

Solutions Lab

name: _____

(40/1200)

This lab will give us varied practice making and understanding solutions.

PART 1 - Making solutions of specific Molarities (0.75M, 0.25M, & 0.10 M), one from scratch, two from dilution.

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

We'll be using 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 make 40.0 mL of a 0.75 M solution of copper chloride. Show your work to teacher before making this solution. Mix ingredients in a graduated cylinder, shake carefully. Put a sample into one of the small test tubes for later.
2. Using the solution you just made as your stock solution, determine how to prepare 20.0 mL of 0.35 M $\text{CuCl}_{2(AQ)}$. Pour enough stock into a small beaker, then pour this stock into a small beaker with sufficient deionized water to get to the 20.0 mL mark. Put a sample into one of the empty small test tubes for later.
3. Using the left over diluted solution, determine how to prepare 10.0 mL of 0.25 M $\text{CuCl}_{2(AQ)}$ solution. Put enough of the stock solution into a small beaker, add sufficient water to get 10.0 mL, swirl together. Put a sample of this third solution into the last empty small test tube, again saving for later.
4. At this point, saving your three small test tubes of solution, clean out all of the glass and put upside down to drain. Please call over your teacher to discuss with him which of these solutions is which, which is most concentrated, which is least, which is a good electrolyte, which is even better (and why this is). Can you make the weakest solution weaker? How? Can you make it accurately stronger? Really?
5. Draw how you prepared each of your solutions below

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PART 3 - PUTTING SOLUTIONS ALL TOGETHER. Mark each box with an I or M, a P or NP, or a yes or a no.

Work top to bottom. NOTE: all ionic compounds must be polar, as they have positive and negative sides.

compound	Is this an IONIC or MOLECULAR compound?	Is this a POLAR or NONPOLAR compound?	Will this dissolve into water? Yes or no	Will this Ionize in water? Yes or no	Will it be an electrolyte in aqueous solution?
CaCl_2					
CH_3Br					
CCl_4					
CH_3OH					
$\text{Al}(\text{NO}_3)_3$					
CHCl_3					
N_2					
CH_4					
BaSO_4					
NaCl					
PbBr_2					

PART 2 Problems - on loose leaf paper, which of course is CHEAP!

Please write complete sentences, neatly as you can. Space is great.

1. To make a solution from scratch, what formula must you start with?
2. If you have a stock solution on hand and need to make a weaker solution from it, what formula do you use?
3. How would you prepare 346.0 mL of 2.18 M NaCl_(AQ)? (a diagram in your answer please)
4. CO₂ is a nonpolar molecule. If you try to blow bubbles into water (or chocolate milk) you can't carbonate it. Explain in one sentence how Wegmans gets the carbonation into my seltzer?
5. In one more sentence explain why it is nearly impossible NOT TO BURP if you chug a cold soda pop.
6. What 3 ways can you increase the rate of dissolving of most solutes into solvents?
7. What would a test tube of water feel like to your hand if you dissolved in some NH₄Cl into it? If you don't know, say I don't know. (in fact, say I don't know over and over again until you figure it out) (DO NOT GUESS)
8. If a bear in northern Alaska and a bear in northern New York fall into rivers at the same time, which of these two bears would dissolve faster, and why?
9. On the large set of boxes on the previous page, only 3 of those compounds are electrolytes. Assuming they all would form 1.0 M solutions of 1.0 Liter, of the three, which is the best electrolyte, which is the worst?
10. Does pressure affect the solubility of something like carbon dioxide in water? Does it affect NaCl_(S) in water?

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	<p>Write an essay about <u>Water & Solutions</u>. Explain: table G, Table F, like dissolves like. Show how to make a solution from scratch, and from another stock solution. Draw a picture to show what you know.</p> <p>Define: solutes, solvents, aqueous, Molarity, PPM, % composition by mass, concentrated vs. dilute, saturation level, unsaturated and supersaturated, heats of solution (table I), homogeneous vs. heterogeneous solutions, miscible vs. immiscible, solutions, etc.</p> <p>Draw a graph (~ 2 inches tall) showing the solubility of CO₂ gas dissolved in water as a function of temperature in °C.</p> <p>What speeds up the rates of dissolving solutes into solvents?</p>	<p>7</p> <p>This is a big part of this lab report.</p>
Lab due on: _____		25 points