Photosynthesis & Cellular Respiration

SBI4U | Student laboratory assignment | 1 of 4

Prepare for your investigation

Name: _____ Date: _____ Class: _____

Research question

How do environmental conditions influence photosynthesis and cellular respiration?

Learning goal: use the virtual model to gather evidence, explain photosynthesis & cellular respiration 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)

Photosynthesis & Cellular Respiration

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.

Purpose

Your task

• Complete at least five photosynthesis trials varying one factor (such as light intensity) while holding others constant. Then complete at least five respiration trials varying one factor (such as glucose or oxygen availability). Record gas production and compare trends.

Requirements

• State a testable hypothesis with scientific reasoning.

• Identify independent, dependent and controlled variables.

• Collect multiple trials and create correctly labelled graphs with units.

• Analyze results and explain patterns using biological concepts.

• Evaluate model limitations and complete the report.

Design controlled investigations.

Interpret quantitative results and graphs.

Communicate evidence-based conclusions.

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	Investigation	Conditions	Time (s)	Gas (mL)	Rate (mL/min)

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. Data analysis and interpretation (K/U, A)

6. Explain limiting factors, photosynthesis and respiration pathways, and why the two gas-production models should not be treated as direct measurements of identical processes. (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