I. PURPOSE
To examine the effect of temperature on the solubility of KCl in an aqueous solution.

II. MATERIALS
1. evaporating dish 5. cotton 9. iron ring
2. test tube 6. 400mL beaker 10. wire gauze
3. stirring rod 7. Bunsen burner 11. utility clamp
4. funnel 8. ring stand 12. thermometer

III. PROCEDURES
1. Your instructor will assign your group a target temperature for this lab.
2. Record the mass of a clean, dry evaporating dish and watch glass together and set aside for later use. Place the watch glass under the evaporating dish while weighing.
3. If assigned a temperature above room temperature, fill a 400 mL beaker with about 300 mL of tap water and place it on the wire gauze on ring stand. Otherwise, leave the water bath on the table.
4. Place 15.0 mL of distilled water in a test tube and place the test tube in the water bath. See figure at right for assigned temperatures above room temperature.
5. Start heating or cooling your water bath to the assigned temperature. Add KCl to the test tube and mix with the stirring rod. At all times keep about 1cm of KCl in the bottom of the test tube.
6. Maintain your assigned temperature for 10 minutes and stir to ensure saturation.
7. Set up the funnel with a cotton wad and an evaporating dish below the funnel.
8. Record the temperature of the solution inside the test tube and quickly decant off one-half of the liquid only onto the cotton wad in the funnel.
9. Record the mass of the evaporating dish, watch glass and filtrate (solution).
10. Place the watch glass concave side up on the evaporating dish and place assembly on wire gauze on ring stand.
11. Heat until all of the water has evaporated. Heat fast to start then reduce heat to avoid spattering.
12. Let the assembly cool and record its mass.

IV. PRE-LAB QUESTIONS
1. How will the solubility of KCl vary with temperature?
2. Why must there always be 1 cm of KCl in the bottom of the test tube throughout the lab?
3. What purpose does the cotton ball serve in Step 8?
4. Why would it be desirable to reheat and reweigh the assembly in Step 14?

V. DATA & CALCULATIONS
A. DATA

<table>
<thead>
<tr>
<th>Actual Temperature (°C)</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Mass (g)</th>
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</thead>
<tbody>
<tr>
<td>Evaporating Dish &amp; Watch Glass</td>
<td></td>
</tr>
<tr>
<td>Evaporating Dish, Watch Glass &amp; Filtrate</td>
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</tr>
<tr>
<td>Evaporating Dish, Watch Glass &amp; Crystals</td>
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B. CALCULATIONS
1. Calculate the mass of dry KCl.
2. Calculate the mass of water in the evaporating dish.
3. Using the answers from calculations 1 and 2, determine how many grams of KCl will dissolve in 100 grams of water. Report this value and your assigned temperature to the instructor.

\[
\frac{\text{mass of KCl}}{\text{mass of water}} = \frac{x}{100 \text{ g water}}
\]
4. Create a table showing the class data. This table should appear above the data plot.
5. Construct a graph of the class data by plotting the solubility on the vertical axis and the temperature on the horizontal axis.

VI. QUESTIONS & DISCUSSION OF ERROR
A. QUESTIONS
1. Would most salts' solubilities increase with temperature? Explain.
2. From your graph, predict the solubility of KCl at 17 °C, 28 °C, 72 °C, and 109 °C. Explain your answer for 109 °C.
3. Using a reference, find the accepted value for the solubility for KCl in water at 20 °C.
4. Calculate your percent error using the value from #3 and your graph.

B. DISCUSSION OF ERROR

VII. CONCLUSION