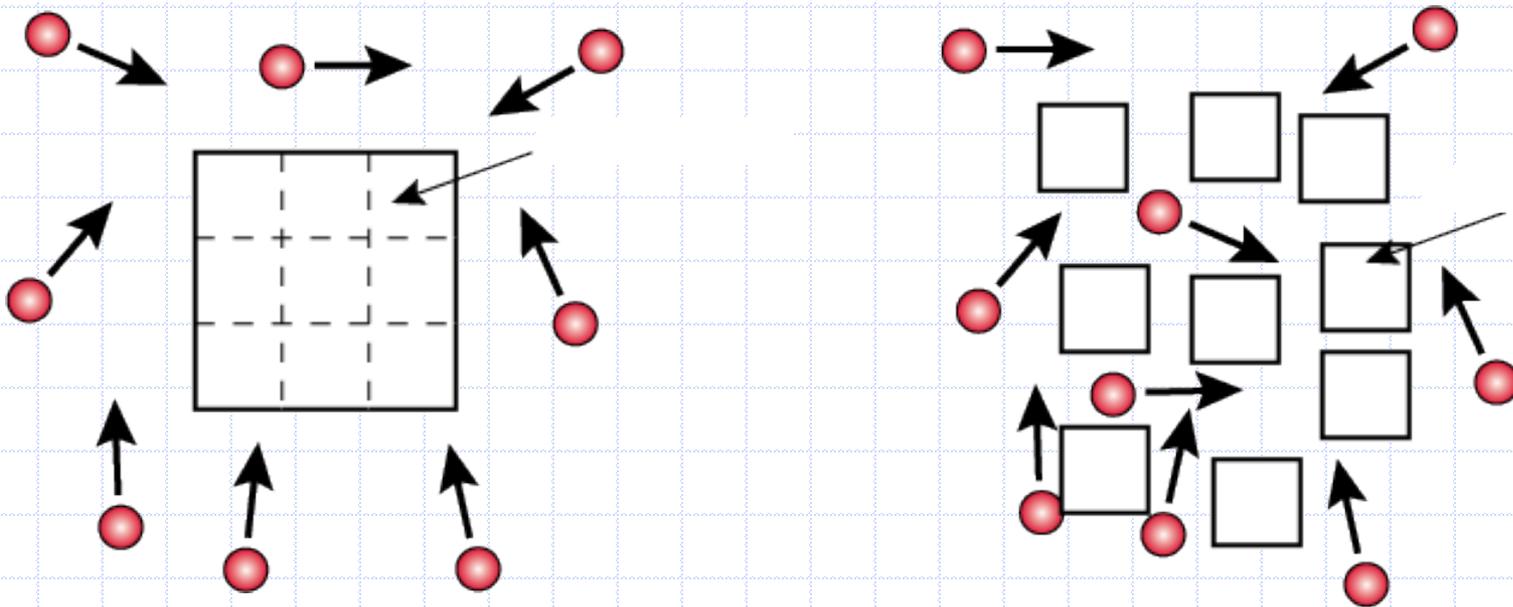
Solvation (Dissolving)

Factors that increase the rate of solvation (i.e. make solutes dissolve faster):

