Part 3 – Mass of a precipitate

Apparatus

Balance
Two small vials
0.1M solutions of $Ca(NO_3)_2$ (16.4 g per liter of solution) and Na_2CO_3 (10.6 g per liter of solution). 300 mL of each should be sufficient for a class of 12 groups.

Pre-lab discussion

Show students that when some solutions are combined, a solid forms. The question they must answer is: does the mass change when the solid is formed?

Lab performance notes

Students should fill each of the vials no more than 1/3 full of the solutions. They should cap the vials and find the mass of both vials together. Then they should carefully pour the contents of one vial into the other; then put both vials and caps back on the balance pan. Once they have found the mass after the reaction, students should pour the solution and precipitate into the waste bottle provided. Encourage the students to be careful, as they now realize that, if they spill a solution, the mass will appear to decrease. No special precaution needs to be taken with the $CaCO_3$, but the students should discard the contents of the vial with the precipitate into a waste bottle on general principles. At a later time you can wash the $CaCO_3$ down the drain, or add some acid to the solid before discarding the solution down the drain. The vials can be washed in soapy water and rinsed.

Post-lab discussion

Students should do their calculations and post their class results as before. Unless students spill solution during the transfer, they should find that the change in mass is very nearly zero. Again, as homework, have the students represent the particles of the substances in the solutions before mixing and after the precipitate has formed.