Heating, Energy Transfer & Climate

SNC2D | Student laboratory assignment | 1 of 4

Prepare for your investigation

Name: _____ Date: _____ Class: _____

Research question

How do surface type, lamp intensity and exposure time affect the heating and cooling of a model surface?

Learning goal: use the virtual model to gather evidence, explain heating, energy transfer & climate 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 which of the four surfaces will reach the highest temperature after 15 minutes of heating.
- Keep lamp intensity at 100% and duration at 15 minutes. Run a trial for each surface.
- Compare the curves for the dark and light surfaces.
- Run at least one cooling trial and describe the temperature trend.
- Change one independent variable while keeping the others constant.
- Record results, graph them, and complete the lab report.
- Variables: Independent—surface, lamp intensity or exposure time; dependent—sample temperature; controls—starting temperature, ambient temperature and model settings.

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	Surface	Lamp	Heat time	Cool time	Peak °C

Data table 1 — continued (2)

Trial / item	Final °C	Rise °C

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. Identify the independent, dependent and controlled variables. (K/U, A)

6. Describe and interpret the heating curves using energy transfer. (K/U, A)

7. Explain how albedo affects absorbed energy. (K/U, A)

8. Explain how thermal inertia changes heating and cooling patterns. (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