

## COMPARING CELLS

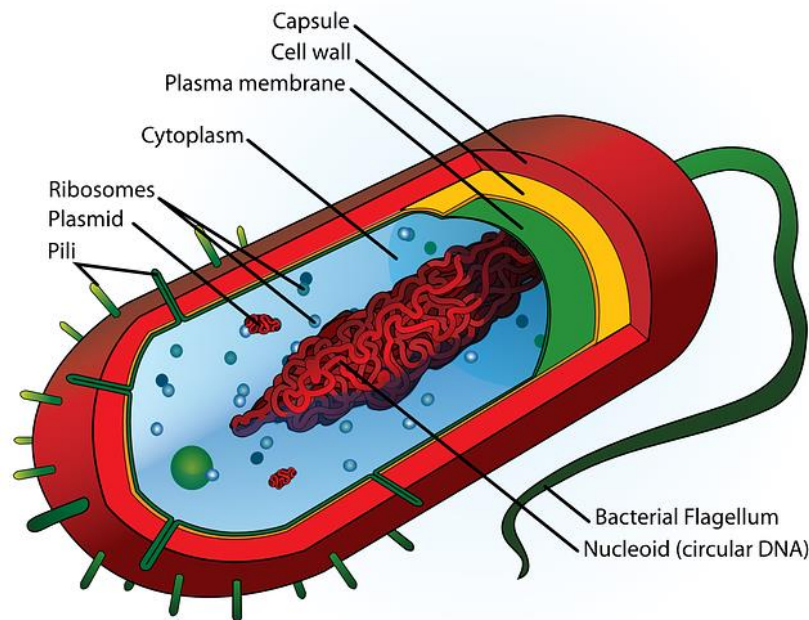
### Introduction

All living things are composed of cells and while the structure is different depending on the category, all cells have common features. Some examples of common features are the **plasma membrane** and the **cytoplasm**. Cells are classified into two categories depending on what organelles they contain: they are either **eukaryotic** or **prokaryotic**.

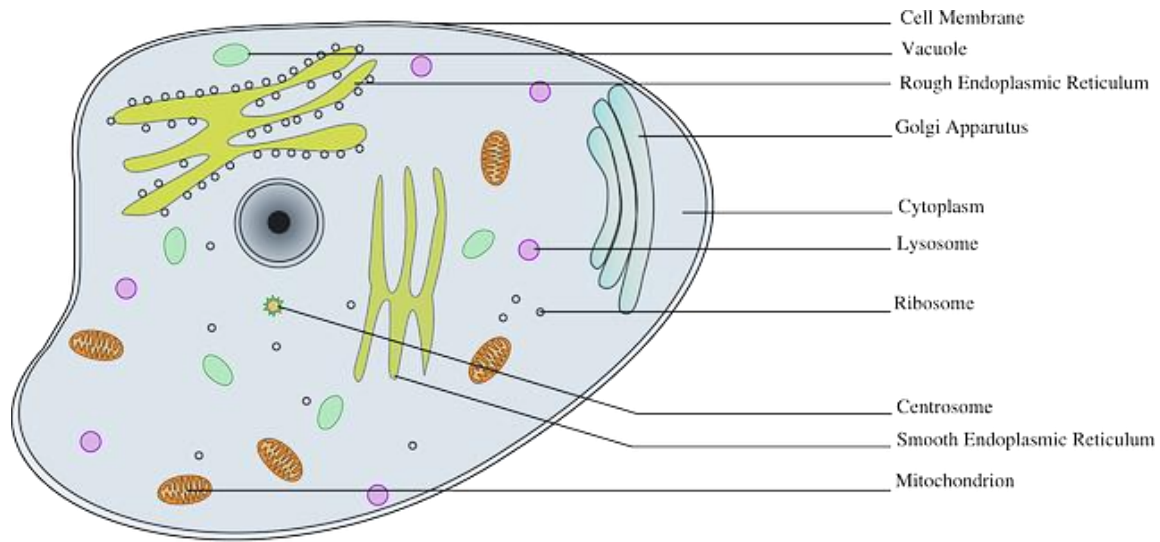
Organisms that are in the domain of **Eukarya** are the Protista, Animalia, Plantae and Fungi kingdoms. They are multicellular, have a nucleus, contain DNA and have several organelles that have specific functions. The main difference in eukaryotic cells lies in the difference between plant and animal cells. Plant cells are larger, contain chloroplast, vacuoles and a cell wall. Animal cells do not have these.

