Conservation of Mass

Summary

Students will conduct a series of four short experiments designed to show that mass is conserved in chemical and physical reactions.

Time Frame

2 class periods of 60 minutes each

Group Size

Pairs

Materials

- Experiment 1:
  - beaker
  - ice
  - balance
- Experiment 2:
  - salt
  - graduated cylinder
  - balance
  - vial (pill bottle)
  - cup
- Experiment 3:
  - two solutions labeled A and B. The solutions need to change color when mixed. Suggestions include weak (one gram/100 mL) solutions of:
    - AgNO3 + NaCl = AgCl (white precipitate)
    - CuCl2 + K2S = CuS (black precipitate)
    - NaOH + CuCl2 = Fe(OH) 3 (rust color precipitate)
    - Water with a few drops of phenolphthalein + weak base (NaOH) = pink color
    - Sodium Silicate + Ethyl Alcohol
- Experiment 4:
  - gas bottle (small glass bottle with tight fitting lid)
  - 1/8 of an Alka Seltzer tablet
  - balance
  - goggles

- Student Sheet (attached)

Student Prior Knowledge

Students should know how to accurately use a balance and know that mass is the best way to determine how much matter is present.

Instructional Procedures

Read directions to labs with students. The labs do not have to be done in any order but the melting ice cube takes all period even with small ice cubes.

Give students an opportunity to work and write their data on the board. They should record the difference they found between the first mass and final in their experiments. Ideally, no difference

would be found. Some student groups will find small differences and others who make errors will find large differences. In a post-lab discussion, talk about why mass appeared to be gained or lost. The precision (or lack) of student balances is often the reason. A follow-up activity for students is to give them a small object and a larger one to mass. If they mass them 5 times apiece, alternating the objects, they will see differences in the mass of the same object. This could be done as a class demonstration.

Assessment Plan

Scoring Guide

:

1. Students make predictions, collect and record data…….15 pts.
2. Students correctly answer analysis questions……..10 pts.

Answers to Analysis Questions:

melting water and dissolving salt
mixing solutions and making a gas
water molecules (H2O), the molecules do not go anywhere, they just move more slowly.
Salt molecules stay in the water, their mass doesn't change.
The new substance was made from a combination of the other substances.
The gas escaped and it has mass.
Answers will vary.
Accept either yes or no. The Why? is important. If they answered yes, they should say that all four experiments from everyone in class supported the law. If they say no, they should indicate that more experiments than this are necessary to prove a law.

3. Conclusion is specific, written in complete sentences and complete. .....5 pts

Bibliography

Lesson Design by Jordan School District Teachers and Staff.

Authors

Utah LessonPlans