

ANSWER KEY

This is the part you will be completing! We don't have the ability to do the lab this year, but you can do the lab analysis!

Part 4: Counting Cells and Analyzing Data

- Please use the "Mitosis Caffeine Lab Data" posted on Canvas. These images represent onion root tips that have been grown in water and in caffeine solution.
- Within the image, look for well-stained distinct cells. Count the cells in interphase vs. mitosis. You are NOT trying to count cells in Prophase, metaphase, etc., just interphase vs. mitosis. Count as many cells in the image.

My data:

Tip	Number of Cells		
	Interphase	Mitotic	Total
Control	49 / 68%	23 / 32%	72
Treated	82	11	93
Total	(expect 63.24)	(expect 29.76)	

$$\rightarrow 93(.68) = \quad 93(.32)$$

- For this experiment, the number of treated cells in interphase and mitosis will be the observed values.
- To find out what your expected values are, complete the following steps:
 - Calculate the percentage of cells in interphase and mitosis in the *control* group from the class data.
 - Multiply the percentages by the total number of cells in the *treated* group; this will give the expected numbers (e).
- On a separate sheet of paper, and by hand, complete a chi-square analysis of the data. Show all of your work, including statistical hypothesis (null and alternative). Include and justify a formal conclusion (do you reject the null, or fail to reject the null?). Why? Take a photo of your work and upload to the assignment link. (Think of this as a mini-lab report of sorts). Neatness counts!

2 If these are not exact that still should be minor differences in counting should not impact value too much unless you are way off.

NULL HYPOTHESIS: The addition of caffeine has no significant statistical effect on the rate of mitosis in onion root tip cells.

$$\chi^2 = \sum \frac{(o-e)^2}{e}$$

$$\frac{(82 - 63.24)^2}{63.24} + \frac{(11 - 29.76)^2}{29.76}$$

$$5.57$$

$$+ 11.83$$

$$= 17.4 = \chi^2$$

∴ Since $17.4 > 3.84$ We must reject the null.

and propose an Alternative

hypothesis: caffeine does (inhibits) affect the rate of mitosis in onion root tips

p of 0.05 on chi chart on formula sheet for 1 degree of freedom