

Ionic vs. Covalent Compounds PRE-LAB

Introduction: In this lab you will be given four unknown compounds – A, B, C and D. You and your partner will perform the tests below to *each* of the unknown compounds in order to determine if they are ionic or covalent compounds. You will be completing a formal lab write-up for this lab, which will include making your own data table and determining the identity of each unknown substance. Prior to starting the tests, form a hypothesis for each compound based on first observations.

Purpose: _____

Background Information:

- What is a compound? _____

- What is an ionic compound? _____

- What are four characteristics of ionic compounds?
 - _____
 - _____
 - _____
 - _____
- List one example of an ionic compound and explain how you know it is an ionic compound. _____

- What is a covalent compound? _____

- What are four characteristics of covalent compounds?
 - _____
 - _____
 - _____
 - _____
- List one example of a covalent compound and explain how you know it is a covalent compound. _____

Hypotheses: Observe the 3 unknown substances. Write a hypothesis stating whether you think the substance will be an ionic or covalent compound and why. (Example: *I think Unknown Z will be an ionic compound because it has a crystalline solid appearance.*)

Unknown A: _____
Unknown B: _____
Unknown C: _____

Materials & Equipment: Observe the materials and equipment set up to complete this lab. Write each one down in the appropriate column below.

Materials		Equipment	
•	•	•	•
•	•	•	•
•	•	•	•
•	•	•	•

Ionic vs. Covalent Compounds Lab Procedure

You must have the pre-lab completed before moving on to the procedure. TEACHER'S INITIALS: _____

Melting Point

1. Turn your hot plate on to medium heat. (#2)
2. Obtain a piece of aluminum foil and make a foil boat with it.
3. Place one spatula full of Unknown A into the weigh boat.
4. Place the foil boat on the hot plate and observe for 1 minute, then remove. (IF THE COMPOUND STARTS TO BURN, REMOVE IT FROM THE HOT PLATE IMMEDIATELY.)
5. Record your data as the unknown having either a high or low melting point.
6. Repeat steps 1-5 with Unknown B.
7. Repeat steps 1-5 with Unknown C.
8. Throw away all the materials.

Dissolves in Water

1. Fill a test tube half-way full with water.
2. Place one spatula full of Unknown A into the test tube.
3. Invert the test tube slowly for about 30 seconds and observe.
4. Record your data as the unknown either dissolving or not dissolving.
5. Clean out your test tube with water and a test tube brush.
6. Repeat steps 1-5 with Unknown B.
7. Repeat steps 1-5 with Unknown C.

Conductivity

1. Fill a beaker half-way full with water.
2. Put two spatulas full of Unknown A into the beaker and use the glass stirring rod to stir it thoroughly.
3. Let it sit for 30 seconds, then stir it thoroughly again.
4. Dip the solution into the prongs of the conductivity tester and observe.
5. Record your data as the unknown either being a good conductor of electricity or a poor conductor of electricity. (Note: If the light bulbs lights up at all, the compound is a good conductor.)
6. Clean out your beaker with water and a test tube brush.
7. Repeat steps 1-5 with Unknown B.
8. Repeat steps 1-5 with Unknown C.

Data: Draw your data table below.

Ionic vs. Covalent Compounds Formal Lab Write-up Guidelines **Due Date:** _____

Directions: Below details the information that must be included in your formal lab write-up. The lab must be typed to receive full credit. (Get a library pass if you do not have a computer at home.) Remember to clearly label each section. (1) Also, quality writing using formal English is expected. (2) If you choose not to complete a lab write-up, you can submit your pre-lab sheet and earn up to 15 points for the lab. Please note that this is a failing grade for the assignment, but is better than submitting nothing at all. **The total value of this assignment is 50 points.**

Title Page: Include the following on your title page: lab title, your name, the class and class period, your teacher's name, the assignment due date and an appropriate picture. (2)

Purpose: Explain the purpose of this lab in 1-2 sentences. (1)

Background Information: A separate paragraph should be written for the following topic areas.

- Your first paragraph should describe what a compound is. (1)
- Your second paragraph should define an ionic compound and then describe at least four characteristics of ionic compounds. This paragraph should also give one specific example of an ionic compound with an explanation of how you know it is ionic. (4)
- Your third paragraph should define a covalent compound and then describe at least four characteristics of covalent compounds. This paragraph should also give one specific example of a covalent compound with an explanation of how you know it is covalent. (4)

Hypothesis: Create a hypothesis for *each* unknown you tested – A, B and C. State whether you think it is an ionic or covalent compound based on your first observations and provide an explanation of why you think that. (3)

Materials & Equipment: Provide 2 separate *lists* (with at least 6 items each.) (4)

Procedure: Use your teacher's procedure or write your own. If you write your own, make sure it is detailed enough that anyone could repeat the lab exactly as you did it. The procedure should be written as a series of steps. (3)

Data: Create **one** data table that clearly presents your data. Remember to give your data table a title and include proper labels for each section. Your data table should not be hand drawn. (5)

Conclusion: Using complete sentences, write one separate paragraph for EACH of the topics below.

- Your first paragraph is about Unknown Compound A. (5)
 - Restate your hypothesis for Unknown A. Does your data support or reject your hypothesis? Explain.
 - State whether you believe unknown compound A is ionic or covalent. *Using specific data from your lab*, explain why you believe this to be true.
 - Guess the identity of the substance based on your data. Then, use your background knowledge or the internet to find the chemical formula for the substance.
- Your second paragraph is about Unknown Compound B. Include the same information as was requested for Unknown A. (5)
- Your third paragraph is about Unknown Compound C. Include the same information as was requested for Unknown A and B. (5)
- In your fourth paragraph, describe 2 possible sources of error and how they may have impacted your results. (2)
- In your fifth paragraph, describe a follow-up investigation you could perform to further support your findings. Explain the purpose of this follow-up investigation. (2) (NOTE: Saying "repeat the same experiment" or "follow the procedure better" are not follow-up investigations.)
- In your sixth paragraph, describe at least 2 things you learned during this lab. (1)