Conservation of Mass

SNC2D | Student laboratory assignment | 1 of 4

Prepare for your investigation

Name: _____ Date: _____ Class: _____

Research question

How does the system boundary affect the measured mass during a reaction that produces a gas?

Learning goal: use the virtual model to gather evidence, explain conservation of mass and communicate a supported conclusion.

Materials: WorksheetGalaxy virtual laboratory, this assignment, calculator or spreadsheet if needed. Virtual observations only; do not recreate hazardous procedures or perform physical fitness tests without teacher approval.

1. Define two relevant scientific terms from the Background Information tab. (K/U)

2. Write a prediction or hypothesis with a scientific reason. (K/U, T/I)

3. Identify the variable or feature compared, the measured outcome and constants or consistent observation criteria. (T/I)

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Perform the virtual laboratory

Open the corresponding virtual lab and read Background Information. Follow the investigation instructions below. Record authentic simulated results; do not invent data.

• Write a hypothesis predicting mass changes in an open and closed system.

• Choose the vinegar + baking soda reaction and run one trial with the container closed .

• Repeat with the container open , using the same starting quantities.

• Repeat both trials using a different reactant amount.

• Investigate a second reaction and compare the results.

• Record at least six trials, export data, and construct a conclusion using evidence.

• Variables: Independent — system type (open/closed); dependent — measured mass change (g); controls — starting quantities, reaction type, scale resolution and measurement procedure.

Record each completed observation using the simulator’s record control when available. Use Data & Graphs to review results. Export CSV if available; attach additional rows or screenshots when needed.

Record the exact settings and any changes to the method.

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Observations & results

Enter the actual results. Keep trial IDs consistent between continued tables. Attach the full exported data or extra sheets when the procedure requires more rows. Include units as displayed.

Data table 1

Trial / item	Reaction	System	Batch (g)	Before (g)	After (g)

Data table 1 — continued (2)

Trial / item	Δ mass (g)	Gas escaped (g)

Qualitative observations / sample calculation (show units where applicable)

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Analysis, conclusion & assessment

4. Present a labelled graph of a measured relationship, or an annotated diagram / comparison chart for qualitative investigations. Attach it separately. Explain the pattern using recorded evidence. (C, T/I)

5. Identify the independent, dependent and controlled variables. (K/U, A)

6. Describe the observations for a gas-producing reaction in a closed vessel. (K/U, A)

7. Compare mass changes in open and closed trials with matching reactant quantities. (K/U, A)

8. Explain why mass is conserved even when an open vessel appears to lose mass. (K/U, A)

Conclusion and evaluation: answer the research question, revisit the prediction using evidence, identify a model limitation and propose an improvement. (T/I, A)

Submit this assignment plus your completed Lab Report (printed or saved as PDF from the lab) and any supporting data/figures.

K/U: accurate concepts /10	T/I: method, data, reasoning /12	C: clear tables, units, report /8	A: explanation, conclusion, transfer /10

Total: /40