

Lab: Microscopic Observation of Plant Cells

Introduction: As we recently discussed in class, ***all living things are made of cells***. All cells have parts that do certain jobs. Cells have an outer covering called the cell (plasma) membrane. The cell membrane controls what enters / exits a cell. The clear jelly-like material inside the cell is the cytoplasm. The nucleus is the control center of the cell. Plant cells have a thick outer covering called the cell wall. It surrounds the cell membrane and encases the entire cell in a rigid container.

Cell parts can be studied by making wet mount slides. In your previous microscope lab you learned how to prepare a basic wet mount slide (using the "e" you printed on a tiny piece of paper). Recall that a wet mount slide is a temporary slide that is not made to last a long time. You can make wet mount slides of living and once living materials to study cell parts.

Materials: glass slides, dropper of water, onion skin, methylene blue stain, fresh blade of brome grass, scissors, cover slips, forceps, lens immersion oil

Specimen #1: Prepare a wet mount of onion cells.

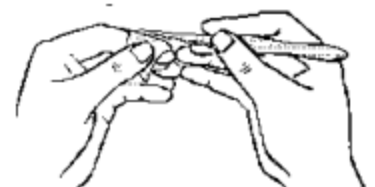
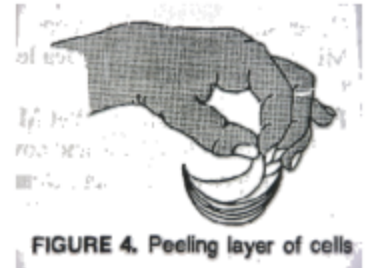
A. Obtain a clean slide; if the microscope slide needs to be cleaned, rinse with water and wipe or pat dry. Place a small drop of methylene blue stain in the middle of a clean microscope slide.

B. Peel a layer of onion skin as seen in the picture to the right, then using your forceps, peel a single thin layer as seen in the second picture to the right and place it in the drop of methylene blue stain. Be sure the onion skin is flat.

C. Place a coverslip on top of the onion skin. This prevents the microscope lens from being damaged.

D. Examine the onion with the scanning objective lens, then low power, and then the two highest powers using your microscope. **NOTE: to get the best results with the 100x objective, you should place a drop of immersion oil on top of your cover slip before switching to this lens--let your teacher know when you are ready for the drop of oil.** Using regular and colored pencils, draw your observations using the 40x and then the 100x objective lenses.

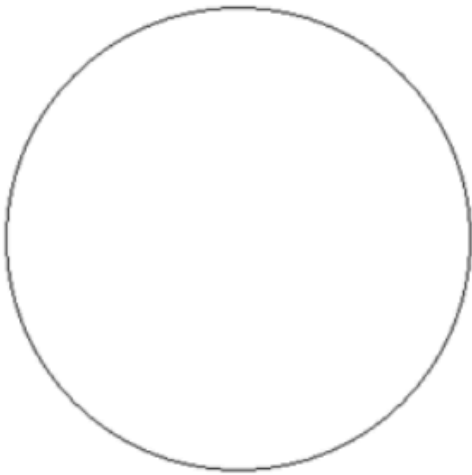
E. Using colored pencils, draw and label the **cell wall, nucleus, and the cytoplasm** in your onion drawing. If you're lucky, you'll even be able to spot the **nucleolus**!



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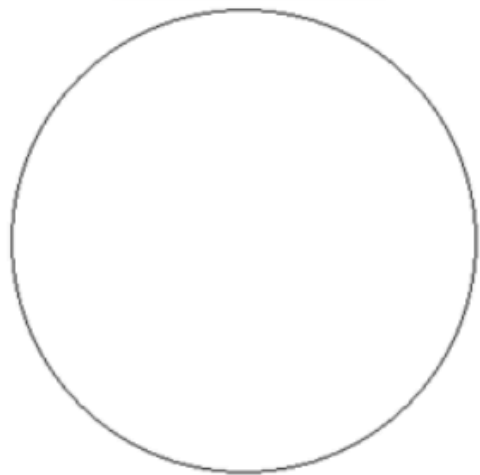
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1) Onion cells (and skin cells) are flat and seem to overlap. Explain why this arrangement is beneficial.

