Heat of Solution — Virtual Calorimetry Lab

SCH4U | Student laboratory assignment | 1 of 4

Prepare for your investigation

Name: _____ Date: _____ Class: _____

Research question

How does the identity of an ionic compound affect the enthalpy change when it dissolves in water?

Learning goal: use the virtual model to gather evidence, explain heat of solution — virtual calorimetry lab 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.

Required investigation

• Predict whether dissolving calcium chloride or ammonium nitrate will raise or lower the temperature.

• Run at least two trials for each compound using the same water mass and solute mass.

• Record the initial temperature, peak or minimum temperature, solution mass, and calculated ΔH.

• Compare your calculated values and explain differences using particle-level energy changes.

• Investigate how changing the solute mass affects the temperature change while holding the water mass constant.

• Complete the report with data, a graph, calculations, error analysis, and a conclusion.

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	Compound	Water (g)	Solute (g)	T_i (°C)	T_{ext} (°C)

Data table 1 — continued (2)

Trial / item	ΔT (°C)	q solution (J)	ΔH (kJ/mol)

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. Analysis: Compare salts and explain the energy changes (K/U, A)

6. Compare two contrasting observations from your investigation of Heat of Solution — Virtual Calorimetry Lab. Explain the difference using the background information. (K/U, A)

7. Use a specific recorded result to answer the research question. Explain the scientific reasoning behind it. (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