

Solutions Lab name: \_\_\_\_\_ (40/1200)

This lab will give us varied practice making and understanding solutions. You must do Part 1 FIRST, because it has to cool as long as possible before completion.

This is a GOGGLES ON lab. **This will take at least 65 minutes.**

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### Part 1 - Supersaturated solutions. DEMONSTRATION

Strangely, some solvents can "hold" more solute than is theoretically possible at a colder temperature. These solutions are said to be super-saturated. The solutions can collapse back into a solid if mishandled. Table sugar can become supersaturated in water, and that's how rock candy is made.

Add 1.0 mL deionized water to 19.0 grams  $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$  crystals. Warm with Bunsen burner. Watch how the solid turns to aqueous solution. Cool in rack.

Later, place a single crystal of \_\_\_\_\_  
(NAME THE COMPOUND) into the solution and observe.

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### PART 2 - Making solutions of specific Molarities (0.75M, 0.25M, & 0.10 M)

Secure a clean beaker. Get 3 clean, small test tubes.

We'll use  $\text{CuCl}_2$  which has a stock name of: \_\_\_\_\_.

1. Using the MOLARITY FORMULA, determine how many grams of  $\text{CuCl}_{2(s)}$  are needed to create 43.0 mL of a 0.75 M solution of copper chloride. Show your work to teacher before making this solution. Mix ingredients in the beaker, stir.

Put about 1 inch of this solution into a small test tube.

2. Using the stock solution you just created, determine how to prepare 18.0 mL of 0.25 M  $\text{CuCl}_{2(AQ)}$ . Make it in a beaker, put about 1 inch of this into another small test tube, put this in rack as well.
3. Using the original stock solution again, determine how to prepare 17.0 mL of 0.10 M  $\text{CuCl}_{2(AQ)}$  solution. Put one inch of this third solution into a third test tube, and put it in the rack. Observe the similarities & differences between these three solutions. Draw them on page 2 of this lab report.

**Wash with plenty of water.**

PART 3 - PUTTING SOLUTIONS ALL TOGETHER (on paper, and in your head)  
 Mark each box with a yes or a no. DO THIS AT HOME.

compound	Is this an iONIC or molecular Compound?	Is this a POLAR compound? Yes or no	Is this a Non-Polar compound? Yes or no	Will this dissolve into water? Yes or no	Will this Ionize in water? Yes or no	Will it be an electrolyte in solution?
CaCl <sub>2</sub>						
CH <sub>3</sub> Br						
CCl <sub>4</sub>						
CH <sub>3</sub> OH						
Mg(NO <sub>3</sub> ) <sub>2</sub>						
CHCl <sub>3</sub>						
NH <sub>3</sub>						*

PART 4 Problems - on loose leaf paper, which of course is CHEAP! **[DO THIS LAST!]**

1. How would you prepare a 250.0 mL of 1.0 M NaCl<sub>(AQ)</sub>?
2. What would a test tube of water feel like to your hand if you dissolved in some NH<sub>4</sub>Cl into it?
3. If you increase pressure on a gas, will it increase or decrease its solubility in water?
4. Most solutes (not gases) will have increased solubility in water when the temperature \_\_\_\_\_?
5. How can you increase the rate of dissolving of most solutes into solvents?
6. What happened to the SUPERSATURATED solution when I added the "seed crystal" to it?  
Mention something about the formation of ionic bonds and temperature change.
7. If a bear in Alaska and a bear in Yosemite fall into the water at the same time, which bear would dissolve faster? (hint: like dissolves like!)

PART 2 CONTINUED

Use colored pencils to show the relative colors of the three tubes of copper chloride solutions as labeled.

0.75 M



0.25 M



0.10 M



This lab requires	this material for	this point spread
Cover page	Excellent title, and a single sentence lab objective.	1 + 1 = 2
Lab Handout	Questions, boxes filled in, drawing above, etc.	16
Conclusion	Write an essay about Water & Solutions including: table G, Table F, aqueous, like dissolves like, polar & non-polar solvents, solutes, Molarity, PPM, % composition by mass, concentrated vs. dilute, diluting concentrated solutions into weaker ones, gas solubility in liquids, rates of dissolving solutes into solvents, saturation level, unsaturated and supersaturated, heats of solution (table I), homogeneous vs. heterogeneous solutions, miscible vs. immiscible, solutions, etc.	7 This is a big part of this lab report.
Lab due on: _____		25 points