# **Biology**

**Standard 2, Objective 3**

# **Title:** Onion Root Online Lab

**Description:** An online lab using an onion root undergoing mitosis. By counting the number of cells in each phase, students infer the length of time cell spend in each phase.

**Materials:** student computers or a teacher computer with projector, student sheet (see below) student microscopes or a microscope attached to a flex cam and projector, prepared onion root mitosis slides.

**Time Needed:** 50 minutes

**Background:** The web page has a nice summary of mitosis.

**Procedures:**

1. If using a projection system, set up and make sure you can get to the site. If using a lab, make sure student computers are operational and that the site will load.

2. “Hook” the students by asking how an alien could determine what percentage of time people sleep by making observations simultaneously around the globe. If they could count 1,000 people on all parts of Earth in a minute they would find that about 333 of them were asleep. 333 divided by 1,000 is about 33%. If they knew a day was 24 hours long, they could figure that .33 x 24 hrs = 8 hours. Work through these steps with the students, some will struggle with calculating the percent.

3. Explain to students that they will make the same kind of “snapshot” of cells undergoing mitosis. They will use a web site and a real onion cell to see mitosis.

4. Go over the directions on the student’s sheet and allow students time to work online and in the lab.

5. Summarize student findings in a class discussion.

**Scoring Guide**

1. Students count and record numbers of cells in various phases…………4

2. Students correctly calculate percentages…………………………………..4

3. Students view and record onion roots under the microscope……………4

4. Students correctly answer analysis questions……………………………..4

answers:

1. Depending on the stain, the chromosomes will be red or purple.

2.

**Title: Onion Root Lab** Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Introduction:** Have you ever calculated what percentage of your life you spend asleep, in the car or watching TV? The results might surprise you. In this activity you will count and calculate the amount of time cells spend in each stage of their cell cycle. The results may not surprise you because you may have never wondered about this. Scientists think it may be important because they think our cells will only divide a certain number of times before they quit and we get old. Knowing how to control cell cycle might someday unlock the secret of youth!

**Procedure:**

1. Go to website, [www.biology.arizona.edu](http://www.biology.arizona.edu)
2. On the left of the screen, click on “Onion Root Tips”
3. Read through the information on each phase of mitosis. There are questions to answer as you go through the reading. When you are done reading click “next.” (You will click “next” three times.)
4. The chart on the website has been copied down for you. Click “next” and classify the cells that appear on the screen for what phase of mitosis that they are in.
5. After classifying the 36 cells according to the phase they are in, transfer the data onto your chart. Calculate the percentages for how long each cell spends in each phase using 36 as your sample size.

**Questions from web site:**

1. How are onion slides prepared in order to view them?
2. What happens during interphase?
3. What is main event that happens during metaphase?
4. What is the main event that happens during telophase?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Interphase** | **Prophase** | **Metaphase** | **Anaphase** | **Telophase** | **Total** |
| Number of cells |  |  |  |  |  | 36 |
| Percent of cells |  |  |  |  |  | 100 |

1. What phase do cells spend most of their time in? Why?

**Extra Credit:**

If you assume a cell cycle of 16 hours, what are your estimates of the duration of the following stages, in minutes?

|  |  |
| --- | --- |
| **Stage** | **Duration in minutes** |
| Interphase |  |
| Prophase |  |
| Metaphase |  |
| Anaphase |  |
| Telophase |  |