Cell Lab
**DO NOT WRITE ON THIS - CLASS SET!
USE A SEPARATE PIECE OF PAPER

PURPOSE: TO OBSERVE, STUDY, DRAW, AND LEARN ABOUT CELLS.

MATERIALS:

MICROSCOPE	CORK	SLIDE	COVER SLIP
TOOTHPICK	IODINE STAIN	DROPPER	LENS PAPER
RAZOR BLADE	ONION	FORCEPS	METHYLENE BLUE
RED BELL PEPPER	*ELODEA*	FROG BLOOD	POTATO
BACTERIUM			

PROCEDURE:

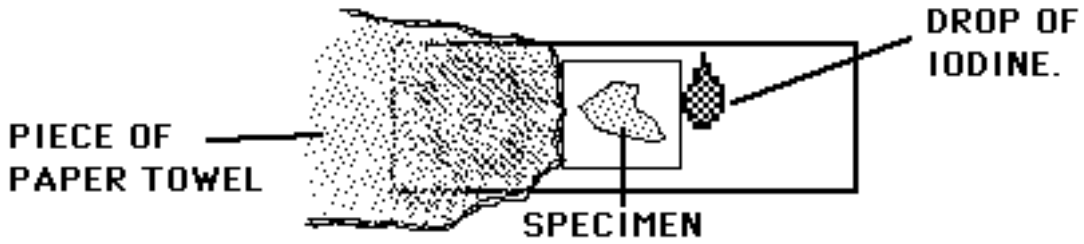
*** Prepare an ANALYSIS section for your detailed cell drawings.**

A. CORK CELLS: (one drawing)

1. With the single edged razor blade shave a very thin slice from a piece of cork. The thinner, the better. Remember light must pass through your slice in order for you to see it under the microscope.
CAUTION: Cutting edges can cause serious injuries. Always cut away from yourself and others. Immediately return the razor blade when you are done with it.
2. Prepare a wet mount slide of the cork slice. On a clean slide, place a drop of water and your cork specimen. Lay the coverslip on at a 45 degree angle to avoid trapping air bubbles.
3. View under low power. Look closely. **Draw your specimen** in the Report section. **Answer questions 1 thru 3.**

B. ONION CELLS: (two drawings)

1. Hold the layer sideways with its concave (inward curve) side toward you. With your thumbs and fingers, hold the piece of onion near its center. Bend the piece of onion sharply toward you so the shiny back surface snaps. This will leave a thin membrane on the inner surface that can be peeled off easily with forceps.
2. Prepare a wet mount slide using a small piece of the membrane. Make sure the membrane is **flat and is not folded**. Spread out with forceps if necessary.
3. **Examine** your onion tissue under low power.
5. **Draw your unstained specimen** in the Report section. **Answer** questions **4 and 5** on onion cells.
6. Remove the slide from the microscope stage.
7. **Add iodine stain** to the cells using the following technique:
a. Place one drop of iodine at the edge of the cover slip.
b. Hold a small piece of paper towel on the edge of the other side of the cover slip. The stain will be pulled under the coverslip and onto the specimen.



8. **Examine** the stained onion cells under low and high power. **Draw the stained onion cells** and **answer questions 6 and 7**.

C. *ELODEA* CELLS: (one drawing)

Elodea is a common pondweed often used to study photosynthesis and plant cell structure.
1.Remove a young leaf from the tip of a sprig of ELODEA.
2. Prepare a wet mount slide with a cover slip.
3. Observe the elodea cells on low and high power.
4. Chloroplasts are suspended in **cytoplasm**, which is the matrix of the cell.
NOTE that the chloroplasts and other contents of the cell may be moving. This is called **cytoplasmic streaming**.
5. **Draw** the *Elodea* cells in the Report section and **answer questions 8 thru10**.

