

# Comparative Cell Lab

NAME \_\_\_\_\_

PER \_\_\_\_\_ DATE \_\_\_\_\_

**Title:** Comparing Cells - Bacteria, Plant Cells and Animal Cells

**Background:**

Ever since the first microscope was used, biologists have been interested in studying the cellular organization of all living things. After hundreds of years of observations by many biologists, the cell theory was developed. The cell theory states that the cell is the structural and functional unit of living things. Cells contain structures called organelles that carry out life processes. Cells can be classified by the types of organelles they contain. In plant and animal cells, similarities and differences exist because of varied life functions.

In this investigation, you will compare the structures of bacterial cells, a typical plant cell (*Elodea*) and a typical animal cell (human).

**Materials:** (Per Group)

Forceps	Microscope	Methylene blue stain
Medicine dropper	Glass slide	Paper towel
<i>Elodea</i> leaf	Cover slip	Lens paper
Water	Toothpicks	

**Procedure:**

**Part A: Three Types of Bacteria**

1. Properly carry a microscope from the storage area and place it about 10 centimeters from the edge of the laboratory table and plug it in. Check to make sure the last group to have your microscope put it away properly. The stage should be all the way down and it should be left on **LOW POWER**.
2. Obtain a slide of bacteria smear. On these slides there are three types of bacteria.
3. Put the slide of bacteria in the microscope and on low power try to find one of the 3 smears. Switch to medium, fine focus and finally to high and fine focus the bacteria. Draw the 1<sup>st</sup> type of bacteria in one of the three circles you have drawn for part A.
4. Repeat and find the other 2 smears and draw them.

**Part B: Examining Plant Cells**

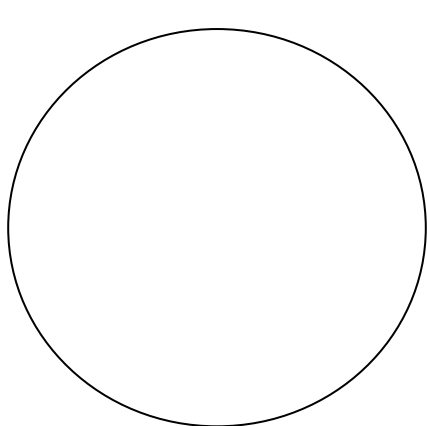
1. Place a drop of water in the center of a clean glass slide.
2. With the forceps, remove a leaf from the *Elodea* plant and place it on the drop of water on the slide. Make sure that the leaf is flat. If it is folded, straighten it with the forceps.
3. Carefully place a cover slip over the drop of water and *Elodea* leaf.
4. Place the slide on the stage of the microscope with the leaf directly over the opening in the stage.
5. Using the low-power objective lens, locate the leaf under the microscope. Turn the coarse adjustment knob until the leaf comes into focus.
6. Switch to the high-power objective lens. **CAUTION:** When turning to the high-power objective lens, you should always look at the objective from the side of your microscope so that the objective lens does not hit or damage the slide.
7. Observe the cells of the *Elodea* leaf. Draw and label what you see in the appropriate place in Observations. Record the magnification of the microscope.
8. Carefully clean and dry your slide and cover slip.

### Part C: Examining Animal Cells

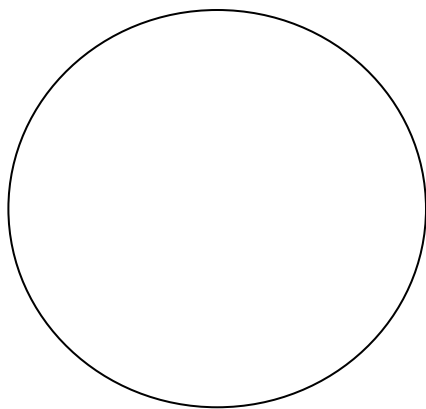
1. Place a drop of methylene blue in the center of a clean glass slide.
2. Using the flat end of a toothpick, gently scrape the inside of your cheek. **CAUTION:** *Do not use force when scraping the inside of your cheek. Only a few cells are needed.* The end of the toothpick will have several cheek cells stuck to it even though you may see nothing but a drop of saliva.
3. Stir the methylene blue on the slide with the end of the toothpick to mix the cheek cells with the methylene blue. Dispose of the toothpick as instructed by your teacher.

