Name _____ Date _____ Period _____

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Net Ionic Equations Lab

Chemistry

Wear goggles the whole time. Record what you see at each station in the data table on page 3.

Overview

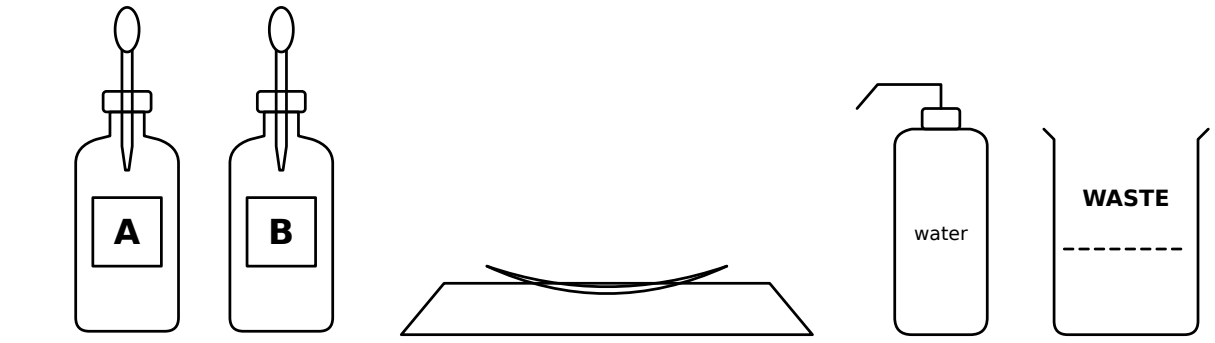
When two solutions of ionic compounds mix, the ions can trade partners. If one of the new combinations does not dissolve in water, it forms a solid called a **precipitate**. A metal can also replace a less active metal ion in a solution, or replace the hydrogen in an acid and make a gas. In this lab you will mix small amounts of solutions on a watch glass, watch for evidence of a reaction, and record what you see. Later you will use your observations to write net ionic equations.

Evidence that a reaction happened. Look for any of these:

- ☐ A precipitate (cloudy, milky, or solid bits)
- ☐ A color change
- ☐ Gas bubbles
- ☐ A solid metal that changes or grows a coating

If nothing changes, the ions stayed dissolved. Write **"no visible change"**. That is still a useful observation.

Station Setup



Solutions, each with its own pipette | Watch glass on a sheet of paper | Wash bottle | Waste beaker

Each station has a watch glass, labeled solutions with their own pipettes, a wash bottle, and a waste beaker.

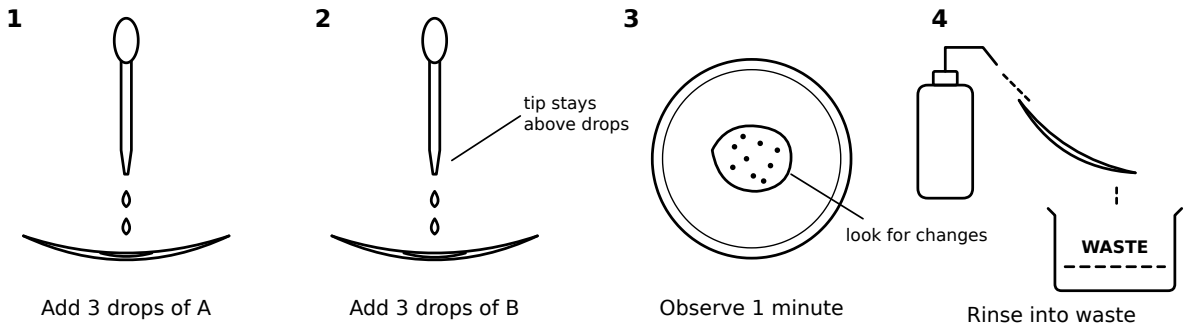
Seeing white solids: Some precipitates are white. They are easy to miss on white paper. If you think you see a white or cloudy solid, slide a dark sheet of paper under the watch glass to check.

