

Investigation

Cells - The Basic Unit of Life

Overview:

What do a tree, a fly, and you have in common? All are alive, and all are made of cells. One can determine the former by observing with the naked eye. The latter statement requires the use of a microscope to observe these tiny miracles. In this investigation, you observe three different cells: a leaf cell, an onion cell, and a human cheek cell. After recording your observations, you make inferences based upon your findings.

Objectives:

In this activity you will ...

- prepare stained and unstained slides for viewing under a microscope.
- view specimens under different magnifications.
- determine the magnification power of a microscope.
- compare the cells you observe.
- make generalizations based upon your observations.

Procedure:

Part A: Cheek Cell

1. Place 1 drop of iodine on the center of a clean glass slide.
2. With the end of a clean toothpick, *gently* scrape the inside lining of your mouth (cheek).
3. Stir the iodine drop with the end of the toothpick used to scrape your cheek. (Nothing will be visible in the iodine at this point.)
4. Place a coverslip over the iodine drop as shown by the instructor. Try to avoid air bubbles under the coverslip.
5. Place the slide on the stage and focus under low power. You should see several cheek cells. What is the magnification of your microscope under low power? (Multiply the eyepiece magnification by the objective magnification.)
6. Move the slide so that one or two isolated cheek cells are in the center of your field of view.
7. Rotate the nosepiece so that you are at the next magnification. What is your magnification?
8. Observe the cells. Center the cells if necessary.
9. If your microscope has a third objective lens, rotate the nosepiece to high power. If not, stay at the current magnification and skip the next step. What is your current magnification?
10. Observe the cells. Center the cells if necessary.
11. With the microscope set at the second or third highest power (whichever gives you the best view of your cheek cells), draw the entire field of view on your lab sheet. Try to draw your cells to scale compared to the circle provided. The circle represents the entire field of view.
12. Label any structures you can identify (nucleus, cytoplasm, plasma membrane, etc.) Be sure to include the magnification below your drawing.

Part A: Elodea Leaf

13. Place a drop of water on a clean glass slide.
14. Remove a leaf from an elodea plant. Place the leaf in the drop of water, and place a coverslip on the leaf. Use good technique.
15. Observe the leaf under low, medium (if present), and high powers. You should be able to focus on the different layers of leaf cells as you adjust the coarse and fine focus knobs.
16. Move the slide so that you have a clear view of the leaf cells and their structures.
17. With the specimen under medium or high power, draw the entire field of view on your lab sheet. Draw the cells to scale.
18. Label any structures you can identify (nucleus, cytoplasm, vacuole, chloroplast, plasma membrane, cell wall, etc.) Be sure to include the magnification of your drawing.

Part C: Onion Skin

19. Place a drop of water on a clean glass slide.
20. Pull a thin layer of onion from the onion wedge provided, and place it in the drop of water. Place a coverslip on the onion skin.
21. Observe the onion under low, medium (if present), and high powers. You should see many cells.
22. Move the slide so that you have a clear view of the onion cells and their structures.
23. With the specimen under medium or high power, draw the entire field of view on your lab sheet. Draw the cells to scale.
24. Label any structures you can identify. Be sure to include the magnification of your drawing.

Microscope Care and Use

1. Always carry the microscope by holding the arm of the microscope with one hand and supporting the base with the other hand.
2. Place the microscope on a flat surface. The arm should be positioned toward you.
3. Look through the eyepieces. Adjust the diaphragm so that light comes through the opening in the stage.
4. Place a slide on the stage so that the specimen is in the field of view. Hold it firmly in place by using the stage clips.
5. Always focus first with the coarse adjustment and the low-power objective lens. Once the object is in focus on low power, the high-power objective can be used. Use **ONLY** the fine adjustment to focus the high-power lens.
6. Store the microscope covered.