Organisms that are in the kingdoms of **Archaea** and **Bacteria** are prokaryotic cells. The Archaea are single-celled microorganisms with no nucleus. There is a cell wall present, they reproduce asexually and live in extreme environments like oceans and humans. The Bacteria are also single-celled microorganisms, have no nucleus, exist in a variety of shapes, have a cell wall, reproduce asexually but form spores that remain dormant for years, and are found everywhere: ranging from radioactive waste to inside Animalia.

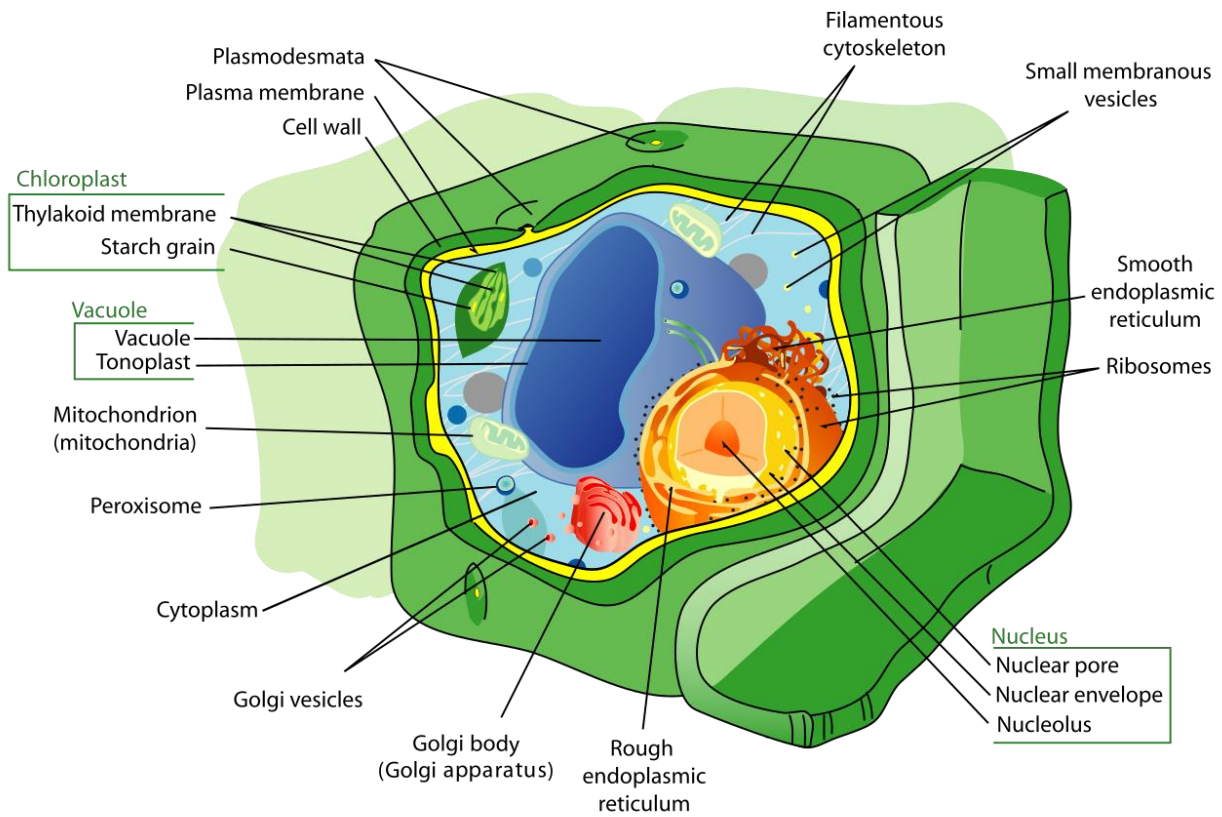
In order to view these cells, a microscope is used to see the cross sections that have been prepared.



**Fig.1. Prokaryotic Cell**



**Fig. 2 Animal Cell**



**Fig. 3 Plant Cell**

From Wikimedia Commons

<https://bit.ly/2ErQp16>

## Purpose

The purpose of this experiment is for students to learn how to prepare wet mounts as well as to observe different types of cells and their unique structures.

## Materials

- Tweezers
- Sterile cotton swab
- Microscope
- Paper towel
- Onion
- Potato
- Layer of a potato
- Scalpel
- Prepared bacteria slide
- 3x Microscope cover slip
- 3x Microscope slide
- 3x Dropper
- Iodine Solution
- Methylene blue stain, 0.5%
- Distilled Water
- 1x 50mL beaker

### **Notes on Materials**

For the onion and potato cells, either each person can have their own or there could be one at the front of the class the students take from.

