Mitotic Index and Cell Stage Practice (A). **Na'am** _____

Directions: each station has an index of cell phase photos for both onion root tip cells and for whitefish blastula cells. Your task is to methodically review the cells within each field of view to count how many of each cell phase is present. Fill in your counts in the tables for each station below. Once you have recorded how many of each cell are present at each station's sample, go back to your desk to finish the calculations for the final columns of the tables.

Formulas: the formulas below will be used to calculate the data in columns 3 – 5 in the tables below.

(1) % of cells in a particular phase = (# cells in that phase / total # of cells counted) x 100

(2) mitotic index (MI) = # of cells observed in the M-phase (PMAT) / total # of cells counted

(3) time spent in a particular phase = (# cells in that phase / total # of cells counted) x 1440

Table 1. Mitotic Index (M.I.) using cell drawings

Cell Cycle Phase	# cells in this phase	% of cells in this phase (1)	Time spent in this phase (3)	Mitotic Index (MI) for this cell and tissue type (2)
Interphase				
Prophase (M)				
Metaphase (M)				
Anaphase (M)				
Telophase (M)				
Total # of cells		100%	1440 mins.	

Table 2. M.I. of onion root cells

Cell Cycle Phase	# cells in this phase	% of cells in this phase (1)	Time spent in this phase (3)	Mitotic Index (MI) for this cell and tissue type (2)
Interphase				
Prophase (M)				
Metaphase (M)				
Anaphase (M)				
Telophase (M)				
Total # of cells		100%	1440 mins.	

Analysis Questions:

1. In your own words, define what a mitotic index is and how it can be valuable to us?

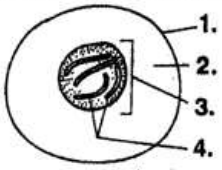
3. If you were looking at a sample of cell in the G0 resting state, like cells of the neural cortex (brain cells = neurons) side by side with the onion root, how do you think it might differ? IMPORTANT FINAL QUESTION…Why do you think it would differ and what would its mitotic index be (higher or lower)?

4. Review. A sample of 100 cells has within it 87 cells in interphase. What is the mitotic index of this sample?

5. Review. A sample cells was recorded for mitotic index and the data to the right was produced. How many minutes of the day was spent in interphase and what was the mitotic index of this sampling?

	NUMBER OF CELLS		
Tip	Interphase	Mitotic	Total
1	142	82	224
2	108	43	151
3	109	63	172
Total	359	188	547

BEFORE MITOSIS: **Interphase**

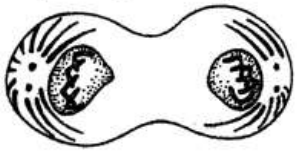


MITOSIS, Stage 1: **Prophase**

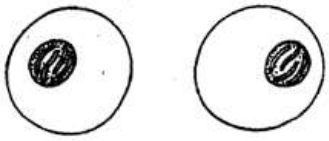
MITOSIS, Stage 2: **Metaphase**

MITOSIS, Stage 3: **Anaphase**

MITOSIS, Stage 4: **Telophase**



AFTER MITOSIS: **Two Daughter Cells**



1. Label the cell membrane, cytoplasm, nucleus, and chromosomes.
2. How many chromosomes are present? ___
3. In prophase what has happened to the chromosomes since interphase? _____
_____.
4. Describe any new structure that has formed.
_____
_____.
5. In metaphase what has happened to the nucleus? _____.
6. How have the arrangement and the location of the chromosomes changed? _____
_____
_____.
7. In anaphase, how have the chromosomes changed since metaphase? _____
_____
_____.
8. In telophase how have the location and arrangement of the chromosomes changed?
_____
_____
_____.
9. After mitosis and cell division are over, how are the two new cells similar to the original cell in interphase? _____
_____
_____
_____.