

Name: \_\_\_\_\_ Date Completed: \_\_\_\_\_  
Class: \_\_\_\_\_ Lab Minutes: \_\_\_\_\_ Teacher: \_\_\_\_\_

## **Comparing Plant and Animal Cells**

**Background:** Cells are the basic functional units of all living organisms. When cells join together to take on a specialized function within a larger organism, they form a **tissue**. This laboratory is intended to give you a bit more insight into exactly what a cell does and how small it actually is. Animal and plant cells share characteristics. Both animal and plant cells may occur unicellularly or within multicellular organisms. Because they often take on special functions within tissues, animal cells are frequently more specialized than plant cells. Epithelial (EP-uh-THEE-lee-ul) cells and blood cells are examples of different tissues. In this lab, you will look at epithelial cells in both plants and animals. These cells are specialized for transportation of substances and protection. The individual cells of these layers may be shaped like cubes, columns, or be flat, depending on their location and function. Normally, we expect cells taken from a plant sample to look like boxes (cuboidal) and those taken from an animal to look more spherical (rounded).

**Purpose:** The purpose of this laboratory experience is:

- to further demonstrate your ability to properly make a wet mount slide of a specimen.
- to properly utilize a microscope to observe cellular structure.
- to understand the differences in structure and function between plant and animal cells.
- to understand and use techniques that demonstrate proper focusing, observation, and recording of data while using the compound light microscope.

**Materials:** The following materials are needed to complete this laboratory experience:

Compound microscope	Paper towel
Microscope slides	Iodine solution
Cover slips	*Methylene blue stain
Forceps (tweezers)	Onion
Scalpel /Flat-edged toothpicks	

*\*Be careful when using methylene blue – it stains quite easily and does not come out of clothing!*

**Procedure:** The following procedure is utilized to perform this experience:

### Part 1: Plant Cells

Onion bulbs are an organized mass of cells with the ability to become an entire plant. The curved pieces that “flake” away from a slice hold, on the concave surface, a thin membrane called the epidermis.

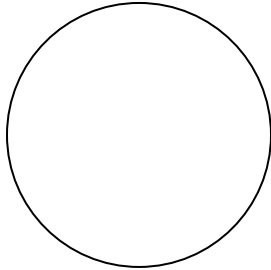
1. Obtain a piece of onion and remove a small square from it. Use forceps to pull away the epidermis from the inner surface. Be careful not to wrinkle the membrane (this sounds easier than it actually is). Place a drop of water on the center of a microscope slide, using a piece of membrane about 0.5 cm square with a scalpel. CAUTION: Handle the scalpel with care – IT IS NOT A TOY.
2. Use a toothpick to straighten out any wrinkles and place the membrane in the drop of water. Take a cover slip, and carefully place it over the sample, lowering it at an angle to the slide. This helps keep air from being trapped under the cover slip. You have just made a wet mount.

3. Place one drop of Iodine stain (also called Lugol's stain) at the very edge of the coverslip. Allow this stain to mix with the water and stain the onion cells. After a minute, use a tissue or paper towel to absorb some extra fluid from the opposite side of the coverslip.
4. Examine the epidermis first under the low power objective of your microscope. If the specimen is still difficult to see try reducing the illumination by adjusting the diaphragm of the microscope. Then examine it under high power.
5. **Record your observations in the space provided (see below).**

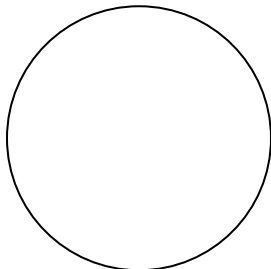
Part 2: Animal Cells

1. Prepare a slide of epithelial cells from your oral cavity, by the following procedure. Take a flat toothpick (a NEW one) and using the large end, scrape the inside of your cheek 3 or 4 times. Gently make a smear in the center of a clean slide, about the size of a dime.
2. Carefully place 1 drop of methylene blue stain on the center of the smear. Place a cover slip over the drop of stain. Allow this slide to rest for about 5 minutes.
3. Using a paper towel or tissue, blot the edge of the coverslip to absorb any excess fluids.
4. Examine the cells, first under middle power, then under high power. At first, the field of view will be light blue and the cells will be a slightly darker blue. After a few minutes, the field will lighten and the cells will become slightly purple.
5. **Record your observations in the space provided (see below).**

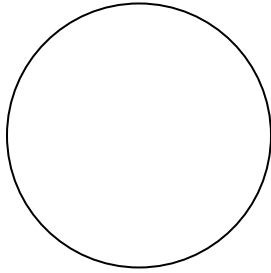
**Data:** The following data was collected during this experience:



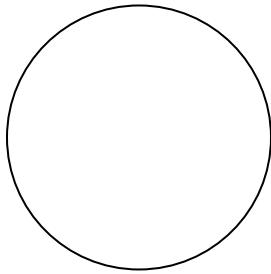
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**Conclusion:** The following can be concluded from this laboratory experience:

Write your own conclusion based upon the factors that we have looked at in previous labs. Make sure to use proper sentence structure and summarize what you learned while performing this lab.

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**Analysis Questions:** Answer the following questions in the space provided.

1. How many layers thick is the onion epidermis?

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2. What is the general shape of a typical plant cell? of a typical animal cell?

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3. What does the nucleus look like under medium and high power?

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4. Within an individual cell, where are the cytoplasm and the nucleus found? What general characteristic of plant cells can be inferred from observations of the cytoplasm and nucleus?

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5. Inside the mouth, these cells are joined together in a sheet. Why are they scattered on your slide?

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6. How are these animal cells different from the plant cells you observed?

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7. Draw a few cells in the space provided below and label the cell membrane, nucleus, and cytoplasm.