

3 - Conservation of Mass

Purpose:

To determine what happens to mass when two substances react.

Materials:

sodium bicarbonate (NaHCO_3)

acetic acid (CH_3COOH)

1cm x 7.5 cm test tube

125 mL Erlenmeyer flask

rubber stopper to fit the flask

balance

10 mL graduated cylinder

Procedure:

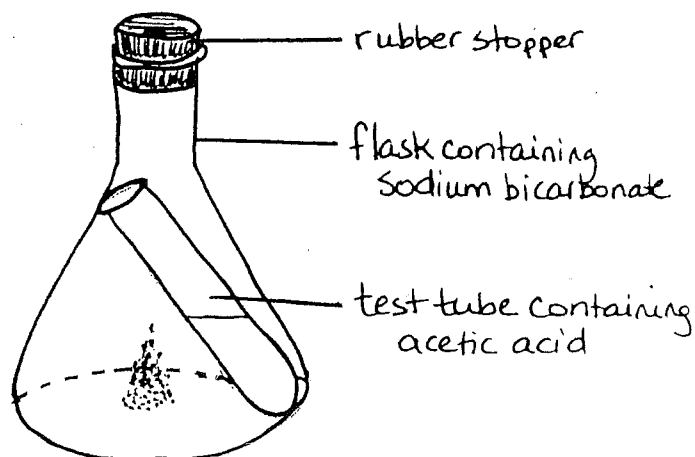
PART 1:

1. MEASURE 8 ml SODIUM BICARBONATE, and pour it into the Erlenmeyer flask.
2. ADD ACETIC ACID TO THE TEST TUBE until it is almost full. Do not spill. Wash if you do.
3. PLACE TEST TUBE IN FLASK as shown below and use the stopper to seal it.
4. CAREFULLY MEASURE AND RECORD THE INITIAL MASS (A).
5. INVERT THE FLASK so that contents of the test tube mix with the sodium carbonate solution.
6. RECORD OBSERVATIONS.
7. CAREFULLY MEASURE AND RECORD THE MASS OF THE FLASK AND CONTENTS AGAIN (B).
8. CALCULATE the difference in mass before and after the reaction, and record it beside C.

PART 2:

1. REMOVE THE STOPPER FROM THE FLASK.
2. FIND THE MASS OF THE BEAKER (PLACE THE STOPPER NEXT TO THE FLASK ON THE BALANCE.) Record the mass beside D.

Diagram:



Observations:

PART 1:

Final mass of flask and contents (UNOPENED) = B _____

Initial mass of flask and contents (UNOPENED) = A _____

Difference (B - A) = C _____

PART 2:

Final mass of flask and contents (OPENED) = D _____

Observations when flask was inverted and contents mixed:

Questions:

(ANSWER EACH QUESTION IN COMPLETE SENTENCES IMMEDIATELY FOLLOWING THE QUESTION.)

1. What evidence is there that a reaction occurred?
2. Name the reactants used in this activity and write their chemical formulas in brackets beside them. (Hint: see materials list for chemical formulas of reactants.)
3. The products of the reaction are sodium acetate (NaCH_3COO), water (H_2O) and carbon dioxide (CO_2). Write a word equation for the chemical reaction.
4. Write the chemical equation, using chemical formulas, for this reaction.
5. If you had placed acetic acid in the flask and sodium bicarbonate in the test tube, do you think your results would have differed? Explain your answer.
6. Was there any difference between the initial mass and the final mass of the flask and its contents (PART 1)? Explain.
6. Why was it important that the flask remain sealed?
7. Did your results support the Law of Conservation of Mass? Explain your answer using results from your experiment.

Conclusion

- A. In a chemical reaction, the total mass of the _____ is equal to the total mass of the _____.
- B. To demonstrate the Law of conservation of mass, a(n) (open or closed) must be used.
- C. When calculating the initial and final mass, all _____ and _____ must be included.