Ecoclimate Lab: Girls In Science, Transpiration & Stomata experiments

Rough notes

One instructor per group of 4 students
Split Burke group into two, one half does Exp A, the other Exp B&C, then switch half way through
Intro with asking the students questions about what plants need to grow, get them to think about what they already know about plants.

Transpiration

- Ask what will happen to the water
- Where will it go?
- Why do plants need water?
- They often think the plant stores the water
- Sometimes the broadleaf branch transpires more, sometimes not. Sometimes the second round after being under the lamps gets it going. Could also be cavitated.

Stomata & Temperature

- Why will clogging the stomata change temperature
- Try to get to evaporative cooling
- Sometimes they think the temperature will be cooler on the leaf with Vaseline because it is “protected”
- The IR camera makes this much more obvious than the IR thermometers, but also less easy for them to make the measurement themselves.

Stomata under a microscope

- Pores that exchange water and CO2
- Ask Marlies and Jennifer for more here
- Make sure the microscopes are all on the right magnification
- They may need help focusing the scope
- The nail polish can be distracting and stinky

Setup

Transpiration

This one takes the longest to set up (by far). We do all of this before the students arrive.
Fill burette-tube with water. Can siphon.
Cut end of branch at an angle while submerged, then insert into rubber tube.
Make sure to get rid of air bubbles that form at burette-tube junction. Can cover burette end and flip upside down while tapping tube to get bubble to rise
Use syringe to fill burette farther if necessary (insert tube past water line to avoid bubbles)

Stomata & Temperature

Branches need to be cut underwater and put into jar to avoid cavitation. Can do this ahead of time (then hold jar by table for Vaseline application) or after Vaseline is applied take the branch to the sink and cut underwater.

Try to pick branches that will get even light across the leaves

Stomata under a microscope

Paint a small square of clear nail polish

After dry, apply clear scotch tape over it, rub with finger, then peel up

Apply the tape to a glass microscope slide, label with plant type