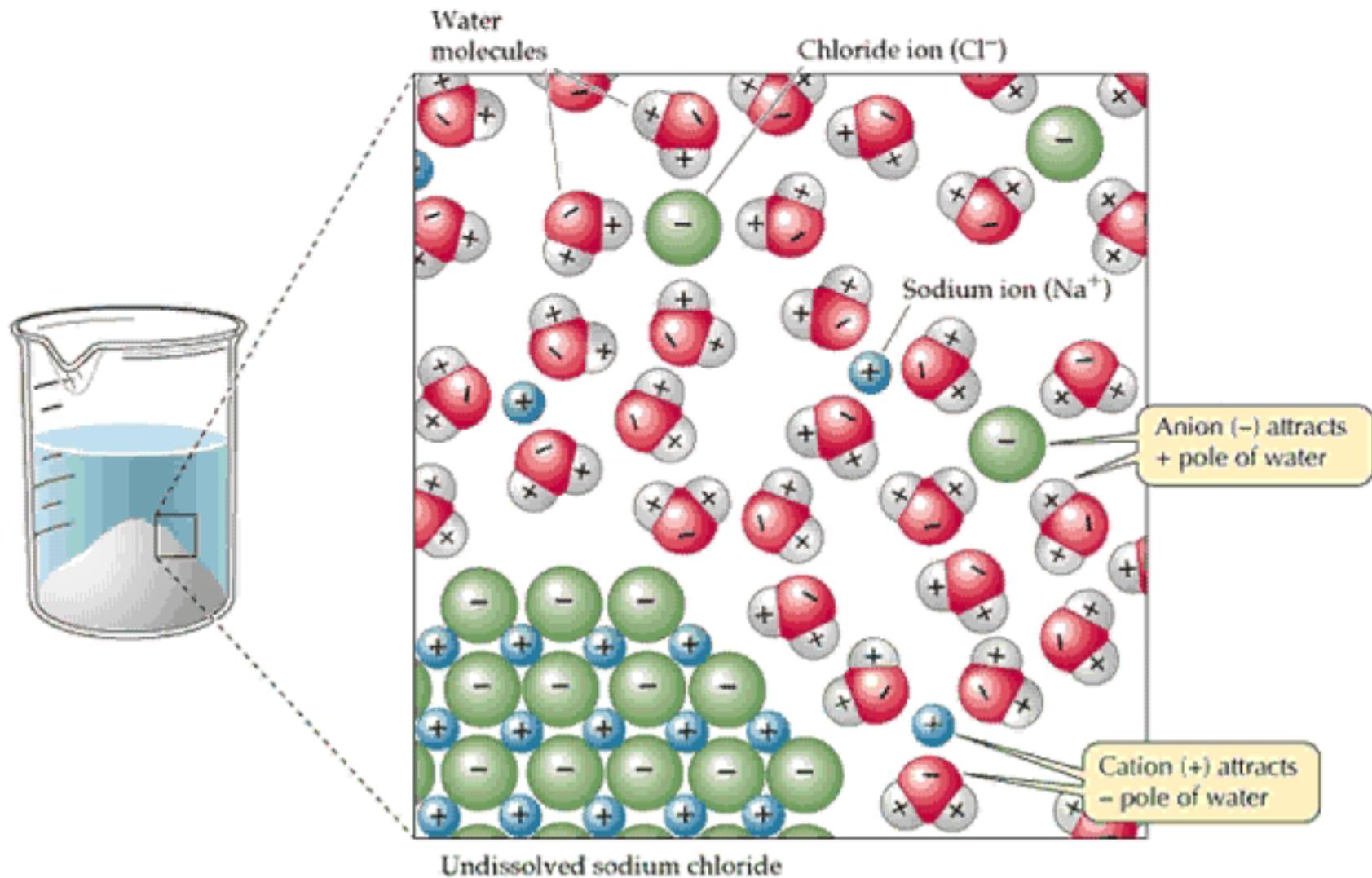
- Agitation (shake it up).
- Increase surface area (break it up).
- Increase temperature (heat it up).
- Add more solvent.

Solvation (Dissolving)

increased surface area = more contact with solvent



Solvation



Video of Solvation

[Link to Video](#)

Activity: Solvation BCR (to be collected)

Based on the video, describe why water is able to dissolve NaCl crystals. In your response include:

- The terms ion, cation, anion, solvation, aqueous, solvent, solute, solution, polarity, and ionic compound.
- Draw a diagram of how the water molecules remove a sodium cation from the NaCl.
- Explain what would happen if a nonpolar compound were added to the solution.

Practice Quiz

1. Why would NaCl (aq) be considered an electrolyte?
2. If the salt were given to you as one large crystal (with a mass of 50g), what is the best way to make it dissolve faster?
3. What part of the water molecule is attracted to the Na⁺ cation?



Warm-Up

1. How would you make 250mL of a 6 M NaCl solution? Describe how you would actually do this in the lab (along with your calculations)

Remember: $M = \text{moles/liters}$



---Coming up Next Week ----



Warm-Up

1. If I have a 3.0 M solution of HCl and want to make 250ml of a 1.0 M solution, how many mL of the 3.0 M solution do I need?
2. A chemist starts with 50.0 mL of a 0.40 M NaCl solution and dilutes it to 1000. mL. What is the concentration of NaCl in the new solution?

Warm-Up

a. Define colloid.

b. Molarity = _____ divided by _____

c. Define surface tension.

Video

[Short Clip on Dilutions](#)