Name: _____
Living Environment

Observing Mitosis Lab

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 microscope and carry it to your desk with two hands. Make sure that the low power objective is in position and that the diaphragm is open to the widest setting.

2. Obtain a prepared slide of an onion root tip (there will be two or 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 and stained when the slide was prepared.

3. Place the slide on the microscope stage with the root tips pointing AWAY from you. Use the LOW power objective to find a root tip and use the COURSE adjustment knob until the root tip comes into focus. 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. Center the image, and then switch to high power.

4. As you look at the cells of the root tip you may notice that some of the 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 thin slices of them. (If you slice a hardboiled egg at random, would you always see the yolk in your slice?). You want to continue to look at cells, but ignore any where you cannot see the genetic material.

5. Observe the box-like plant 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. (Remember that you use only the FINE adjustment knob when focusing under HIGH power).

6. Sketch the cell that you selected in the box on the next page.

7. Label the stage of mitosis it is in. Refer to the diagram on the next page.

8. Look around at the cells again. Select four other cells whose internal appearances are DIFFERENT from each other. Sketch them in the boxes given. You should have cells in each of the stages of mitosis represented. Use the diagram on the next page and label the stage each cell is in

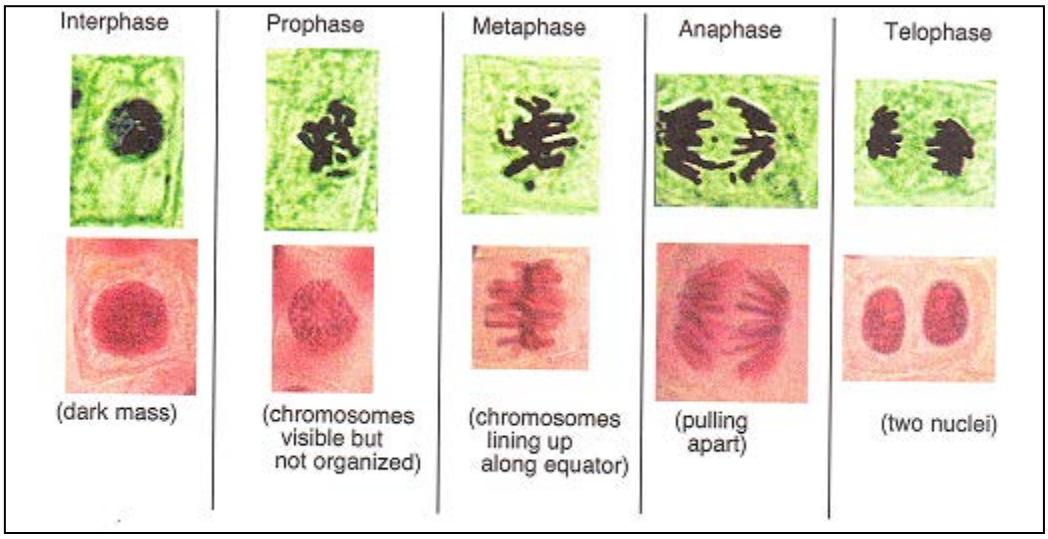
Stage: _____

Stage: _____

Stage: _____

Stage: _____

Stage: _____



9. Use the data table to record the number of cells that you see in each of the stages of mitosis. The easiest way to do this is for one person to look through the microscope, going along each row of cells. For each cell say out loud what stage the cell appears to be in. Another student makes tally marks for each stage. Sum you tally marks and record. Calculate the percent of time the cells were in each phase.

Stage of Cell Cycle	Tally marks	Total number of cells in that stage	Percent of time spent in that stage
Interphase			
Prophase			
Metaphase			
Anaphase			
Telophase			
Total number of cells			100%

Questions:

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

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

   _____

   _____

   _____

   _____

3. How does mitosis differ in animal and plant cells? Complete the chart below

	Animal Cell	Plant Cell
Centrioles		
Cell wall		
Method of cytokinesis		

4. Make a pie chart of the cell cycle. The pie chart should be a representation of the amount of time a cell spends at each stage. The pie should be divided into _____ slices. (How many phases are there?)