<table>
<thead>
<tr>
<th>Name:</th>
<th>Sodium Chloride</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molar Mass:</td>
<td>58.44 g/mol</td>
</tr>
<tr>
<td>Hazard Pictograms</td>
<td></td>
</tr>
<tr>
<td>NFPA Diamond</td>
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<table>
<thead>
<tr>
<th>First Aid Measures for</th>
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<tbody>
<tr>
<td><strong>Inhalation</strong></td>
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<tr>
<td><strong>Skin contact</strong></td>
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<tr>
<td><strong>Eye contact</strong></td>
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<tr>
<td><strong>Ingestion</strong></td>
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II. Procedure – Preparation of the three saline solutions  (Please work independently. No pairs.)

A. Creation and Measurement of the First Solution with Known Concentration

1. **TARE AN ANALYTICAL BALANCE WITH A WEIGHT BOAT ON THE BALANCE.** Place a plastic weighing boat on an analytical balance and press the reset bar. When you remove the weigh boat, the balance will register a negative value of mass. This just means that the balance reads zero with the weigh boat on it.

2. Use the scoopula to put 8.0-8.5 g NaCl in the boat. The exact amount is not important; recording the exact weight is.

3. **RECORD THE MASS** of the salt.

4. **CONDITION** a 100.00 mL volumetric flask with DI.

5. **QUANTITATIVELY TRANSFER** the NaCl to the 100 mL volumetric flask. Carefully pour the NaCl into the flask (use a funnel to minimize spills). "Quantitatively" means get 100% of the material. You might use the spatula / scoopula in your locker to get as much as possible. If you put too much in the funnel at one time, it will clog. Use water to dissolve the salt and clear the clog.

6. Pour approximately 50 mL of DI water through the funnel to ensure that all of the salt goes from the funnel into the flask.

7. Put the cap or stopper on the flask and swirl the solution until the crystals disappear. (Swirl the solution gently so that you do not splash any solution above the mark on the stem.)

8. Add more DI water through the funnel until the level of the solution is one inch below the mark on the stem. Use a dropper to raise the level to the mark. If you go past the mark, you will need to properly dispose of the solution and start over.

9. **MIX** the salt solution in the flask by inverting the flask repeatedly for at least two minutes.
10. If possible, obtain a clean, dry 125 mL Erlenmeyer flask. (Dry overnight in your lab drawer, or in the oven.). If this is unavailable, then properly CONDITION an Erlenmeyer flask using the solution from the volumetric flask.

11. **TRANSFER WITHOUT DILUTION** the salt solution to the 125 mL Erlenmeyer flask. If the flask is clean and dry, then you can pour the solution in straight away. If the flask is wet, then properly CONDITION the Erlenmeyer flask using the solution from the volumetric flask. Seal the flask with a rubber stopper to prevent evaporation.

12. **CONDITION** the 100.00 mL volumetric flask with DI water. Return the flask to the shelf.

13. Rinse a 20.00 mL pipet with DI water. **CONDITION** the inside of the pipet **WITH THE SOLUTION TO BE MEASURED** (the salt solution).

14. **DETERMINE THE DENSITY OF THE SOLUTION** for the first time:

   a. **RECORD THE MASS** of a 50 mL Erlenmeyer flask with a rubber stopper in the top.

   b. **DELIVER 20.00 ML** of the salt solution **USING THE PIPET** from the 125 mL Erlenmeyer flask to the 50 mL Erlenmeyer flask. Put the stopper in the 50 mL flask.

   c. **RECORD THE MASS** of the 50 mL Erlenmeyer flask, stopper and solution, and determine the net weight of the solution. Review this weight with your instructor. (20.00 mL of an aqueous solution cannot weigh less than 20.00 grams)

   d. Calculate the density of the solution. (Be sure to label all of your calculations!).

   e. Pour the contents of the weighed 50 mL Erlenmeyer flask down the sink.

15. **DETERMINE THE DENSITY OF THE SAME SOLUTION** for the second time.

16. Calculate the percent composition of the solution for each of the two samples.

   \[ \text{\% comp.} = \frac{\text{wt of sample NaCl}}{\text{wt of sample solution}} \times 100 \]

17. Calculate the average of the two approved values for density and percent composition.

18. Calculate the molarity of your solution. There is only one molarity calculation.

   \[ M = \text{mol solute} / L \text{ solution} \]

19. Review your density, percent composition, and molarity values with your instructor. Do not discard the solution in your 125 mL Erlenmeyer flask until these values have been approved.

B. Creation and Measurement of the Second Solution with Known Concentration

   Repeat Steps 1-19, using 4.0-4.5 g NaCl.

C. Creation and Measurement of the Third Solution with Known Concentration

   Repeat Steps 1-19, using 2.0-2.5 g NaCl.

D. Analysis of a saline solution of unknown composition

   This step may be done before or after generating your graphs (ask your instructor).

   1. Bring your notebook, graph, and a clean, dry 100-200 mL stoppered flask to your instructor; they
will direct you to take about 60 mL of a saline solution of unknown concentration. After you have received your unknown solution, record its number in your notebook.

2. **DETERMINE THE DENSITY OF THE** unknown **SOLUTION** with two separate samples of the unknown solution.

3. Calculate the average of the two approved values for density.

4. Review the two density values with your instructor.

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