

# LAB: PLANT CELLS vs. ANIMAL CELLS

## **INTRODUCTION**

### **Background Information:**

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. Eukaryotic cells contain structures called organelles that carry out life processes. Eukaryotic 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 2 typical plant cells, onion (*Allium*) and *Elodea densa* (Anacharis- a common aquarium plant), with a typical animal cell, a cheek cell.

**Research Problem:** How are plant and animal cells alike and how are they different?

## **MATERIALS & METHODS**

### **Materials:**

Microscope  
slides & coverslips  
water bottle  
cell stains: iodine & methylene blue  
forceps  
toothpicks  
lens paper  
colored pencils

### **Methods:**

1. Make wet-mount slides of the available cell types. You may do them in any order. Work at your own pace.

### **REMEMBER:**

- Look around on LOW power; go up to MEDIUM or HIGH when you've found something.
- It may take two or three tries at a slide before you get a good preparation!
- Adjust fine focus to see one layer of cells (especially if viewing plant tissue).
- Draw ONLY what you see, and LABEL the structures you recognize!



## **AVAILABLE CELL TYPES**

### **Onion**

1. Remove a scale from the onion.
2. Snap the scale in half and peel a thin layer of tissue from its inner surface.
3. Make a wet-mount (add 1 drop of water) of a piece of this tissue. Smooth out any "wrinkles."
4. STAIN with iodine (Lugol's) stain, as demonstrated by the teacher.
5. Put on a cover slip; be sure to angle the cover slip to avoid air bubbles.
6. Locate cells on LOW power and then bring up to MEDIUM power and then HIGH power.
7. Observe, draw, and label.

### ***Elodea densa***

1. Tear off one young leaf from the tip of the plant.
2. Make a wet-mount of this leaf by adding water.
3. Put on a cover slip.
4. Do NOT stain.
5. FOCUS carefully (start with LOW and then bring up to MEDIUM- try for HIGH power). You should see small, round, green chloroplasts.
6. Use the fine focus to see detail because *Elodea* leaves are two cell layers thick.
7. Observe, draw, and label.

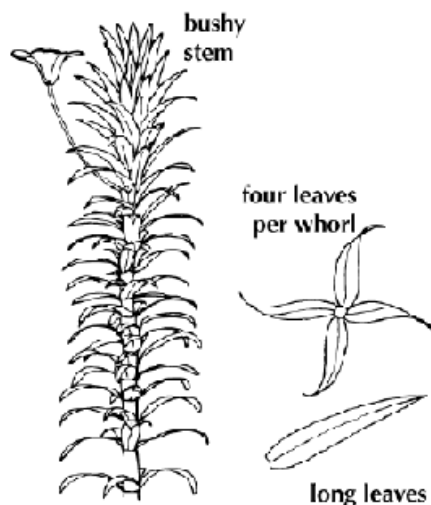
### **Cheek**

1. With a flat clean toothpick, gently scrape the inside of your mouth. You'll pick up many cheek lining cells, even though you won't be able to see them!
2. Smear the toothpick on a slide to spread out the cells and saliva.
3. Stain with methylene blue, as demonstrated by the teacher.
4. Put on a cover slip; be sure to angle the cover slip to avoid air bubbles.
5. Observe, draw, and label.

### **Blood Cells**

1. These are prepared slides, so just check one out from your teacher, and be sure to return to the appropriate storage container when you are finished.
2. Observe, draw, and label.

2. Draw what you see on the data page and be sure to label the cell structures!
3. Have your teacher initial your sketch page that your microscope and all slides are cleaned up and put away properly.
4. Answer the Discussion Questions that follow your cell drawings and observations.



