

Chem 3L: Identifying Unknown Aqueous Ionic Compounds

In this lab, your instructor will assign you an unknown aqueous ionic compound that could be one of the 14 substances below. *Each unknown will have a letter code for identification purposes; be sure to record the letter of your unknown in your lab notebook for reference.*

- Na_2CO_3
- NaOH
- NaCl
- NaNO_3
- Na_3PO_4
- Na_2SO_4
- AlCl_3
- NH_4Cl
- CuSO_4
- FeCl_3
- $\text{Pb}(\text{NO}_3)_2$
- KI
- AgNO_3
- CaCl_2

Your task is to perform chemical tests on your unknown in an attempt to unambiguously identify the substance. At your disposal, you will have these same 14 solutions as known compounds for testing purposes. To approach this lab systematically, use your understanding of solubility rules to reason through the possibilities.

Organize all of observations clearly in your lab notebook. **After each chemical test, describe the results in detail, followed by an analysis of those results.** Your analysis should include a list of the substances that can be eliminated as possibilities based on the observation from the test performed. If any inconsistencies are present, take note of them and consider the possibility of contamination or ambiguous observations; control experiments can be performed by using the known substances for comparison purposes. You are not limited by the number of tests you can perform, but it is best to look at the results one test at a time, and approach the identification by logically eliminating possibilities after each test.

Format for observations:

- **Test 1:** Unknown mixed with _____
 - **Observations:**
 - Substances that can be eliminated based on these observations: _____
 - Briefly explain the reasoning behind eliminating any compound as a possibility.
- **Test 2:** Unknown mixed with _____
 - **Observations:**
 - Substances that can be eliminated based on these observations: _____
 - Briefly explain the reasoning behind eliminating any compound as a possibility.

When you believe you have reached an unambiguous identification of your unknown, write your educated guess into a table in your lab notebook following the format below; you will be given three attempts to identify your unknown. Successful identification in the first attempt earns 5 out of 5 points; correct identification in the third attempt earns 4/5, and the third attempt earns 3/5.

Unknown Letter Code:		_____
1st Attempt	2 nd Attempt	3 rd Attempt