

CHAPTER 16	Investigation 16.B: Observing the Cell Cycle in Plant and Animal Cells	BLM 16.2.6
HANDOUT		
Question: What stages of the cell cycle can you recognize and identify in plant and animal cells?		

Safety Precautions



- Be sure that the microscope is turned off and your hands are dry when you plug in or disconnect the cord.
- Handle the microscope slides with care.

Materials

- microscope
- prepared slide of onion root-tip cells
- prepared slide of whitefish embryo cells

Procedure

1. Place the onion root-tip slide on the microscope stage, and observe it under low power. Focus on the area just behind the tip of the root.
2. Carefully shift to medium power, focus, and then go to high power to observe the cells. Try to find cells in the different phases of mitosis, and draw a cell in each phase. Also find and draw a cell in interphase and a cell undergoing cytokinesis. Label as many features as you can.

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3. Move the slide to concentrate your attention on the root tip. Note any differences between the root tip and the area you observed in step 2.
4. Change back to lower power, and remove the onion root tip slide. Place the whitefish embryo slide on the stage, and observe it under low power.
5. Find an area of dividing cells. Change to medium power, focus, and then shift to high power. As you look at each cell, determine which phase of mitosis it is in.
6. Draw one cell in interphase, one cell in each phase of mitosis, and one cell in cytokinesis. Label as many parts as you can. Note any difference between mitosis in animal cells and mitosis in plant cells.

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7. Switch back to the onion slide and, working in pairs, observe every onion root-tip cell in one high power field of view and identify its phase of the cell cycle. Have one partner observe the slide and call out the phase of each cell while the other partner records the observations in the table below. After you do one full field of view, choose another and switch roles. If you have not counted at least 200 cells, then count a third field of view.

Data table for determining timing of cell division

	Number of cells				Percent of total counted	Time in each stage
	Field 1	Field 2	Field 3	Total		
Interphase						
Prophase						
Metaphase						
Anaphase						
Telophase						
Total cells						

8. Calculate the percentage of cells found in each stage by dividing the number of cells in a given stage by the total number of cells in the sample and then multiplying by 100:

$$\frac{\text{number in a stage}}{\text{total sample number}} \times 100$$

Enter your calculated values in the data table. (Show calculations below.)

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9. Assuming that it takes about 24 h (1440 min) for onion root-tip cells to go through one full cell cycle, you can calculate the amount of time the cells spend in each phase from the percentage of the cells in that stage: percent of cells in a stage \times 1440 min. Enter your calculated values in the data table. (Show calculations below.)

10. Change back to lower power, and remove the slide. Turn off and unplug the microscope.

Analysis

- What differences did you notice between the cells in the onion root tip and the cells farther away from the root tip? Consider
 - the size of the cells
 - the shape of the cells
 - the number of dividing cells
- What differences did you notice between the onion root-tip cells and the whitefish embryo cells? Consider
 - the size of the cells

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b) the shape of the cells

c) the arrangement of chromosomes in the cells

3. Draw a pie graph using the data you collected in steps 8 and 9.

4. Do you think that your observations and calculations in steps 7–9 are representative of the cell division taking place in the entire root? Explain your answer.

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Conclusion

5. Prepare a table that compares and contrasts the events of the cell cycle in plant cells and animal cells.