

Solutions Activity

I. **Do Now:** Observe the three graduated cylinders on the front lab bench. Answer the following questions:

1. What do the following graduated cylinders have in common?



2. What is different about the three graduated cylinders?

3. How would you describe these graduated cylinders to someone who could not see them?

4. Is there a way to describe your observations at the molecular level? Draw what you think this would look like at the molecular level.

II. **Introduction:** During the class discussion answer the following questions.

1. Solution: _____

2. Concentration: _____

Name: _____ Per _____

3. Molarity: _____

4. Calculating Molarity:

5. Calculate molarity for graduated cylinders 2 and 3:

Name: _____ Per _____

Determining an Unknown Concentration Activity

Directions: As a group you will work together to complete the following tasks. Each group member will have a designated role during each task. This is to ensure that every member in the group actively participates. You will be scored as an entire group. For each part of this activity you must rotate roles so that each person has the chance to participate in a different role for each task. Below is a description of the roles:

- **Facilitator:** Guides the group in the process. Makes sure everyone is participating.
- **Scribe:** Takes the official notes.
- **Experimenter:** Does any actions that are required by the procedure.
- **Presenter:** Will answer questions of the group, and present information to the teacher when asked.

Part 1: Making Salt Water Solution

Facilitator: _____

Scribe: _____

Experimenter: _____

Presenter: _____

1. In your group make a salt water solution. Decide how much salt you will dissolve into 200 mL of water. You can use up to 2.00 g of NaCl.
2. Weigh this amount of salt and add to 200 mL of DI water. Add the salt and water to the beaker labeled with your group number. Record this information in the results table below.
3. Stir your solution until all of the salt is completely dissolved.
4. Calculate the molarity of your salt solution. Record this in the table below.

Part 2: Determining the concentration of an unknown solutions.

Facilitator: _____

Scribe: _____

Experimenter: _____

Presenter: _____

5. Pass your solution to the group clockwise from you. For example, group 1 will pass to group 2, and group 8 will pass to group 1.
6. As a group you will design a procedure to determine the concentration of the unknown solution that you received from another group. The following questions may help you when designing your procedure.
 - a. What glassware will you use?
 - b. How will you know you have determined the correct molarity?
 - c. Is your procedure the most efficient? Could you use another technique instead?
 - d. What are potential sources of error, that could prohibit you from determining molarity?
7. Write your procedure in the space provided below.
8. Have your instructor approve your procedure before experimenting.

Name: _____ Per _____

Procedure:

Instructor Signature (*must have before starting experiment*): _____

Part 3: The Experiment

Facilitator: _____ Scribe: _____

Experimenter: _____ Presenter: _____

9. Run your experiment by following the procedure that you wrote. If you have to do something else when running your experiment make sure to include this in your procedure.
10. Calculate the molarity of the unknown salt solution from another group and record this in the table below.

Part 4: Calculations

Facilitator: _____ Scribe: _____

Experimenter: _____ Presenter: _____

11. *AFTER* you have calculated the molarity of the unknown salt solution, ask the group what their actual molarity was and record this in the results table below.
12. Calculate percent error.
13. List possible sources of error.
14. Write a conclusion about your results and findings.

Name: _____ Per _____

Results Table:

Amount of NaCl added to 200 mL of water (record the actual amount that you weighed)	
Molarity of your Salt Solution:	
Group # for unknown salt solution	
Molarity of Unknown salt solution	
Actual Molarity of unknown salt solution	
Percent error	
Possible sources of error	

Conclusion: Describe your findings in this experiment. Were you successful? Use claim based evidence writing.

(Use the back of the paper if needed).

Name: _____ Per _____

Connections: Read the Article, “*How tap water became toxic in Flint, Michigan.*” Then answer the following questions on a separate sheet of paper.

1. What two elements are present in the water supply in Flint, Michigan which are causing the water to turn brown?
2. What caused this problem?
3. What were some of the symptoms that people saw as a result of drinking/being exposed to the water?
4. How do you think the researches from Virginia Tech tested for the levels of lead in the drinking water?
5. Would they need to test the entire water supply, or would a sample be able to tell the water quality? What does this tell you about a solution? What does this tell you about the intrinsic properties of solutions?
6. Why is doing this type of research important?