

Cell Cycle Lab Report

Instructions: For this lab activity, you will examine a section of an onion root tip under a compound light microscope to determine the approximate amount of time spent in each stage of a cell's life cycle. At the end of your lab activity, you will complete chi-square testing using some of your data. Submit your lab report to your instructor when completed.

Title: Make this information and descriptive; try this model: The effect of (independent variable) on (dependent variable) as measured by (how are you measuring the dependent variable) on (subject)

Objective(s): What are you learning in this investigation? Think about your independent and dependent variables.

Hypothesis:

Write a hypothesis, using an if/then/because statement, to predict the stage in which a cell spends most of its time. This video should help you with your prediction. [VIDEO](#)

I recommend an “if/then/because” statement

IF (I do this... a short explanation of your procedure, eg, the variables you are manipulating and testing)

THEN (I think... your prediction)

BECAUSE (what background knowledge do you have to support your prediction? Include that support for why you predicted the way you did)

Procedure:

Access the virtual lab and complete both examinations of onion root tip cells. The materials are listed for you. However, you are responsible for providing a brief summary of the steps you followed during the experimental procedure.

Materials:

Cell Cycle Virtual Lab

Summary of Steps:

Variables:

List and explain your controlled variables, independent variable, and dependent variable for this virtual investigation.

Remember, controlled variables are factors that remain the same throughout the experiment (**You should have an exhaustive list for your controlled variables.**). An independent (test) variable (**What *I change***) changes so that the experimenter can see the effect on other variables. The dependent (outcome) variable (**What *I measure***) will change in response to the test variable.

Controlled variables:

Independent variable:

Dependent variable:

Data:

Here is a great resource to help you: [4.5 Cell Cycle](#)

Table 1

Record any observations about the cells you observed. What does the cell look like for each stage? What is a distinguishing visible feature of each stage of the cell cycle?

		Description of cell
	Interphase	
Mitosis	Prophase	
	Metaphase	
	Anaphase	
	Telophase	

Table 2

Record the number of cells you observed in each part of the lab activity.

		Number of Cells in Trial 1	Number of Cells in Trial 2
	Interphase		
Mitosis	Prophase		
	Metaphase		
	Anaphase		
	Telophase		

Table 3

In this table, list the number of cells in interphase for each trial, then add up all the other stages under the mitosis column. Place these numbers in the chart below:

	Interphase	Mitosis
Trial One- Control		
Trial Two- Treated		

Calculations

Calculate the percentage of the cell cycle spent in each stage for both trials. Number of cells in given stage $\div$ total number of cells counted $\times 100 = \%$ of the cell cycle spent in this stage.

Record your percentages below:

	Interphase	Prophase	Metaphase	Anaphase	Telophase
Trial 1					
Trial 2					

Conclusion:

Write a conclusion statement that addresses the following questions:

- Based on your data, what can you infer about the length of time spent in each stage of the cell cycle? **Use data from your investigation to support your conclusion.**
- What stages were the longest and shortest? Give a brief explanation of why these stages may have that time period. **Use data from your investigation to support your conclusion. This video should help you with your explanation. [VIDEO](#)**
- Does your data support or fail to support your hypotheses (**include examples**)?
- Discuss the sources of error that could impact the results of this investigation if it were repeated in a **physical** laboratory.

Lab Reflection Questions

Answer the reflection questions using what you have learned from the lesson and your experimental data. It will be helpful to refer to your class notes. Answer questions in complete sentences.

1. What differences can you see when you compare the nucleus of a dividing cell with that of a non-dividing cell? **Use these notes to help you. [4.5 Cell Cycle](#)**

2. If your observation had not been restricted to the tip of the onion root, how would the results be different?
3. If you need assistance on chi-square hypothesis testing for the question below, refer to the pre-lab activity of your lesson. **Video support for how to complete a chi-square test.**
[VIDEO](#)

Agriculturalists investigating a poorly growing onion crop discovered it was infected with a fungal pathogen. The fungus secreted a lectin-like protein in the soil surrounding the onions' roots. Lectins often accelerate mitosis in root systems, but this abnormal growth creates weaker plant tissues. Three samples of 25 cells each were observed from the struggling onion crop. The observed number of cells in each part of the cell cycle are shown below:

	Interphase	Mitosis
Sample One	11	14
Sample Two	9	16
Sample Three	12	13

- a) **State** the null and alternative hypothesis related to the data.
- b) **Calculate** the chi-square values for interphase and mitosis using your trial one data in table 3 as the expected data (e). These cells are normal, onion root tip cells. Use the sample data above as the observed values (o). These samples were exposed to lectin.
- c) Using the chi-square table, **determine** the critical value for interphase and mitosis of the struggling onion crop using the chi-square values in (b).

p-value	Degrees of Freedom							
	1	2	3	4	5	6	7	8
0.05	3.84	5.99	7.82	9.49	11.07	12.59	14.07	15.11
0.01	6.64	9.21	11.34	13.28	15.09	16.81	18.48	20.09

- d) Based on the chi-square and critical value, draw a conclusion about the null hypothesis.