



Mitosis & Cancer Cell Cycle Investigation

Analyze microscope evidence, calculate mitotic index, test cell-cycle regulation, and use evidence to identify disrupted cell division.

NGSS: HS-LS1-4 - Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

Name: _____ Class / Period: _____ Date: _____

Before You Begin

1. Why must multicellular organisms regulate when cells divide?

Part A - Microscope Cell Analysis

Use the model's microscope samples. Count total cells and cells visibly in mitosis for each sample.

Sample	Total cells	Cells in mitosis	Mitotic index (%)	Initial interpretation
A				
B				
C				

Mitotic index (%) = (cells in mitosis / total cells) x 100

2. Which sample has the highest mitotic index? What does a high mitotic index suggest about cell behavior?

Part B - Cell-Cycle Regulation Tests

Use the model's regulation tests. Record whether each sample responds normally or shows evidence of disrupted control.

Sample / test	Observed response	Normal or disrupted?	Evidence

Part C - Multiple Lines of Evidence

3. Why would mitotic index alone be insufficient to conclude that a sample is cancerous or has lost cell-cycle control?

4. Identify two different lines of evidence from the model that should be considered together.

Cell Division as a Model of Growth and Maintenance

5. Explain how mitosis helps a multicellular organism grow while also maintaining tissues after cells are damaged or lost.

6. Why must daughter cells receive the same genetic information during ordinary mitosis?

CER - Identify the Most Concerning Sample

Claim: Which sample shows the strongest evidence of disrupted cell-cycle regulation?

Evidence: Use at least two different model results, including one quantitative result.

Reasoning: Explain how those results connect to normal cell-cycle control and uncontrolled division.

Model Limitation

7. This simulation simplifies real cancer biology. Name one conclusion the model can support and one conclusion it cannot prove by itself.
