

## 2025 Competition

### Lab #2 information and resources

#### Investigation of leaves stomata

Plants develop various adaptations as a result of natural selection in the environment in which they have evolved. When examining leaves, it is possible to explore their adaptations and identify three main groups of plants: **hydrophytes**, **mesophytes**, and **xerophytes**.

Hydrophytes have adapted to growth wholly or partly submerged in water or in wet habitats. Mesophytes are plants that are adapted to moderate water availability. Finally, xerophytes are adapted to arid environments where water is a scarce resource. You should complete additional research to learn about the main features of these groups of plants.

You should conduct your own study or read the reports of studies that explore the differences in adaptations between different groups of plants as described above. In particular, the anatomy of their leaves with emphasis on stomata features. Some examples of questions you can use to guide you are presented below:

#### Observational study questions:

- Does stomatal morphology, density, and distribution pattern (random, even, or clumped) vary between dicots adapted to different environments?
- Is there a statistically significant difference in stomata density between individuals of the same species of plants? - *make sure you also learn about statistical tests that can allow you to determine if differences are statistically significant or not.*

#### Literature research question:

What is the physiological and ecological rationale for observed differences in stomata morphology, density, and distribution?

#### Resources

A Rapid and Simple Method for Microscopy-Based Stomata Analyses:

<https://pmc.ncbi.nlm.nih.gov/articles/PMC5061359/>

How to view a stomata peel: <https://www.youtube.com/watch?v=iPgbzduHDjY>

Measuring field of view: <https://www.photomacrography.net/forum/viewtopic.php?t=8459>

Measuring Stomatal Density:

<https://www.saps.org.uk/teaching-resources/resources/299/measuring-stomatal-density/>

Stomata pattern and distribution study of leaves:

<https://byjus.com/biology/study-of-distribution-of-stomata-in-the-upper-and-lower-surfaces-of-leaves.>

Stomata Patterns of Dicotyledons and Monocotyledons: <https://www.jstor.org/stable/2423132?seq=1>

Stomatal Development in *Arabidopsis*

<https://bioone.org/journals/the-arabidopsis-book/volume-2013/issue-11/tab.0162/Stomatal-Development-in-Arabidopsis/10.1199/tab.0162.full>

Structure of stomata and stomatal density in monocot & dicot plants: kidney, dumbbell-shaped stomata

[https://www.youtube.com/watch?v=V\\_U25tbkMQU](https://www.youtube.com/watch?v=V_U25tbkMQU)

Using clear nail polish to make impressions of plant leaves

<https://www.microbehunter.com/using-clear-nail-polish-to-make-impressions-of-plant-leaves/>