The prokaryotic slide that is used can be left up to the discretion of the teacher, students can even be given different types and compare with their classmates. Bacteria cell slides can be purchased in groups, or as individual slides.

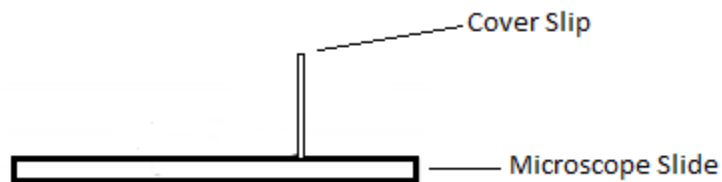
Students can each be given individual bottles of iodine and methylene blue solution from a stock solution or students can share bottles between each other.

## Procedure

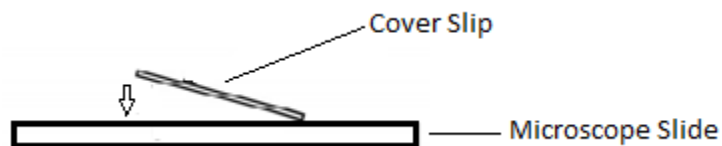
### **Part 1: Onion Cell**

1. Fill 50mL beaker with distilled water.
2. Using dropper, add 1 drop of distilled water to center of microscope slide.

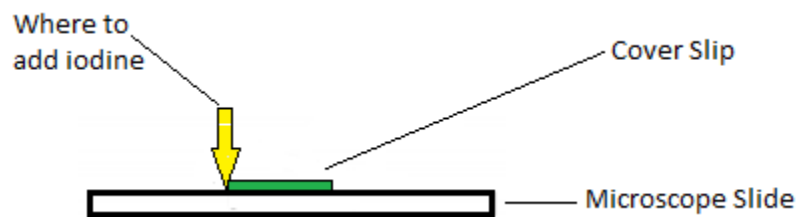
3. Pull off a small, thin layer of the onion using the tweezers.
4. Place specimen directly in the middle of the water drop. Make sure it lays flat.
5. Using tweezers, line up the cover slip to a 90-degree angle on the slide. Only touch the edges of the cover slide with fingers to avoid fingerprints.



6. Gently lower cover slip over the onion layer. Avoid air bubbles.



7. Using dropper, add 1 drop of iodine solution on the edge of the cover slip.



8. Allow stain to be absorbed for at least 30 seconds.
9. Use paper towel to remove excess fluid from the microscope slide.
10. Place slide on microscope stage under low focus.
11. Adjust focus for maximum clarity.
12. Record observations.

## **Part 2: Potato Cell**

1. Cut a wedge of potato out with a scalpel. Make sure it is thin enough that light can be seen through it.
2. Using dropper, add 1 drop of distilled water to center of microscope slide.
3. Using tweezers, place specimen directly into the middle of the water drop. Make sure it lays flat.
4. Place cover slip on microscope slide as in part 1.
5. Stain specimen as in part 1.
6. Allow stain to be absorbed for 30 seconds.
7. Place slide on microscope stage under low focus.
8. Adjust focus for maximum clarity.
9. Record Observations.

## **Part 3: Human Cheek Cell**

1. Gently rub the inside of your cheek with a sterile cotton swab.
2. Smear the wet swab on the center of the microscope slide.
3. Using dropper, add 1 drop of methylene blue stain to the smear.
4. Place cover slip on microscope slide as in part 1.
5. Place slide on microscope stage under low focus.
6. Adjust focus for maximum clarity.
7. Record Observations.

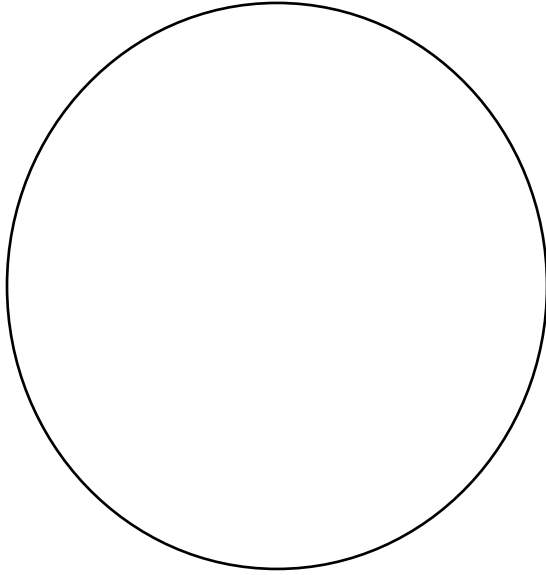
## **Part 4: Prepared Prokaryotic cell**

