Online Lab Simulation: Mitosis in Onion Root Tip Cells

Background

This is an online version of a classic biology lab that’s been used in high school biology classes for many years. Traditionally, you would be given a prepared slide of onion skin cells and would have to identify the phases of mitosis in about 50 cells. This online version of the lab makes the activity much easier because cells are presented one-at-a-time and you’ll get feedback about wrong answers. Isn’t technology great?

**Objectives**

After completing this online lab you will:

* Have gained experience identifying the phases of mitosis in pictures of real plant cells
* Have learned about the amount of time that cells typically spend in each phase of mitosis

**Procedure**

Start your computer’s web browser and type the following web address in the “Address” box:

http://www.biology.arizona.edu/cell\_bio/activities/cell\_cycle/cell\_cycle.html

You should see a screen titled “Online Onion Root Tips. If you don’t get this screen, ask Ms. Phifer for help. There are a few pages of background information to read. Read all of this information carefully so you understand the lab. Once you’ve finished reading each page, click the “Next” button at the bottom of the page to go to the next page. One of the pages will ask you to copy a table onto paper. It has been provided for you below. Once you’ve read all the background information, the lab will begin. You will be shown small pictures of 36 onion root tip cells. As each one is presented, click on the name of the phase the cell is in (Interphase, Prophase, Metaphase, Anaphase, or Telophase). If you’re wrong, the computer will tell you. Click the “Try Again” button to go back and make another attempt. After you’ve successfully classified 36 cells, the lab will end. Count the cells in each column then complete the table:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Interphase | Prophase | Metaphase | Anaphase | Telophase | Totals |
| Number of Cells |  |  |  |  |  |  |
| Percent of Cells |  |  |  |  |  |  |
| Number of Minutes |  |  |  |  |  |  |

You will need to use a calculator to complete some of the rows in this table.

To fill in the “Number of Cells” row, count up the number of cells that are in each stage of the cell cycle and write the number in the appropriate column.

To fill in the “Percent” row, divide the number of cells by 36 and multiply by 100. Write the percent on the appropriate column.

To fill in the “Number of Minutes” row you will determine how long a cell spends in each phase. Multiply the percent of cells by 1060minutes (the total length of an onion cell cycle).

**Post-Lab Questions**

Answer the following questions on your own paper. Be sure to copy the questions and answer in complete sentences.

1) Which phase of the cell cycle had the most cells?

2) Explain why this phase had so many more cells than any other phase.

3) Visually, how did the cells in interphase differ from the cells in prophase?

4) Visually, how did the cells in metaphase differ from the cells in anaphase?

5) Based on what you know about cell division, are the daughter cells produced by mitosis identical to their parents or different from their parents? Explain your answer.