Space Exploration & Planetary Motion

SNC1W | Student laboratory assignment | 1 of 4

Prepare for your investigation

Name: _____ Date: _____ Class: _____

Research question

How does distance from the Sun affect a planet's orbital period, and how is surface gravity different from orbital motion?

Learning goal: use the virtual model to gather evidence, explain space exploration & planetary motion 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 whether a more distant planet has a longer or shorter year.

• Choose Earth and record its distance, period, and surface gravity.

• Choose at least five other planets and record their properties.

• Use the custom-orbit controls to test three distances and record the calculated periods.

• Compare a planet's surface gravity with its orbital period. Explain why they are different quantities.

• Use the Data & Graphs tab to identify a pattern and export your evidence.

• Complete the Lab Report, including the limitations of the model.

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	Object	a (AU)	T (years)	a^3	T^2

Data table 1 — continued (2)

Trial / item	g (m/s²)	Action

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 in your custom-orbit investigation. (K/U, A)

6. Compare Earth, Mars, and Jupiter using numerical evidence and units. (K/U, A)

7. Explain the meaning of an astronomical unit (AU) and why it is useful. (K/U, A)

8. Identify two limitations of the simulation and explain how each affects interpretation. (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