
Staying Alive

Overview

This lesson and related activities are designed to give students hands-on experience in determining that all organisms are composed of cells that carry on functions to sustain life.

Grade: 6

TEKS

Scientific Processes

6.1 A

6.2 A, B, C, D

6.3 C

6.4 A

Science Concepts

6.10 A, B, C

Vocabulary

Structure

Function

Cell

Cellular processes

Stomates

Nucleus

Cell membrane

Chloroplast

Mitochondrion

Vacuole

Guard cells

Cell wall

Materials

Ziploc bags

Downloadable Sheets

*Cell Job Cards

*Picture of cell with labeled parts

*Action Scenarios

*Stomates Lab Activity Recording Sheet

*Transparency of Stomates

Pre-Eastman Classroom Activities

Before Class Begins:

1. Note that this lesson assumes students have observed cheek and onion cells. They know all living things are comprised of cells. This lesson focuses on the functions carried out by the cell to sustain life.
2. Create a K-W-L chart.
3. Make a transparency of cell with the labeled parts.
4. Make a set of Cell Job Cards and Action Scenario cards.

Lesson:

1. To begin lesson, use a K-W-L chart in response to the guiding question: How do we stay alive?" Fill out the "K" and "W" sections.
2. Introduce the idea of cell structures and functions by comparing a cell to the school.
 - a. Nucleus = office
 - b. Cell membrane = doors
 - c. Cell wall = brick wall (plants only)
 - d. Chloroplast = kitchen (plants only)
 - e. Mitochondrion = breaker box/electrical outlets
 - f. Vacuole = storage closets
3. Have students draw and label cell structures on a diagram similar to the downloadable sheet. Explain that there are many more parts of a cell, but we are concentrating on these six today.
4. Student volunteers will role-play the structures and functions of a cell using the Cell Job Cards.
5. After students observe the functioning cell model, the teacher should present Action Scenarios which the cell must perform to keep the organism alive.
6. Return to the K-W-L chart and complete the "L" section. Guide students to the concept that all organisms stay alive through the proper functioning of individual cells in the body.

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In The Field

1. Prior to leaving the school, make sure you have:
 - Ziploc bags
 - First Aid Kit
 - Water and snacks if needed
2. Set behavior expectations and go over safety issues with students, including the proper treatment of plants in the forest. Remind students not to touch anything without permission.
3. Explain that all plants are comprised of cells and those cells are grouped to do very specialized and specific jobs. Groups of similar cells form tissues and groups of similar tissues form organs. Plants have three main organs: roots, stems, and leaves.
4. Students will get into groups and find one root, one stem, and one green leaf. After returning, examine the roots and make observation such as color. Roots are not green because they do not contain chlorophyll, the green substance in plants needed to make food. Root hairs allow the plant to absorb more water.
5. Observe the stems. They are rigid to hold the plant up. Stems also serve as a highway through which materials are transported to all cells of the plant.
6. Observe the leaf. Note that they are green because they contain chlorophyll, the green substance in plants needed to make food.
7. Students will be reminded of Action Scenario #2 from the previous classroom activity. Prompt students to remember that carbon dioxide must come from outside the plant and that excess water must be released.
8. On the underneath side of a leaf are guard cells which form openings called stomates. To model the structure and function of guard cells, line students up shoulder to shoulder in a circle, facing the inside. Explain that each student represents a cell of the leaf. Have 3-4 students inside the circle who will represent cells containing chlorophyll. These cells need the carbon dioxide from outside the leaf. In order for the carbon dioxide to come in, the leaf needs openings.
9. The teacher will represent carbon dioxide. Guide students to determine that if two students move apart they will provide an opening for the carbon dioxide to get to the cells inside the circle. The opening is called a stomate and the two students represent guard cells.
10. Reinforce the ideas of structure and function of the organs in the plant.
11. Before leaving, tell students that we will be able to observe stomates with a microscope. They should gather a variety of leaves to observe upon returning to the classroom.

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Post-Eastman Classroom Activities

Stomates Lab Activity

Before Class Begins:

1. Copy the Lab Recording Sheet for each student.
2. Set up microscopes for student use.
3. Make a transparency of Stomates sheet.

Lesson:

1. Go over Lab Safety Procedures related to this activity.
2. Show students what they are looking for by looking at stomates transparency on the overhead.
3. Put clear nail polish on 1 square centimeter section on the underside of a leaf collected at the forest. Let it dry thoroughly, and then peel it off.
4. Place the square centimeter of nail polish under the microscope. Record what they observe under the microscope on the recording sheet.
5. Complete the recording sheet for the experiment.
6. Discuss students' inferences.

ANSWERS TO LAB RECORDING SHEET

1. If the stomates were not able to close, then the plant would lose too much water and wilt.
2. Light has a greater effect than moisture in determining whether the guard cells open or close. Gas exchange is crucial to photosynthesis, which can occur only in daylight. The plant undergoes photosynthesis even at the risk of wilting from water loss through the open stomates.