

# Precipitation Reactions & Solubility

## Teacher Notes & Tips

**Biggest Tip of All:** Always do the lab yourself before doing it in class! Make notes of any techniques that you want to teach or demonstrate prior to lab. Make notes of any modifications that you want to make to instructions prior to students starting lab. Discuss any modifications during pre-lab discussion. Be sure to try each reaction for yourself first to make sure that your solutions are performing as expected.

### Lesson Plan:

In this lab, students will mix several solutions, observe reactions, and use a solubility chart to determine the precipitate product. This is a great reinforcement lab. Students will write formulas for compounds, write balanced chemical equations, determine the products of double replacement reactions, and determine the precipitate product.

### Timing:

One class period

### Objective:

Students will master using the solubility chart to determine the precipitate product.

### Safety:

During pre lab discussion, make sure students understand that some of the solutions used in this lab are toxic. They must wear safety glasses at all times. Some of the solutions can be corrosive to skin and clothing. Wear aprons during the lab, and be sure to wash skin immediately should any chemicals get on the skin.

### Materials: (per lab group)

- well plate
- dropping bottles w/ solutions
- toothpicks

### Set Up:

I use well plates, but you can use small (25-50 mL) beakers, test tubes, plastic sheet covers, or even plastic overhead transparency sheets – if you still have them – for the reactions. The main idea is to have a way for students to keep up with the reactions. Adjust instructions and demonstrate process to students during pre-lab time.

I like to use dropping bottles for this experiment - <https://www.flinnsci.com/products/apparatus/bottles--containers/bottles-dropping-polyethylene-with-push-on-cap/> - but if you don't have enough, you can use disposable pipets with beakers. Just make sure that students use one pipet per solution so they won't contaminate solutions. You will need 50 mL beakers with solutions for each group. I like to use the blue painters tape to label beakers. It comes off really nice! Make sure each group beaker is labeled with its own dedicated pipet. I like to use the thin-stemmed disposable pipets as they drop really easily and precisely. Label stock solutions in volumetric flasks for refilling group beakers between classes.

Have students line up the dropping bottles with the column or row that they will be used for. Across the top will be solutions 1-4, and down the side will be solutions A-D. Depending on what you are using, you may want to adjust the amount of solutions students will be using. For example, for transparency sheets, you will want students to use two drops each solution. For deep well plates, beakers, or test tubes maybe as much as filling it  $\frac{1}{4}$  with solutions. Give students a dark piece of paper to use for seeing the precipitate clearer.

I have included a data table that can be used for the lab. Students will place the clear well plates over the data table and conduct the reactions using the dropping bottles. If you are using small beakers, have students develop a similar data table using beakers instead of well plates. (larger spaces for the beakers to fit). If you are using plastic sheet covers, you can place a copy of the data table inside of the sheet covers and students will do the reactions on the surface of the sheet cover. These rinse off well.

Prepare solutions to approximately a 0.2 M solution for this lab. Be sure to test your solutions before student use.

**Clean up:** Have students rinse well plates with copious amounts of water. Use a test tube brush to clean wells if necessary. Turn up side down on paper towel for the next class. The dropping bottles can be stored for next year.