General Safety

- Wear chemical splash goggles and gloves the whole time, including cleanup.
- Nothing goes down the sink. All liquids and solids go in the waste beaker. Several of these chemicals contain metals that harm water systems.
- Never put extra solution back in a bottle. Never switch pipettes between bottles.
- If a chemical touches your skin, rinse it with water right away and tell your teacher. If anything gets in your eyes, use the eyewash for 15 minutes. Report every spill, even a small one.
- No food or drink in the lab. Wash your hands with soap before you leave.

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Procedure



1. Set a clean, dry watch glass on a sheet of white paper.
2. Find the next reaction in your data table. Use the pipette that goes with the first solution to add **3 drops** to the center of the watch glass.
3. Use the pipette that goes with the second solution to add **3 drops** right on top of the first drops. Keep the pipette tip above the liquid. Never let a tip touch the drops or another solution.
4. Watch for **1 minute**. Record the color, cloudiness, and anything that forms. Be specific: "bright yellow cloudy solid," not "it changed."
5. **Metal stations (5 and 7):** Place one small piece of metal in the watch glass. Add enough solution to cover it, about 5 to 8 drops. Zinc reacts slowly, so check the surface of the zinc every minute for **5 minutes**. Magnesium reacts right away, so watch it for **1 minute**. Do not touch the watch glass at station 7. It may get warm.
6. Hold the watch glass over the waste beaker. Use the wash bottle to rinse everything, including any metal, into the waste beaker. Dry the watch glass with a paper towel.
7. Put each pipette back with its own solution. Move to the next station when your teacher tells you.

Chemical Hazards

Chemical	Main hazards	Handle it safely
Sodium chloride, NaCl (1 M)	Low hazard. May irritate eyes.	Keep away from eyes.
Copper (II) sulfate, $CuSO_4$ (0.1 M)	Harmful if swallowed. Irritates skin and eyes. Toxic to aquatic life.	Avoid skin contact.
Lead (II) nitrate, $Pb(NO_3)_2$ (0.1 M)	Toxic if swallowed. May harm an unborn child. Can damage organs with repeated contact. Toxic to aquatic life.	Wear gloves. Never touch your face. Wash hands well.
Potassium iodide, KI (0.1 M)	Low hazard. May irritate skin and eyes.	Keep away from eyes.
Silver nitrate, $AgNO_3$ (0.1 M)	Can damage eyes. Stains skin dark brown or black, and the stain shows up hours later. Toxic to aquatic life.	Wear gloves. Rinse any contact right away, even if you see nothing yet.
Sodium hydroxide, NaOH (1 M)	Corrosive. Can burn skin and cause serious eye damage.	Handle with extra care. Rinse any contact with lots of water.
Hydrochloric acid, HCl (1 M)	Corrosive. Irritates skin and can cause serious eye damage.	Handle with extra care. Rinse any contact with lots of water.
Zinc, Zn (solid)	Low hazard as a solid piece.	Rinse it into the waste beaker when done.
Magnesium, Mg (ribbon)	Flammable solid. Makes hydrogen gas, which is flammable, when it reacts with acid.	Keep away from flames. Rinse any leftover metal into the waste beaker.

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Data Table

Describe what you see: color, cloudiness, solids, bubbles, or changes to the metal. If nothing happens, write "no visible change".

	Reaction	Observations	Reaction? (yes/no)
1	Sodium chloride + copper (II) sulfate $NaCl + CuSO_4$		
2	Lead (II) nitrate + potassium iodide $Pb(NO_3)_2 + KI$		
3	Silver nitrate + sodium chloride $AgNO_3 + NaCl$		
4	Copper (II) sulfate + sodium hydroxide $CuSO_4 + NaOH$		
5	Zinc + copper (II) sulfate $Zn + CuSO_4$		
6	Lead (II) nitrate + sodium chloride $Pb(NO_3)_2 + NaCl$		
7	Magnesium + hydrochloric acid $Mg + HCl$		

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