(before reaction) to the nearest 0.01 g. Record the mass in your data table.

5. Add the vinegar to the baking soda a little at a time to prevent the reaction from getting out of control, as shown in **Figure A.** Allow the vinegar to slowly run down the inside of the cup. Observe and record your observations about the reaction.
6. When the reaction is complete, place both cups on the balance, and determine the total final mass of the system to the nearest 0.01 g. Calculate any change in mass. Record both the final mass and any change in mass in your data table.
7. Examine the plastic bottle and the hook-insert cap. Try to develop a modified procedure that will test the law of conservation of mass more accurately than the procedure in Part I.
8. In your notebook, write the answers to items 1 through 3 in Analysis and Interpretation—Part I.

PROCEDURE—PART II

9. Your teacher should approve the procedure you designed in Procedure—Part I, step 7. Implement your procedure with the same chemicals and quantities you used in Part I, but use the bottle and hook-insert cap in place of the two cups. Record your data in your data table.
10. If you were successful in step 9 and your results reflect the conservation of mass, proceed to complete the experiment. If not, find a lab group that was successful, and discuss with them what they did and why they did it. Your group should then test the other group's procedure to determine whether their results are reproducible.

CLEANUP AND DISPOSAL

11. Clean your lab station. Clean all equipment, and return it to its proper place. Dispose of chemicals and solutions in the containers designated by your teacher. Do not pour any chemicals down the drain or throw anything in the trash unless your teacher directs you to do so. Wash your hands thoroughly after all work is finished and before you leave the lab.

ANALYSIS AND INTERPRETATION—PART I

1. **Drawing Conclusions:** What evidence was there that a chemical reaction occurred?
2. **Organizing Data:** How did the final mass of the system compare with the initial mass of the system?
3. **Resolving Discrepancies:** Does your answer to the previous question show that the law of conservation of mass was violated? (Hint: Another way to express the law of conservation of mass is to say that the mass of all of the products equals the mass of all of the reactants.) What do you think might cause the mass difference?

ANALYSIS AND INTERPRETATION—PART II

1. **Drawing Conclusions:** Was there any new evidence in Part II indicating that a chemical reaction occurred?
2. **Organizing Ideas:** Identify the state of matter for each reactant in Part II. Identify the state of matter for each product.

CONCLUSIONS

1. **Relating Ideas:** What is the difference between the system in Part I and the system in Part II? What change led to the improved results in Part II?
2. **Evaluating Methods:** Why did the procedure for Part II work better than the procedure for Part I?

EXTENSIONS

1. **Applying Models:** When a log burns, the resulting ash obviously has less mass than the unburned log did. Explain whether this loss of mass violates the law of conservation of mass.
2. **Designing Experiments:** Design a procedure that would test the law of conservation of mass for the burning log described in Extension item 1.