D. CHEEK CELLS: (two drawings)

1. The cells that line the inside of your cheek are called epithelial cells. They are constantly being soughed off like the cells of the outer skin. As a result, some of these cells can easily and painlessly be removed.
2. Put a drop of water on a clean slide.
3. To collect some epithelial cheek cells gently scrape the inside of one of your cheeks with the flat end of a toothpick using an up and down motion.
4. Remove the cell from the end of the toothpick by swirling the end in the drop of water on the slide. Do not spread the water drop around the slide. Swirl ten or fifteen times.
5. Add a coverslip and view under low & high power. The cells tend to clump together so try to locate one by itself for clear viewing. Note their shape. **Draw the unstained cheek cells under high power** in the analysis section.
6. Remove the slide from the stage for staining. Place a drop of **methylene blue stain** at one edge of the coverslip. Draw the stain under the coverslip with piece of paper towel at the opposite edge as done above.
7. View under low power. Find one cell and center it in your field of view. Now switch to high power.
8. **Draw the cheek cell under high power** in the analysis section.
Answer questions 11 and 12.

*** Plastids** are cellular organelles of certain eukaryotes where food is made and stored. Chloroplasts are a type of plastid. However, other plastids have different functions such as pigment storage. For **sections E and F** you will examine two other types of plastids - **amyloplasts** and **chromoplasts.**

E. POTATO CELL: (one drawing)

1. Use a razor blade to prepare a section of potato as thin as possible.
2. Place the potato on a slide.
3. Stain the potato with **iodine stain** for a few seconds.
4. Add a drop of water and a cover slip.
5. Examine under low and high power.
6. **Draw the potato cell** in the analysis section.
5. **Answer questions 13 and 14.**

F. RED BELL PEPPER CELLS: (one drawing)

1. Use a razor blade to prepare a thin section of bell pepper.
2. Remove the outer skin layer and place the section on a wet mount slide with a cover slip.
3. Examine under low and high power. How is it different than the elodea?
4. **Draw the bell pepper cell under high power** in the analysis section.
5. **Answer questions 15 and 16.**

G. PREPARED FROG BLOOD CELLS: (one drawing)

1. Examine the prepared blood cells under low and high power.
2. **Draw the blood cells under high power** in the analysis section.
3. **Answer question 17.**

H. PREPARED BACTERIA CELLS: (one drawing)

1. Examine the prepared bacteria cells under high power.
2. **Draw the bacteria cells under high power** in the analysis section.
3. **Answer questions 18 thru 20.**

REPORT: - Drawings should include the following information:

A. The magnification used while drawing the cell (e.g., 400X)

B. Appropriately **labeled** cell structures from the following list:

cell membrane	cell wall	chloroplast	nucleus
cytoplasm	chromoplast	amyloplast	vacuole

QUESTIONS: (Complete sentences for Full Credit!)

A. Cork cells:

1. What difference did you notice about the cells near the edge of your slice compared to the cells near the center of your slice? Explain!
2. What cell structures do you see when looking at cork cells?
3. Why do the cork cells appear to be empty?

B. Onion cells:

4. What microscopic evidence shows that the onion cell is a plant cell?
5. What structures can be seen in an unstained onion cell.
6. How do the stained onion cells appear differently than the unstained onion cells?
7. Do the onion cells have chloroplasts? Why or why not?

C. *Elodea* cells:

8. How are *Elodea* cells the same and/or different than the onion cells?
9. What is the function of a cell wall?
10. With regard to cytoplasmic streaming, what might be the function of this phenomenon?

D. Cheek cells:

11. How are cheek cells different from the plant cells you have studied?
12. What is the purpose for staining cells?

E. Potato cells:

13. What structure can be seen with the aid of the iodine stain?
14. Why are potatoes a good source of carbohydrates?

F. Red Bell Pepper cells:

15. What structure is visible in the bell pepper cell and not in any other cell in this investigation?
16. What is a similarity in the functions of the chloroplast and chromoplast?

G. Frog Blood cells:

17. What structures were present in the frog blood cells that were present in your cheek cells?

H. Bacteria cells:

18. Were any internal cell structures present? Why or why not?
19. Compare the size and shape (appearance) of a bacterium cell to any one of the other cells observed.
20. Are bacteria single cell or multicellular organisms? What evidence did you observe to support your answer? **Hint:** compare them to other organisms observed in this investigation!

* Complete the following chart below based on "what you know" using **"yes" or "no" and "E" or "P"**

	Cell wall	Cell membrane	Has Chloroplast, or Chromoplast, or Amyloplast (Please state which one if **yes**)	Nucleus	Eukaryotic or Prokaryotic
Onion					
Cheek					
Elodea					
Cork					
Frog blood					
Bell pepper					
Potato					
Bacteria					