Combustion Products: Virtual Chemistry Lab

SCH4C | Student laboratory assignment | 1 of 4

Prepare for your investigation

Name: _____ Date: _____ Class: _____

Research question

How does oxygen availability affect the products of hydrocarbon combustion?

Learning goal: use the virtual model to gather evidence, explain combustion products: virtual chemistry 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.

• Read the background and write a prediction comparing high and low oxygen conditions.

• Choose methane, propane, or butane as a fuel. Run a high-oxygen trial and record flame appearance, limewater result, condensation, and predicted products.

• Repeat with medium and low oxygen. Use the same fuel to control variables.

• Repeat at least one condition to assess consistency; try a second fuel for comparison.

• Record at least four trials, export the data, and complete the lab report with balanced equations and safety considerations.

• Variables: independent — oxygen availability; dependent — simulated combustion product indicators; controlled — fuel, sampling interval, and virtual apparatus.

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	Fuel	Oxygen	Flame	Limewater	Condensation

Data table 1 — continued (2)

Trial / item	CO / soot risk	Remove

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. Explain what limewater and condensation do—and do not—demonstrate. (K/U, A)

6. Explain why incomplete combustion presents a safety risk. (K/U, A)

7. Conclusion: answer the research question and identify a limitation of the model. (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