

## Biology 1

### CALCULATING TIME SPENT IN EACH STAGE OF MITOSIS

Name \_\_\_\_\_

Date \_\_\_\_\_ Hr \_\_\_\_\_

At the time when the slide of the onion root tip was prepared, the cells in the region of cell division were arrested at their current phase within the cell cycle. Some were fixed at the time of interphase, while others were fixed at some stage of mitosis. The duration of each stage in the cell cycle of the onion root tip can be estimated by determining the proportion of cells arrested at each stage of mitosis and interphase.

Studies have shown that onion root tip cells take about 16 hours to complete the cell cycle. By determining the percentage of cells in each stage of mitosis and in interphase, you can calculate the amount of time spent in each stage. For example:

*If ten cells out of 150 were found to be in **prophase**, then*

*percentage of cells is  $10/150 \times 100 = 6.7\%$*

*This shows that any one of the hypothetical cells spends 6.7% of the time in prophase,*

*$0.067 \times 16 \text{ hours (960 minutes)} = .067 \times 960 = 64 \text{ minutes spent in prophase (hypothetically)}$*

#### PROCEDURE

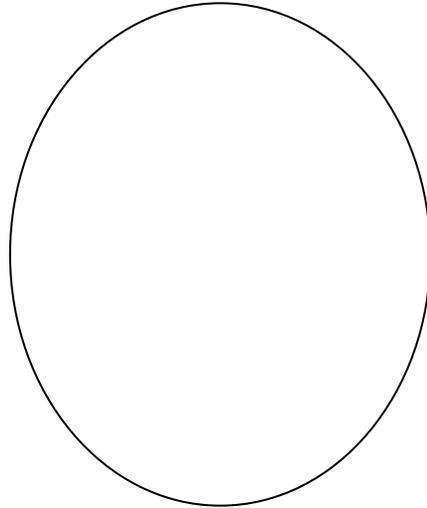
1. Examine the slide provided of an onion root tip. Count and record the stages of the cycle of each of the cells in the field of view.
2. Calculate the percentage of cells in each stage, and enter the results in Table 1. Keep in mind that you must count enough cells to make a representative sample (at least 100). If you count too few your data will be skewed. If you are using the highest power ocular, you may have to record more than one field of view.
3. Calculate the time spent in each stage, assuming the entire cell cycle takes 16 hours (0.1 hr = 6 min).

TABLE 1 DATA ON STAGES IN PLANT CELLS

Cell Cycle Stage	Number of Cells in the Stage	% of Total Cells in the Stage	Hours and Minutes in Stage
Interphase			
Prophase			
Metaphase			
Anaphase			
Telophase			
Total		100	16:00

**Draw and label a pie chart of the time spent in each mitotic phase for the onion root tip, as observed and detailed in Table 1.**

Title \_\_\_\_\_



**Conclusion Questions**

1. Based upon your data, which phase of mitosis is the shortest in duration? Why do you suppose this is observed to be the shortest phase?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. Based upon your data, which phase of mitosis is the longest in duration (Interphase is not technically one of the cell division phases of mitosis)? Why do you suppose this is observed to be the longest phase?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
3. Why is the tip of the onion root chosen for this activity?  
\_\_\_\_\_  
\_\_\_\_\_
4. If your observations had not been restricted to the area of the onion root tip that is actively dividing, how would you predict that your results would have been different?  
\_\_\_\_\_  
\_\_\_\_\_
5. How do the sizes of cells in Cytokinesis compare with those in Prophase? Why?  
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\_\_\_\_\_
6. Which types of cells in the human body undergo mitosis? Give examples.  
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\_\_\_\_\_