1. Place slide on microscope
2. Adjust focus for maximum clarity.
3. Record observations.

## Data

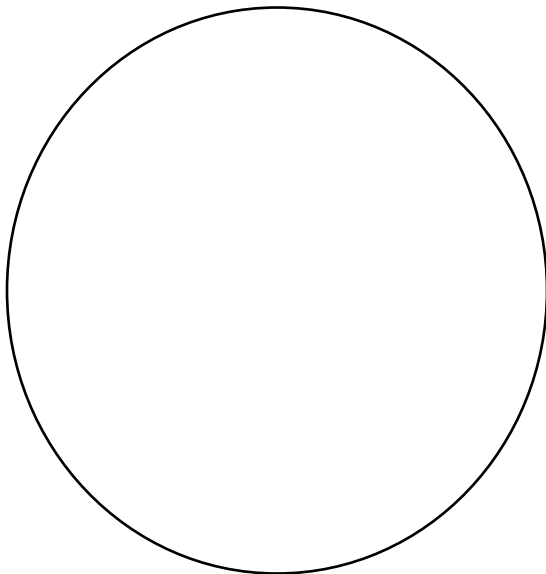
### **Part 1: Onion Cell**

Draw onion cell and label: cell wall, cytoplasm and chloroplast.



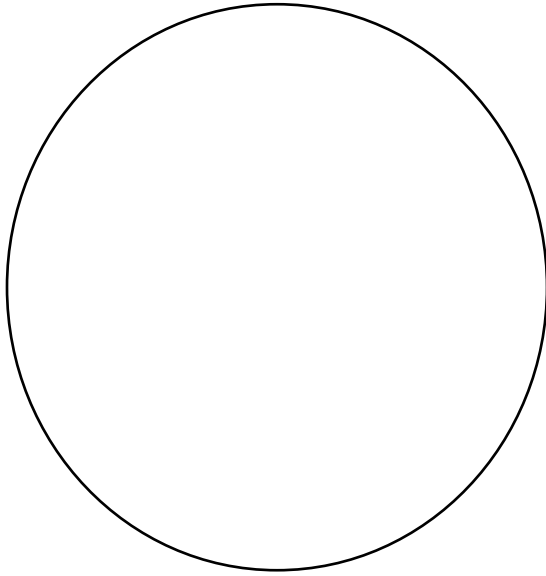
### **Part 2: Potato Cell**

Draw potato cell and label: cell wall, cytoplasm and amyloplast.



**Part 3: Human Cheek Cell**

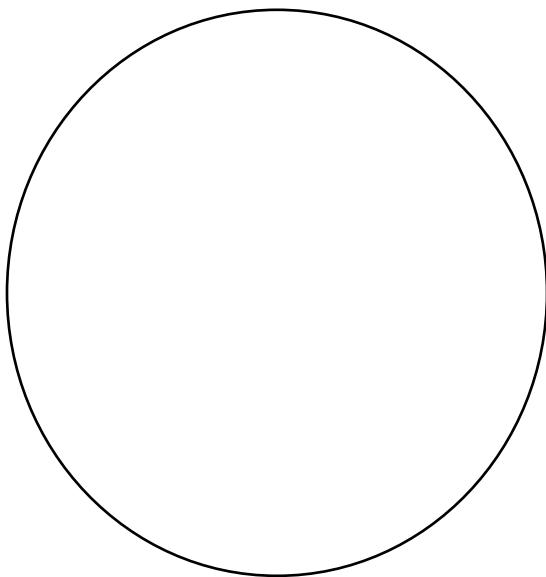
Draw cheek cell and label: plasma membrane, cytoplasm and nucleus.



**Part 4: Prokaryotic cell**

Name of your specimen: \_\_\_\_\_

Draw cell



## Results

1. What is the purpose of using iodine and methylene blue stain?

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2. When comparing eukaryotic and prokaryotic cells, how does the size of the cells compare between them?

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3. If you were given an unknown slide, how would you determine if you were looking at a plant or animal cell?

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4. When comparing two plant cells, what are the major differences between the onion and potato cells that you observed?

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