TEACHER'S INITIALS: \_\_\_\_\_

Name \_\_\_\_\_ Date \_\_\_\_\_ Per \_\_\_\_\_

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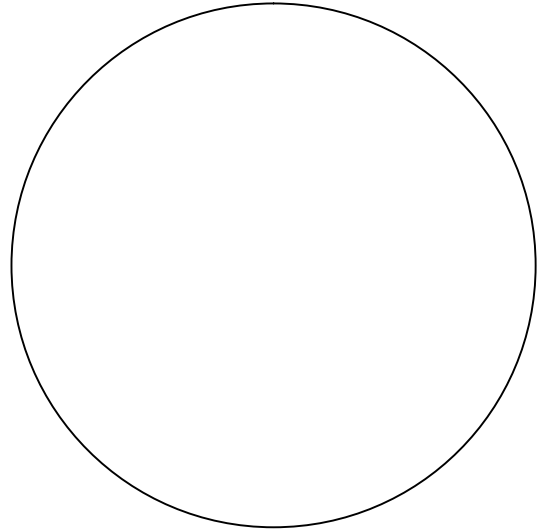
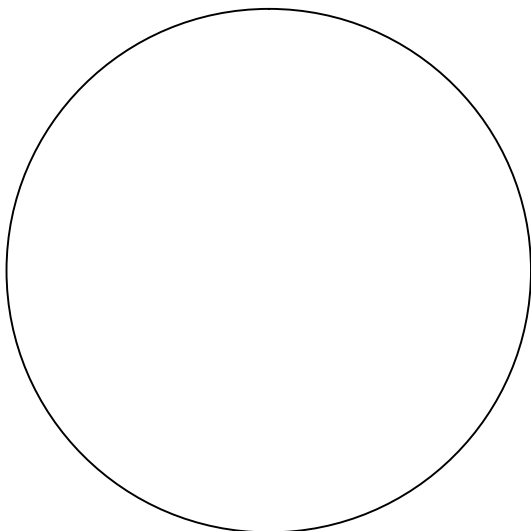
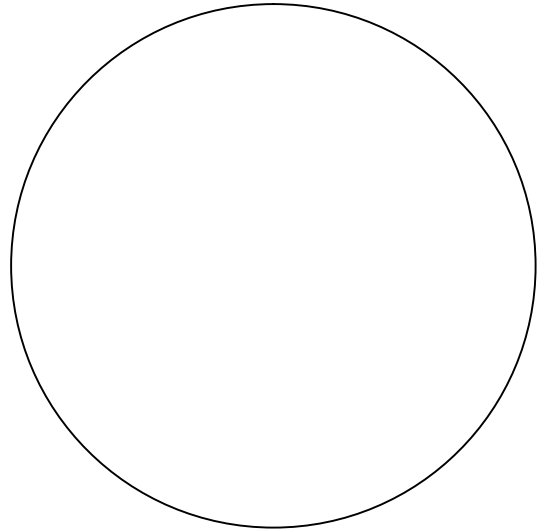
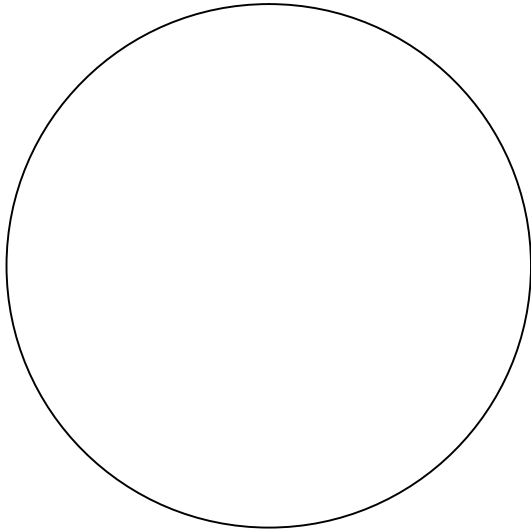
### **RESULTS**

#### Microscope Observations

\*Within the circles below, draw what you see. ***Make sure to give each figure:***

- a number and title (ex: Figure 1: Onion Cell)
- magnification (40x, 100x, or 400x)
- label all visible cell parts

\*Use pencil or colored pencil. **LABEL** AS MUCH AS POSSIBLE!



**Data Table 1: Observations**

Summarize the cell parts that were visible for each cell type.

<b>Cell Type</b>	<b>Structures Observed</b>
<b>Onion Cells (<i>Allium</i>)</b>	
<b><i>Elodea densa</i></b>	
<b>Human cheek cell</b>	
<b>Blood cells</b>	

**DISCUSSION QUESTIONS**

1. Why are stains such as methylene blue used when observing cells under the microscope?
2. In general, the surface of a tree has a harder "feel" than does the surface of a dog. What **cell characteristic or cell structure** of each organism can be used to explain the difference?
3. If you were given a slide containing living cells of an unknown organism, how would you identify the cells as either plant or animal?
4. Fill in the Venn-Diagram below showing **six similarities** and **three differences** between plant and animal cell organelles.

