Name_____ Date _____ Period____

Onion Cell Mitosis

Background:
In a growing plant root, the cells at the tip of the root are constantly dividing to allow the root to grow. Because each cell divides independently of the others, a root tip contains cells at different stages of the cell cycle. This makes a root tip an excellent tissue to study the stages of cell division.

Materials:
microscope prepared slides of onion (allium) root tips

Procedure:
1. Obtain a prepared slide of an onion root tip (there will be three root tips on a slide). Hold the slide up to the light to see the pointed ends of the root sections. This is the root tip where the cells were actively dividing. (The root tips were freshly sliced into thin sections, then preserved when the slide was prepared.)

2. Place the slide on the microscope stage with the root tips pointing away from you. Using the focus adjustment, obtain the clearest image possible on the laptop. Just above the root "cap" is a region that contains many new small cells. The larger cells of this region were in the process of dividing when the slide was made. These are the cells that you will be observing.

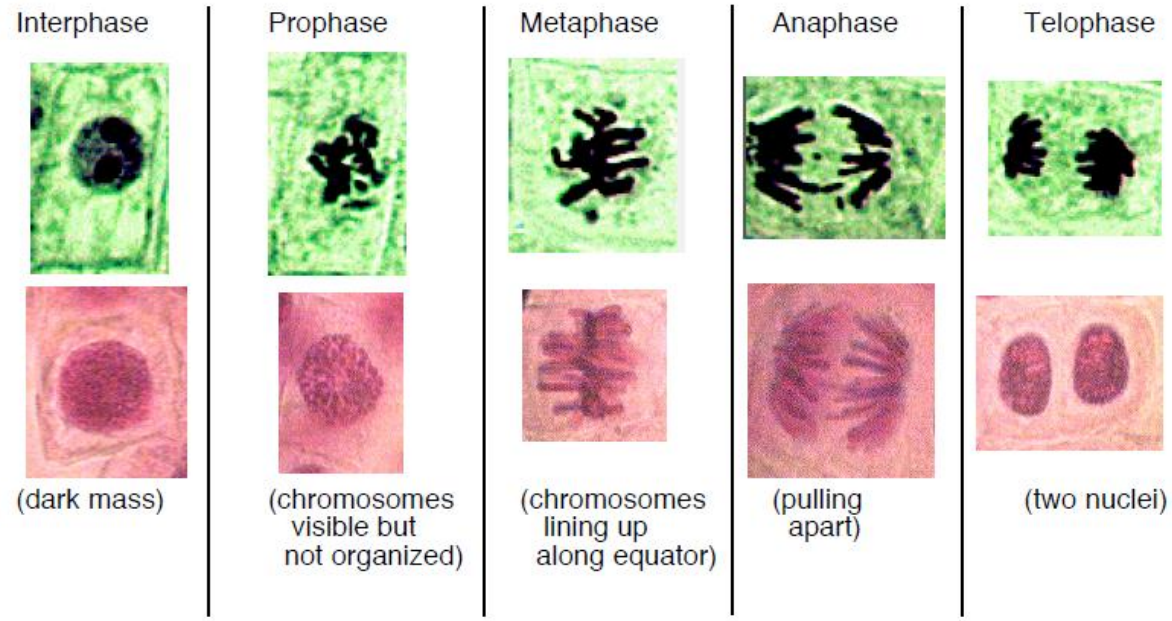
3. Observe the box-like cells that are arranged in rows. The chromosomes of the cells have been stained to make them easily visible. Select one cell whose chromosomes are clearly visible.

