

Matter conservation Investigation

Background: The Law of Conservation of mass states that matter cannot be created or destroyed in normal chemical reactions or when matter undergoes a physical change.

Rationale: In this experiment you will combine chemicals in different scenarios and investigate the Law of Conservation of Matter.

Materials:

1 flask	1 small sample tube	1 piece of parafilm	balance
1 beaker	Crucible & cover	Matches	2 test tubes
Barium Chloride	Sodium Carbonate	Hydrochloric Acid	Marble Chips

System One

1. Record the mass of a clean dry crucible.
2. Add approximately 4 grams of iron and record the mass.
3. Heat the crucible **strongly** over the Bunsen Burner for at least 20 minutes. A noticeable difference should occur to the product, if not continue heating. (**Start system two while waiting.**)
4. Allow the crucible to COOL and re-mass.
5. Dump product in the trash.
6. Calculate any change in Mass
7. Calculate % change

$$\% \text{ Change} = 100\% \times \frac{\text{Change in Mass}}{\text{Original Mass}}$$

System Two

1. Place six marble chips in 250 ml beaker.
2. Pour 10 mls of hydrochloric acid (HCl) into a test tube.
3. Place the test tube into the beaker (without mixing) and record the mass to 3 decimal places.
4. Pour the acid into the beaker with the marbles chips and observe. (Start system three.)
5. Wait for the reaction to stop and re-weigh the entire system. Dump aqueous contents in sink and solids in the trash.
6. Calculate any change in Mass
7. Calculate % change

System Three

1. Pour 5 mls of barium chloride (BaCl_2) into a clean flask.
2. Fill a small sample tube 1/4 full with sodium carbonate (Na_2CO_3).
3. Slide sample tube into the flask **with out spilling** the contents of the tube.
4. Parafilm the top of the flask and mass the system.
5. Tip the flask upside down allowing the chemicals to mix. Observe.
6. Reweigh the flask.
7. Calculate any change in Mass
8. Calculate % change

Data Create three tables that will show all data collected in the lab including any observations be sure to have labels and units

Analysis: Show all preformed calculations

Error: Describe any possible errors that may have occurred in each of the different steps that would affect your results.

Reflections/Conclusion: Use Claim Evidence and Reasoning to describe if the Law of Conservation on Matter can be proven by the results shown in each of the three systems. If it was shown explain why, if not explain why. Be sure to use your data to back up your claim!!!!!!

Post Lab Questions

1. What is the law of Conservation of Matter?
2. Suppose you had two chemicals that will react if put together. If you measured the mass before and after the reaction, how would the masses compare? If they are the same mass, is mass considered to be conserved.

Science Investigation

Name: _____

Date: _____

Investigation Title: _____

1 Question Statement

4	3	2	1	Total Points
Scientific question is stated accurately and clearly. Object of inquiry is clear.	Question is stated accurately OR clearly. Object of inquiry is clear.	Question is stated, but is neither clear nor accurate. Object of inquiry is clear.	Object of inquiry is unclear.	_____ X ___1___ Multiplier = _____ Points

2 and 3. Prior Knowledge

4	3	2	1	Total Points
All facts used in investigation are listed. All Formulas for calculations are included. Source for each fact is cited.	Most facts used in investigation are listed. Some formulas for calculations are included. Source for each fact is cited.	At least some facts used in investigation are listed. Sources for most facts are cited.	At least some facts used in investigation are listed. Few (if any) sources for facts are cited.	_____ X ___2___ Multiplier = _____ Points

4. Evaluation/Hypothesis

4	3	2	1	Total Points
Reasonable evaluation method is proposed and clearly explained. (What shows Matter is Conserved)	Reasonable evaluation method is proposed. Explanation is attempted but may not be clear.	Reasonable evaluation method is proposed but not explained	Evaluation method is proposed but appears to be unworkable.	_____ X ___1___ Multiplier = _____ Points

5. Method proposed to answer Question

4	3	2	1	Total Points
All materials and equipment are listed. Complete procedure that explains how equipment is used to find answer to question is given. Diagram included that illustrates procedure.	All materials and equipment are listed. Partial procedure that explains how equipment is used to find answer to question is given. Diagram included that illustrates procedure.	All materials and equipment are listed. Attempt is made to explain procedure but it is not clear how student proposes to answer question. Diagram included that illustrates procedure.	Materials and equipment list is missing or incomplete. AND/OR Proposed procedure is unworkable.	_____ X ___1___ Multiplier = _____ Points

6. Data/Evidence

4	3	2	1	Total Points
All data are clearly organized and presented in a table. All quantities include appropriate units.	All data are presented. All quantities include appropriate units.	Most data are presented. All quantities include appropriate units	Minimal data presented. AND/OR Some quantities lack appropriate units	_____ X ___5___ Multiplier = _____ Points

7. Analysis

4	3	2	1	Total Points
All results are logically interpreted in attempt to answer question. All calculations used are accurately shown and explained.	All results are logically interpreted in attempt to answer question. Some calculations used may be inaccurate or not explained.	Attempt is made to interpret results, but interpretation is incomplete or logical reasoning is not evident. OR Calculations are not shown.	Minimal attempt made to interpret results.	_____ X ___4___ Multiplier = _____ Points

8. and 9. Evaluation and Troubleshooting

4	3	2	1	Total Points
Results are evaluated using previously identified method. All discrepancies/errors are identified and explained. Solutions for observed errors proposed (and may be implemented).	Results are evaluated using previously identified method. At least some discrepancies/errors are identified. Solutions for observed errors proposed (and may be implemented).	Results are evaluated using previously identified method. Few, if any, discrepancies/errors are identified. Solutions for observed errors may not be proposed.	Evaluation of results is not clearly based upon previously identified method. Few, if any, discrepancies/errors are identified. Solutions for observed errors may not be proposed	_____ X ___4___ Multiplier = _____ Points

10. Concluding Argument/Reflection

4	3	2	1	Total Points
Appropriate Data/Evidence is used to: <ul style="list-style-type: none"> Answer the question Support or refute the hypothesis Logical, well-ordered and reasoned argument is presented that cites Analysis of data for all systems	Appropriate Data/Evidence is used to: <ul style="list-style-type: none"> Answer the question Support or refute the hypothesis Logical argument is presented that cites Analysis for two systems	Data/Evidence is used to: <ul style="list-style-type: none"> Answer the question Support or refute the hypothesis Argument is presented that does not accurately cite Analysis OR is missing 2 systems	Minimal attempt made to justify answer.	_____ X ___5___ Multiplier = _____ Points

10. Post Lab: Questions should be rewritten and answered in complete sentence = _____ /8 Points)

Comments

TOTAL POINTS: _____ / _____ (Total Possible)