Name Class \_\_\_\_\_\_\_\_\_ Due Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Lab 7: How Plant and Animal Cells Differ**

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**Purpose**

What are the similarities and differences between plant and animal cells.

**Introduction**

Although plant and animal cells have many structures in common, they also have some very important differences. Plant cells have a rigid cell wall, and if they are green they also have chloroplasts. Animal cells lack a cell wall and chloroplasts. They also lack the central contractile vacuole common to plant cells, which is used to store water. You will first examine epithelial cells from the inside of your cheek. Epithelium is a type of tissue that covers or lines the surface of many parts of the body. You will next examine the cells from a leaf of the freshwater plant elodea. Elodea is often used in home fish tanks and backyard ponds because it has many chloroplasts in each cell and produces lots of oxygen via photosynthesis.

**Materials**

* Microscope
* Slides
* Cover slips
* Water
* Elodea
* Tooth picks
* Lugol’s iodine
* Methylene blue

**Pre-Lab Predictions**

1. Are plant and animal cells prokaryotic or eukaryotic? What does this mean they possess and do not possess?

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**2. Critical thinking**: What does a vital stain and a non-vital stain mean?

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3. What plant cells may not have chloroplasts?

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**Procedure**

**Part A: Human Epithelial Cells**

1. To obtain epithelial cells, gently scrape the inside of your cheek with a clean toothpick. Stir the material from the toothpick into a drop of water on a clean slide. (discard the toothpick immediately)
2. Place a cover slip over the cell culture and add a small drop of methylene blue stain to the side of the cover slip and place a piece of paper towel on the opposite side to drag the stain across the sample.
3. First view under the scanning magnification and locate some cells that are separated from others and look to be intact
4. Center a specific cell and increase the magnification. You may have to adjust the diagram to get the right intensity of the light
5. Make a drawing of two or three cells as they appear  
    under the highest magnification. Label the **nucleus**,   
   **cytoplasm** and **cell membrane**.
6. What is the shape of the cells?

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**Part B: Elodea Leaf Cells**

1. Break off a small leaf near the tip of the elodea plant
2. Place the entire leaf in a drop of water on a clean slide. Add a cover slip and examine under scanning magnification
3. What is the general shape of the cells? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Look for a area of the leaf where you can see the cells most clearly. Examine these cells under high power, carefully adjusting with the fine adjustment.
5. Describe the shape and location of the chloroplasts

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1. As you examine the cells you may see the chloroplasts moving around. If they are not moving, place the slide under the light in the back of the classroom. Do not allow the slide to dry out.
2. Describe how the chloroplasts are moving around the cells.

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1. Make a drawing of a single elodea cells (about 3cm long) Label the **cell wall** and the **chloroplasts**.
2. The numerous chloroplasts makes it difficult to see the nucleus, nucleolus, and central vacuole. In order to see these structures more clearly you are going to use a stain.
3. Removed your current slide from the microscope stage and add a drop of Lugol’s iodine to the side of the coverslip and use a paper towel on the opposite side to drag the stain across the specimen. Let it sit a minute or so allowing the stain to diffuse into the cells.
4. Examine the cells under the scanning power and once you have focused and centered some cells increase the magnification to high.
5. Make a drawing of the stained cell, about 3cm long. Label the **cell wall**, **cell membrane**, **chloroplasts**, **nucleus**, **nucleolus** and **central vacuole**.

**Analyze and Conclude**

**Discussion Questions (FULL SENTENCES)**

1. **Infer** What structures do human epithelial cells have in common with elodea cells? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. How do human epithelial cells and elodea plant cells differ?

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1. Some of the epithelial cells appear folded or wrinkled. What does this tell you about the thickness of these cells? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Chloroplasts cannot move on their own. How do you think they move around the cell?

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1. What did Lugol’s Iodine stain do to the activity inside the cell?

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1. Describe how two of the cell structures we have learned about help to maintain a balanced internal environment in the cell. (be sure to state the organelle name, its function and how they work together)

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1. What is the purpose of the cell wall and why are they necessary in plants but not animals

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1. What is the purpose of lysosomes and why do plant cells lack them?

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