Lesson Plan

Examining Stomates – Teacher Guide

Time of Activity: 45 minute block

Objectives:
1. Students practice microscopy and diagramming techniques.
2. Students observe stomates and guard cells.
3. Students infer how the structure of stomates and guard cells is appropriate for their function.
4. Students learn digital imaging applications.

Science Skills:
Microscopy (stereo and compound)

Science Concepts:
Photosynthesis
Plant Leaf Anatomy

Materials:
Microscope: Stereo and compound
Zebrina plant
Other plants (optional)
Prepared slides of leaf cross sections (optional)

Procedure:

This is an especially easy, yet highly instructive lab. A *Zebrina* plant can be obtained from any garden store and is easily maintained all year long in the classroom. Give students single leaves to examine, making sure that they are looking at the underside of the leaf since that is where the stomates are. The best stomates are found on the older leaves, not the youngest ones.

Examining Stomates – Plants need both water and carbon dioxide for photosynthesis. The challenge for plants is to conserve water while permitting carbon dioxide to enter the leaf where photosynthesis will occur. Stomates are the adaptation that permits carbon dioxide to enter the leaf while allowing most of the leaf to be covered with a waxy cuticle that will conserve water.

Initial Experimentation – Take one leaf from a *Zebrina* (*Zebrina* pendula works well due to the purple pigment in the leaves) plant and place it on your stereo microscope's stage plate so the bottom side of the leaf is up. Examine the leaf under the lowest possible power. Notice the stomates which are visible in the green patches. These are easy to see since they stand out against the purple background of the leaf. Increase the magnifying power to the maximum available on the stereoscope.

Questions to consider:
1. Why do you look at the underside of the leaf in order to see stomates?

2. Why do you think the stomates are located on the underside of the leaf?

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