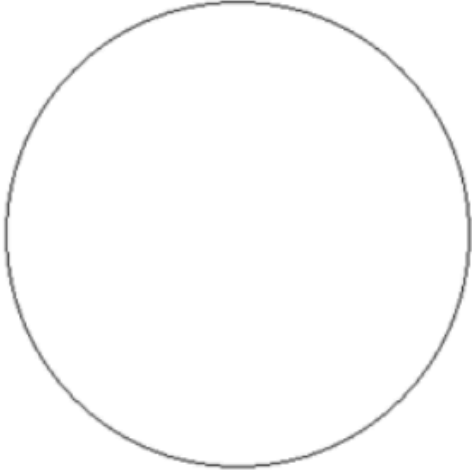
Specimen #2: Prepare a wet mount of brome grass cells.

- A. Place a drop of water in the middle of a clean microscope slide. If the microscope slide needs to be cleaned, rinse it with water and wipe dry.
- B. Tear a one-centimeter piece from the blade (leaf) of brome grass and place the piece into the drop of water. Make sure the piece of leaf is flat on the slide.
- C. Use the corner of your square coverslip to very gently scrape away the top layers of the leaf in one spot near the edge (margin) of the leaf.
- D. Add a cover slip over your leaf piece; this prevents the microscope lens from being damaged.
- E. Examine the grass cells with the scanning objective lens, then low power, and then the two highest powers using your microscope. **NOTE: to get the best results with the 100x objective, you should place a drop of immersion oil on top of your cover slip before switching to this lens--let your teacher know when you are ready for the drop of oil.** Using regular and colored pencils, draw your observations using the 40x and then the 100x objective lenses. Take your time. If you make careful adjustments to the condenser, the diaphragm, and the stage height, and you are patient and observant, you should see the green chloroplasts suspended in the cytoplasm interior of the cell.
- F. Using colored pencils, draw and **label the cell wall, chloroplast, and the cytoplasm** in your grass cell drawing.

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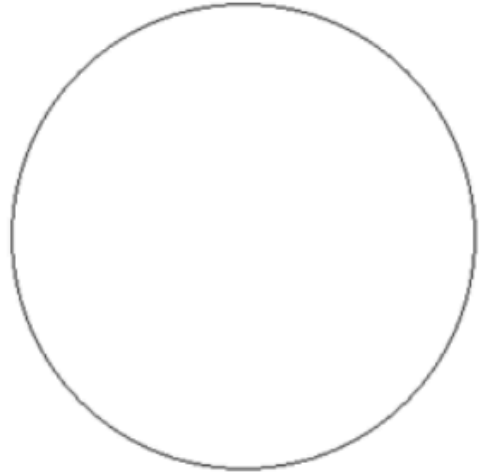
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2) Which major biochemical processes occur in the chloroplast and how do the products of these processes benefit the plant cells in which these organelles are found?

3) Explain how chloroplasts support the ecological role of brome grass in an ecosystem.

4) Review your drawing of grass cells and onion cells. Both samples are plants but only the grass has chloroplasts. Explain why onion bulb cells normally do not have any chloroplasts but the brome grass blades do.

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5) Review your drawing of the grass/plant cell. How does it compare to a typical animal cell? Discuss major differences between an animal cell and a plant cell.

General Analysis Questions

9) Which magnification (scanning objective lens, low power, or high power) allows you to see less detail, but more of the overall specimen? Why is this so?

10) When first viewing an object under the microscope, explain why you should always find it using the lowest power available. Be sure to say more than just "because it's easier". Explain **why** it is easier.

11) What happens to the apparent brightness of the light you see through the ocular lenses as you increase magnification by switching to progressively higher power objective lenses? Explain why this change happens.

12) The shape of a cell helps the cell better perform its function. Give and explain an example of this statement.

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