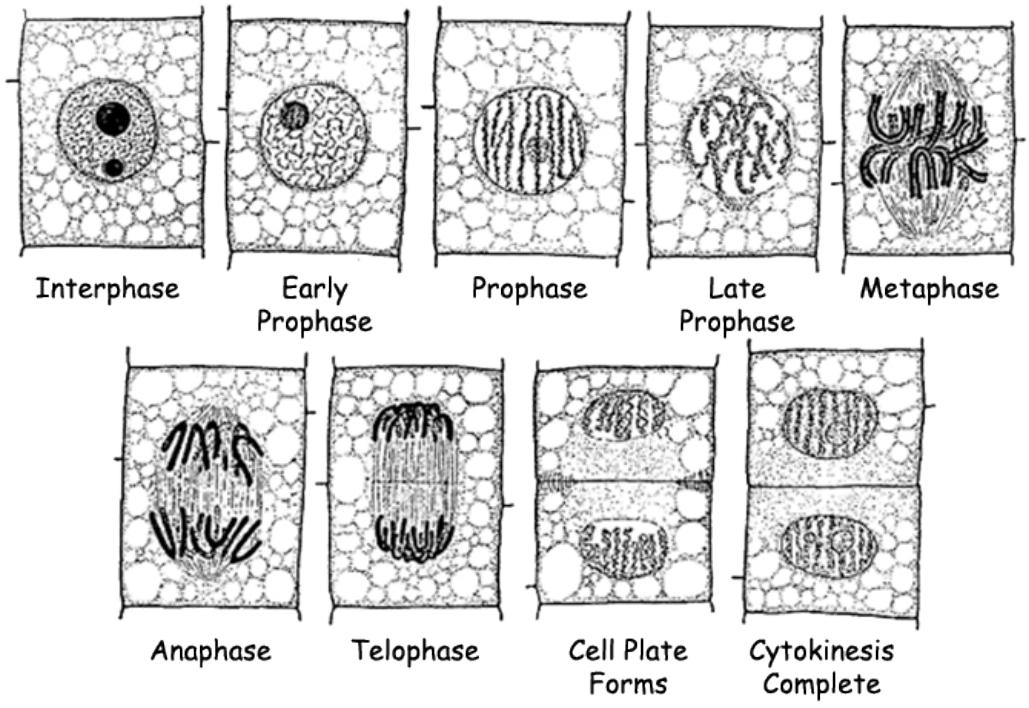
4. Sketch the cell that you selected in the box on the right.

5. Look around at the cells again. Select four other cells whose internal appearances are **different** from each other and the first one that you sketched. Sketch them in the boxes below.

6. As you look at the cells of the root tip, you may notice that some cells seem to be empty inside (there is no dark nucleus or visible chromosomes). This is because these cells are three dimensional, but we are looking at just thin slices of them. (If you slice a hard boiled egg at random, would you definitely see the yolk in your slice? No.) We want to continue to look at the cells, but we will ignore any where we cannot see the genetic material (dark areas).

7. Looking along the rows of cells, identify what stage each cell is in. Use the photos below as a guide. (This will be a hypothesis. You will have a chance to change these answers after we have talked about mitosis)





8. Use the data table to record the number of cells that you see in each of the stages.

Stage of Cell Cycle	Number of cells in the Stage:
Interphase	
Prophase	
Metaphase	
Anaphase	
Telophase	

Analysis & Conclusions:

1. What stage were the majority of the cells in? _____

2. What percentage of the cells were in each stage? Create a ratio. $\frac{\#\text{of cells in that stage}}{\text{total \# of cells looked at}} = \frac{x}{100}$

Interphase

Prophase

Metaphase

Anaphase

Telophase

STOP here for now. We will complete the questions after we have a discussion about mitosis

3. What evidence shows that mitosis is a continuous process, not a series of separate events?_____
_____

4. The onion plant began as a single cell. That cell had **X** number of chromosomes. (The exact number does not matter, we will just call that number "X".) How many chromosomes are in each of the cells that you observed? _____
How do you know?_____
_____

5. Test your knowledge. Using the picture on page 5, write down the correct stage for as many of the numbered cells as you can.

1		36	
2		37	
3		38	
4		39	
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7		42	
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