ONION RINGS
Follow up lesson to “Enormous E”
From Magnificent Microworld Adventures, AIMS Education Foundation

ACADEMIC STANDARDS:
  3.7.4.A: Explore the use of basic tools, simple materials and techniques to safely solve problems.
  3.7.4.B: Select the appropriate instruments to study materials.

ASSESSMENT ANCHORS:
  S4.A.2.2: Identify appropriate tools or instruments for specific tasks and describe the information they can provide.

OBJECTIVES

The students will be able to make a wet mount slide of onion cells and observe the cell’s, nucleus, cytoplasm, cell wall, and cell membranes.

BACKGROUND

Although cells vary in size and shape, most have a similar cellular organization. The nucleus is the most prominent feature of a plant cell. The nucleus is the control center of the cell and regulates all the processes that occur within the cell. Some of the important structures of the plant cell are the cell wall which provides support and protection, the cell membrane which allows dissolved materials to enter and leave the cell, and cytoplasm, the fluid that fills each cell in which other important cell parts can be found.

What you will be able to see in either a wet mount or a stained, wet mount onion skin slide will depend upon the magnifying power of the microscope and the quality of the wet mount slides. The basic cell shape will be visible in good wet mount slides viewed at even 20X.

MATERIALS

Whole white onion **soak in water overnight
Microscopes (2-3 students per scope)
Microscope slides
Water bottle
Cover slips
Eyedropper/pipette
Methylene blue (1% solution)
Tweezers
Kim-wipe
Worksheet
Lesson time
This activity should take two 45-minute periods to complete. To reduce time, prepare the slides ahead of time, staining the onion cells.

Lesson preparation
1. The NIGHT BEFORE, cut the onion in half and soak in half-filled cups of water overnight. This makes it easy to separate the onion’s membrane.
2. Have the materials ready: tweezers, eyedroppers, water and methylene blue stain.
3. When students are ready to stain the onion slide, have them do this at special stations located around the room. Put dropper bottles of stain in tip proof boxes and set these boxes on newspaper. Or you may choose to have the onion slides already stained and prepared ahead of time.

PROCEDURE

Review use of microscope and its parts (see lesson ‘Enormous E’)

Preparing the wet mount slide of onion skin
1. Have students clean the slide and cover slip with Kim-wipe.
2. Direct them to break an onion slide in two.
3. Tell them to carefully pull the slice apart.
4. Have them use tweezers to pull off a very thin piece of onion skin (the thinner, the better)
5. Direct the students to place the skin in the center of their slide. Urge them to try to keep it from folding and to flatten it as much as possible.
6. Have them add a drop of water to the onion skin and cover with a cover slip.
7. Tell them to press the cover slip down carefully to remove any air bubes.
8. Have students place the slide on the stage of the microscope, set it to low power, adjust the focus so the onion slice is clear, and draw four or five cells as they see them. Have them label the cell walls.
9. Direct them to switch to higher power and try to identify the cell membrane, nucleus, and cytoplasm.

Staining the onion cells
1. Have students lift up the cover slip and add one or two drops of methylene blue to the slide.
2. Direct them to lower the cover slip and examine the cells on higher power.
3. Methylene blue stains different parts of the cells so that they can see structures they could not see before. Have students draw lines on worksheet from the labels (cell wall, cell membrane, cytoplasm, and nucleus) to the appropriate structures in their drawing.

NOTE: If students are having a difficult time seeing the cell clearly, they could have too many layers of the onion on their slide. The cells are transparent, so it could be possible to see several layers of cells at once under the microscope. Try to make a new slide or
remove an onion layer or two. The thinner the onion skin on the slide, the more clearly it will be to see the cells.

DISCUSSION

1. What is the general shape of the onion cells? (rectangular)
2. Describe what you saw without the stain.
3. Why do you think there are many cells close together? (strength and protection)
4. Is the onion skin composed of one cell or many cells? (many)
5. Why is it easier to see the onion cells after they are stained blue? (helps to create a contrast between light and dark surfaces)
6. All plant cells have cell walls. What is the function of the cell wall? (to provide strength and protection)
7. What is the nucleus? (control center of the cell)
8. Count the number of cells that are seen in the field of view under low power magnification and also under higher magnification. Compare the number of cells observed in each field of view.

EXTENSIONS

1. Have students make wet mount slides using red and green onions. Compare the cell shapes.
2. Prepare wet mount slides of other plant cells (carrots or geraniums)
Onion Rings

Preparing A Wet Mount Slide of Onion Cells

1. Pull the onion slice apart.

2. Pull off a thin piece of onion skin.

3. Place the onion skin piece on the center of the slide. Add a drop of water and then the cover slip.

Staining A Wet Mount Slide of Onion Cells

1. Lift the cover slip. Add one or two drops of methylene blue.

2. Add the cover slip.

My Drawing of an Onion Skin Cell

My Drawing of a Stained Onion Skin Cell

High Power=_______ x