Acid–Base Titration: Determine an Unknown Acid Concentration

SCH3U | Student laboratory assignment | 1 of 4

Prepare for your investigation

Name: _____ Date: _____ Class: _____

Research question

What is the molar concentration of an unknown hydrochloric acid sample when titrated with 0.1000 mol/L NaOH?

Learning goal: use the virtual model to gather evidence, explain acid–base titration: determine an unknown acid concentration 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.

• Record a hypothesis and identify the independent, dependent and controlled variables.

• Measure a 25.00 mL aliquot of unknown acid. Record the initial burette reading.

• Carry out one rough titration and at least three careful titrations, using smaller increments near the endpoint.

• Record initial and final burette readings, titre volumes, and endpoint observations.

• Use concordant titres (within 0.20 mL where practical) to calculate mean titre and unknown concentration.

• Explain the endpoint/equivalence distinction, identify sources of error, and write 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	Type	Initial (mL)	Final (mL)	Titre (mL)	Endpoint

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: endpoint vs equivalence and titre agreement (K/U, A)

6. Compare two contrasting observations from your investigation of Acid–Base Titration: Determine an Unknown Acid Concentration. 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