Acids, Bases & Neutralization

SNC2D | Student laboratory assignment | 1 of 4

Prepare for your investigation

Name: _____ Date: _____ Class: _____

Research question

How do solution type, concentration, and volume of added base influence pH and indicator colour?

Learning goal: use the virtual model to gather evidence, explain acids, bases & neutralization 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.

• Predict the pH and indicator appearance of three sample solutions.

• Use Identify a solution mode to test an acid, neutral solution, and base. Record observations.

• Switch to Neutralization . Keep the HCl sample constant and add NaOH in at least six steps, including points before, near and after equivalence.

• Record pH, indicator colour and amounts of reactants at each step.

• Graph pH versus volume of NaOH added; locate the equivalence region.

• Explain the shape of the graph and identify two limitations of the simulation.

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	Mode / sample	HCl (M)	HCl (mL)	NaOH (M)	NaOH (mL)

Data table 1 — continued (2)

Trial / item	pH	Indicator

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. Compare the indicators and describe observed colours (K/U, A)

6. Explain the change in pH before, near and after equivalence (K/U, A)

7. Discuss two limitations of this model and how a real experiment might differ (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