Name: ______________________

**Indicators of Acids and Bases**

**Objective**
In this lab you will identify solutions as acidic, basic, or neutral using various indicators.

**Pre-lab Questions**
1. What is an indicator?

2. What are the three indicators being used in this lab?

3. Acids will turn red litmus paper ________ and blue litmus paper ________. Bases will turn red litmus paper ________ and blue litmus paper ________.

4. What color will red cabbage juice turn in an acid? A base? A neutral substance?

5. What color will phenolphthalein turn in an acid? A base? A neutral substance?

**Safety**
- Always wear safety goggles when handling chemicals in the lab.
- Wash your hands thoroughly before leaving the lab.
- Follow your teacher’s instructions for clean-up of materials and disposal of any chemicals.
- When working with acids and bases, if any solution gets on your skin immediately rinse the area with water.

**Procedure**
1. Obtain and wear safety goggles and lab apron.
2. Label the plate below for your reference BEFORE getting the solutions!!! Using a 24-well plate, add each of eight solutions to their own unique well (you will need to add each solution to two wells (total of 16 wells) – only fill about halfway).
Part 1: Litmus Paper
3. Obtain **four** strips of each color of litmus paper, then tear them in half to make a total of eight strips. Using the blue litmus first, test each of the eight solutions by quickly dipping the litmus paper into one well. Record the color on your data table. Repeat with the red litmus paper.

Part 2: Red Cabbage Juice Indicator
4. After completing Part 1, add a couple drops of red cabbage juice indicator to **one** well for each of the eight solutions. Record the color of each solution in your data table.

Part 3: Phenolphthalein
5. After completing Part 1 and Part 2, add a couple drops of phenolphthalein to **the other** well (not the one you added red cabbage juice indicator) for each of the eight solutions. Record the color of each solution in your data table.

Part 4: Clean-Up
6. Put all litmus in the trash. Thoroughly rinse the solutions out of your 24-well plate (repeatedly rinse each well with water). It is very important that you remove **ALL** of the solutions **COMPLETELY** from the wells. Left over residue of solutions and indicators will cause incorrect data for future users. Shake the water out and dry the wells of the plate using a paper towel.
Observations

<table>
<thead>
<tr>
<th>Solution</th>
<th>Blue Litmus</th>
<th>Red Litmus</th>
<th>Red Cabbage Juice</th>
<th>Phenolphthalein</th>
<th>Acid, Base, or Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Post-lab Questions

1. Which of the solutions are acids? How do you know? Repeat for bases and neutral solutions. You must reference every indicator you used in your explanation as to why you know a solution is an acid, base, or neutral. Do not be general! Give an explanation for EACH solution #1 thru #8. Put your final answer in the last column of the data table.

Example: I know solution #2 is a(n) ____ because the red litmus turned ____ , the blue litmus turned ____ , the cabbage juice was ____ , the phenolphthalein was ____.

2. Choose two of the following substances to research. You must:
   - Write the chemical name of the substance and identify the substance as an acid or base.
   - List safety precautions associated with the substance.
   - List uses for the substance.

Options (choose 2):

- HCl
- HNO₃
- HF
- NH₃
- HC₂H₃O₂
- NaOH
- H₂SO₄
- Ca(OH)₂
- CH₅N