Chemistry **Chemical Names and Formulas** **Name:**
Peterson **Anions and Cations Lab** **Period:**

Background: The solutions used in this experiment are ionic compounds that have been dissolved into water. This physical change (dissolution) allows the ions that make up the ionic compounds to move freely around in the solution.

$$Cr(NO_3)_3 \rightarrow Cr^{3+} + NO_3^-$$

You will be combining anion solutions with cation solutions to determine whether a reaction occurs by looking for evidence of a **precipitate**. A precipitate is a solid substance that forms when a cation and an anion chemically combine (lock on to each other) and settle out from the solution. Some ions never form solid precipitates and are always unchanged in the reaction. These ions are called spectator ions. Examples include Sodium (Na^+) and Nitrate (NO_3^-).

precipitate name

Evidence: *white cloudiness/precipitate*

Reaction: Sodium sulfate + Barium nitrate → Sodium nitrate + **Barium sulfate**

$Na^+ + SO_4^{2-} + Ba^{2+} + NO_3^- \rightarrow Na^+ + NO_3^- +$ **$BaSO_4$**

precipitate formula

Evidence: *No cloudiness seen*

No Reaction: Sodium chloride + Potassium nitrate → No Reaction

$Na^+ + Cl^- + K^+ + NO_3^- \rightarrow$ No Reaction

Materials:

- **Soluble Metallic Cations (combined with Nitrate):**
  Write the formula for the ionic compound on the line!

1. Chromium (III) Nitrate _____
2. Copper (II) Nitrate _____
3. Cobalt (II) Nitrate _____
4. Iron (III) Nitrate _____
5. Lead (II) Nitrate _____
6. Silver (I) Nitrate _____

- **Soluble Nonmetallic Anions (combined with Sodium)**
  Write the formula for the ionic compound on the line!

A. Sodium Hydrogen Carbonate _____
B. Sodium Chloride _____
C. Sodium Hydroxide _____
D. Sodium Iodide _____
E. Sodium Phosphate _____
F. Sodium Sulfate _____

Cautions:

1. Contamination of our water supply must be avoided.
   The compounds used in this experiment are soluble. Many of the reaction products are also soluble. This can lead to contamination of our water supply if these chemicals are washed down the drain. Using a paper towel, please WIPE off the chemicals from the acetate sheet and place the paper towel in the specially marked container.

2. Cross-contamination of chemicals must be avoided.
   a. Work with only one open container (dropper bottle) at a time, carefully replacing the screw cap after use.
   b. Do not allow the dropper bottle tip to touch the first drop of chemical already placed on the acetate sheet. Drop the new chemical onto the sheet from a height of approximately ½ to 1 inches.

3. Silver nitrate solution.
   Silver nitrate will permanently stain any clothing or skin that comes into contact with it. The stain will only be noticeable after exposure to ultraviolet light.

Procedure:

1. Place a clean acetate sheet over the grid sheet at your lab table. Using a grease pencil, draw the grid **on the acetate sheet** (not the plastic covered grid sheet).

2. Find **solution 1** - Chromium (III) Nitrate. On the marked acetate sheet, place one drop of the solution in each of the six squares **in column 1**. Continue this procedure with solutions 2 – 6.

3. Find **solution A** - Sodium Hydrogen Carbonate. From a height of at least one inch, release one drop of the solution onto the existing drops in each of the six squares in **row A**. It is important that the second drop DOES NOT TOUCH the first drop to prevent cross-contamination of the dropper. Continue this procedure with solutions B – F.

4. Record the color in the data table below. Ex: light blue, light pink, orange-yellow, grayish white.

5. If a **solid precipitate** forms a REACTION has occurred, record the **chemical formula and the chemical name** of the new compound that is formed.

6. If no solid precipate forms, write "NO REACTION" on your data sheet.

   Do not write a chemical formula or the chemical name because a reaction has not occurred!

7. When finished, **wipe** the acetate sheet with a dry paper towel then wipe the sheet with a damp paper towel. Throw the paper towels in the designated waste containers ONLY.

If you are not part of the SOLUTION,

then you are part of the PRECIPITATE .

---and will have to settle for what you get!

Data Table (Anions and Cations Lab):

Reaction #	Color	Precipitate (Yes or No)	Precipitate Formula ONLY	Precipitate Name ONLY
1 (1A)				
2 (2A)				
3 (3A)				
4 (4A)				
5 (5A)				
6 (6A)				
7 (1B)				
8 (2B)				
9 (3B)				
10 (4B)				
11 (5B)				
12 (6B)				
13 (1C)				
14 (2C)				
15 (3C)				
16 (4C)				
17 (5C)				
18 (6C)				

Data Table (Anions and Cations Lab):

Reaction #	Color	Precipitate (Yes or No)	Precipitate Formula ONLY	Precipitate Name ONLY
19 (1D)				
20 (2D)				
21 (3D)				
22 (4D)				
23 (5D)				
24 (6D)				
25 (1E)				
26 (2E)				
27 (3E)				
28 (4E)				
29 (5E)				
30 (6E)				
31 (1F)				
32 (2F)				
33 (3F)				
34 (4F)				
35 (5F)				
36 (6F)				