Mitosis & Specialized Cells Microscopy

SNC2D | Student laboratory assignment | 1 of 4

Prepare for your investigation

Name: _____ Date: _____ Class: _____

Research question

How can cell appearance reveal the stage of the cell cycle, and how do specialized structures support cell functions?

Learning goal: use the virtual model to gather evidence, explain mitosis & specialized cells microscopy 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 predict which phase will be most common in a growing onion root-tip sample.

• Inspect each of the five phase models. Identify the phase using observable chromosome features.

• Run three virtual fields of view. Record phase counts and calculate the mitotic index.

• Inspect four specialized cell models. Identify each and match its structural adaptation to its function.

• Compare the sample fields and complete a formal lab report, including limitations of the model.

• Variables: Observed variable: cell-cycle stage. Measured outcomes: phase counts and mitotic index. Keep the field size and sample protocol consistent when comparing counts.

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	Specimen	Objective	Focus	Measured result / observation

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. Calculate the mitotic index (show work) (K/U, A)

6. Explain the observable features of metaphase and anaphase (K/U, A)

7. Compare two specialized cells and explain their adaptations (K/U, A)

8. Explain why most cells may be in interphase (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