

Online Activity Worksheet 9.3

Cells divide during the mitotic phase.

Observe mitosis in action.

PAGE 1 OBJECTIVE: to examine how cells divide in a process called mitosis

In Online Activity 9.2, you learned about the phases of the cell cycle. Some cells do not complete the cell cycle. Instead, they enter the M phase and undergo nuclear division (mitosis) and cell division (cytokinesis). In this activity, you will examine the preparation and the process involved in the actual nuclear and cytoplasmic division of a cell.

- The cell spends most of its time in interphase. To review the names of some structures visible during this phase, drag the labels from the top to the boxes next to the appropriate structure. Once you have correctly identified these structures, click **next** to view an animation that will demonstrate how these structures change as the cell enters prophase.
- The animation shows how cellular structures change as a cell enters prophase. Click **next** to go to the next screen.
- Now the chromatin can be clearly seen as discrete chromosomes. Make sure that you can identify all the parts now visible by dragging each term from the box.

PAGE 2 OBJECTIVE: to examine how cells divide in a process called mitosis

The chromosomes have duplicated and become visible, and the cell has completed the interphase stage. The cell is now ready for cell division. In this activity, you will view a time-lapse video of cell division in a newt lung cell. The video shows cell division occurring over one hundred times faster than normal. So you will see a process that usually takes more than one hour happen in less than a minute.

Click **play** to begin. At each new phase the video will pause. Click **continue** to see the next phase. Before you begin, be sure to scroll down far enough to see both the video and list of mitosis phases on your screen.

Now answer the following questions in the spaces provided.

- 1.** Describe the role of the spindle microtubules.

- 2.** Explain the relationship between the terms “chromosome” and “chromatid.”

3. During which phase of mitosis do the chromatids separate and become daughter chromosomes?

4. The fruit fly, *Drosophila melanogaster*, has eight chromosomes in its body cells. If one of its cells divided, how many chromosomes would be in each of the daughter cells?

PAGE 3 OBJECTIVE: to determine the amount of time that an onion root cell spends in each phase of mitosis

You know that a cell spends most of its life in interphase. How much time does it spend in each phase of mitosis? You can determine this by looking at a slide of cells that have been arrested in the process of division. In this activity, you will practice with a slide of onion root cells.

Complete the following activities:

- 1) Categorize each cell that is shown in full color into one of the following five categories listed (interphase, prophase, metaphase, anaphase, or telophase) and record these data in the table below.
- 2) Count all the colored cells in the image and record this number in the table below.
- 3) The average time for onion root tip cells to complete the cell cycle is 24 hours or 1440 minutes. Calculate the length of time a cell spends in each phase of the cell cycle by multiplying the % of cells in that stage by 1440 minutes (number of minutes in the cell cycle) and record in the table. Then click **check your answer**.

Onion Root Tip

Phase	Number of cells	Time/minutes
Interphase		
Prophase		
Metaphase		
Anaphase		
Telophase		
Total number of cells		

Name _____ Class _____ Date _____

Now answer the following questions in the spaces provided.

- 1.** Root tip cells spend the most time in which phase: interphase or the mitotic phase? Suggest a reason.

- 2.** Root tip cells spend the least amount of time in which phase(s)?

- 3.** Why do you think scientists use the root tip to study mitosis?