#### Data:

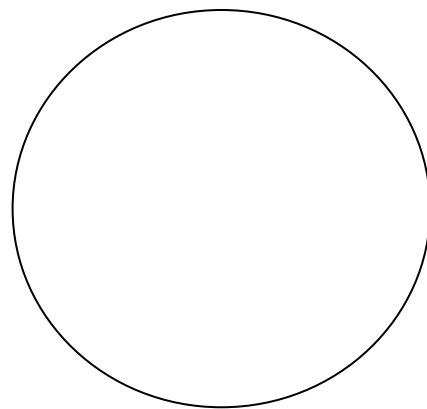
Detailed drawing of three types of bacteria



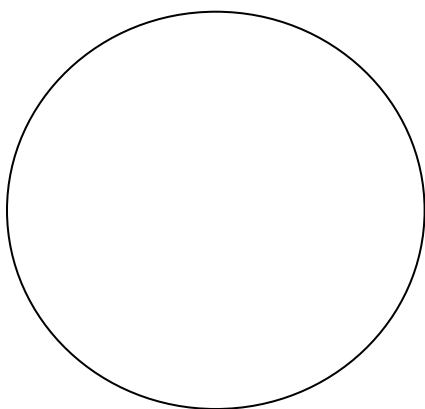
Bacteria \_\_\_\_\_  
Magnification = \_\_\_\_\_



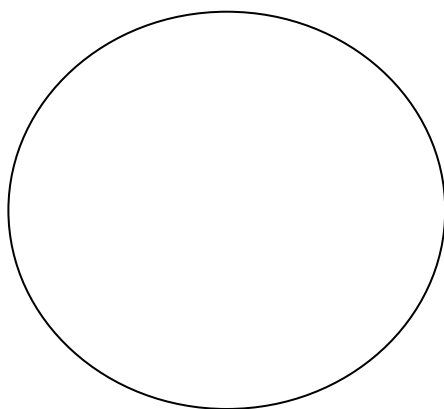
Bacteria \_\_\_\_\_  
Magnification = \_\_\_\_\_



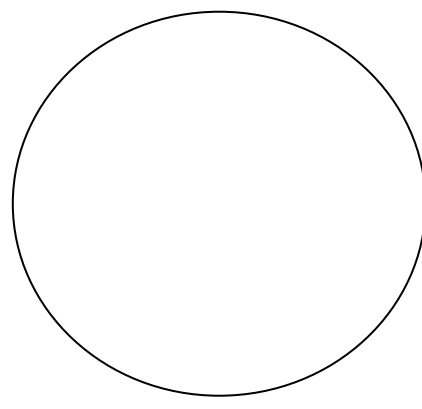
Bacteria \_\_\_\_\_  
Magnification = \_\_\_\_\_



Onion Cell / Potato  
Magnification = \_\_\_\_\_



Elodea Cell  
Magnification = \_\_\_\_\_



Human Cheek Cell  
Magnification = \_\_\_\_\_

**Questions:**

1. What is the shape of an Elodea cell?
2. What is the general location of the nucleus in an Elodea cell?
3. What is the shape of the cheek cell?
4. What is the general location of the nucleus in the cheek cell?
5. How are bacteria different than the plant and animal cells you looked at?
6. How are the plant and animal cells you looked at similar in structure? How are they different?
7. Why are cells such as methylene blue used when observing cells under the microscope?
8. What is the advantage of using a wet mount preparation instead of a dry-mount preparation in the study of living cells?
9. Explain why you could not use a leaf or blade of grass from outside in this lab?
10. Why is it possible to easily collect cells by gently scraping the inside of your cheek?
11. In general, the surface of a tree has a harder “feel” than the surface of a dog. What cell characteristic of each organism can be used to explain this difference?
12. If you were given a slide containing living cells of an unknown organism, how would you identify the cells as either plant or animal cells?

**Conclusion (on the back):**

Write a 4 to 6 sentence paragraph restating (what this lab was about, why this lab was done, and any errors that occurred during this lab that might have created bad results.)