Activity: “Botany II-Microscopes”

Lesson Objectives: Students will be able to:
• Use microscopes to look at specimens
• Make cross-sections of specimens
• Identify plant parts seen under the microscope

Time Required: 1 class period

Materials Needed: Microscopes (at least 1 per pair)
Slides and glass cover slips (at least 2 sets per scope)
Water in a dropper bottle
Razors (1 per scope)
Specimen stains (if available)
Powerpoint presentation
LCD Projector
Clear nail polish

Standards Addressed: Domain I: 1. Doing Scientific Inquiry
4. Doing Safety
Domain II: 4. Unity and Diversity
9. Cells, Tissues, and Organs

Assessment: Students who:
• Make cross sections of their plants
• Label the plant parts they see
• Make observations of their cross-sections
Have a good understanding of plant anatomy
Students will also self-assess their understanding on their worksheets

Introduction: Begin the class with the powerpoint presentation of the ohia site on Mauna Loa. Explain to the students that the habitat of this site considered sub-apline. At approximately 6600ft in altitude, the temperatures can reach near freezing all year long, the soil does not receive much rainfall, the soil is very young compared to that on Kauai, and plants need to adapt to this harsh environment in order for them to live here. Make comparisons between the habitats (Kauai and Mauna Loa) and explain that one of the adaptations that ohia can make in harsh conditions is pubescence.

Show the students the cross section, explaining the internal plant parts. And, show them the external anatomy and discuss the use of stomata and the waxy cuticle. Explain a bit about the SEM.

Then, explain the basics of how to use a microscope.
If you trust students using the glass slides, cover slips, and razor blades, then allow them to make their own cross-sections. If not, set up cross sections of the leaves
for them, and have them take turns drawing their observations. Ask students to label the parts of the leaf that they see under the scope.

Once all students have had a chance to look at cross-sections, allow the students time to do “peels.” The students should put a thin layer of nail polish on the bottom of the leaf. Then, lift it using tweezers and mount the peel on a glass slide. If they just use the 4x and 100x objectives, no cover slip in needed. Have them look for imprints of stomata and veins on the nail polish peel.

At the end of the lesson, have students rate their understanding if the skills using the target.
Microscope Observations

Name: _______________________

Sample cross sectional view of a leaf

Plant part: _________________
Microscope Objective Power: __________
Sketch:

Plant part: _________________
Microscope Objective Power: __________
Sketch:
Use this target to rate your understanding of the following topics. Fill in the area that fits your own understanding best.

**Bullseye** = I can teach someone else this concept or skill  
**Middle** = I understand it, but not enough to teach it  
**Outer circle** = I do NOT understand this very well

- **Microscopes:**
  - Bullseye
  - Middle
  - Outer circle

- **Making Cross-Sections:**
  - Bullseye
  - Middle
  - Outer circle

- **Plant Anatomy:**
  - Bullseye
  - Middle
  - Outer circle